Each and Every Carbon Major Entity

Entity emissions from combustion, venting, flaring, and fugitive methane: Scope 1 and Scope 3

Richard Heede
Climate Accountability Institute
18-Oct-20

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	1850s										1860s						
anno	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866

#	Entities		anno	
1	Abu Dhabi, United Arab Emirates	SOE	1962-2018	oil & gas
	Carbon dioxide	MtCO2		
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
2	Alliance, USA	IOC		
	Carbon dioxide	MtCO2	1996-2018	coal
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
3	Anadarko, USA	IOC	1945-2018	oil & gas
	Carbon dioxide	MtCO2	1979-1996	coal
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
4	Anglo American, UK	IOC	1909-2018	coal
	Carbon dioxide	MtCO2		
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
5	Antero, USA	IOC	2012-2018	oil & gas
	Carbon dioxide	MtCO2		
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
6	Apache, USA	IOC	1985-2015	coal
	Carbon dioxide	MtCO2		
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
7	Arch Coal, USA	IOC	1973-2015	coal
	Carbon dioxide	MtCO2		
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
8	Bahrain Petroleum Corp.	SOE	1968-2015	oil & gas
	Carbon dioxide	MtCO2		
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
9	BHP Billiton, Australia	IOC	1970-2015	oil
	Carbon dioxide	MtCO2	1955-2015	coal
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
10	BP, UK	IOC	1913-2015	oil
	Carbon dioxide	MtCO2	1932-2015	gas
	Methane	MtCH4	1960-1989	coal
	Total entity emissions	MtCO2e		
11	British Coal Corp., UK	SOE	1947-1994	coal
	Carbon dioxide	MtCO2		
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
12	Canadian Natural Resources, Canada	IOC	1989-2015	oil & gas
	Carbon dioxide	MtCO2		
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
13	Cemex, Mexico	IOC	1990-2015	cement
	Carbon dioxide	MtCO2		
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
14	Chesapeake Energy, USA	IOC		
	Carbon dioxide	MtCO2	1994-2018	oil
	Methane	MtCH4	1994-2018	gas
	Total entity emissions	MtCO2e		
15	Chevron, USA	IOC	1912-2015	oil
	Carbon dioxide	MtCO2	1935-2015	gas
	Methane	MtCH4	1965-2011	coal
	Total entity emissions	MtCO2e		
16	China, Peoples Rep. (coal & cement)	Nation-State	1945-2015	coal
	Carbon dioxide	MtCO2	1928-2015	cement
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
17	CNOOC (China National Offshore Oil Co.)	SOE	1988-2015	oil
	Carbon dioxide	MtCO2	1996-2015	gas
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
18	Cloud Peak	IOC	1985-2018	coal
	Carbon dioxide	MtCO2		
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
19	Coal India, India	SOE	1973-2015	coal
	Carbon dioxide	MtCO2		
	Methane	MtCH4		
	Total entity emissions	MtCO2e		
20	ConocoPhillips, USA	IOC	1924-2015	oil
	Carbon dioxide	MtCO2	1926-2015	gas
	Methane	MtCH4	1966-1988	coal
	Total entity emissions	MtCO2e		

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	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA
10				1870s										1880s													
11	1867	1868	1869	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893

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	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC
	1890s						1900s								1900s					1910s								
	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
																0.7	0.8	0.9	0.9	1.0	1.0	1.1	1.2	1.2	1.3	1.4	1.4	2
																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	1	1	1	1	1	1	2	2	2
																				2	2	2	2	3	3	4	7	10
																				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
																			-	2	2	2	3	3	3	4	7	11
																		2	2	2	2	1	1	1	1	1	2	2
																		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
																		-	2	2	3	2	2	1	1	1	2	2

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	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE
	1920s								1930s						1930s				1940s									
	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
25																								10	11	13	14	12
26																								0.0	0.0	0.0	0.0	0.0
27																								11	12	13	15	13
30	3	3	4	5	5	6	7	7	7	7	8	8	9	10	10	11	11	12	13	14	15	17	18	19	21	22	23	25
31	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	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
32	3	4	4	5	6	7	7	7	7	8	9	9	10	11	11	12	13	13	14	15	17	18	20	21	23	25	26	28
60	14	18	20	27	34	41	43	43	45	37	30	26	29	31	36	44	43	42	40	40	49	56	73	86	101	108	130	131
61	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3
62	15	19	21	29	36	44	46	45	47	39	32	28	30	33	39	47	46	45	43	43	53	59	78	91	108	115	139	140
65																										488	504	520
66																										2.0	2.0	2.1
67																									-	543	561	578
85	3	7	6	5	20	21	21	25	39	36	37	38	40	47	51	82	95	99	113	117	109	129	158	173	186	200	227	229
86	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6
87	3	7	6	6	21	22	22	26	41	38	39	40	42	49	54	87	101	105	121	125	117	138	169	185	199	214	244	246
90							0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	15	36	57	78	99
91																								0	0	0	0	0
92						-	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	16	40	63	87	110
110			0.3	1	6	15	17	19	20	20	21	22	23	25	26	27	24	26	27	31	31	34	38	41	70	74	80	76
111			0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4
112		-	0	1	8	17	19	21	22	23	24	26	27	28	30	32	28	30	32	36	36	39	44	47	79	83	90	86

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	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG
	1950s										1960s							1960s			1970s							
	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
													0	1	4	6	7	7	9	11	13	17	19	50	120	119	137	145
													0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.3	0.3	0.3
													0	1	4	6	8	8	10	12	14	19	21	54	128	126	146	155
	13	15	16	16	15	17	20	22	24	26	28	30	33	35	37	39	41	77	79	80	78	76	74	72	70	68	67	65
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	14	16	17	17	16	18	21	23	25	27	30	32	34	37	39	41	43	87	89	90	88	85	83	81	79	77	75	73
	24	24	25	27	26	27	28	28	31	30	32	32	32	32	33	41	40	38	32	27	29	32	34	37	41	45	51	59
	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
	27	26	28	30	29	30	31	31	34	34	35	36	36	36	37	46	44	42	36	30	32	35	38	41	46	50	57	66
																							22	24	24	24	24	22
																							0.1	0.1	0.1	0.1	0.1	0.1
																								24	27	26	26	25
																			1	1	1	1	1	1	1	7	8	9
																			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
																			1	1	1	1	1	1	1	8	8	10
						6	6	7	7	8	8	8	10	10	11	13	14	14	14	16	18	28	38	39	45	43	50	52
						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
					-	6	7	8	8	9	9	9	11	11	12	14	16	15	16	18	20	30	41	42	48	47	54	57
	179	167	150	173	183	227	250	251	284	298	347	366	394	415	470	503	564	611	668	743	836	896	971	971	906	769	775	797
	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.8	1.0	1.1	1.1	1.2	1.4	1.5	1.7	1.8	1.9	2.2	2.4	2.5	2.7	2.7	2.5	2.2	2.2	2.2
	191	179	161	186	197	244	269	270	306	321	375	396	426	449	509	545	611	661	723	804	903	966	1,047	1,047	976	830	837	860
	536	538	541	544	546	549	535	521	507	494	480	474	469	464	458	453	433	413	393	373	353	344	334	325	316	307	295	295
	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.7	1.7	1.6	1.5	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2
	596	599	602	605	608	611	596	580	565	549	534	528	522	516	510	504	482	460	437	415	393	382	372	362	352	341	328	328
	274	328	350	372	395	444	485	537	566	605	668	730	797	846	897	1,002	1,111	1,219	1,326	1,437	1,569	1,600	1,714	1,774	1,751	1,351	1,386	1,346
	0.7	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	4	4	5	5	5	5	5	5	4	4	4
	295	351	375	400	425	480	524	580	612	654	723	791	863	917	974	1,088	1,207	1,325	1,442	1,564	1,707	1,740	1,863	1,924	1,899	1,474	1,509	1,466
	119	140	162	269	376	483	590	322	805	914	1,021	610	610	666	711	733	799	555	731	882	1,136	1,151	1,169	1,159	1,221	1,271	1,317	1,364
	0	1	1	1	2	2	2	1	3	4	4	2	2	3	3	3	3	2	3	4	5	5	5	5	5	5	5	5
	133	156	180	299	418	537	657	358	896	1,016	1,135	679	679	741	790	815	889	617	813	981	1,264	1,279	1,300	1,289	1,358	1,413	1,463	1,515
																							130	138	160	165	159	
																							0.5	0.6	0.6	0.7	0.6	
																							145	154	178	183	177	
	101	117	121	123	128	135	149	158	159	179	186	189	199	208	220	231	240	241	252	261	281	282	290	286	260	253	252	255
	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1
	115	135	139	141	146	155	170	181	182	205	212	216	226	237	250	261	270	271	283	293	315	316	324	321	293	284	283	286

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	EH	EI	EJ	EK	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE	FF	FG	FH	FI
			1980s										1990s															2000s
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
15	131	134	126	112	95	88	89	88	131	174	168	230	254	306	289	283	297	295	294	310	334	315	323	317	303	327	344	392
16	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.6	0.7	0.8	0.8	0.8	0.9	0.8	0.8	0.9	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.3
17	140	143	136	122	104	97	98	97	142	187	182	248	273	329	311	305	321	318	317	334	361	343	353	346	333	359	377	428
20																			20	24	30	31	30	35	40	42	45	51
21																			0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
22																			22	27	33	35	34	39	44	47	50	56
25	63	71	80	81	81	82	84	113	111	107	115	115	121	125	126	131	144	138	154	96	132	115	91	120	124	117	114	105
26	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.8	0.5	0.7	0.6	0.5	0.6	0.7	0.7	0.6	0.6
27	70	79	89	91	90	92	94	127	125	121	130	130	138	142	143	149	164	156	175	111	151	132	105	138	143	136	132	122
30	73	75	79	79	75	75	81	81	90	94	100	95	96	93	92	100	101	102	107	116	142	146	161	171	177	191	198	201
31	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
32	81	83	88	88	83	84	90	90	100	104	112	106	107	104	102	112	112	113	119	129	158	163	179	190	197	212	220	223
40								3	3	3	4	6	7	9	10	13	16	19	20	22	11	27	35	46	45	56	60	61
41								0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.2	0.3	0.3	0.3	0.3	0.3
42								4	4	4	5	7	8	11	12	15	19	23	23	26	12	31	40	53	52	64	68	69
45	23	22	47	50	56	55	69	75	70	79	89	102	108	105	105	110	107	123	125	127	186	232	248	279	268	261	215	245
46	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.7	0.9	1.0	1.1	1.1	1.1	0.9	1.0
47	25	25	52	56	62	62	77	83	78	87	99	114	120	117	117	122	120	136	139	141	207	258	276	311	298	291	240	273
50	9	9	14	14	15	15	15	16	18	16	17	18	18	17	29	30	30	21	21	32	32	33	37	47	47	48	29	32
51	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.3
52	10	10	15	17	17	18	17	19	21	19	21	21	21	20	33	34	34	25	26	37	37	38	43	54	54	56	35	40
55	56	53	50	54	92	102	82	125	135	134	131	133	141	153	148	178	170	184	154	163	176	258	337	343	311	314	326	332
56	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.6	0.7	0.7	1.0	1.4	1.4	1.3	1.3	1.4	1.4
57	61	58	55	59	99	110	90	137	149	148	145	147	156	170	164	197	189	204	172	182	196	287	375	382	347	351	364	371
60	900	846	702	684	672	644	644	621	593	604	529	531	457	443	430	432	437	429	444	442	481	450	428	450	477	491	530	533
61	2.4	2.4	2.0	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.8	2.0	1.7	1.7	1.7	1.7	1.8	1.8	1.9	1.9	2.1	1.8	2.0	2.2	2.3	2.3	2.3	2.3
62	968	914	759	740	726	697	699	675	645	658	580	586	505	492	477	479	486	478	496	494	539	500	483	511	540	554	595	597
65	292	301	309	303	295	257	104	255	252	243	253	230	223	222	187	137	78											
66	1.2	1.2	1.2	1.2	1.2	1.0	0.4	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.8	0.6	0.3											
67	325	335	344	337	328	286	116	284	280	270	282	256	249	247	208	153	87											
70												0.3	1.6	2.9	4	6	7	9	16	23	25	27	41	48	56	61	69	74
71												0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
72												0	2	4	5	7	8	11	19	27	29	32	46	54	64	70	78	84
75													24	24	24	24	24	24	24	24	24	24	24	24	24	27	30	31
77													24	24	24	24	24	24	24	24	24	24	24	24	24	27	30	31
80																	1	2	4	5	8	8	8	9	11	16	21	27
81																	0	0	0	0	0	0	0	0	0	0	0	0
82																	1	2	4	6	9	10	10	12	13	19	26	34
85	1,253	1,254	1,173	1,120	844	724	610	520	511	500	470	431	432	432	420	421	465	443	457	467	496	476	457	464	444	423	414	360
86	4	4	4	4	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
87	1,366	1,367	1,279	1,220	926	797	681	579	568	557	525	482	485	485	472	472	520	496	511	523	554	531	510	519	496	473	460	398
90	1,534	1,576	1,547	1,552	1,666	1,790	1,978	2,191	2,253	2,345	2,486	2,665	2,729	2,769	2,867	2,980	3,223	3,544	3,639	3,627	3,504	3,600	3,661	3,906	4,129	4,889	5,642	6,281
91	6	6	6	6	7	7	8	9	9	9	10	10	11	11	11	11	12	13	14	14	13	13	14	14	15	18	21	23
92	1,704	1,750	1,717	1,723	1,849	1,986	2,195	2,430	2,499	2,600	2,755	2,954	3,025	3,067	3,173	3,296	3,564	3,918	4,023	4,008	3,870	3,975	4,041	4,310	4,555	5,393	6,225	6,930
95										7	8	8	15	21	27	36	51	58	71	87	89	91	67	74	94	85	86	136
96										0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.4
97										8	9	9	16	23	29	39	54	62	77	95	97	98	73	80	102	92	93	147
105	160	164	172	193	202	212	229	238	256	282	298	317	324	372	391	389	398	416	449	464	467	468	482	503	523	551	582	617
106	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.2	1.3	1.3	1.5	1.6	1.6	1.6	1.7	1.8	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.3	2.5
107	178	183	191	215	224	235	255	264	285	313	332	353	360	414	435	433	443	463	500	517	520	521	537	560	582	613	647	687
110	268	265	261	245	238	242	225	223	224	222	237	241	242	244	248	247	251	255	270	281	283	298	270	282	276	263	274	302
111	1.1	1.1	1.1	1.0	1.0	1.0	0.9	1.0	1.0	0.9	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.3	1.4	1.4	1.6	1.3	1.2	1.4	1.3	1.3	1.4
112	299	296	291	273	265	270	252	250	251	248	265	271	272	275	280	279	285	290	307	321	324	342	307	316	314	299	311	340

Entity emissions from combustion, venting, flaring, and fugitive methane: Scope 1 and Scope 3

