

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W					
1	<b>Emissions</b>																										
2	<b>Summary of emissions from identified gas production</b>																										
3	Richard Heede										Copyright Climate Mitigation Services																
4	Climate Mitigation Services										24-Jun-13																
5			1870s										1880s										1890s				
6			1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894						
7	<b>Natural Gas Emissions</b>		<b>Notes</b>																								
8	Million tonnes CO2 per billion cubic feet:																										
9			0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053					
10	1	Abu Dhabi National Oil (ADNOC), UAE	Flaring not included (8 to 80%)																								
11	2	Anadarko, USA																									
12	3	Apache, USA	Apache gas-blow-out not included																								
13	4	Bahrain Petroleum Corporation																									
14	5	BG Group (British Gas), UK																									
15	6	BHP Billiton, Australia																									
16	7	British Petroleum, UK																									
17	8	Canadian Natural Resources, Canada																									
18	9	Chevron, USA (Texaco, Gulf, Unocal, etc)																									
19	10	CNOOC (China National Offshore Oil), PRChina																									
20	11	ConocoPhillips, USA																									
21	12	CONSOL Energy, USA																									
22	13	Devon Energy, USA																									
23	14	Ecopetrol, Colombia																									
24	15	Egyptian General Petroleum, Egypt																									
25	16	ErCana, Canada																									
26	17	ENI, Italy																									
27	18	ExxonMobil, USA																									
28	19	Former Soviet Union																									
29	20	Gazprom, Russian Federation																									
30	21	Hess, USA																									
31	22	Husky, Canada																									
32	23	Iraq National Oil Company, Iraq																									
33	24	Kuwait Petroleum Corp., Kuwait																									
34	25	Libya National Oil Corp., Libya																									
35	26	Lukoil, Russian Federation																									
36	27	Marathon, USA																									
37	28	Murphy Oil, USA																									
38	29	Nexen, Canada																									
39	30	National Iranian Oil Company (NIOC), Iran																									
40	31	Nigerian National Petroleum, Nigeria																									
41	32	Occidental, USA																									
42	33	Oil and Gas Corporation, India																									
43	34	OMV Group, Austria																									
44	35	Pertamina, Indonesia																									
45	36	PetroChina (CNPC), China																									
46	37	Petroleo Brasileiro (Petrobras), Brazil																									
47	38	Petroleos de Venezuela, Venezuela																									
48	39	Petroleos Mexicanos (PEMEX), Mexico																									
49	40	Petroleum Development Oman, Oman																									
50	41	Petronas, Malaysia																									
51	42	Polish Oil & Gas, Poland																									
52	43	Qatar Petroleum, Qatar																									
53	44	Repsol, Spain																									
54	45	Rosneft, Russian Federation																									
55	46	Royal Dutch Shell plc, The Netherlands																									
56	47	Saudi Aramco, Saudi Arabia																									
57	48	Sinopec, China																									
58	49	Sonangol, Angola																									
59	50	Sonatrach, Algeria																									
60	51	Statoil, Norway	CCS CO2 re-injection not included																								
61	52	Suncor / Petro-Canada, Canada																									
62	53	Syrian Petroleum, Syria																									
63	54	Talisman, Canada																									
64	55	Total, France																									
65	56	Yukos, Russian Federation																									
66	Emissions from identified gas prod'n (MtCO2/yr)																										
67	Emissions from identified gas prod'n (MtC/yr)																										
68	CDIAC emissions from annual gas prod'n (MtCO2/yr)																										
69	CDIAC emissions from annual gas prod'n (MtC/yr)																										
70	Percent of total CDIAC gas emissions identified		CDIAC 1885-2010		4		7		11		18		11		11		7		7		7						
71			1885: first year of CDIAC gas																								
72			1		2		3		5		3		3		2		2		2		2						
73			0.0%																								
74			0.0%																								
75			0.0%																								
76			0.0%																								
77			0.0%																								
78			0.0%																								
79			0.0%																								
80			0.0%																								
81			0.0%																								
82			0.0%																								
83			0.0%																								
84			0.0%																								
85			0.0%																								
86			0.0%																								
87			0.0%																								
88			0.0%																								
89			0.0%																								
90			0.0%																								
91			0.0%																								
92			0.0%																								
93			0.0%																								
94			0.0%																								
95			0.0%																								
96			0.0%																								
97			0.0%																								
98			0.0%																								
99			0.0%																								
100			0.0%																								
101			0.0%																								
102			0.0%																								
103			0.0%																								
104			0.0%																								
105			0.0%																								
106			0.0%																								
107			0.0%																								
108			0.0%																								
109			0.0%																								
110			0.0%																								
111			0.0%																								
112			0.0%																								
113			0.0%																								
114			0.0%																								
115			0.0%																								
116			0.0%																								
117			0.0%																								
118			0.0%																								
119			0.0%																								
120			0.0%																								
121			0.0%																								
122			0.0%																								
123			0.0%																								
124			0.0%																								
125			0.0%																								
126			0.0%																								
127			0.0%																								
128			0.0%																								
129			0.0%																								
130			0.0%																								
131			0.0%																								
132			0.0%																								
133			0.0%																								
134			0.0%																								
135			0.0%																								
136			0.0%																								
137			0.0%																								