Richard Heede
Climate Accountability Institute

18-Oct-20

AR4 GWP of CH4 28.0 xCO2

Each and Every Carbon Major Entity

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dataset marker

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Sum to 2018 MtCO2 & MtCH4	Entities		Percent of total by gas
																Abu Dhabi, United Arab Emirates		1
417	402	417	371	380	440	473	490	494	516	529	573	630			13,345	Carbon dioxide	MtCO2	91.80%
1.3	1.3	1.4	1.2	1.3	1.5	1.7	1.7	1.8	1.8	1.8	2.0	2.2			43	Methane	MtCH4	8.20%
454	439	455	406	416	482	521	539	543	566	580	628	692			14,538	Total entity emissions	MtCO2e	100.00%
															14,538 check			
																Alliance, USA		2
52	54	58	57	64	68	77	86	90	91	81	84	89			1,300	Carbon dioxide	MtCO2	89.85%
0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.4			5	Methane	MtCH4	10.15%
58	60	65	64	71	76	86	95	100	101	90	93	100			1,447	Total entity emissions	MtCO2e	100.00%
															1,447 check			
																Anadarko, USA		3
70	77	74	79	85	90	97	103	112	111	106	90	90			5,533	Carbon dioxide	MtCO2	88.40%
0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.4	0.3			26	Methane	MtCH4	11.60%
81	89	87	93	99	104	113	120	129	127	120	101	99			6,258	Total entity emissions	MtCO2e	100.00%
															6,258 check			
																Anglo American, UK		4
203	205	218	215	218	210	219	218	221	209	158	108	111			6,975	Carbon dioxide	MtCO2	89.85%
0.8	0.8	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.8	0.6	0.4	0.4			28	Methane	MtCH4	10.15%
226	228	243	239	243	233	244	242	246	233	176	120	124			7,763	Total entity emissions	MtCO2e	100.00%
															7,763 check			
																Antero, USA		5
						5	11	22	32	40	49	59			218	Carbon dioxide	MtCO2	83.01%
						0	0	0	0	0	0	0			2	Methane	MtCH4	16.99%
						6	14	26	39	48	58	70			263	Total entity emissions	MtCO2e	100.00%
															263 check			
																Apache, USA		6
66	74	71	77	87	99	102	100	87	73	70	61	63			1,506	Carbon dioxide	MtCO2	87.28%
0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.3	0.3	0.3	0.3			8	Methane	MtCH4	12.72%
77	86	82	89	100	114	117	114	98	82	79	69	70			1,725	Total entity emissions	MtCO2e	100.00%
															1,725 check			
																Arch Coal, USA		7
236	236	244	221	285	255	231	235	235	223	169	172	169			6,608	Carbon dioxide	MtCO2	89.85%
1.0	1.0	1.0	0.9	1.1	1.0	0.9	0.9	0.9	0.9	0.7	0.7	0.7			27	Methane	MtCH4	10.15%
263	263	272	246	317	284	257	262	262	249	188	191	188			7,354	Total entity emissions	MtCO2e	100.00%
															7,354 check			
																Bahrain Petroleum Corp.		8
27	28	30	30	31	31	32	34	37	37	36	37	37			1,138	Carbon dioxide	MtCO2	84.25%
0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3			8	Methane	MtCH4	15.75%
33	34	36	37	38	38	39	42	45	45	44	45	46			1,351	Total entity emissions	MtCO2e	100.00%
															1,351 check			
																BHP Billiton, Australia		9
324	333	316	288	298	295	322	341	279	287	266	236	236			9,117	Carbon dioxide	MtCO2	89.74%
1.4	1.4	1.3	1.2	1.2	1.2	1.5	1.6	1.3	1.3	1.2	1.1	1.1			37	Methane	MtCH4	10.26%
362	372	353	322	332	329	363	384	315	323	299	266	266			10,159	Total entity emissions	MtCO2e	100.00%
															10,159 check			
																BP, UK		10
521	506	509	530	506	436	441	428	417	434	433	477	487			37,073	Carbon dioxide	MtCO2	91.34%
2.3	2.2	2.2	2.3	2.2	1.8	2.0	1.9	1.9	1.9	1.9	2.1	2.2			126	Methane	MtCH4	8.66%
584	568	571	595	569	487	496	481	469	488	486	536	549			40,588	Total entity emissions	MtCO2e	100.00%
															40,588 check			
																British Coal Corp., UK		11
															17,742	Carbon dioxide	MtCO2	89.85%
															72	Methane	MtCH4	10.15%
															19,746	Total entity emissions	MtCO2e	100.00%
															19,746 check			
																Canadian Natural Resources, Canada		12
78	81	75	77	85	71	79	91	106	115	108	130	146			1,712	Carbon dioxide	MtCO2	88.75%
0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.5			8	Methane	MtCH4	11.25%
88	93	86	87	95	80	88	100	119	128	121	144	161			1,929	Total entity emissions	MtCO2e	100.00%
															1,929 check			
																Cemex, Mexico		13
34	35	32	27	27	27	27	26	28	28	29	28	28			770	Carbon dioxide	MtCO2	100.00%
															-	Methane	MtCH4	0.00%
34	35	32	27	27	27	27	26	28	28	29	28	28			770	Total entity emissions	MtCO2e	100.00%
															770 check			
																Chesapeake Energy, USA		14
34	42	49	53	61	70	84	87	92	89	83	71	68			1,002	Carbon dioxide	MtCO2	82.51%
0	0	0	0	1	1	1	1	1	1	1	1	0			8	Methane	MtCH4	17.49%
42	52	61	66	75	86	102	105	110	106	99	85	81			1,214	Total entity emissions	MtCO2e	100.00%
															1,214 check			
															updated links, 7Jul19	Chevron, USA		15
384	376	362	384	388	369	356	349	346	353	349	366	392			50,466	Carbon dioxide	MtCO2	91.36%
2	2	2	2	2	1	1	1	1	1	1	2	2			170	Methane	MtCH4	8.64%
427	419	404	426	431	410	396	390	386	394	390	411	443			55,239	Total entity emissions	MtCO2e	100.00%
															55,239 check			
							Nation-State coal production revised 2013-2017									China, Peoples Rep. (coal & cement)		16
6,862	7,386	7,756	8,393	9,273	10,198	10,692	10,864	10,660	10,280	9,493	9,763	10,226			227,996	Carbon dioxide	MtCO2	90.60%
25	27	28	31	34	37	39	39	38	37	33	35	36			845	Methane	MtCH4	9.40%
7,567	8,143	8,553	9,248	10,214	11,231	11,775	11,955	11,724	11,308	10,430	10,730	11,241			251,645	Total entity emissions	MtCO2e	100.00%
															251,645 check			
									CNOOC acquired Nexen Jan13							CNOOC (China National Offshore Oil Co.)		17
91	98	106	117	151	147	151	153	157	184	177	175	176			2,993	Carbon dioxide	MtCO2	92.08%
0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.6			9	Methane	MtCH4	7.92%
99	106	115	127	164	160	163	167	171	200	192	190	192			3,250	Total entity emissions	MtCO2e	100.00%
															3,250 check			
																Cloud Peak		18
			150	154	157	149	142	141	124	96	95	82			1,290	Carbon dioxide	MtCO2	89.85%
			0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.4	0.4	0.3			5	Methane	MtCH4	10.15%
			167	172	175	166	158	157	138	107	106	91			1,436	Total entity emissions	MtCO2e	100.00%
															1,436 check			
									updated 29jan19						updated links, 7Jul19	Coal India, India		19
649	682	726	775	775	784	813	831	889	969	996	1,020	1,091			21,870	Carbon dioxide	MtCO2	89.85%
2.6	2.8	2.9	3.1	3.1	3.2	3.3	3.4	3.6	3.9	4.0	4.1	4.4			88	Methane	MtCH4	10.15%
722	759	808	863	863	872	905	925	989	1,078	1,109	1,135	1,214			24,341	Total entity emissions	MtCO2e	100.00%
															24,341 check			
															updated links, 7Jul19	ConocoPhillips, USA		20
308	311	299	307	278	216	210	206	208	212	210	184	172			16,849	Carbon dioxide	MtCO2	88.50%
1.3	1.4	1.4	1.4	1.3	1.1	1.0	1.0	1.0	1.0	1.0	0.8	0.7			78	Methane	MtCH4	11.50%
346	351	337	345	314	246	240	234	237	241	237	208	193			19,039	Total entity emissions	MtCO2e	100.00%
															19,039 check			

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
114																										
115		21	CONSOL Energy, USA	IOC		1864-2015	coal																			
116			Carbon dioxide	MtCO2		2000-2015	CBM																	0.1	0.1	0.2
117			Methane	MtCH4		pasted sums 1854-1879 w link		19-Jul-18																0.000	0.000	0.001
118			Total entity emissions	MtCO2e																				0	0	0
119																										
120		22	Contura Energy / ANR, USA	IOC		1981-2018	coal																			
121			Carbon dioxide	MtCO2																						
122			Methane	MtCH4																						
123			Total entity emissions	MtCO2e																						
124																										
125		23	Cyprus Amax, USA	IOC		1969-1998	coal																			
126			Carbon dioxide	MtCO2																						
127			Methane	MtCH4																						
128			Total entity emissions	MtCO2e																						
129																										
130		24	Czech Republic (coal)	Nation-State		1993-2015	coal																			
131			Carbon dioxide	MtCO2																						
132			Methane	MtCH4																						
133			Total entity emissions	MtCO2e																						
134																										
135		25	Czechoslovakia (coal)	Nation-State		1938-1992	coal																			
136			Carbon dioxide	MtCO2																						
137			Methane	MtCH4																						
138			Total entity emissions	MtCO2e																						
139																										
140																										
141			Copyright Climate Accountability Institute			anno				1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
142																										
143		26	Devon Energy, USA	IOC																						
144			Carbon dioxide	MtCO2		1988-2015	oil & gas																			
145			Methane	MtCH4																						
146			Total entity emissions	MtCO2e																						
147																										
148		27	Ecopetrol, Colombia	SOE		1997-2015	oil & gas																			
149			Carbon dioxide	MtCO2																						
150			Methane	MtCH4																						
151			Total entity emissions	MtCO2e																						
152																										
153		28	Egyptian General Petroleum, Egypt	SOE		1959-2015	oil																			
154			Carbon dioxide	MtCO2		1970-2015	gas																			
155			Methane	MtCH4																						
156			Total entity emissions	MtCO2e																						
157																										
158		29	EnCana, Canada	IOC		1987-2015	oil & gas																			
159			Carbon dioxide	MtCO2																						
160			Methane	MtCH4																						
161			Total entity emissions	MtCO2e																						
162																										
163		30	ENI, Italy	IOC		1950-2015	oil & gas																			
164			Carbon dioxide	MtCO2																						
165			Methane	MtCH4																						
166			Total entity emissions	MtCO2e																						
167																										
168		31	EOG Resources, USA	IOC		1991-2018	oil																			
169			Carbon dioxide	MtCO2		1991-2018	gas																			
170			Methane	MtCH4																						
171			Total entity emissions	MtCO2e																						
172																										
173		32	EQT, USA	IOC		2008-2018	oil																			
174			Carbon dioxide	MtCO2		1992-2018	gas																			
175			Methane	MtCH4																						
176			Total entity emissions	MtCO2e																						
177																										
178		33	Equinor, Norway	IOC		1971-2018	oil																			
179			Carbon dioxide	MtCO2		1977-2018	gas																			
180			Methane	MtCH4																						
181			Total entity emissions	MtCO2e																						
182																										
183		34	Exxaro, South Africa	IOC		1988-2018	coal																			
184			Carbon dioxide	MtCO2																						
185			Methane	MtCH4																						
186			Total entity emissions	MtCO2e																						
187																										
188		35	ExxonMobil, USA	IOC		1884-2015	oil																			
189			Carbon dioxide	MtCO2		1900-2015	gas																			
190			Methane	MtCH4		1970-2002	coal																			
191			Total entity emissions	MtCO2e																						
192																										
193		36	FSU (Former Soviet Union) (coal oil gas)	Nation-State		1949-1991	oil																			
194			Carbon dioxide	MtCO2		1956-1988	gas																			
195			Methane	MtCH4		1900-1991	coal																			
196			Total entity emissions	MtCO2e																						
197																										
198		37	Gazprom, Russia	SOE		1989-2015	oil & gas																			
199			Carbon dioxide	MtCO2																						
200			Methane	MtCH4																						
201			Total entity emissions	MtCO2e																						
202																										
203		38	Glencore, Switzerland	IOC		1998-2015	coal																			
204			Carbon dioxide	MtCO2																						
205			Methane	MtCH4																						
206			Total entity emissions	MtCO2e																						
207																										
208		39	HeidelbergCement, Germany	IOC		1990-2015	cement																			
209			Carbon dioxide	MtCO2																						
210			Methane	MtCH4																						
211			Total entity emissions	MtCO2e																						
212																										
213		40	Hess, USA	IOC		1958-2015	oil & gas																			
214			Carbon dioxide	MtCO2																						
215			Methane	MtCH4																						
216			Total entity emissions	MtCO2e																						
217																										
218		41	Husky, Canada	IOC		1988-2015	oil & gas																			
219			Carbon dioxide	MtCO2																						
220			Methane	MtCH4																						
221			Total entity emissions	MtCO2e																						
222																										
223		42	Inpex, Japan	IOC		2004-2018	oil & gas																			
224			Carbon dioxide	MtCO2																						
225			Methane	MtCH4																						
226			Total entity emissions	MtCO2e																						
227																										
228		43	Iraq National Oil Co., Iraq	SOE		1960-2015	oil & gas																			
229			Carbon dioxide	MtCO2																						
230			Methane	MtCH4																						
231			Total entity emissions	MtCO2e																						
232																										

	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA
116	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.9	1.0	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.6	2	2	2	2
117	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.004	0.004	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
118	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
141	**1867**	**1868**	**1869**	**1870**	**1871**	**1872**	**1873**	**1874**	**1875**	**1876**	**1877**	**1878**	**1879**	**1880**	**1881**	**1882**	**1883**	**1884**	**1885**	**1886**	**1887**	**1888**	**1889**	**1890**	**1891**	**1892**	**1893**
189																		0	0	0	0	0	0	0	1	1	1
190																		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
191																		0	0	0	0	0	0	0	1	1	1

	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC
116	2	2	2	2	2	2	2	6	11	15	15	16	16	16	17	17	18	18	18	19	19	20	20	20	21	21	21	22
117	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
118	2	2	2	2	2	2	2	7	12	17	17	17	18	18	19	19	20	20	20	21	21	22	22	23	23	23	24	24

	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
189	1	1	1	1	1	1	2	2	3	3	3	4	5	5	5	6	7	8	8	8	8	9	10	12	13	16	18	18
190	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
191	1	1	1	1	2	2	2	3	3	3	4	4	5	6	6	7	8	8	9	9	9	10	12	13	15	17	19	19
194							36	35	33	32	31	30	29	28	27	26	25	23	22	21	20	19	18	17	16	15	13	21
195							0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
196							40	39	37	36	35	34	32	31	30	29	27	26	25	24	22	21	20	19	17	16	15	23

	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE
116	22	23	23	23	24	24	22	21	19	17	15	13	16	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
117	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
118	25	25	26	26	26	27	25	23	21	19	17	15	17	16	18	20	22	25	27	29	31	34	36	38	40	43	45	47
136																	60	58	56	54	51	49	47	45	43	41	39	38
137																	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
138																-	67	64	62	60	57	55	52	50	48	45	43	42
141	**1922**	**1923**	**1924**	**1925**	**1926**	**1927**	**1928**	**1929**	**1930**	**1931**	**1932**	**1933**	**1934**	**1935**	**1936**	**1937**	**1938**	**1939**	**1940**	**1941**	**1942**	**1943**	**1944**	**1945**	**1946**	**1947**	**1948**	**1949**
189	20	26	33	34	38	40	43	50	51	49	59	74	90	96	105	123	111	125	117	129	100	132	168	181	198	221	229	209
190	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.6	0.6
191	21	28	36	37	41	43	47	55	55	53	64	79	96	103	112	132	119	134	126	139	109	142	180	194	212	237	247	227
194	29	36	44	51	59	66	74	82	89	113	158	194	249	243	282	283	297	368	440	496	551	310	283	327	359	391	458	554
195	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.6	0.8	1.0	1.0	1.1	1.1	1.2	1.5	1.8	2.0	2.2	1.3	1.1	1.3	1.5	1.6	1.8	2.2
196	32	40	49	57	66	74	82	91	99	125	176	216	277	271	314	315	330	410	490	552	614	346	315	364	400	435	509	615