	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU
1	<div style="background-color: yellow; padding: 5px; display: inline-block;">Summary of emissions from identified gas production</div>																							
2																								
3																								
4																								
5																								
6																								
7																								
8	1890s					1900s										1910s								
9	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918
10	0.053	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534
11																								
12																								
13																								
14																								
15																								
16																								
17																								
18																								
19																								
20																								
21																								
22																								
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
32																								
33																								
34																								
35																								
36																								
37																								
38																								
39																								
40																								
41																								
42																								
43																								
44																								
45																								
46																								
47																								
48																								
49																								
50																								
51																								
52																								
53																								
54																								
55																								
56																								
57																								
58																								
59																								
60																								
61																								
62																								
63																								
64																								
65																								
66																								
67																								
68																								
69																								
70																								
71																								
72																								
73																								
74																								
75																								
76																								
77																								
78																								
79																								
80																								
81																								
82																								
83																								
84																								
85																								
86																								
87																								
88																								
89																								
90																								
91																								
92																								
93																								
94																								
95																								
96																								
97																								
98																								
99																								
100																								
101																								
102																								
103																								
104																								
105																								
106																								
107																								
108																								
109																								
110																								
111																								
112																								
113																								
114																								
115																								
116																								
117																								
118																								
119																								
120																								
121																								
122																								
123																								
124																								
125																								
126																								
127																								
128																								
129																								
130																								
131																								
132																								
133																								
134																								
135																								
136																								
137																								

	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	
1																										
2	<b>Summary of emissions from identified gas production</b>																									
3																										
4	Richard Heede																									
5	Climate Mitigation Services																									
6	24-Jun-13																									
7																										
8	1920s											1930s									1940s					
9	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	
10	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	
11																										
12																										
13																										
14																										
15																										
16																										
17																										
18																										
19																										
20																										
21																										
22																										
23																										
24																										
25												1	1	1	1	1	2	2	2	2	3	3	3			
26																										
27																										
28																										
29												1	2	3	4	4	8	11	10	11						
30																										
31																										
32																										
33												5	6	6	7	7	8	9	10	11	12	13	14	14	15	16
34																										
35																										
36																										
37																										
38																										
39																										
40																										
41																										
42																										
43																										
44																										
45																										
46																										
47	3	3	3	3	4	5	5	5	6	6	8	8	7	6	6	7	8	9	12	8	11	12	13	14	16	
48																										
49																										
50																										
51																										
52																										
53																										
54																										
55																										
56																										
57																										
58																										
59																										
60																										
61																										
62																										
63																										
64																										
65																										
66																										
67																										
68																										
69																										
70																										
71																										
72																										
73																										
74																										
75																										
76																										
77																										
78																										
79																										
80																										
81																										
82																										
83																										
84																										
85																										
86																										
87																										
88																										
89																										
90																										
91																										
92																										
93																										
94																										
95																										
96																										
97																										
98																										
99																										
100																										
101																										
102																										
103												3	3	3	3	4	3	4	5	5	5	6	6	7	7	
104																										
105																										
106																										
107																										
108																										
109																										
110																										
111																										
112																										
113																										
114																										
115																										
116																										
117																										
118																										
119																										
120																										
121																										
122																										
123																										
124																										
125	3	3	3	3	4	5	5	10	11	12	14	18	18	19	20	22	25	29	35	31	36	42	47	49	53	
126																										
127	1	1	1	1	1	1	1	3	3	3	4	5	5	5	6	6	7	8	10	8	10	11	13	13	15	
128																										
129	37	40	37	40	51	59	62	70	77	84	103	103	92	88	92	103	110	125	139	136	139	154	154	165	183	
130																										
131	10	11	10	11	14	16	17	19	21	23	28	28	25	24	25	28	30	34	38	37	38	42	42	45	50	
132																										
133	7.9%	7.8%	7.1%	7.5%	7.7%	7.7%	7.5%	14.6%	14.6%	14.5%	13.9%	17.2%	19.3%	21.6%	22.1%	21.9%	22.4%	23.6%	25.3%	22.8%	25.6%	27.3%	30.4%	29.6%	29.1%	
134																										
135																										
136																										
137																										