	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG
114																												
115																												
116	44	46	48	52	56	60	77	82	87	92	96	101	106	111	115	120	125	130	134	137	144	123	146	136	116	123	125	108
117	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.6	0.5	0.5	0.5	0.5	0.4
118	49	52	54	58	63	67	86	91	97	102	107	113	118	123	128	134	139	144	150	152	160	137	162	151	129	137	140	120
119																												
120																												
121																												
122																												
123																												
124																												
125																												
126																				22	28	26	32	32	39	42	47	54
127																				0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
128																				24	31	29	35	36	43	47	52	60
129																												
130																												
131																												
132																												
133																												
134																												
135																												
136	41	52	64	76	87	99	111	123	134	146	158	170	180	189	193	188	188	181	187	198	205	210	201	203	206	214	219	226
137	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9
138	45	58	71	84	97	110	123	136	149	162	175	190	200	211	215	209	209	202	208	221	228	234	224	226	229	239	244	251
139																												
140																												
141	**1950**	**1951**	**1952**	**1953**	**1954**	**1955**	**1956**	**1957**	**1958**	**1959**	**1960**	**1961**	**1962**	**1963**	**1964**	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**
142																												
143																												
144																												
145																												
146																												
147																												
148																												
149																												
150																												
151																												
152																												
153																												
154										1	1	1	1	1	2	2	2	1	2	3	5	4	3	2	2	3	24	31
155										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	0.0	0.0	0.0	0.0	0.1
156										1	1	1	1	2	2	2	2	2	2	4	5	4	3	2	2	3	25	32
157																												
158																												
159																												
160																												
161																												
162																												
163																												
164	1	2	3	4	6	7	9	10	11	13	15	15	27	32	40	39	40	38	39	45	51	58	68	82	71	69	73	69
165	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.3
166	1	2	3	6	7	9	11	13	13	16	18	19	31	37	45	44	46	43	45	52	58	66	78	92	81	78	83	78
167																												
168																												
169																												
170																												
171																												
172																												
173																												
174																												
175																												
176																												
177																												
178																												
179																						0.1	0.4	0.4	0.4	2	3	4
180																						0.0	0.0	0.0	0.0	0.0	0.0	0.0
181																						0.1	0.4	0.4	0.4	2.2	3	4
182																												
183																												
184																												
185																												
186																												
187																												
188																												
189	254	299	322	337	349	388	426	439	433	456	473	507	559	615	671	733	789	853	943	996	1,102	1,168	1,252	1,269	1,120	1,019	889	934
190	0.7	0.8	0.9	1.0	1.0	1.1	1.2	1.3	1.3	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.6	3.0	3.3	3.7	4.0	4.3	4.6	4.3	4.1	3.8	3.9
191	274	323	348	365	377	419	460	474	468	493	512	549	606	665	726	795	857	927	1,027	1,088	1,206	1,282	1,373	1,397	1,241	1,133	996	1,043
192																												
193																												
194	646	669	718	844	968	1,053	1,193	1,354	1,492	1,569	1,642	1,707	1,811	1,936	2,074	2,207	2,299	2,399	2,472	2,391	2,455	2,577	2,786	2,873	3,003	3,195	3,367	3,519
195	2.5	2.6	2.8	3.3	3.8	4.1	4.7	5.3	5.9	6.2	6.5	6.9	7.3	7.9	8.5	9.1	9.6	10.0	10.3	10.0	10.4	10.9	11.7	12.1	12.8	13.7	14.5	15.3
196	717	742	796	936	1,073	1,166	1,325	1,502	1,657	1,743	1,826	1,900	2,016	2,157	2,311	2,463	2,567	2,680	2,761	2,672	2,746	2,882	3,114	3,212	3,361	3,578	3,773	3,947
197																												
198																												
199																												
200																												
201																												
202																												
203																												
204																												
205																												
206																												
207																												
208																												
209																												
210																												
211																												
212																												
213																												
214									17	18	18	18	20	26	33	42	49	48	48	49	50	47	48	45	37	35	35	38
215									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
216									19	20	20	20	23	29	36	46	53	52	53	54	55	53	54	51	42	40	40	42
217																												
218																												
219																												
220																												
221																												
222																												
223																												
224																												
225																												
226																												
227																												
228																												
229											13.5	14.1	14.1	16.1	17.5	18.3	155	137	167	170	173	188	164	225	220	253	270	263
230											0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.5	0.5	0.5
231											14	15	15	17	18	19	163	144	176	179	182	199	173	237	232	267	285	277
232																												

	EH	EI	EJ	EK	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE	FF	FG	FH	FI
114																												
115																												
116	94	113	110	94	105	95	105	96	93	118	123	120	123	124	126	102	158	155	157	163	164	157	157	167	151	138	155	158
117	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.6	0.6	0.6	0.7	0.7	0.6	0.6	0.7	0.6	0.6	0.6	0.7
118	104	125	122	105	117	105	117	107	104	131	137	134	136	138	141	114	176	173	175	182	183	175	175	187	168	154	173	177
119																												
120																												
121				32	42	41	53	55	52	40	38	38	42	38	41	50	57	65	72	78	85	221	235	249	259	295	274	291
122				0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.9	0.9	1.0	1.0	1.2	1.1	1.2
123				35	47	46	59	61	58	45	43	42	47	42	45	55	64	72	80	87	95	246	262	277	289	328	304	324
124																												
125																												
126	58	67	78	68	75	77	80	74	68	95	97	102	116	119	115													
127	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5													
128	64	74	87	76	84	86	89	82	76	106	108	113	129	132	129													
129																												
130																												
131																127	115	112	116	111	102	90	98	99	95	96	96	92
132																0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
133																141	128	125	129	124	114	100	109	111	106	106	107	103
134																												
135																												
136	230	232	251	247	251	258	264	258	257	258	253	242	216	200	186													
137	0.9	0.9	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.8													
138	256	258	279	275	280	288	293	287	286	287	282	269	241	223	207													
139																												
140																												
141	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
142																												
143																												
144											1	1	35	36	42	55	59	74	73	77	84	80	95	85	88	82	81	74
145											0.0	0.0	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5
146											1	1	40	41	48	63	68	86	84	89	99	93	111	99	103	96	95	88
147																												
148																												
149										19	62	66	69	68	69	71	69	91	67	102	76	125	55	61	67	88	80	81
150										0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.2
151										21	68	72	74	73	74	77	75	98	72	110	82	134	59	66	73	95	86	86
152																												
153																												
154	36	39	44	45	51	56	64	70	65	72	69	72	73	74	73	76	77	79	80	76	75	78	76	79	79	84	84	93
155	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.5
156	38	41	47	48	55	60	68	74	70	77	75	78	78	80	79	82	84	86	88	83	82	85	84	89	89	95	95	107
157																												
158																												
159										21	26	26	28	29	34	40	44	49	55	56	60	68	76	84	90	85	95	100
160										0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.5	0.6	0.5	0.6	0.7
161										25	30	30	33	33	40	46	51	56	64	64	69	78	89	98	106	100	113	119
162																												
163																												
164	77	76	75	63	62	62	68	68	69	81	89	96	104	106	108	115	126	132	132	137	139	143	159	184	197	210	218	237
165	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.8	0.9	0.9	1.0	1.1
166	87	86	85	72	72	71	77	77	79	92	101	108	117	119	121	130	142	148	148	154	157	160	179	206	222	236	245	267
167																												
168																												
169														12	13	16	18	18	20	21	22	22	24	24	23	24	27	31
170														0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
171														14	16	20	22	22	25	26	27	27	29	29	29	29	32	38
172																												
173																												
174															3	3	3	4	3	3	2	2	4	4	4	4	4	4
175															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
176														-	4	4	4	5	4	4	2	2	5	4	4	5	5	5
177																												
178																												
179	8	13	19	21	24	31	50	53	56	64	66	71	71	88	97	102	114	113	115	124	148	196	190	189	205	213	222	227
180	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.7	0.8	0.6	0.7	0.8	0.8	0.9	1.0
181	9	15	21	24	27	34	54	57	60	71	72	78	77	95	105	111	123	121	125	139	167	219	208	208	226	236	246	254
182																												
183																												
184																					38	33	36	37	40	42	43	44
185																					0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2
186																				-	42	37	40	42	45	47	48	49
187																												
188																												
189	898	933	766	506	488	519	570	595	596	618	630	638	628	647	630	629	653	609	611	614	608	608	614	605	586	579	587	574
190	3.8	3.9	3.1	2.5	2.3	2.3	2.6	2.6	2.6	2.7	2.8	2.9	2.9	3.0	2.9	2.9	3.0	2.8	2.9	2.9	2.9	2.8	2.9	2.8	2.8	2.7	2.7	2.7
191	1,005	1,042	853	576	551	583	642	669	669	694	708	720	708	730	712	711	738	688	693	695	688	687	694	684	664	656	663	648
192																												
193																												
194	3,691	3,808	4,150	4,200	4,309	4,378	4,483	4,591	4,788	4,895	5,033	3,331	3,362	2,860														
195	16.0	16.6	17.7	18.2	18.9	19.6	20.5	21.6	22.8	23.5	24.6	9.8	10.2	8.4														
196	4,139	4,273	4,646	4,708	4,839	4,926	5,058	5,197	5,425	5,553	5,721	3,606	3,647	3,097	-													
197																												
198																												
199												1,355	1,388	1,380	1,324	1,277	1,256	1,249	1,191	1,145	1,195	1,194	1,151	1,139	1,178	1,232	1,267	1,256
200												12	12	12	12	11	11	11	10	10	10	10	10	10	10	10	11	11
201												1,693	1,734	1,724	1,655	1,596	1,569	1,557	1,483	1,423	1,484	1,484	1,429	1,411	1,456	1,521	1,563	1,552
202																												
203																												
204																					107	100	102	101	174	148	148	152
205																					0.4	0.4	0.4	0.4	0.7	0.6	0.6	0.6
206																					119	111	113	113	193	164	164	169
207																												
208																												
209													51	51	50	49	49	48	47	47	46	45	45	43	42	44	47	50
210																												
211													51	51	50	49	49	48	47	47	46	45	45	43	42	44	47	50
212																												
213																												
214	37	40	38	37	36	35	34	31	31	30	31	33	39	45	51	49	53	55	48	42	41	46	51	60	61	50	46	45
215	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
216	41	45	42	41	40	39	37	35	35	34	35	37	44	51	57	55	59	61	53	47	45	51	56	66	67	56	51	50
217																												
218																												
219											9	13	11	11	12	12	13	14	14	15	15	15	24	37	40	42	44	42
220											0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
221											10	14	13	12	14	14	15	16	16	17	16	17	27	41	45	47	49	47
222																												
223																												
224																											31	50
225																											0.2	0.2
226																											37	57
227																												
228																												
229	286	388	282	112	114	113	135	161	190	237	309	336	236	36	52	63	69	70	72	135	246	285	292	271	230	148	227	214
230	0.6	0.8	0.6	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.5	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.5	0.6	0.6	0.5	0.5	0.3	0.5	0.4
231	302	409	297	118	120	119	143	169	201	251	327	356	250	38	56	67	74	75	77	144	261	301	308	287	243	156	240	226
232																												

	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB	GC	GD	GE	GF	GG
114																								
115																			CONSOL Energy, USA				21	
116	155	148	151	134	148	81	71	76	86	85	78	82	43			V	8,899		Carbon dioxide	MtCO2		89.63%		
117	0.6	0.6	0.6	0.6	0.6	0.4	0.3	0.4	0.4	0.4	0.4	0.5	0.3			V	37		Methane	MtCH4		10.37%		
118	173	166	169	150	166	91	81	86	98	97	90	95	51			V	9,929		Total entity emissions	MtCO2e		100.00%		
119																	9,929 check							
120																			Contura Energy / ANR, USA				22	
121	306	306	302	274	269	275	245	196	181	159	28	24	40			V	5,348		Carbon dioxide	MtCO2		89.85%		
122	1.2	1.2	1.2	1.1	1.1	1.1	1.0	0.8	0.7	0.6	0.1	0.1	0.2			V	22		Methane	MtCH4		10.15%		
123	340	341	336	305	299	306	273	218	201	177	31	27	44			V	5,953		Total entity emissions	MtCO2e		100.00%		
124																	5,953 check							
125											Delete								Cyprus Amax, USA				23	
126																V	1,611		Carbon dioxide	MtCO2		89.85%		
127																V	7		Methane	MtCH4		10.15%		
128																V	1,793		Total entity emissions	MtCO2e		100.00%		
129																	1,793 check							
130								Nation-State coal production revised 2013-2017											Czech Republic (coal)				24	
131	93	92	89	84	82	86	83	74	70	69	68	67	62			V	2,370		Carbon dioxide	MtCO2		89.85%		
132	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3			V	10		Methane	MtCH4		10.15%		
133	103	103	100	94	92	96	92	82	78	77	75	74	70			V	2,638		Total entity emissions	MtCO2e		100.00%		
134																	2,638 check							
135																			Czechoslovakia (coal)				25	
136																V	8,634		Carbon dioxide	MtCO2		89.85%		
137																V	35		Methane	MtCH4		10.15%		
138																V	9,610		Total entity emissions	MtCO2e		100.00%		
139																	9,610 check							
140																								
141	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019			MtCO2e		Entities	Copyright Climate Accountability Inst				
142																								
143																			Devon Energy, USA				26	
144	72	81	80	83	82	86	90	91	89	91	80	75	72			V	2,193		Carbon dioxide	MtCO2		85.97%		
145	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.5	0.5	0.4	0.4	0.3	0.3			V	13		Methane	MtCH4		14.03%		
146	85	95	95	99	97	102	105	106	102	103	90	84	81			V	2,551		Total entity emissions	MtCO2e		100.00%		
147																	2,551 check							
148																			Ecopetrol, Colombia				27	
149	52	54	60	70	83	91	95	100	95	103	97	97	97			V	2,482		Carbon dioxide	MtCO2		92.51%		
150	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3			V	7		Methane	MtCH4		7.49%		
151	56	59	66	76	90	98	103	109	103	112	105	105	106			V	2,683		Total entity emissions	MtCO2e		100.00%		
152																	2,683 check							
153																			Egyptian General Petroleum, Egypt				28	
154	104	105	111	115	113	114	114	110	101	97	93	100	108			V	3,417		Carbon dioxide	MtCO2		89.45%		
155	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.6	0.6			V	14		Methane	MtCH4		10.55%		
156	121	122	129	135	132	133	132	127	117	112	106	116	127			V	3,819		Total entity emissions	MtCO2e		100.00%		
157																	3,819 check							
158																			EnCana, Canada				29	
159	95	94	100	64	71	75	68	66	62	53	46	41	48			V	1,950		Carbon dioxide	MtCO2		84.17%		
160	0.7	0.7	0.8	0.6	0.6	0.7	0.6	0.5	0.5	0.3	0.3	0.2	0.3			V	13		Methane	MtCH4		15.83%		
161	114	114	122	80	88	94	84	82	75	63	55	48	55			V	2,316		Total entity emissions	MtCO2e		100.00%		
162																	2,316 check							
163																			ENI, Italy				30	
164	233	228	236	232	234	197	209	197	204	225	213	218	220			V	7,115		Carbon dioxide	MtCO2		88.20%		
165	1.0	1.1	1.1	1.1	1.1	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.1			V	34		Methane	MtCH4		11.80%		
166	263	258	267	263	266	223	238	224	233	257	243	250	252			V	8,067		Total entity emissions	MtCO2e		100.00%		
167																	8,067 check							
168																			EOG Resources, USA				31	
169	34	37	43	46	50	56	62	68	80	77	75	82	97			V	1,120		Carbon dioxide	MtCO2		85.37%		
170	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4			V	7		Methane	MtCH4		14.63%		
171	41	45	52	55	60	65	71	77	90	86	84	91	108			V	1,311		Total entity emissions	MtCO2e		100.00%		
172																	1,311 check							
173																			EQT, USA				32	
174	4	4	5	6	8	12	16	22	28	35	44	52	87			V	371		Carbon dioxide	MtCO2		80.83%		
175	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.7			V	3		Methane	MtCH4		19.17%		
176	6	6	6	8	10	15	19	27	34	44	55	64	108			V	459		Total entity emissions	MtCO2e		100.00%		
177																	459 check							
178																			Equinor, Norway				33	
179	223	227	232	233	221	213	235	222	226	236	240	249	252			V	5,911		Carbon dioxide	MtCO2		89.51%		
180	1.0	1.0	1.1	1.1	1.0	1.0	1.2	1.1	1.1	1.1	1.1	1.3	1.3			V	25		Methane	MtCH4		10.49%		
181	251	254	261	263	251	241	268	252	256	267	272	284	288			V	6,604		Total entity emissions	MtCO2e		100.00%		
182																	6,604 check							
183																			Exxaro, South Africa				34	
184	92	91	99	101	97	88	91	89	91	97	96	101	105			V	1,552		Carbon dioxide	MtCO2		89.85%		
185	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4			V	6		Methane	MtCH4		10.15%		
186	103	101	110	113	108	98	101	99	102	109	107	112	117			V	1,727		Total entity emissions	MtCO2e		100.00%		
187																	1,727 check							
188																			ExxonMobil, USA				35	
189	602	600	576	586	593	599	563	555	528	547	542	532	513			V	47,505		Carbon dioxide	MtCO2		89.94%		
190	2.7	2.8	2.8	2.9	3.0	3.1	2.9	2.9	2.7	2.6	2.6	2.6	2.4			V	190		Methane	MtCH4		10.06%		
191	678	678	653	666	676	687	646	635	604	621	614	604	580			V	52,817		Total entity emissions	MtCO2e		100.00%		
192																	52,817 check							
193																			FSU (Former Soviet Union) (coal oil gas)				36	
194																V	120,522		Carbon dioxide	MtCO2		89.46%		
195																V	507		Methane	MtCH4		10.54%		
196																V	134,720		Total entity emissions	MtCO2e		100.00%		
197																	134,720 check							
198																			Gazprom, Russia				37	
199	1,267	1,251	1,247	1,063	1,164	1,176	1,128	1,161	1,074	1,026	1,037	1,148	1,244			V	36,163		Carbon dioxide	MtCO2		80.80%		
200	11	10	10	9	10	10	9	9	9	8	8	9	10			V	307		Methane	MtCH4		19.20%		
201	1,564	1,544	1,540	1,310	1,436	1,451	1,389	1,424	1,315	1,253	1,266	1,404	1,527			V	44,757		Total entity emissions	MtCO2e		100.00%		
202																	44,757 check							
203										Glencore and Xstrata merged in May 2013									Glencore, Switzerland				38	
204	189	204	210	209	197	210	325	340	360	324	307	297	319			V	4,521		Carbon dioxide	MtCO2		89.85%		
205	0.8	0.8	0.8	0.8	0.8	0.8	1.3	1.4	1.5	1.3	1.2	1.2	1.3			V	18		Methane	MtCH4		10.15%		
206	210	227	234	232	219	234	362	378	401	360	342	330	355			V	5,032		Total entity emissions	MtCO2e		100.00%		
207																	5,032 check							
208										Lafarge acquired Italcementi Oct16									HeidelbergCement, Germany				39	
209	57	64	63	54	55	59	57	59	60	60	58	49	51			V	1,502		Carbon dioxide	MtCO2		100.00%		
210																	-		Methane	MtCH4		0.00%		
211	57	64	63	54	55	59	57	59	60	60	58	49	51			V	1,502		Total entity emissions	MtCO2e		100.00%		
212																	1,502 check							
213																			Hess, USA				40	
214	49	51	51	55	57	50	55	45	45	51	44	41	37			V	2,544		Carbon dioxide	MtCO2		89.87%		
215	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2			V	10		Methane	MtCH4		10.13%		
216	54	56	57	61	62	55	60	50	49	56	48	46	42			V	2,831		Total entity emissions	MtCO2e		100.00%		
217																	2,831 check							
218																			Husky, Canada				41	
219	49	51	48	41	39	42	41	42	46	47	43	44	40			V	955		Carbon dioxide	MtCO2		89.71%		
220	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2			V	4		Methane	MtCH4		10.29%		
221	54	56	53	46	43	47	45	47	51	52	48	48	45			V	1,065		Total entity emissions	MtCO2e		100.00%		
222																	1,065 check							
223																			Inpex, Japan				42	
224	51	56	56	54	54	57	54	52	52	52	67	68	59			V	813		Carbon dioxide	MtCO2		88.60%		
225	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.2			V	4		Methane	MtCH4		11.40%		
226	57	63	64	61	62	64	61	59	59	59	74	75	65			V	918		Total entity emissions	MtCO2e		100.00%		
227																	918 check							
228																			Iraq National Oil Co., Iraq				43	
229	228	242	277	280	281	304	346	355	395	465	510	512	533			V	12,514		Carbon dioxide	MtCO2		94.50%		
230	0.5	0.5	0.6	0.6	0.6	0.7	0.8	0.8	0.9	1.0	1.1	1.1	1.2			V	26		Methane	MtCH4		5.50%		
231	241	257	294	298	298	322	367	377	421	493	541	543	566			V	13,241		Total entity emissions	MtCO2e		100.00%		
232																	13,241 check							