	BU	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	
1																									
2		<b>Summary of emissions from identified gas production</b>																							
3																									
4																									
5																									
6																									
7																									
8		<b>1940s</b>						<b>1950s</b>										<b>1960s</b>							
9		<b>1944</b>	<b>1945</b>	<b>1946</b>	<b>1947</b>	<b>1948</b>	<b>1949</b>	<b>1950</b>	<b>1951</b>	<b>1952</b>	<b>1953</b>	<b>1954</b>	<b>1955</b>	<b>1956</b>	<b>1957</b>	<b>1958</b>	<b>1959</b>	<b>1960</b>	<b>1961</b>	<b>1962</b>	<b>1963</b>	<b>1964</b>	<b>1965</b>	<b>1966</b>	<b>1967</b>
10		0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534
11																									
12																					0	0	1	2	2
13																									
14																									
15																									
16																									
17																									
18																									
19																									
20																									
21																									
22																									
23																									
24																									
25		4	4	5	5	7	9	10	13	15	18	19	21	26	29	30	33	42	45	49	53	61	66	71	76
26																									
27																									
28																									
29		13	14	14	16	20	21	26	29	31	38	45	55	59	67	73	81	93	102	113	122	134	145	167	186
30																									
31																									
32																									
33		17	18	24	25	27	28	43	51	52	52	54	56	62	66	67	74	75	76	78	79	82	81	81	79
34																									
35																									
36																									
37																									
38																									
39																									
40																									
41																									
42																									
43																									
44																									
45																									
46								0.6	1	2	4	5	6	8	9	9	11	12	13	13	13	14	14	16	17
47		17	18	19	23	25	28	33	36	40	44	46	50	53	57	58	62	66	69	78	82	93	107	122	133
48																									
49														24	37	60	74	94	121	150	182	208	244	273	299
50																									
51																									
52																									
53																									
54																									
55																									
56																									
57																									
58																									
59																									
60																									
61																									
62																									
63																									
64																									
65																									
66							2	2	3	4	4	4	5	6	6	6	6	6	6	6	6	7	6	7	8
67																									
68																									
69																									
70																									
71																									
72																									
73																									
74																									
75																									
76																									
77																									
78																									
79																									
80																									
81																									
82																									
83				</																					