	A	B	C	D	E	F	G	H	I
233									
234		44	Kazakhstan (coal)	Nation-State		1992-2015	coal		
235			Carbon dioxide	MtCO2					
236			Methane	MtCH4					
237			Total entity emissions	MtCO2e					
238									
239		45	Kiewit Mining Group, USA	IOC		1944-2015	coal		
240			Carbon dioxide	MtCO2					
241			Methane	MtCH4					
242			Total entity emissions	MtCO2e					
243									
244		46	Kuwait Petroleum Corp., Kuwait	SOE		1946-2015	oil		
245			Carbon dioxide	MtCO2		1964-2015	gas		
246			Methane	MtCH4					
247			Total entity emissions	MtCO2e					
248									
249		47	LafargeHolcim, France	IOC		1990-2015	cement		
250			Carbon dioxide	MtCO2					
251			Methane	MtCH4					
252			Total entity emissions	MtCO2e					
253									
254		48	Libya National Oil Corp., Libya	SOE		1961-2015	oil		
255			Carbon dioxide	MtCO2		1970-2015	gas		
256			Methane	MtCH4					
257			Total entity emissions	MtCO2e					
258									
259		49	Lukoil, Russia	IOC		1996-2015	oil & gas		
260			Carbon dioxide	MtCO2					
261			Methane	MtCH4					
262			Total entity emissions	MtCO2e					
263									
264		50	Marathon, USA	IOC		1938-2015	oil		
265			Carbon dioxide	MtCO2		1949-2015	gas		
266			Methane	MtCH4					
267			Total entity emissions	MtCO2e					
268									
269		51	Murphy Oil, USA	IOC		1983-2015	oil & gas		
270			Carbon dioxide	MtCO2					
271			Methane	MtCH4					
272			Total entity emissions	MtCO2e					
273									
274		52	Murray Coal Corporation, USA	IOC		1988-2015	coal		
275			Carbon dioxide	MtCO2					
276			Methane	MtCH4					
277			Total entity emissions	MtCO2e					
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280			Copyright Climate Accountability Institute			anno			
281									
282		53	National Iranian Oil Co.	SOE		1928-2015	oil		
283			Carbon dioxide	MtCO2		1956-2015	gas		
284			Methane	MtCH4					
285			Total entity emissions	MtCO2e					
286									
287		54	Nigerian National Petroleum, Nigeria	SOE		1959-2015	oil		
288			Carbon dioxide	MtCO2		1960-2015	gas		
289			Methane	MtCH4					
290			Total entity emissions	MtCO2e					
291									
292		55	Noble Energy, USA	IOC		1992-2018	oil & gas		
293			Carbon dioxide	MtCO2					
294			Methane	MtCH4					
295			Total entity emissions	MtCO2e					
296									
297		56	North American Coal, USA	IOC		1950-2015	coal		
298			Carbon dioxide	MtCO2					
299			Methane	MtCH4					
300			Total entity emissions	MtCO2e					
301									
302		57	North Korea (coal)	Nation-State		1980-2015	coal		
303			Carbon dioxide	MtCO2					
304			Methane	MtCH4					
305			Total entity emissions	MtCO2e					
306									
307		58	Novatek, Russian Federation	IOC		2002-2018	oil & gas		
308			Carbon dioxide	MtCO2					
309			Methane	MtCH4					
310			Total entity emissions	MtCO2e					
311									
312		59	Obsidian, Canada	IOC		1996-2018	oil & gas		
313			Carbon dioxide	MtCO2					
314			Methane	MtCH4					
315			Total entity emissions	MtCO2e					
316									
317		60	Occidental, USA	IOC		1958-2015	oil & gas		
318			Carbon dioxide	MtCO2		1945-1992	coal		
319			Methane	MtCH4					
320			Total entity emissions	MtCO2e					
321									
322		61	Oil & Gas Corp., India	SOE		1956-2015	oil & gas		
323			Carbon dioxide	MtCO2					
324			Methane	MtCH4					
325			Total entity emissions	MtCO2e					
326									
327		62	OMV Group, Austria	IOC		1997-2015	oil & gas		
328			Carbon dioxide	MtCO2					
329			Methane	MtCH4					
330			Total entity emissions	MtCO2e					
331									
332		63	Peabody Energy, USA	IOC		1945-2015	coal		
333			Carbon dioxide	MtCO2					
334			Methane	MtCH4					
335			Total entity emissions	MtCO2e					
336									
337		64	Pertamina, Indonesia	SOE		1958-2015	oil & gas		
338			Carbon dioxide	MtCO2					
339			Methane	MtCH4					
340			Total entity emissions	MtCO2e					
341									
342		65	Petoro. Norway	IOC		1999-2018	oil & gas		
343			Carbon dioxide	MtCO2					
344			Methane	MtCH4					
345			Total entity emissions	MtCO2e					
346									
347									
348		66	PetroChina, China	SOE		1988-2018	oil & gas		
349			Carbon dioxide	MtCO2					
350			Methane	MtCH4					
351			Total entity emissions	MtCO2e					
352									

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280	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866

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233																												
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280	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
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	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE
233																												
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237																												
238																												
239																												
240																							6	6	6	6	6	6
241																							0.02	0.02	0.02	0.02	0.03	0.03
242																							6	7	7	7	7	7
243																												
244																												
245																									0	1	2	4
246																									0.0	0.0	0.0	0.0
247																									0	1	3	4
248																												
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263																												
264																												
265																	7.3	7.9	8.6	9.5	10.4	11.3	12.1	12.0	11.9	12.5	13.3	13.2
266																	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
267																	8	8	9	10	11	12	13	13	13	13	14	14
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280	**1922**	**1923**	**1924**	**1925**	**1926**	**1927**	**1928**	**1929**	**1930**	**1931**	**1932**	**1933**	**1934**	**1935**	**1936**	**1937**	**1938**	**1939**	**1940**	**1941**	**1942**	**1943**	**1944**	**1945**	**1946**	**1947**	**1948**	**1949**
281																												
282																												
283							2	2	2	2	2	2	2	2	2	3	3	3	2	2	3	3	4	5	5	6	7	8
284							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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
285						-	2	2	2	2	2	2	2	2	2	3	3	3	3	2	3	3	4	5	6	6	7	8
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318																								5	7	9	11	13
319																								0.0	0.0	0.0	0.0	0.1
320																								6	8	10	13	15
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332																												
333																								1	4	7	10	13
334																								0.0	0.0	0.0	0.0	0.1
335																								1	4	8	11	14
336																												
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	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG
240	7	7	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10	10	10	10	11	11	11	11	12	12
241	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05
242	7	7	8	8	8	8	8	9	9	9	9	9	10	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13
245	5	7	9	11	13	15	17	19	20	22	23	24	27	29	32	33	34	35	37	39	43	45	75	139	291	298	309	284
246	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.6	0.6	0.7	0.6
247	5	7	9	12	14	16	18	20	21	23	25	25	29	31	34	34	36	36	39	42	45	48	80	147	308	316	327	302
255												0	3	6	12	17	21	24	36	43	93	114	127	160	123	131	183	211
256												0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4
257												0	3	7	13	18	22	25	38	45	98	121	134	170	130	139	194	223
265	14.3	16.3	17.3	18.5	18.2	20.0	21.0	20.9	20.0	21.5	21.4	22.6	25.0	27.7	32.0	35.2	40.2	40.6	45.8	50.0	57.2	55.1	53.6	52.1	47.3	46.1	49.1	52.9
266	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
267	15	18	19	20	20	22	23	23	22	24	24	25	28	31	35	38	44	44	50	54	62	60	58	57	52	50	54	58
280	**1950**	**1951**	**1952**	**1953**	**1954**	**1955**	**1956**	**1957**	**1958**	**1959**	**1960**	**1961**	**1962**	**1963**	**1964**	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**
283	9	31	2	4	10	45	74	100	114	128	150	172	190	212	239	267	297	362	396	473	553	645	720	851	878	784	859	821
284	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.2	1.3	1.5	1.9	2.0	1.8	2.0	1.8
285	9	33	2	4	10	47	78	105	120	135	158	182	201	225	252	281	314	382	417	499	586	683	763	904	934	835	914	872
288										0	0	1	1	1	2	4	6	4	2	7	15	53	63	71	78	62	72	72
289										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	0.1	0.1	0.1	0.1	0.1	0.1
290										0	0	1	1	1	2	4	6	5	2	8	16	56	66	75	82	65	76	76
298	2	2	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	10	10	11	9	13	12	11	11	12	10
299	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
300	3	3	3	3	3	3	3	4	4	4	4	4	4	4	5	5	5	5	11	11	12	10	14	13	12	12	13	11
303													43	42	40	38	39	40	41	42	43	47	52	56	60	64	69	73
304													0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
305													48	46	44	43	44	45	46	47	48	53	58	62	67	72	76	81
318	15	18	13	13	16	19	22	25	28	39	50	61	71	82	93	104	114	125	136	154	160	134	105	88	72	66	66	75
319	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2
320	17	20	15	14	18	21	25	28	32	43	55	66	78	89	101	112	124	135	147	166	173	145	114	96	79	72	72	82
323							1	2	2	2	2	2	3	5	7	9	14	17	18	21	21	21	23	23	23	25	28	31
324							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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
325							1	2	2	2	2	2	4	5	7	9	15	19	19	23	23	23	25	24	24	27	30	33
333	16	27	21	16	18	23	43	45	44	51	56	58	64	77	91	96	106	110	114	117	133	110	141	137	134	144	139	129
334	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.6	0.6	0.5	0.6	0.6	0.5
335	18	30	24	18	20	25	48	51	49	56	63	65	72	86	102	107	118	122	126	130	148	122	157	153	149	160	154	143
338									0.2	27	30	30	33	32	34	35	33	36	43	54	62	64	78	95	98	95	110	127
339									0.00	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3
340									0	29	31	32	34	34	35	37	35	38	46	57	65	68	82	100	104	100	116	135