Gas Emissions

	CS	CT	CU	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR															
1	<b>Summary of emissions from identified gas production</b>																																								
2	Richard Heede																																								
3	Climate Mitigation Services																																								
4	24-Jun-13																																								
5																																									
6																																									
7																																									
8	1970s														1980s								1990s																		
9	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993															
10	0.0534	0.0534	0.0534	####	####	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534	0.0534																
11	2	3	3	4	4	5	5	5	5	8	10	11	14	17	18	17	19	21	21	22	22	25	26	30	31	32															
12	28	25	25	24	23	23	22	22	21	20	20	19	19	18	17	17	16	30	29	31	34	34	36	35	37	37															
13	See Apache note for gas well blow-out																		2	2	2	3	5	5	6	5	7														
14	0.0	0.1	0.1	0.1	0.1	0.3	0.4	2	2	3	3	3	5	6	7	7	7	9	10	9	10	10	11	8	9	10															
15	4	4	5	6	8	9	10	12	13	15	14	13	14	15	15	16	17	18	18	17	17	17	17	18	22																
16	0.01	0.20	0	1	1	1	2	2	3	3	3	3	4	5	5	5	6	7	10	9	11	10	10	10	10																
17	82	94	99	102	107	105	97	89	89	89	88	87	79	80	75	72	78	81	79	82	89	108	110	114	113	114															
18																						0.2	1	2	3	4															
19	205	225	245	251	263	254	250	231	226	218	209	208	194	178	164	153	171	135	129	134	128	122	131	129	127	123															
20																																									
21	80	82	85	86	88	88	87	81	82	79	80	79	75	71	66	66	66	68	68	67	72	80	81	84	87	89															
22																																									
23																						0.3	0.4	16	15	18	24														
24																				8	9	9	8	8	8	8															
25		0.02	0.02	0.01	0.02	0.01	0.01	0.4	0	1	1	1	1	3	3	4	5	5	6	7	7	8	9	10	11																
26																				11	13	13	12	13	15	17															
27	18	21	23	23	26	28	28	27	27	25	26	26	27	27	26	25	26	26	28	30	33	33	34	35	33	38															
28	155	181	209	234	249	274	278	270	267	265	264	267	207	187	164	157	179	178	171	181	185	194	190	197	200	204															
29	322	345	377	401	418	445	492	545	606	660	713	767	821	878	945	1,011	1,108	1,213	1,293	1,355	1,453																				
30																						1,216	1,245	1,239	1,188	1,146															
31	9	11	12	13	15	14	14	13	11	12	12	12	12	11	11	10	10	9	9	10	10	11	14	16	18	17															
32																																									
33																						2	5	4	4	5	5														
34	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	4	6	7	5	1	3	3															
35	1	1	1	1	2	3	8	10	11	11	12	12	13	11	8	8	10	9	12	10	12	15	10	1	5	8															
36		0.1	0.4	6	10	10	12	18	16	13	10	7	4	4	5	6	7	7	7	7	8	8	8	8	9	10															
37																																									
38	8	8	9	9	8	8	8	9	8	9	9	8	8	9	10	11	12	20	20	19	22	25	23	21	18	17															
39																	3	3	4	4	4	5	5	4	5	5															
40																				3	4	4	4	4	4	4															