	EH	EI	EJ	EK	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE	FF	FG	FH	FI
233																												
234																												
235															298	253	235	190	175	165	163	137	176	180	167	190	196	195
236															1.2	1.0	0.9	0.8	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.8	0.8	0.8
237															332	281	262	212	195	184	181	152	196	201	186	212	218	217
238																												
239																												
240	12	12	13	13	13	14	14	14	15	15	29	25	25	27	32	24	24	23	24	25	24	25	24	24	24	21	48	46
241	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.12	0.10	0.10	0.11	0.13	0.10	0.10	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.08	0.20	0.19
242	14	14	14	15	15	15	16	16	16	17	32	28	28	30	36	27	27	26	27	27	27	28	27	27	27	23	54	51
243																												
244																												
245	307	359	256	188	123	123	162	148	180	151	180	237	155	20	151	270	289	289	289	310	267	243	311	300	287	294	344	320
246	0.7	0.8	0.6	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.6	0.4	0.0	0.3	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8
247	326	381	273	200	131	131	172	158	192	161	192	253	165	21	160	286	306	306	306	330	285	260	331	319	306	313	366	342
248																												
249																												
250													73	75	77	79	81	83	85	87	89	91	93	96	99	101	107	111
251																												
252													73	75	77	79	81	83	85	87	89	91	93	96	99	101	107	111
253																												
254																												
255	203	216	184	118	120	116	115	112	111	105	125	123	145	157	152	145	146	147	150	155	149	141	151	147	143	152	165	185
256	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5
257	215	230	195	125	127	123	123	120	119	112	133	132	155	167	162	154	156	157	159	165	159	150	161	157	152	161	176	198
258																												
259																												
260																			163	173	185	218	225	212	221	230	249	262
261																			0.3	0.4	0.4	0.5	0.5	0.4	0.5	0.5	0.5	0.6
262																			172	183	197	231	239	224	234	244	265	278
263																												
264																												
265	50.7	50.2	49.8	49.5	49.1	48.8	48.4	56.6	56.6	51.0	54.8	56.1	51.9	49.7	42.7	40.0	43.5	50.7	49.3	48.6	52.2	55.4	54.1	56	55	52	47	42
266	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
267	55	54	54	54	54	54	54	64	64	58	62	65	60	57	49	46	50	58	57	56	60	64	62	64	63	59	54	49
268																												
269																												
270						11.4	11.2	11.4	11.4	10.6	11.0	11.1	10.8	9.0	9.7	10.7	12.6	13.2	12.2	13.6	13.1	14.2	13.9	15	17	16	16	16
271						0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
272						13	12	13	13	12	12	13	12	10	11	12	14	15	14	16	15	16	16	17	19	18	18	17
273																												
274																												
275											2	5	8	11	13	16	19	22	24	27	30	33	36	35	44	43	48	44
276											0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
277											2	6	9	12	15	18	21	24	27	30	33	37	40	39	49	48	53	49
278																												
279																												
280	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
281																												
282																												
283	755	461	246	204	322	356	330	347	315	353	353	438	479	518	532	553	573	584	600	613	615	621	645	661	642	697	740	799
284	1.6	1.0	0.6	0.5	0.7	0.8	0.8	0.9	0.8	0.9	1.0	1.2	1.2	1.4	1.4	1.4	1.6	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.5	2.6	3.0
285	801	490	261	217	342	379	353	373	337	379	380	470	514	556	571	593	616	630	649	665	669	677	704	724	707	767	814	884
286																												
287																												
288	66	136	172	122	109	106	119	128	126	116	128	150	158	164	171	172	170	174	174	185	186	184	187	194	197	207	224	265
289	0.1	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.8
290	70	144	181	128	115	112	125	135	133	123	136	160	168	174	182	183	180	185	185	197	198	195	198	206	211	222	242	289
291																												
292																												
293															6.8	6.9	8.2	9.1	14.8	17.3	17.2	13.8	12.2	13	11	12	14	19
294															0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
295															8	8	10	11	18	21	20	16	15	16	13	14	16	22
296																												
297																												
298	9	13	14	13	15	16	21	24	26	23	25	25	24	25	27	29	30	29	29	31	35	34	34	34	37	39	38	38
299	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
300	10	14	16	14	17	18	23	27	29	25	27	27	27	28	30	32	33	33	32	34	39	38	38	38	42	43	42	42
301																												
302																												
303	77	81	75	78	82	83	85	67	67	66	80	62	82	77	72	67	63	59	52	51	46	52	56	57	54	55	56	60
304	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
305	86	90	83	87	91	92	94	75	74	74	89	68	91	86	80	75	70	65	58	57	51	58	62	64	60	61	63	66
306																												
307																												
308																									23	46	51	59
309																									0.2	0.4	0.4	0.5
310																									28	57	62	72
311																												
312																												
313																			4	5	6	8	11	12	13	13	14	13
314																			0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
315																			5	6	7	10	13	14	15	16	16	15
316																												
317																												
318	78	96	89	84	90	107	85	92	97	101	96	88	89	82	79	48	51	59	61	62	68	67	73	70	82	83	87	105
319	0.2	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
320	84	105	97	91	99	117	95	102	108	112	108	99	99	92	89	53	57	65	68	68	75	74	81	78	90	90	95	113
321																												
322																												
323	34	37	28	49	59	73	79	94	98	100	106	115	118	114	111	106	121	137	135	138	118	113	123	126	125	130	135	124
324	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6
325	37	39	30	52	63	78	84	100	106	108	115	126	129	126	123	118	135	152	151	154	132	127	140	143	142	147	153	140
326																												
327																												
328																				8	9	10	11	11	11	16	17	16
329																				0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
330																				9	9	11	12	12	13	18	19	18
331																												
332																												
333	103	127	116	102	113	105	127	122	131	164	168	180	194	217	240	263	285	305	316	336	350	364	347	381	389	399	446	472
334	0.4	0.5	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.7	0.7	0.7	0.8	0.9	1.0	1.1	1.2	1.2	1.3	1.4	1.4	1.5	1.4	1.5	1.6	1.6	1.8	1.9
335	115	141	129	113	126	117	141	136	146	182	187	200	216	241	267	292	318	340	352	374	390	405	386	424	433	445	497	525
336																												
337																												
338	127	128	136	140	120	124	136	130	135	122	227	238	251	275	244	243	275	275	296	260	251	257	249	233	22	38	42	43
339	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.7	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.1	1.0	1.0	1.1	1.0	0.9	0.1	0.2	0.2	0.3
340	136	137	147	151	130	135	149	144	150	136	247	259	274	301	269	268	303	303	326	289	278	287	277	259	25	44	48	50
341																												
342																												
343																						214	219	205	182	183	175	163
344																						0.8	0.8	0.7	0.7	0.7	0.7	0.7
345																						235	241	226	201	203	195	182
346																												
347																												
348																												
349											68	409	413	419	424	436	444	451	482	487	487	452	399	365	377	397	403	434
350											0.2	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.0	1.0	1.1	1.1	1.2	1.4
351											73	437	441	447	453	466	475	482	517	521	522	486	428	393	406	429	437	473
352																												

	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB	GC	GD	GE	GF	GG
233																								
234								Nation-State coal production revised 2013-2017											Kazakhstan (coal)				44	
235	228	231	233	238	261	274	284	282	269	253	243	265	278			V	6,061		Carbon dioxide	MtCO2		89.85%		
236	0.9	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.1	1.1			V	24		Methane	MtCH4		10.15%		
237	254	257	260	265	291	305	316	314	299	282	270	295	309			V	6,745		Total entity emissions	MtCO2e		100.00%		
238																	6,745 check							
239																			Kiewit Mining Group, USA				45	
240	36	60	56	53	53	48	36	32	28	26	19	31	29			V	1,425		Carbon dioxide	MtCO2		89.85%		
241	0.15	0.24	0.22	0.21	0.21	0.19	0.15	0.13	0.11	0.10	0.08	0.13	0.12			V	6		Methane	MtCH4		10.15%		
242	40	66	62	59	59	53	40	35	31	29	21	35	33			V	1,586		Total entity emissions	MtCO2e		100.00%		
243																	1,586 check							
244																			Kuwait Petroleum Corp., Kuwait				46	
245	290	323	347	301	305	374	412	388	427	430	431	409	415			V	13,348		Carbon dioxide	MtCO2		93.88%		
246	0.7	0.8	0.8	0.7	0.7	0.9	1.0	1.0	1.0	1.1	1.1	1.0	1.0			V	31		Methane	MtCH4		6.12%		
247	311	345	370	322	326	399	441	415	456	460	461	438	444			V	14,218		Total entity emissions	MtCO2e		100.00%		
248																	14,218 check							
249									Lafarge merged with Holcim in 2015										LafargeHolcim, France				47	
250	120	126	133	121	123	124	127	125	128	90	87	89	84			V	2,907		Carbon dioxide	MtCO2		100.00%		
251																	-		Methane	MtCH4		0.00%		
252	120	126	133	121	123	124	127	125	128	90	87	89	84			V	2,907		Total entity emissions	MtCO2e		100.00%		
253																	2,907 check							
254																			Libya National Oil Corp., Libya				48	
255	199	209	211	201	203	62	167	119	74	66	63	103	117			V	7,177		Carbon dioxide	MtCO2		93.73%		
256	0.5	0.6	0.6	0.5	0.6	0.2	0.4	0.4	0.3	0.2	0.2	0.3	0.3			V	17		Methane	MtCH4		6.27%		
257	214	224	227	216	219	67	180	129	81	73	69	111	126			V	7,657		Total entity emissions	MtCO2e		100.00%		
258																	7,657 check							
259																			Lukoil, Russia				49	
260	292	297	299	302	305	289	290	300	317	329	307	302	311			V	6,079		Carbon dioxide	MtCO2		93.11%		
261	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	1.0	0.9	1.0	1.1			V	16		Methane	MtCH4		6.89%		
262	313	318	322	324	328	312	314	326	344	356	333	330	341			V	6,529		Total entity emissions	MtCO2e		100.00%		
263																	6,529 check							
264																			Marathon, USA				50	
265	49	47	55	56	54	54	63	66	62	58	53	53	56			V	3,210		Carbon dioxide	MtCO2		89.63%		
266	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2			V	13		Methane	MtCH4		10.37%		
267	55	53	62	63	61	60	71	73	69	64	59	60	63			V	3,581		Total entity emissions	MtCO2e		100.00%		
268																	3,581 check							
269																			Murphy Oil, USA				51	
270	14	14	18	22	25	24	26	28	30	28	24	22	23			V	589		Carbon dioxide	MtCO2		89.29%		
271	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			V	3		Methane	MtCH4		10.71%		
272	15	15	19	24	28	27	29	31	34	31	26	25	26			V	659		Total entity emissions	MtCO2e		100.00%		
273																	659 check							
274																			Murray Coal Corporation, USA				52	
275	45	61	58	56	55	59	65	144	139	123	102	101	103			V	1,568		Carbon dioxide	MtCO2		89.85%		
276	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.6	0.6	0.5	0.4	0.4	0.4			V	6		Methane	MtCH4		10.15%		
277	50	68	64	62	61	65	72	160	155	137	113	113	114			V	1,746		Total entity emissions	MtCO2e		100.00%		
278																	1,746 check							
279																								
280	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		MtCO2e		Entities			Copyright Climate Accountability Inst		
281																								
282																			National Iranian Oil Co.				53	
283	797	788	816	867	887	895	815	773	826	862	1,015	1,090	1,108			V	35,345		Carbon dioxide	MtCO2		91.66%		
284	3.1	3.1	3.3	3.7	3.8	3.9	3.9	3.8	4.1	4.4	4.9	5.2	5.6			V	115		Methane	MtCH4		8.34%		
285	884	875	907	971	995	1,005	924	881	942	983	1,152	1,236	1,266			V	38,561		Total entity emissions	MtCO2e		100.00%		
286																	38,561 check							
287																			Nigerian National Petroleum, Nigeria				54	
288	252	245	235	245	253	263	257	244	289	278	248	260	272			V	8,343		Carbon dioxide	MtCO2		92.56%		
289	0.8	0.8	0.8	0.9	0.8	0.9	0.8	0.8	1.2	1.2	1.1	1.2	1.2			V	24		Methane	MtCH4		7.44%		
290	275	268	259	271	276	287	280	267	323	311	278	293	306			V	9,014		Total entity emissions	MtCO2e		100.00%		
291																	9,014 check							
292																			Noble Energy, USA				55	
293	25	26	28	28	28	28	31	36	39	47	55	51	47			V	646		Carbon dioxide	MtCO2		85.77%		
294	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2			V	4		Methane	MtCH4		14.23%		
295	29	31	33	32	33	33	36	42	46	55	64	58	53			V	753		Total entity emissions	MtCO2e		100.00%		
296																	753 check							
297																			North American Coal, USA				56	
298	39	37	37	37	37	30	31	33	32	33	35	41	42			V	1,366		Carbon dioxide	MtCO2		89.85%		
299	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2			V	6		Methane	MtCH4		10.15%		
300	43	41	41	42	41	34	35	36	36	37	39	45	47			V	1,520		Total entity emissions	MtCO2e		100.00%		
301																	1,520 check							
302								Nation-State coal production revised 2013-2017											North Korea (coal)				57	
303	61	60	62	63	80	75	75	74	76	68	77	54	54			V	3,527		Carbon dioxide	MtCO2		89.85%		
304	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2			V	14		Methane	MtCH4		10.15%		
305	68	66	69	70	89	83	83	82	85	76	85	60	60			V	3,926		Total entity emissions	MtCO2e		100.00%		
306																	3,926 check							
307																			Novatek, Russian Federation				58	
308	66	65	71	76	88	120	128	139	144	165	173	163	174			V	1,750		Carbon dioxide	MtCO2		81.53%		
309	0.5	0.5	0.6	0.6	0.7	1.0	1.1	1.2	1.2	1.3	1.3	1.2	1.3			V	14		Methane	MtCH4		18.47%		
310	81	81	87	93	108	148	158	172	177	201	210	198	212			V	2,146		Total entity emissions	MtCO2e		100.00%		
311																	2,146 check							
312																			Obsidian, Canada				59	
313	15	17	20	24	22	23	22	17	12	10	7	4	4			V	298		Carbon dioxide	MtCO2		87.65%		
314	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0			V	1		Methane	MtCH4		12.35%		
315	17	19	23	27	25	25	24	19	14	11	8	5	4			V	340		Total entity emissions	MtCO2e		100.00%		
316																	340 check							
317																			Occidental, USA				60	
318	70	78	93	97	101	99	104	103	81	91	86	82	89			V	5,456		Carbon dioxide	MtCO2		91.17%		
319	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3			V	19		Methane	MtCH4		8.83%		
320	76	85	102	107	112	110	115	114	89	100	94	90	98			V	5,984		Total entity emissions	MtCO2e		100.00%		
321																	5,984 check							
322																			Oil & Gas Corp., India				61	
323	131	138	136	151	149	136	136	133	123	120	118	119	121			V	4,853		Carbon dioxide	MtCO2		89.80%		
324	0.6	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6			V	20		Methane	MtCH4		10.20%		
325	147	156	154	170	168	154	153	150	140	135	134	135	138			V	5,404		Total entity emissions	MtCO2e		100.00%		
326																	5,404 check							
327																			OMV Group, Austria				62	
328	42	41	41	41	41	37	39	37	40	39	40	45	55			V	647		Carbon dioxide	MtCO2		87.73%		
329	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3			V	3		Methane	MtCH4		12.27%		
330	48	47	47	47	47	42	45	42	46	45	46	52	64			V	738		Total entity emissions	MtCO2e		100.00%		
331																	738 check							
332																			Peabody Energy, USA				63	
333	488	464	502	479	483	450	450	437	451	420	353	372	358			V	14,867		Carbon dioxide	MtCO2		89.85%		
334	2.0	1.9	2.0	1.9	2.0	1.8	1.8	1.8	1.8	1.7	1.4	1.5	1.4			V	60		Methane	MtCH4		10.15%		
335	543	517	559	533	538	501	501	487	502	468	393	414	398			V	16,547		Total entity emissions	MtCO2e		100.00%		
336																	16,547 check							
337																			Pertamina, Indonesia				64	
338	42	43	46	54	57	59	60	60	72	79	85	90	119			V	6,994		Carbon dioxide	MtCO2		90.82%		
339	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.7			V	25		Methane	MtCH4		9.18%		
340	49	50	53	62	67	69	70	70	82	91	98	104	139			V	7,702		Total entity emissions	MtCO2e		100.00%		
341																	7,702 check							
342																			Petoro. Norway				65	
343	156	156	148	138	138	130	143	131	127	135	131	140	136			V	3,151		Carbon dioxide	MtCO2		88.06%		
344	0.7	0.8	0.7	0.7	0.8	0.7	0.9	0.8	0.7	0.8	0.8	0.9	0.9			V	15		Methane	MtCH4		11.94%		
345	176	177	169	158	160	150	168	153	148	158	153	164	160			V	3,578		Total entity emissions	MtCO2e		100.00%		
346																	3,578 check							
347																								
348																			PetroChina, China				66	
349	476	504	525	536	566	475	496	516	690	706	708	730	754			V	15,027		Carbon dioxide	MtCO2		90.99%		
350	1.6	1.8	2.0	2.1	2.3	1.9	2.0	2.1	3.0	3.1	3.1	4.3	4.6			V	53		Methane	MtCH4		9.01%		
351	521	554	580	595	630	528	552	576	773	791	796	851	883			V	16,515		Total entity emissions	MtCO2e		100.00%		
352																	16,515 check							

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
353																										
354		67	PetroEcuador	IOC		1991-2018	oil & gas																			
355			Carbon dioxide	MtCO2																						
356			Methane	MtCH4																						
357			Total entity emissions	MtCO2e																						
358																										
359		68	Petroleo Brasileiro (Petrobras), Brazil	SOE		1960-2015	oil & gas																			
360			Carbon dioxide	MtCO2																						
361			Methane	MtCH4																						
362			Total entity emissions	MtCO2e																						
363																										
364		69	Petroleos de Venezuela (PDVSA)	SOE		1960-2015	oil & gas																			
365			Carbon dioxide	MtCO2																						
366			Methane	MtCH4																						
367			Total entity emissions	MtCO2e																						
368																										
369		70	Petroleos Mexicanos (Pemex)	SOE		1938-2015	oil																			
370			Carbon dioxide	MtCO2		1959-2015	gas																			
371			Methane	MtCH4																						
372			Total entity emissions	MtCO2e																						
373																										
374		71	Petroleum Development Oman	SOE		1988-2015	oil & gas																			
375			Carbon dioxide	MtCO2																						
376			Methane	MtCH4																						
377			Total entity emissions	MtCO2e																						
378																										
379		72	Petronas, Malaysia	SOE		1974-2015	oil & gas																			
380			Carbon dioxide	MtCO2																						
381			Methane	MtCH4																						
382			Total entity emissions	MtCO2e																						
383																										
384		73	Pioneer, USA	IOC		1995-2018	oil & gas																			
385			Carbon dioxide	MtCO2																						
386			Methane	MtCH4																						
387			Total entity emissions	MtCO2e																						
388																										
389		74	Poland (coal)	Nation-State		1913-2015	coal																			
390			Carbon dioxide	MtCO2																						
391			Methane	MtCH4																						
392			Total entity emissions	MtCO2e																						
393																										
394		75	Polish Oil & Gas Co., Poland	SOE		1998-2015	oil & gas																			
395			Carbon dioxide	MtCO2																						
396			Methane	MtCH4																						
397			Total entity emissions	MtCO2e																						
398																										
399		76	PTTEP, Thailand																							
400			Carbon dioxide	MtCO2																						
401			Methane	MtCH4																						
402			Total entity emissions	MtCO2e																						
403																										
404		77	Qatar Petroleum, Qatar	SOE		1959-2015	oil																			
405			Carbon dioxide	MtCO2		1964-2015	gas																			
406			Methane	MtCH4																						
407			Total entity emissions	MtCO2e																						
408																										
409		78	Repsol, Spain	IOC		1964-2015	oil																			
410			Carbon dioxide	MtCO2		1987-2015	gas																			
411			Methane	MtCH4																						
412			Total entity emissions	MtCO2e																						
413																										
414		79	Rio Tinto, UK	IOC		1961-2015	coal																			
415			Carbon dioxide	MtCO2																						
416			Methane	MtCH4																						
417			Total entity emissions	MtCO2e																						
418																										
419		80	Rosneft, Russian Federation	SOE		1990-2018	oil																			
420			Carbon dioxide	MtCO2		1993-2018	gas																			
421			Methane	MtCH4																						
422			Total entity emissions	MtCO2e																						
423																										
424		81	Royal Dutch Shell, The Netherlands	IOC		1892-2015	oil																			
425			Carbon dioxide	MtCO2		1930-2015	gas																			
426			Methane	MtCH4																						
427			Total entity emissions	MtCO2e																						
428																										
429		82	Ruhrkohle AG (RAG), Germany	IOC		1989-2003	coal																			
430			Carbon dioxide	MtCO2																						
431			Methane	MtCH4																						
432			Total entity emissions	MtCO2e																						
433																										
434		83	Russian Federation (excl. FSU) (coal)	Nation-State		1992-2015	coal																			
435			Carbon dioxide	MtCO2																						
436			Methane	MtCH4																						
437			Total entity emissions	MtCO2e																						
438																										
439																										
440			Copyright Climate Accountability Institute			anno				1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
441																										
442		84	RWE, Germany	IOC		1965-2015	coal																			
443			Carbon dioxide	MtCO2																						
444			Methane	MtCH4																						
445			Total entity emissions	MtCO2e																						
446																										
447		85	Santos, Australia	IOC		1992-2018	oil																			
448			Carbon dioxide	MtCO2		1991-2018	gas																			
449			Methane	MtCH4																						
450			Total entity emissions	MtCO2e																						
451																										
452		86	Sasol, South Africa	IOC		1953-2015	coal																			
453			Carbon dioxide	MtCO2																						
454			Methane	MtCH4																						
455			Total entity emissions	MtCO2e																						
456																										
457		87	Saudi Aramco, Saudi Arabia	SOE		1938-2015	oil																			
458			Carbon dioxide	MtCO2		1955-2015	gas																			
459			Methane	MtCH4																						
460			Total entity emissions	MtCO2e																						
461																										
462		88	Singareni Collieries, India	SOE		1947-2015	coal																			
463			Carbon dioxide	MtCO2																						
464			Methane	MtCH4																						
465			Total entity emissions	MtCO2e																						
466																										
467		89	Sinopec, China	SOE		1999-2015	oil & gas																			
468			Carbon dioxide	MtCO2																						
469			Methane	MtCH4																						
470			Total entity emissions	MtCO2e																						
471																										

	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA
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424																											
425																										0	0
426																										0.0	0.0
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438																											
439																											
440	1867	1868	1869	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893
441																											
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	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC
390																				56	56	55	55	54	53	53	52	54
391																				0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
392																				63	62	61	61	60	60	59	58	60
425	0	0	0	1	1	0	0	1	1	1	1	1	2	3	2	2	3	3	6	10	3	2	13	13	6	11	17	21
426	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	0.0	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
427	0	0	1	1	1	0	0	1	1	1	1	1	2	3	2	2	3	3	7	11	4	2	14	14	7	12	18	22
440	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921

	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE
353																												
354																												
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367																												
368																												
369																												
370																	17	18	19	20	21	22	23	24	25	26	27	28
371																	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.1	0.1
372																	18	19	20	21	22	23	24	25	26	27	28	29
373																												
374																												
375																												
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389																												
390	55	56	57	58	59	61	62	63	64	65	66	67	68	69	70	71	72	78	85	91	98	104	111	117	124	130	137	144
391	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6
392	61	62	64	65	66	67	69	70	71	72	74	75	76	77	78	79	80	87	94	102	109	116	123	131	138	145	152	161
393																												
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424																												
425	25	41	37	36	39	47	61	67	67	60	61	64	71	78	83	93	88	67	71	74	78	82	87	91	100	121	144	135
426	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.3
427	26	43	39	38	41	49	64	71	72	64	65	69	75	83	88	99	94	72	76	80	84	88	93	98	107	130	154	144
428																												
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438																												
439																												
440	**1922**	**1923**	**1924**	**1925**	**1926**	**1927**	**1928**	**1929**	**1930**	**1931**	**1932**	**1933**	**1934**	**1935**	**1936**	**1937**	**1938**	**1939**	**1940**	**1941**	**1942**	**1943**	**1944**	**1945**	**1946**	**1947**	**1948**	**1949**
441																												
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455																												
456																												
457																												
458																	0.0	0	0	0	0	0	0	1	2	3	5	7
459																	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
460																	0	0	0	0	0	0	0	1	2	4	6	7
461																												
462																												
463																										4	4	5
464																										0.0	0.0	0.0
465																										5	5	5
466																												
467																												
468																												
469																												
470																												
471																												

	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG
353																												
354																												
355																												
356																												
357																												
358																												
359																												
360					0	1	2	4	8	10	12	14	14	14	14	14	18	22	24	26	25	26	25	26	27	27	26	26
361					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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
362					1	1	2	4	8	10	13	15	15	15	14	15	19	23	26	28	27	28	27	28	29	29	28	28
363																												
364																												
365											41	42	45	46	48	49	48	51	52	51	53	51	47	49	44	35	276	273
366											0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.7	0.7
367											43	44	48	49	51	52	51	54	55	55	57	54	50	52	47	37	295	293
368																												
369																												
370	29	30	31	32	33	35	36	37	39	59	61	65	68	71	78	81	79	90	94	99	106	105	107	112	134	157	168	203
371	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.7
372	30	31	32	34	35	37	38	39	41	66	68	73	76	80	88	91	89	102	106	112	119	118	120	126	149	175	186	224
373																												
374																												
375																		1	3	5	5	4	23	24	24	32	30	29
376																		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
377																		1	4	5	5	4	25	26	26	34	32	30
378																												
379																												
380																									11	13	22	24
381																									0.0	0.0	0.1	0.1
382																									12	14	23	26
383																												
384																												
385																												
386																												
387																												
388																												
389																												
390	152	158	164	171	177	183	189	196	202	208	215	221	228	242	260	267	276	279	293	313	326	339	369	369	381	399	412	428
391	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.1	1.1	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.5	1.6	1.7	1.7
392	169	176	183	190	197	204	211	218	225	232	239	245	253	270	289	297	307	310	326	348	363	378	411	411	424	444	459	476
393																												
394																												
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403																												
404																												
405										2	2	2	3	3	3	3	4	5	5	5	5	6	7	21	46	40	59	54
406										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	0.0	0.1	0.1	0.1	0.1
407										2	3	3	3	3	3	3	4	5	5	5	6	7	7	22	48	43	62	57
408																												
409																												
410															0.0	0.2	0.3	0.5	0.7	1	1	1	1	2	2	2	3	4
411															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
412															0.0	0.2	0.4	0.5	0.7	1	1	1	1	2	2	2	3	4
413																												
414																												
415												3	3	3	4	4	5	6	6	6	6	6	6	6	6	27	30	30
416												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	0.1	0.1
417												4	4	4	4	4	6	7	7	7	7	7	7	7	7	30	33	33
418																												
419																												
420																												
421																												
422																												
423																												
424																												
425	152	177	192	199	190	206	228	249	235	265	270	275	303	317	352	380	421	441	480	550	617	867	908	958	872	635	615	601
426	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.5	2	2	2	3	3	3	2	2	2
427	163	189	205	212	204	221	244	266	252	283	289	295	326	342	379	409	455	478	521	598	672	937	983	1,038	950	699	679	665
428																												
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434																												
435																												
436																												
437																												
438																												
439																												
440	**1950**	**1951**	**1952**	**1953**	**1954**	**1955**	**1956**	**1957**	**1958**	**1959**	**1960**	**1961**	**1962**	**1963**	**1964**	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**
441																												
442																												
443																96	101	100	108	112	113	109	113	125	132	130	132	132
444																0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5
445																107	112	111	121	124	126	122	126	139	147	145	147	147
446																												
447																												
448																												
449																												
450																												
451																												
452																												
453				0	1	3	3	4	5	5	5	6	6	6	6	7	8	9	10	9	10	10	11	11	11	11	12	14
454				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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
455				0	1	3	4	5	5	5	6	6	6	6	6	8	9	10	11	11	11	11	12	12	13	13	13	16
456																												
457																												
458	8	11	11	12	13	13	14	14	14	15	17	20	22	25	27	31	37	40	44	47	55	68	86	273	700	585	1,190	1,286
459	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.5	1.4	1.2	2.3	2.5
460	8	11	12	12	14	14	14	14	15	16	18	21	23	26	28	33	39	42	47	50	58	72	91	288	739	617	1,255	1,356
461																												
462																												
463	5	5	5	5	5	6	6	6	7	7	8	8	9	10	9	10	10	10	11	11	11	10	11	12	13	13	14	15
464	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
465	5	6	6	6	6	6	7	7	7	8	8	9	10	11	10	11	11	11	12	13	12	12	12	13	14	15	15	16
466																												
467																												
468																												
469																												
470																												
471																												

	EH	EI	EJ	EK	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE	FF	FG	FH	FI
353																												
354																												
355														42	45	49	53	54	53	54	41	37	36	32	31	38	27	27
356														0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
357														44	47	51	55	57	56	57	43	39	38	33	32	40	29	28
358																												
359																												
360	26	27	29	34	42	54	75	88	93	93	91	97	103	102	104	107	111	115	130	140	160	180	212	221	245	276	273	300
361	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.8	0.8	0.9
362	28	29	32	37	45	58	81	95	100	100	99	105	110	110	112	115	120	124	140	151	173	194	229	239	265	299	296	325
363																												
364																												
365	269	293	282	265	244	232	234	221	240	235	252	259	290	320	319	334	355	378	402	443	437	397	437	429	376	330	366	369
366	0.7	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.1	1.1	1.2	1.3	1.1	1.2	1.3	1.1	1.0	1.1	1.1
367	289	315	304	285	263	250	252	239	259	253	271	280	314	346	344	360	383	407	434	478	473	429	472	464	407	357	396	400
368																												
369																												
370	238	265	344	406	409	412	416	419	422	425	421	423	442	461	445	446	511	504	543	566	586	564	576	588	589	619	626	622
371	0.8	0.9	1.2	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.5	1.5	1.7	1.7	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9
372	262	292	377	445	448	451	454	457	460	463	459	461	481	501	484	485	554	546	590	615	637	614	627	638	639	671	678	675
373																												
374																												
375	27	26	25	28	29	35	39	46	52	54	55	57	62	63	66	70	76	79	82	84	84	81	90	99	98	92	92	91
376	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4
377	29	27	27	30	31	38	42	49	56	59	59	61	67	67	71	76	82	85	88	91	90	86	98	110	109	103	104	102
378																												
379																												
380	29	38	38	36	41	54	75	82	95	99	107	108	123	124	134	132	131	150	175	189	149	193	180	188	225	242	211	215
381	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.7	1.0	1.1	0.6	1.1	0.9	1.0	1.2	1.2	1.2	1.2
382	31	40	41	39	44	58	83	92	107	111	119	120	136	138	150	147	146	168	202	220	167	225	207	217	258	277	245	249
383																												
384																												
385																		10	9	13	23	19	16	15	15	20	12	13
386																		0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
387																		11	10	15	26	21	18	17	17	24	14	15
388																												
389																												
390	441	451	434	375	428	441	456	470	489	502	502	470	406	395	374	374	377	377	379	378	336	321	305	307	304	307	305	299
391	1.8	1.8	1.7	1.5	1.7	1.8	1.8	1.9	2.0	2.0	2.0	1.9	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.4	1.3	1.2	1.2	1.2	1.2	1.2	1.2
392	490	502	483	417	476	490	508	523	544	559	559	523	451	440	416	416	420	419	422	420	374	357	339	342	338	341	339	333
393																												
394																												
395																					10	9	9	9	9	29	48	68
396																					0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
397																					12	12	12	12	12	32	53	73
398																												
399																												
400														1	1	2	2	3	4	6	7	9	10	13	16	19	22	25
401														0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
402														1	1	2	2	3	5	7	9	11	12	16	19	23	26	30
403																												
404																												
405	60	64	62	55	48	43	56	45	45	44	51	55	60	62	74	74	74	77	84	97	118	122	145	141	145	163	192	213
406	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.6	0.6	0.6	0.7	0.8	0.9
407	64	69	67	59	53	47	61	50	50	48	56	60	65	68	82	82	82	86	93	108	131	136	162	157	162	182	215	239
408																												
409																												
410	5	7	8	9	10	11	13	14	15	115	125	135	137	116	101	105	124	140	145	160	172	131	190	189	190	199	208	208
411	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.6	0.6	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.7	0.6	0.8	0.8	0.9	1.0	1.1	1.1
412	6	7	8	9	11	12	13	14	16	129	141	152	154	128	113	117	138	156	161	177	191	147	214	212	214	227	239	240
413																												
414																												
415	29	38	39	47	38	37	40	50	73	80	82	89	108	113	86	97	137	141	145	175	237	290	274	311	311	310	329	321
416	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.3	0.4	0.6	0.6	0.6	0.7	1.0	1.2	1.1	1.3	1.3	1.3	1.3	1.3
417	32	42	44	52	42	41	44	56	82	89	91	99	121	125	96	108	153	157	161	195	264	322	305	346	346	346	366	357
418																												
419																												
420													50	46	42	47	43	43	42	41	43	46	49	55	59	73	79	229
421													0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.6
422													53	49	44	51	47	47	46	44	47	50	54	60	65	80	87	247
423																												
424																												
425	565	565	360	349	361	387	414	428	462	460	456	475	504	539	522	528	541	543	596	594	579	578	557	564	570	570	558	530
426	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	2	3	3	3	3	3
427	626	626	410	398	409	437	467	484	521	520	513	533	566	605	586	593	607	609	671	668	650	651	627	638	646	645	633	603
428																												
429																												
430												84	82	77	90	79	69	72	65	62	65	65	63	61	59	57		
431												0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2		
432												93	91	86	101	87	77	80	72	69	72	72	70	68	65	63		
433																												
434																												
435															704	637	566	546	534	510	486	523	534	552	528	571	576	629
436															3	3	2	2	2	2	2	2	2	2	2	2	2	3
437															783	709	630	608	595	568	541	582	595	614	588	636	641	700
438																												
439																												
440	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
441																												
442																												
443	130	141	141	143	140	140	144	138	135	128	124	125	124	128	131	122	120	120	123	118	113	112	113	116	118	118	120	119
444	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
445	145	157	157	159	155	155	161	154	150	142	138	139	138	142	146	135	134	134	137	131	126	125	126	129	131	131	134	133
446																												
447																												
448														2	3	14	25	25	13	13	15	16	17	17	16	16	16	19
449														0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
450														3	4	16	29	29	16	16	18	20	21	20	19	19	19	22
451																												
452																												
453	17	20	32	41	68	81	85	86	86	84	86	89	90	91	95	98	99	106	108	118	118	124	125	126	125	127	116	113
454	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
455	19	22	36	46	76	90	95	96	96	94	95	99	100	101	106	110	110	118	120	131	132	138	139	140	139	141	129	125
456																												
457																												
458	1,170	1,345	1,412	1,425	959	675	629	506	742	643	793	793	1,005	1,262	1,291	1,253	1,265	1,267	1,283	1,269	1,306	1,202	1,288	1,270	1,191	1,405	1,453	1,572
459	2.3	2.7	2.9	2.9	2.0	1.4	1.4	1.3	1.8	1.5	1.9	1.9	2.4	2.9	3.0	2.9	3.0	3.0	3.0	3.0	3.1	2.9	3.2	3.2	3.1	3.6	3.6	4.2
460	1,235	1,421	1,492	1,507	1,015	715	669	541	792	685	845	848	1,071	1,342	1,375	1,335	1,349	1,351	1,368	1,354	1,394	1,284	1,377	1,360	1,279	1,507	1,552	1,689
461																												
462																												
463	15	16	17	18	19	20	22	23	25	27	29	30	31	35	36	38	39	41	44	46	46	47	54	55	60	61	63	65
464	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
465	17	18	19	20	22	23	24	25	28	30	33	34	35	39	40	42	44	46	49	51	51	52	61	62	67	68	71	72
466																												
467																												
468																					44	96	98	111	113	114	116	119
469																					0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3
470																					46	102	104	119	121	122	124	127
471																												