41	3	5	21	16	24	37	42	41	42	35	28	21	13	11	13	17	25	32	29	36	33	41	45	42	50	54															
42	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	3	3	3	4	4	7	7	7	6	9	9														
43	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	15	14	14	14	16	16	15	14	14	15															
44	1	1	1	1	2	2	1	2	3	3	3	3	3	3	3	5	6	6	7	10	14	17	20	23	26	30	29														
45																																									
46	1	1	1	1	1	1	1	2	3	7	11	14	18	18	18	21	28	31	32	35	38	40	45	51	53	55															
47																																									
48																						5	27	28	29	29	31														
49	2	2	2	2	2	2	3	3	3	3	3	3	4	5	6	8	9	10	11	11	11	11	12	13	13																
50	2	2	2	2	2	2	3	2	26	29	33	37	41	31	32	31	33	33	36	68	73	76	75	80	80	85															
51	31	33	36	34	34	36	40	42	41	46	50	57	69	79	77	76	74	72	70	68	68	70	71	71	70	70															
52		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	1	1	1	2	2	4	4	5	6	7	5	5	7	7	8	9															
53																																									
54																						1	1	1	2	2	3	3	3	3	8	17	23	28	30	32	28	30	31	39	39
55																																									
56	0.1	0.2	0.2	0.2	0.3	1	2	3	2	3	4	5	6	5	6	6	7	6	6	6	7	7	9	11	15	17															
57																																									
58																						36	42	48	46	25	27	25													
59																						10	9	8	8																
60	68	82	97	104	116	124	132	129	131	130	126	127	122	117	108	111	115	122	123	128	118	114	126	138	128	133															
61	0.4	1	0	1	1	2	7	6	7	8	18	21	24	30	23	22	33	38	48	40	48	58	61	64	70	70															
62																																									
63		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1														
64	3	4	4	4	4	6	8	14	15	16	17	18	19	36	45	64	68	69	69	79	82	124	85	86	98	95															
65																																									
66																						1	4	6	7	8	7	7	8	8	7	13	11	12	10	11	11	13			
67																																									
68																						15	11	12	11	10	10	11													
69																																									
70		0.3	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.2	0.3	1	1	1	1	3	4	4	4																
71																																									
72																						4	7																		
73		0.9	0.6	0.3	0.6	1.0	2	6	9	10	11	10	11	11	43	40	45	50	50	50	50	53	55	55																	
74																																									
75	1,026	1,132	1,260	1,324	1,408	1,486	1,553	1,578	1,668	1,722	1,783	1,857	1,846	1,884	1,900	1,994	2,194	2,358	2,444	2,673	2,829	2,730	2,783	2,790	2,807	2,813															
76	280	309	344	361	384	406	424	431	455	470	487	507	504	514	518	544	599	644	667	730	772	745	760	761	766	768															
77	1,554	1,711	1,806	1,942	2,052	2,155	2,188	2,213	2,308	2,382	2,492	2,642	2,712	2,770	2,712	2,715	2,961	3,067	3,045	3,276	3,433	3,565	3,737	3,891	4,009	4,100															
78	424	467	493	530	560	588	597	604	630	650	680	721	740	756	740	741	808	837	831	894	937	973	1,020	1,062	1,094	1,119															
79	66.1%	66.1%	69.7%	68.2%	68.6%	69.0%	71.0%	71.3%	72.3%	72.3%	71.6%	70.3%	68.1%	68.0%	70.1%	73.4%	74.1%	76.9%	80.3%	81.6%	82.4%	76.6%	74.5%	71.7%	70.0%	68.6%															