	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB	GC	GD	GE	GF	GG
353																								
354																			PetroEcuador				67	
355	69	71	68	66	68	70	70	73	78	76	77	74	72			V	1,549		Carbon dioxide	MtCO2		94.82%		
356	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1			V	3		Methane	MtCH4		5.18%		
357	73	75	72	69	72	74	74	77	82	80	81	79	76			V	1,634		Total entity emissions	MtCO2e		100.00%		
358																	1,634 check							
359																			Petroleo Brasileiro (Petrobras), Brazil				68	
360	311	312	325	342	350	355	351	343	360	375	376	372	353			V	8,458		Carbon dioxide	MtCO2		92.33%		
361	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.1			V	25		Methane	MtCH4		7.67%		
362	337	337	352	370	379	384	381	372	392	409	409	405	385			V	9,160		Total entity emissions	MtCO2e		100.00%		
363																	9,160 check							
364																			Petroleos de Venezuela (PDVSA)				69	
365	352	350	377	348	357	387	396	385	416	420	385	342	260			V	15,082		Carbon dioxide	MtCO2		92.73%		
366	1.0	1.1	1.1	1.0	1.0	1.0	1.1	1.0	1.1	1.2	1.1	1.1	0.9			V	42		Methane	MtCH4		7.27%		
367	380	379	407	376	385	416	427	413	447	453	417	373	284			V	16,264		Total entity emissions	MtCO2e		100.00%		
368																	16,264 check							
369																			Petroleos Mexicanos (Pemex)				70	
370	623	571	527	505	503	502	496	492	478	445	418	377	349			V	22,076		Carbon dioxide	MtCO2		91.71%		
371	2.0	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.3	1.2	1.1			V	71		Methane	MtCH4		8.29%		
372	679	619	572	550	549	548	541	537	521	485	456	410	380			V	24,072		Total entity emissions	MtCO2e		100.00%		
373																	24,072 check							
374																			Petroleum Development Oman				71	
375	97	97	98	102	107	109	112	114	112	116	116	110	105			V	3,359		Carbon dioxide	MtCO2		89.91%		
376	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.5			V	13		Methane	MtCH4		10.09%		
377	111	111	112	117	123	126	130	132	129	135	135	127	120			V	3,736		Total entity emissions	MtCO2e		100.00%		
378																	3,736 check							
379																			Petronas, Malaysia				72	
380	211	226	235	236	231	273	264	280	221	213	236	231	221			V	6,712		Carbon dioxide	MtCO2		86.97%		
381	1.2	1.3	1.4	1.4	1.4	1.7	1.7	1.8	1.4	1.3	1.5	1.5	1.4			V	36		Methane	MtCH4		13.03%		
382	245	262	274	274	269	320	311	329	260	251	277	273	261			V	7,717		Total entity emissions	MtCO2e		100.00%		
383																	7,717 check							
384																			Pioneer, USA				73	
385	12	13	14	14	14	17	21	23	26	28	32	37	44			V	460		Carbon dioxide	MtCO2		88.31%		
386	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			V	2		Methane	MtCH4		11.69%		
387	14	15	16	17	17	19	24	26	29	31	35	40	47			V	520		Total entity emissions	MtCO2e		100.00%		
388																	520 check							
389								Nation-State coal production revised 2013-2017											Poland (coal)				74	
390	293	273	270	254	250	261	271	268	257	255	246	239	231			V	24,576		Carbon dioxide	MtCO2		89.85%		
391	1.2	1.1	1.1	1.0	1.0	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9			V	99		Methane	MtCH4		10.15%		
392	326	304	301	282	278	291	301	299	286	284	274	266	257			V	27,353		Total entity emissions	MtCO2e		100.00%		
393																	27,353 check							
394																			Polish Oil & Gas Co., Poland				75	
395	60	59	59	58	10	10	10	12	13	13	13	13	13			V	536		Carbon dioxide	MtCO2		89.07%		
396	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			V	2		Methane	MtCH4		10.93%		
397	65	64	63	62	12	13	13	15	15	16	15	15	16			V	602		Total entity emissions	MtCO2e		100.00%		
398																	602 check							
399																			PTTEP, Thailand				76	
400	26	27	29	31	35	35	43	39	37	43	43	40	41			V	608		Carbon dioxide	MtCO2		84.10%		
401	0	0	0	0	0	0	0	0	0	0	0	0	0			V	4		Methane	MtCH4		15.90%		
402	31	33	34	36	41	42	51	46	44	51	51	47	49			V	722		Total entity emissions	MtCO2e		100.00%		
403																	722 check							
404																			Qatar Petroleum, Qatar				77	
405	224	252	287	319	387	449	478	496	212	201	202	187	200			V	6,639		Carbon dioxide	MtCO2		88.25%		
406	1.0	1.2	1.5	1.7	2.1	2.6	2.8	2.9	1.2	1.2	1.2	1.1	1.2			V	32		Methane	MtCH4		11.75%		
407	253	287	328	366	446	521	555	576	246	234	236	218	234			V	7,523		Total entity emissions	MtCO2e		100.00%		
408																	7,523 check							
409										Repsol acquired Talisman in May 2015									Repsol, Spain				78	
410	209	193	180	173	169	100	98	93	95	90	90	91	94			V	4,675		Carbon dioxide	MtCO2		88.00%		
411	1.1	1.0	1.0	0.9	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6			V	23		Methane	MtCH4		12.00%		
412	240	222	207	198	194	116	115	109	112	106	107	107	110			V	5,312		Total entity emissions	MtCO2e		100.00%		
413																	5,312 check							
414																			Rio Tinto, UK				79	
415	339	325	335	292	152	66	67	73	68	63	62	49	14			V	6,089		Carbon dioxide	MtCO2		89.85%		
416	1.4	1.3	1.4	1.2	0.6	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.1			V	25		Methane	MtCH4		10.15%		
417	377	362	373	325	169	73	74	81	76	70	69	55	15			V	6,777		Total entity emissions	MtCO2e		100.00%		
418																	6,777 check							
419																			Rosneft, Russian Federation				80	
420	249	313	319	328	346	356	372	604	685	691	721	766	777			V	7,514		Carbon dioxide	MtCO2		92.40%		
421	0.7	0.8	0.8	0.8	0.8	0.9	0.9	1.7	2.1	2.2	2.4	2.5	2.5			V	22		Methane	MtCH4		7.60%		
422	267	336	341	350	370	380	399	651	745	754	787	835	846			V	8,132		Total entity emissions	MtCO2e		100.00%		
423																	8,132 check							
424										Shell acquired BG in Feb2016									Royal Dutch Shell, The Netherlands				81	
425	533	512	508	507	528	504	512	500	481	479	481	479	478			V	34,803		Carbon dioxide	MtCO2		89.92%		
426	3	3	3	3	3	3	3	3	3	3	3	3	3			V	139		Methane	MtCH4		10.08%		
427	608	585	582	582	607	582	592	578	556	551	551	550	550			V	38,704		Total entity emissions	MtCO2e		100.00%		
428																	38,704 check							
429																			Ruhrkohle AG (RAG), Germany				82	
430																V	1,049		Carbon dioxide	MtCO2		89.85%		
431																V	4		Methane	MtCH4		10.15%		
432																V	1,168		Total entity emissions	MtCO2e		100.00%		
433																	1,168 check							
434								Nation-State coal production revised 2013-2017											Russian Federation (excl. FSU) (coal)				83	
435	633	643	678	614	664	657	732	778	794	826	853	907	981			V	17,659		Carbon dioxide	MtCO2		89.85%		
436	3	3	3	2	3	3	3	3	3	3	3	4	4			V	71		Methane	MtCH4		10.15%		
437	704	715	755	683	739	732	815	866	884	920	950	1,009	1,092			V	19,654		Total entity emissions	MtCO2e		100.00%		
438																	19,654 check							
439																								
440	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019			MtCO2e		Entities			Copyright Climate Accountability Inst		
441																								
442																			RWE, Germany				84	
443	118	120	115	111	109	114	121	116	113	113	114	114	105			V	6,531		Carbon dioxide	MtCO2		89.85%		
444	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4			V	26		Methane	MtCH4		10.15%		
445	131	134	128	124	121	127	135	129	125	126	127	127	117			V	7,268		Total entity emissions	MtCO2e		100.00%		
446																	7,268 check							
447																			Santos, Australia				85	
448	21	20	19	20	18	17	19	19	20	21	23	22	22			V	490		Carbon dioxide	MtCO2		86.07%		
449	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			V	3		Methane	MtCH4		13.93%		
450	25	24	23	23	21	20	22	21	22	24	26	25	24			V	569		Total entity emissions	MtCO2e		100.00%		
451																	569 check							
452																			Sasol, South Africa				86	
453	109	109	100	100	108	100	103	104	104	108	111	100	99			V	4,091		Carbon dioxide	MtCO2		89.63%		
454	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.4			V	17		Methane	MtCH4		10.37%		
455	122	121	112	112	121	112	116	116	117	121	125	112	111			V	4,564		Total entity emissions	MtCO2e		100.00%		
456																	4,564 check							
457																			Saudi Aramco, Saudi Arabia				87	
458	1,556	1,488	1,559	1,431	1,461	1,606	1,692	1,563	1,589	1,722	1,868	1,763	1,798			V	57,468		Carbon dioxide	MtCO2		93.58%		
459	4.2	4.0	4.2	4.0	4.2	4.3	4.6	4.4	4.5	4.7	5.1	4.7	4.7			V	141		Methane	MtCH4		6.42%		
460	1,674	1,599	1,675	1,543	1,578	1,726	1,820	1,686	1,713	1,855	2,010	1,894	1,931			V	61,410		Total entity emissions	MtCO2e		100.00%		
461																	61,410 check							
462																			Singareni Collieries, India				88	
463	68	73	80	91	92	94	96	91	94	109	110	111	116			V	2,513		Carbon dioxide	MtCO2		89.85%		
464	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5			V	10		Methane	MtCH4		10.15%		
465	75	81	89	101	103	104	106	101	105	121	123	124	129			V	2,797		Total entity emissions	MtCO2e		100.00%		
466																	2,797 check							
467																			Sinopec, China				89	
468	123	127	143	141	150	152	236	267	276	281	262	165	166			V	3,300		Carbon dioxide	MtCO2		91.92%		
469	0.3	0.4	0.4	0.4	0.5	0.5	0.7	0.9	0.9	1.0	1.0	0.7	0.7			V	10		Methane	MtCH4		8.08%		
470	132	137	154	152	163	166	257	292	303	308	289	184	186			V	3,590		Total entity emissions	MtCO2e		100.00%		
471																	3,590 check							

90	Sonangol, Angola	SOE	1959-2015	oil	
	Carbon dioxide	MtCO2	1969-2015	gas	
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
91	Sonatrach, Algeria	SOE	1959-2015	oil	
	Carbon dioxide	MtCO2	1961-2015	gas	
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
92	Southwestern, USA	IOC	1988-2018	oil & gas	
	Carbon dioxide	MtCO2			
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
93	Suncor, Canada	IOC	1987-2015	oil & gas	
	Carbon dioxide	MtCO2			
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
94	Syrian Petroleum, Syria	SOE	1968-2015	oil	
	Carbon dioxide	MtCO2	1972-2015	gas	
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
95	Taiheiyo, Japan	IOC	1975-2015	cement	
	Carbon dioxide	MtCO2			
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
96	Teck Resources, Canada	IOC			
	Carbon dioxide	MtCO2	1998-2018	coal	
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
97	Total, France	IOC	1934-2015	oil	
	Carbon dioxide	MtCO2	1972-2015	gas	
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
98	TurkmenGaz, Turkmenistan	SOE	1997-2018	oil & gas	
	Carbon dioxide	MtCO2			
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
99	UK Coal, UK	IOC	1995-2015	coal	
	Carbon dioxide	MtCO2			
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
100	Ukraine (coal)	Nation-State	1992-2015	coal	
	Carbon dioxide	MtCO2			
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
101	Vale, Brazil	IOC	2007-2018	coal	
	Carbon dioxide	MtCO2			
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
102	Vistra, USA	IOC	1977-2018	coal	
	Carbon dioxide	MtCO2			
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
103	Westmoreland Mining, USA	IOC	1854-2018	coal	
	Carbon dioxide	MtCO2	replaced linked sums for 1854-1879 with linked data		
	Methane	MtCH4	19-Jul-18		
	Total entity emissions	MtCO2e			
104	Whitehaven Coal, Australia	IOC			
	Carbon dioxide	MtCO2	2006-2018	coal	
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
105	Wintershall, Germany	IOC	1999-2018	oil	
	Carbon dioxide	MtCO2	1998-2018	gas	
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
106	Woodside, Australia	IOC	1984-2018	oil	
	Carbon dioxide	MtCO2	1971-2018	gas	
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
107	YPF, Argentina	SOE	2007-2018	oil & gas	
	Carbon dioxide	MtCO2			
	Methane	MtCH4			
	Total entity emissions	MtCO2e			
108	Yukos, Russian Federation	IOC			
	Carbon dioxide	MtCO2	2000-2005	gas	
	Methane	MtCH4			
	Total entity emissions	MtCO2e			

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All entitites			
Carbon dioxide	MtCO2		25.763
Methane	MtCH4		0.104
Methane	MtCO2e		2.910
Total all Carbon Major Entities	MtCO2e	sum of entities above	28.673

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Global CO2 1751-1849 MtCO2 1751-1849

CDIAC CO2 emissions	MtCO2	1,254 MtC	4,595 MtCO2	
CDIAC/EDGAR methane	Tg CH4			
CDIAC CO2 plus methane emissions	MtCO2e		4,595	
Carbon Majors of global CO2 plus methane	percent			
(excluding CME venting, flaring, own fuel)				

	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
CDIAC CO2 emissions	198	198	209	216	253	260	278	282	286	304	333	348	352	377	410	436	447
CDIAC/EDGAR methane											2	2	2	3	3	3	3
CDIAC CO2 plus methane emissions	198	198	209	216	253	260	278	282	286	304	396	414	417	448	487	517	532
Carbon Majors of global CO2 plus methane	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%

Ownership categories		1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Investor-owned	MtCO2e	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.5	0.6
State-owned	MtCO2e													
Nation-States	MtCO2e													
Total Carbon Majors	MtCO2e	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.5	0.6

	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Carbon dioxide	0.09	0.12	0.14	0.17	0.19	0.21	0.24	0.26	0.28	0.30	0.33	0.35	0.37
Methane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total entity emissions	0	0	0	0	0	0	0	0	0	0	0	0	0

	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866
Carbon dioxide	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.5
Methane	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
Methane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Total all Carbon Major Entities	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.5	0.6