	DS	DT	DJ	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL	EM	EN							
1	<b>Summary of emissions from identified gas production</b>																				<b>Coefficient</b>	<b>0.053434</b>	Million tonnes CO <sub>2</sub> /Billion cubic feet (MtCO <sub>2</sub> /Bcf)						
2	dataset marker																				Richard Heede Climate Mitigation Services 24-Jun-13			<b>Copyright Climate Mitigation Services</b>			<b>Emissions</b>		
3																													
4																													
5																													
6																													
7																													
8	<b>1990s</b>										<b>2000s</b>										<b>Sum to 2010</b>								
9	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>Million tonnes CO<sub>2</sub></b>											
10	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>0.0534</b>	<b>MtCO<sub>2</sub>/Bcf</b>											
11	<b>Entity</b>																												
12	37	30	39	47	48	49	53	53	53	53	63	67	63	67	58	59	1,278	<b>Abu Dhabi National Oil (ADNOC), UAE</b>											
13	41	31	45	47	55	52	39	54	56	56	55	51	34	37	40	43	44	1,475	<b>Anadarko, USA</b>										
14	9	11	11	12	3	13	16	22	21	24	24	25	31	35	32	34	37	397	<b>Apache, USA</b>										
15	10	15	16	11	11	12	21	21	22	22	25	20	22	23	24	24	454	<b>Bahrain Petroleum Corporation</b>											
16	25	23	23	23	23	23	24	28	34	38	43	51	47	52	54	55	952	<b>BG Group (British Gas), UK</b>											
17	10	11	11	12	13	14	14	15	15	16	17	19	19	19	20	19	20	380	<b>BHP Billiton, Australia</b>										
18	119	122	132	131	149	118	148	168	170	168	166	164	164	159	163	165	164	5,707	<b>BP, UK</b>										
19	5	6	10	12	13	14	15	18	24	25	27	28	29	33	29	26	24	348	<b>Canadian Natural Resources, Canada</b>										
20	130	125	128	131	130	129	125	128	121	117	107	83	97	98	100	97	98	8,465	<b>Chevron, USA</b>										
21																													
22																													
23	94	97	106	112	117	130	110	104	113	109	111	101	97	99	95	135	124	5,426	<b>CNOOC (China National Offshore Oil), China</b>										
24																													
25																													
26	27	37	37	38	45	40	49	43	49	46	47	44	43	46	50	52	50	816	<b>ConocoPhillips, USA</b>										
27	10	10	9	11	7	10	6	6	11	12	7	7	7	8	9	10	11	210	<b>CONSOL Energy, USA</b>										
28	12	12	13	13	13	14	18	24	29	31	41	43	45	57	60	59	589	<b>Devon Energy, USA</b>											
29	19	20	24	26	28	32	39	44	49	49	58	63	66	70	75	55	62	876	<b>Ecopetrol, Colombia</b>										
30	43	43	43	44	45	46	51	60	64	68	69	77	77	80	86	85	89	1,960	<b>Egyptian General Petroleum, Egypt</b>										
31	209	208	220	215	212	207	208	209	214	210	209	201	205	211	215	225	237	10,699	<b>EnCana, Canada</b>										
32																													
33																													
34	1,127	1,104	1,044	993	1,030	1,032	990	969	987	1,023	1,046	1,049	1,049	1,035	1,037	871	960	17,937	<b>ENI, Italy</b>										
35	17	17	13	11	11	13	13	16	15	13	11	11	12	12	13	13	13	23,383	<b>ExxonMobil, USA</b>										
36	5	6	5	5	5	5	7	11	11	12	13	13	13	12	12	11	10	608	<b>Former Soviet Union</b>										
37	4	4	4	4	5	4	4	3	3	1	2	3	3	7	9	10	10	180	<b>Gazprom, Russian Federation</b>										
38	9	11	11	11	11	10	14	13	17	18	17	19	20	20	27	23	22	135	<b>Hess, USA</b>										
39	9	9	9	9	9	8	9	9	9	9	8	12	16	27	30	30	30	479	<b>Husky, Canada</b>										
40																													
41																													
42	18	21	22	24	23	24	24	25	24	23	20	18	17	18	20	19	17	135	<b>Iraq National Oil Company, Iraq</b>										
43	5	5	4	5	5	5	4	5	6	4	3	2	1	1	1	4	7	479	<b>Kuwait Petroleum Corp., Kuwait</b>										
44	5	4	5	8	8	5	5	6	5	6	6	5	5	5	4	4	5	436	<b>Libya National Oil Corp., Libya</b>										
45	53	60	72	162	184	198	114	125	142	87	139	171	172	159	188	182	259	246	<b>Lukoil, Russian Federation</b>										
46	9	8	8	8	7	7	7	7	19	17	28	43	45	46	51	57	45	791	<b>Marathon, USA</b>										
47	15	16	16	16	17	17	18	16	13	16	9	15	14	18	20	23	113	<b>Murphy Oil, USA</b>											
48	32	37	41	42	35	36	46	48	48	49	48	43	45	47	48	53	53	119	<b>Nexen, Canada</b>										
49																													
50	61	62	66	66	63	73	68	61	12	18	21	22	22	22	23	27	28	3,258	<b>National Iranian Oil Company (NIOC), Iran</b>										
51	14	15	17	18	20	22	27	28	30	37	40	41	42	43	47	46	48	482	<b>Nigerian National Petroleum, Nigeria</b>										
52	45	48	103	103	115	111	78	80	73	127	34	37	41	44	47	44	44	462	<b>Occidental, USA</b>										
53	71	73	82	87	93	93	91	88	86	88	89	94	104	118	135	137	137	978	<b>Oil and Gas Corporation, India</b>										
54	9	9	9	9	9	7	15	25	28	29	34	34	44	47	46	45	52	115	<b>OMV Group, Austria</b>										
55	39	49	79	94	45	98	77	86	97	101	101	104	103	112	118	119	121	1,246	<b>Pertamina, Indonesia</b>										
56																													
57	17	17	18	23	25	29	37	35	38	41	50	59	64	79	93	108	115	1,306	<b>PetroChina (CNPC), China</b>										
58	26	25	28	30	33	25	43	40	46	59	66	67	66	61	56	51	49	709	<b>Petrole Brasileiro (Petrobras), Brazil</b>										
59	7	7	7	7	9	10	11	12	13	15	17	25	26	30	23	24	23	2,099	<b>Petroleos de Venezuela, Venezuela</b>										
60	131	135	165	158	153	156	161	177	181	173	172	161	163	160	167	165	181	3,357	<b>Petroleos Mexicanos (PEMEX), Mexico</b>										
61	77	79	81	83	86	86	94	104	114	127	104	153	160	137	148	167	183	524	<b>Petroleum Development Oman, Oman</b>										
62																													
63	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,869	<b>Petronas, Malaysia</b>										
64	95	98	108	112	110	114	123	123	142	152	159	170	176	177	176	157	159	103	<b>Polish Oil &amp; Gas, Poland</b>										
65	14	14	19	35	51	55	37	39	47	52	58	69	71	72	78	81	81	982	<b>Qatar Petroleum, Qatar</b>										
66	14	14	18	20	19	21	20	17	20	21	21	20	18	16	16	9	11	1,019	<b>Repsol, Spain</b>										
67	4	4	5	6	8	8	8	7	8	8	9	7	8	7	8	7	8	300	<b>Rosneft, Russian Federation</b>										
68	10	13	13	13	15	18	19	20	20	21	25	26	26	25	24	25	27	6,416	<b>Royal Dutch Shell plc, The Netherlands</b>										
69	60	61	66	66	61	62	73	79	88	93	106	107	105	107	113	104	125	2,687	<b>Saudi Aramco, Saudi Arabia</b>										
70																													
71	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	144	<b>Sinopec, China</b>										
72	95	98	108	112	110	114	123	123	142	152	159	170	176	177	176	157	159	19	<b>Sonangol, Angola</b>										
73	14	14	19	35	51	55	37	39	47	52	58	69	71	72	78	81	81	3,491	<b>Sonatrach, Algeria</b>										
74	14	14	18	20	19	21	20	17	20	21	21	20	18	16	16	9	11	1,019	<b>Statoil, Norway</b>										
75	4	4	5	6	8	8	8	7	8	8	9	7	8	7	8	7	8	373	<b>Suncor / Petro-Canada, Canada</b>										
76	10	13	13	13	15	18	19	20	20	21	25	26	26	25	24	25	27	146	<b>Syrian Petroleum, Syria</b>										
77	60	61	66	66	61	62	73	79	88	93	106	107	105	107	113	104	125	349	<b>Talisman, Canada</b>										
78																													
79																													
80	2,832	2,860	3,051	3,169	3,244	3,331	3,239	3,349	3,469	3,582	3,625	3,769	3,876	3,926	4,108	3,982	4,274	1,994	<b>Total, France</b>										
81	773	781	833	865	885	909	884	914	947	977	989	1,029	1,058	1,071	1,121	1,087	1,166	41	<b>Yukos, Russian Federation</b>										
82	4,152	4,228	4,426	4,434	4,555	4,654	4,719	4,804	4,932	5,097	5,243	5,397	5,566	5,683	5,921	5,772	6,200	120,113	<b>Emissions from identified gas prod'n (MtCO<sub>2</sub>/yr)</b>										
83	1,133	1,154	1,208	1,210	1,243	1,270	1,288	1,311	1,346	1,391	1,431	1,473	1,519	1,551	1,616	1,575	1,692	32,780	<b>Emissions from identified gas prod'n (Mtc/yr)</b>										
84	68.2%	67.6%	68.9%	71.5%	71.2%	71.6%	68.6%	69.7%	70.3%	70.3%	69.1%	69.8%	69.6%	69.1%	69.4%	69.0%	68.9%	176,055	<b>CDIAC emissions from annual gas prod'n (MtCO<sub>2</sub>/yr)</b>										
85																					48,047	<b>CDIAC emissions from annual gas prod'n (Mtc/yr)</b>							
86																					68.2%	<b>Percent of total CDIAC gas emissions identified</b>							
87	<b>Total emissions from identified gas production 1900-2010 (million tonnes CO<sub>2</sub>)</b>																				120,113								

**Cell:** E12

**Comment:** Rick Heede:

See the "Gas Emissions Factor Calc" worksheet for details, which accounts for carbon content, heating values, and final emission factor per billion cubic feet (Bcf) of gas production, including deducting for non-energy uses of natural gas (see "non-energy uses" worksheet). Ancillary emissions of fugitive methane, vented CO<sub>2</sub>, and CO<sub>2</sub> from flaring are estimated and applied in the summary entity worksheet.

**Cell:** C13

**Comment:** Rick Heede:

ADNOC details both gas production and utilization rates from 1974 through 1994 in its annual reports; see ADNOC gas production worksheet for details.

**Cell:** C17

**Comment:** Rick Heede:

CMS estimated the CO<sub>2</sub>-equivalent of Apache Corporation's 1981-1983 gas blow-out (assuming all of the gas was vented and none of it was flared). The company reported a blow rate of 35 million cf per day, which we use as the average over the sixteen month event: 35 million cf/d = 0.0168 Tcf over 30d\*16months = 0.01858 QBtu (at 1,106 Btu per cf for wet gas), which, at 14.92 MtC/QBtu, equals 0.2772 MtC (1.01581 MtCO<sub>2</sub>) and thus (at CH<sub>4</sub> at 23xCO<sub>2</sub>) = 6.3762 MtC-eq (23.3636 MtCO<sub>2</sub>-eq). This represents a significant additional impact of Apache's total estimated emissions from natural gas and oil production. See cell comment at Apache Corporation worksheet for details.

This amount is added to Apache's estimated emissions in 1982.

**Cell:** EM17

**Comment:** Rick Heede:

26Jan06 estimate of the CO<sub>2</sub>-equiv of the Apache's blow-out (assuming none of it was flared, and using only 50 percent of the 35 million cf per day): 17.5 Mcf = 0.0084 Tcf over 30d\*16 months = 0.00929 QBtu (at 1,106 Btu per cf for wet gas), which, at 14.92 MtC/QBtu, equals 0.139 MtC (0.508 MtCO<sub>2</sub>) and thus (at CH<sub>4</sub> at 23xCO<sub>2</sub>) = 3.19 MtC-eq (11.7 MtCO<sub>2</sub>-eq). These emissions are NOT included in this summary.

**Cell:** EM19

**Comment:** Rick Heede (Jan10):

Bahrain: Banagas annual emissions of CO<sub>2</sub>-equivalent if the reported 3 million SCM per of natural gas vented to the atmosphere (prior to 1979 only) is estimated by CMS to total 56.3 million tonnes of CO<sub>2</sub>e per year (MtCO<sub>2</sub>e/yr). If the natural gas (assumed to be all methane, since CMS does not have data on entrained CO<sub>2</sub> and other entrained gases) is assumed to be flared rather than vented, then emissions would total 2.25 MtCO<sub>2</sub>/yr.

**Cell:** EM129

**Comment:** Rick Heede:

CDIAC data in million tonnes of carbon converted to CO<sub>2</sub>, which is 3.664191 times Carbon if carbon and oxygen isotopes are accounted for, per Kevin Baumert May05, then at World resources Institute: CO<sub>2</sub> conversion is, precisely: C=12.0107 + O=15.9994 x 2 = 44.0095/12.0107 = 3.664191.

**Cell:** E1131

**Comment:** Rick Heede:

Updated with DCIAC emissions data for gas fuels to 2010 in December 2011.

**Cell:** EM131

**Comment:** Rick Heede:

From the associated "Methods" paper: CDIAC's emissions are estimated for each fuel using the following formula: CO<sub>2</sub> = (P) (FO) (C).

From primary and secondary gas fuel production and trade:

CO<sub>2</sub> = CO<sub>2</sub> emissions in 10<sup>6</sup> metric tonnes of carbon;

P = annual production or consumption in thousands of 10<sup>12</sup> joules;

FO = 0.98 ± 1%;

C = carbon content in 10<sup>6</sup> tonnes per thousand 10<sup>12</sup> joules = 0.0137 ± 2%.

Boden, T.A., G. Marland, and R.J. Andres. 2009. Global, Regional, and National Fossil-Fuel CO<sub>2</sub> Emissions. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A. doi 10.3334/CDIAC/00001.

Jan10: CMS added DCIAC extrapolations for gas emissions from their dataset "Preliminary 2007-08 Global & National Estimates by Extrapolation" (undated) to the main file cited above.

**Cell:** EM136

**Comment:** Rick Heede:

Page Intentionall Left Blank.