	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA
539	0.40	0.42	0.44	0.61	0.77	0.93	1.10	1.26	1.42	1.58	1.75	1.91	2.07	2.24	2	3	3	3	3	3	3	4	4	4	4	4	4
540	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02
541	0	0	0	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	4	4	4	4	4	4	5	5
570	**0.6**	**0.7**	**0.8**	**1.0**	**1.2**	**1.5**	**1.7**	**1.9**	**2.1**	**2**	**3**	**3**	**3**	**3**	**3**	**4**	**4**	**4**	**4**	**5**	**5**	**5**	**6**	**6**	**6**	**7**	**7**
571	**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**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
572	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	1	1	1	1
573	0.7	0.8	0.9	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	6	6	6	7	7	7	8
576	**476**	**491**	**520**	**539**	**575**	**638**	**674**	**638**	**689**	**700**	**711**	**718**	**769**	**865**	**890**	**938**	**997**	**1,008**	**1,019**	**1,033**	**1,081**	**1,198**	**1,198**	**1,304**	**1,359**	**1,370**	**1,356**
578	3	3	3	3	4	4	4	4	4	4	5	5	5	5	6	6	6	7	6	6	7	7	8	8	8	8	8
580	568	581	614	634	682	753	798	758	813	825	839	846	904	1,012	1,049	1,108	1,178	1,190	1,197	1,212	1,272	1,405	1,408	1,528	1,592	1,605	1,586
582	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.5%	0.5%
584	**1867**	**1868**	**1869**	**1870**	**1871**	**1872**	**1873**	**1874**	**1875**	**1876**	**1877**	**1878**	**1879**	**1880**	**1881**	**1882**	**1883**	**1884**	**1885**	**1886**	**1887**	**1888**	**1889**	**1890**	**1891**	**1892**	**1893**
587	0.7	0.8	0.9	1.1	1.4	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	6	6	6	7	7	7	8
590	0.7	0.8	0.9	1.1	1.4	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	6	6	6	7	7	7	8

	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC
539	5	5	5	5	5	5	5	6	6	6	6	6	6	7	7	7	7	7	7	8	7	7	7	7	7	7	6	6
540	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
541	5	5	5	6	6	6	6	6	6	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	8	7	7	7
570	**8**	**8**	**8**	**10**	**10**	**9**	**46**	**50**	**53**	**57**	**57**	**57**	**58**	**59**	**58**	**59**	**60**	**60**	**66**	**127**	**119**	**117**	**128**	**129**	**122**	**129**	**138**	**155**
571	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
572	1	1	1	1	1	1	5	6	6	6	6	6	6	7	6	7	7	7	7	13	13	13	13	13	13	13	14	15
573	8	9	9	11	11	10	51	55	59	63	63	63	64	65	64	66	67	67	73	140	132	130	142	142	135	142	151	170
576	**1,403**	**1,488**	**1,535**	**1,612**	**1,700**	**1,861**	**1,957**	**2,026**	**2,074**	**2,261**	**2,286**	**2,433**	**2,594**	**2,869**	**2,744**	**2,876**	**3,001**	**3,060**	**3,221**	**3,459**	**3,115**	**3,071**	**3,298**	**3,503**	**3,430**	**2,953**	**3,415**	**2,942**
578	9	9	9	10	10	11	12	12	12	14	14	14	15	17	16	17	18	18	19	20	18	18	20	21	20	18	21	18
580	1,643	1,740	1,796	1,885	1,987	2,175	2,287	2,365	2,420	2,640	2,669	2,836	3,028	3,349	3,201	3,353	3,498	3,567	3,755	4,031	3,629	3,579	3,844	4,079	3,997	3,455	3,993	3,437
582	0.5%	0.5%	0.5%	0.6%	0.5%	0.5%	2.2%	2.3%	2.5%	2.4%	2.4%	2.2%	2.1%	1.9%	2.0%	2.0%	1.9%	1.9%	1.9%	3.5%	3.6%	3.6%	3.7%	3.5%	3.4%	4.1%	3.8%	5.0%
584	**1894**	**1895**	**1896**	**1897**	**1898**	**1899**	**1900**	**1901**	**1902**	**1903**	**1904**	**1905**	**1906**	**1907**	**1908**	**1909**	**1910**	**1911**	**1912**	**1913**	**1914**	**1915**	**1916**	**1917**	**1918**	**1919**	**1920**	**1921**
587	8	9	9	11	11	10	11	17	22	27	28	29	32	34	34	37	39	41	48	54	48	48	61	63	58	67	78	87
589						-	40	39	37	36	35	34	32	31	30	29	27	26	25	86	84	82	81	79	77	75	73	83
590	8	9	9	11	11	10	51	55	59	63	63	63	64	65	64	66	67	67	73	140	132	130	142	142	135	142	151	170

	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE
509													11	15	19	22	26	30	34	37	41	45	49	52	56	60	64	67
510													0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
511													12	16	20	24	28	31	35	39	43	47	51	55	59	63	67	71
539	6	6	6	6	6	5	5	5	5	5	5	5	5	6	6	6	6	7	7	7	7	8	8	8	8	8	9	9
540	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04
541	7	7	7	6	6	6	6	6	5	5	6	6	6	6	7	7	7	7	8	8	8	8	9	9	9	9	10	10
570	**176**	**215**	**230**	**246**	**291**	**326**	**356**	**382**	**407**	**411**	**463**	**515**	**612**	**635**	**707**	**784**	**882**	**962**	**1,056**	**1,149**	**1,196**	**1,032**	**1,116**	**1,253**	**1,411**	**2,047**	**2,262**	**2,387**
571	**0.6**	**0.7**	**0.8**	**0.8**	**1.0**	**1**	**1**	**1**	**1**	**1**	**2**	**2**	**2**	**2**	**2**	**3**	**3**	**3**	**4**	**4**	**4**	**3**	**4**	**4**	**5**	**7**	**8**	**8**
572	17	20	21	23	27	29	32	34	36	38	44	49	58	60	67	73	81	91	103	112	119	97	102	114	129	198	218	234
573	193	235	251	269	318	355	388	416	443	449	507	564	670	695	773	857	963	1,054	1,159	1,261	1,315	1,129	1,218	1,368	1,539	2,244	2,481	2,621
576	**3,096**	**3,554**	**3,525**	**3,573**	**3,606**	**3,891**	**3,906**	**4,195**	**3,855**	**3,441**	**3,104**	**3,276**	**3,565**	**3,759**	**4,141**	**4,430**	**4,188**	**4,364**	**4,760**	**4,884**	**4,914**	**5,097**	**5,068**	**4,254**	**4,536**	**5,104**	**5,383**	**5,199**
578	19	21	21	21	21	23	23	24	22	20	18	19	20	21	23	25	23	25	26	27	27	27	27	23	25	28	29	28
580	3,627	4,151	4,117	4,167	4,198	4,535	4,543	4,877	4,480	3,999	3,605	3,801	4,135	4,347	4,793	5,124	4,843	5,059	5,493	5,640	5,669	5,864	5,819	4,912	5,227	5,877	6,201	5,988
582	5.3%	5.7%	6.1%	6.4%	7.6%	7.8%	8.5%	8.5%	9.9%	11.2%	14.1%	14.8%	16.2%	16.0%	16.1%	16.7%	19.9%	20.8%	21.1%	22.4%	23.2%	19.3%	20.9%	27.8%	29.4%	38.2%	40.0%	43.8%
584	**1922**	**1923**	**1924**	**1925**	**1926**	**1927**	**1928**	**1929**	**1930**	**1931**	**1932**	**1933**	**1934**	**1935**	**1936**	**1937**	**1938**	**1939**	**1940**	**1941**	**1942**	**1943**	**1944**	**1945**	**1946**	**1947**	**1948**	**1949**
587	101	132	139	147	186	214	235	254	271	250	256	271	315	345	378	459	465	471	490	525	510	586	699	776	880	970	1,081	1,062
588						-	2	2	2	2	2	2	2	2	2	3	21	22	22	23	25	26	28	31	34	586	609	631
589	93	102	112	122	132	141	151	161	171	198	249	291	352	348	393	395	477	562	646	714	781	517	492	561	625	689	791	928
590	193	235	251	269	318	355	388	416	443	449	507	564	670	695	773	857	963	1,054	1,159	1,261	1,315	1,129	1,218	1,368	1,539	2,244	2,481	2,621

	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG
472																												
473																												
474										0.0	0.0	0.0	0	0	0	0	0	0	0	1	2	1	2	2	2	2	4	14
475										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	0.0	0.0	0.0	0.0	0.0
476										0	0	0	0	0	0	0	0	0	0	1	2	1	2	2	2	2	4	15
477																												
478																												
479										0	3	5	6	7	25	27	35	41	48	51	57	46	63	69	67	73	82	89
480										0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3
481										0	3	5	7	8	27	29	38	44	51	55	61	49	67	74	72	80	89	97
482																												
483																												
484																												
485																												
486																												
487																												
488																												
489																												
490																												
491																												
492																												
493																												
494																			2	4	7	8	11	9	11	14	15	16
495																			0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03
496																			2	4	7	9	11	9	11	15	16	17
497																												
498																												
499																										9	10	12
500																												
501																										9	10	12
502																												
503																												
504																												
505																												
506																												
507																												
508																												
509	71	75	79	83	86	90	94	98	101	105	109	113	116	120	124	128	131	135	139	143	146	150	173	90	98	82	86	83
510	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
511	75	79	83	87	91	95	99	103	107	111	115	119	123	126	130	134	138	142	146	150	154	158	182	95	103	87	90	88
512																												
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531																												
532																												
533																												
534																												10
535																												0.0
536																												11
537																												
538																												
539	9	9	10	10	10	10	11	11	11	11	11	12	12	12	12	13	13	13	13	19	18	13	14	14	12	13	12	12
540	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.08	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0
541	10	10	11	11	11	11	12	12	12	13	13	13	13	14	14	14	14	15	15	21	20	15	16	16	13	14	14	14
542																												
543																												
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546																												
547																												
548																												
549																												
550																												
551																												
552																												
553																												
554																						0.2	0.2	0.2	0.3	0.3	0.4	0.4
555																						0.0	0.0	0.0	0.0	0.0	0.0	0.0
556																						0	0	0	0	0	1	1
557																												
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569																												
570	**2,726**	**2,971**	**3,084**	**3,421**	**3,738**	**4,175**	**4,650**	**4,694**	**5,417**	**5,836**	**6,283**	**6,141**	**6,570**	**7,008**	**7,541**	**8,129**	**8,802**	**9,015**	**9,720**	**10,315**	**11,290**	**11,961**	**12,784**	**13,605**	**14,126**	**13,412**	**14,682**	**15,066**
571	**10**	**10**	**11**	**12**	**13**	**15**	**17**	**17**	**19**	**21**	**23**	**22**	**23**	**25**	**27**	**29**	**31**	**32**	**34**	**36**	**40**	**41**	**44**	**47**	**48**	**48**	**51**	**52**
572	267	288	302	338	373	413	463	463	544	588	633	613	655	699	750	810	870	890	958	1,017	1,113	1,161	1,238	1,307	1,355	1,332	1,422	1,460
573	2,993	3,259	3,386	3,758	4,111	4,588	5,113	5,157	5,962	6,424	6,915	6,755	7,225	7,707	8,291	8,939	9,672	9,906	10,678	11,332	12,402	13,123	14,023	14,911	15,481	14,745	16,104	16,526
574																												
575																												
576	**5,976**	**6,475**	**6,577**	**6,742**	**6,834**	**7,490**	**7,977**	**8,318**	**8,538**	**8,857**	**9,345**	**9,366**	**9,699**	**10,248**	**10,781**	**11,282**	**11,807**	**12,184**	**12,849**	**13,705**	**14,840**	**15,440**	**16,158**	**17,016**	**16,943**	**16,921**	**17,819**	**18,308**
577																												
578	30	32	33	33	33	36	38	40	41	43	45	44	45	47	49	51	53	55	57	61	87	92	99	113	112	105	117	115
579																												
580	6,827	7,376	7,493	7,670	7,760	8,496	9,052	9,429	9,684	10,053	10,593	10,606	10,961	11,567	12,164	12,719	13,302	13,715	14,452	15,403	17,270	18,025	18,942	20,169	20,092	19,866	21,104	21,523
581																												
582	43.8%	44.2%	45.2%	49.0%	53.0%	54.0%	56.5%	54.7%	61.6%	63.9%	65.3%	63.7%	65.9%	66.6%	68.2%	70.3%	72.7%	72.2%	73.9%	73.6%	71.8%	72.8%	74.0%	73.9%	77.1%	74.2%	76.3%	76.8%
583																												
584	**1950**	**1951**	**1952**	**1953**	**1954**	**1955**	**1956**	**1957**	**1958**	**1959**	**1960**	**1961**	**1962**	**1963**	**1964**	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**
585																												
586																												
587	1,275	1,440	1,491	1,576	1,637	1,839	2,044	2,171	2,255	2,429	2,619	2,786	3,037	3,252	3,543	3,963	4,322	4,650	5,028	5,453	5,972	6,340	6,783	6,848	6,443	5,532	5,452	5,477
588	654	687	664	673	688	732	754	772	779	842	922	955	991	1,030	1,098	1,150	1,334	1,401	1,495	1,611	1,781	1,957	2,134	2,863	3,599	3,468	4,638	4,779
589	1,064	1,132	1,231	1,509	1,786	2,018	2,316	2,214	2,927	3,153	3,375	3,014	3,196	3,425	3,650	3,826	4,016	3,854	4,155	4,268	4,649	4,826	5,106	5,200	5,439	5,745	6,015	6,270
590	2,993	3,259	3,386	3,758	4,111	4,588	5,113	5,157	5,962	6,424	6,915	6,755	7,225	7,707	8,291	8,939	9,672	9,906	10,678	11,332	12,402	13,123	14,023	14,911	15,481	14,745	16,104	16,526
591																												

	EH	EI	EJ	EK	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE	FF	FG	FH	FI
472																												
473																												
474	9	11	11	9	9	13	15	17	20	26	32	33	34	36	38	36	38	46	51	51	52	53	53	53	64	64	75	89
475	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
476	10	11	11	10	9	14	16	18	21	27	34	34	36	38	40	39	41	49	53	54	55	56	56	56	67	68	79	94
477																												
478																												
479	97	99	95	109	120	141	153	158	162	173	176	233	202	205	214	208	207	212	230	240	234	229	246	242	272	359	340	372
480	0.3	0.3	0.3	0.5	0.6	0.8	0.8	0.8	0.8	0.9	1.0	1.4	1.0	1.1	1.2	1.1	1.1	1.2	1.3	1.3	1.3	1.3	1.4	1.4	1.6	1.9	1.9	2.0
481	105	109	104	123	136	162	176	181	186	199	204	273	232	235	246	240	239	245	266	277	271	266	286	282	317	412	393	429
482																												
483																												
484											1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	3	4
485											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	0.0	0.0	0.0	0.0
486											1	1	1	2	2	3	3	3	3	3	3	2	3	3	3	3	4	4
487																												
488																												
489										30	26	29	26	25	24	25	32	34	46	48	50	51	50	47	84	102	97	95
490										0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.4	0.3	0.3
491										35	30	33	30	29	27	28	37	39	53	55	56	58	57	53	92	112	107	105
492																												
493																												
494	15	14	14	14	14	14	14	15	16	20	23	30	36	45	45	51	52	53	56	55	56	55	54	51	52	52	50	47
495	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.05	0.06	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.1
496	15	15	15	15	14	15	15	16	17	21	24	31	39	49	48	55	56	57	60	59	61	60	59	55	57	56	55	51
497																												
498																												
499	13	13	13	12	12	11	11	10	9	10	10	11	12	11	12	12	13	13	14	13	12	11	11	11	11	10	10	10
500																												
501	13	13	13	12	12	11	11	10	9	10	10	11	12	11	12	12	13	13	14	13	12	11	11	11	11	10	10	10
502																												
503																												
504																					13	10	15	21	18	27	29	28
505																					0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1
506																					15	11	16	23	20	30	32	32
507																												
508																												
509	87	89	82	54	49	45	47	132	132	185	206	219	200	214	216	219	263	282	269	276	274	270	278	287	316	331	359	352
510	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.6	0.6	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.2	1.3	1.4	1.5	1.5
511	93	96	89	59	54	50	52	148	148	204	227	242	222	237	239	243	290	310	297	305	301	298	309	320	352	369	401	394
512																												
513																												
514																				51	32	49	89	93	104	114	114	120
515																				0.4	0.2	0.4	0.7	0.7	0.8	0.9	0.9	1.0
516																				62	38	59	109	114	127	139	139	147
517																												
518																												
519																		90	85	78	62	55	51	54	53	46	35	25
520																		0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1
521																		101	95	86	69	61	57	61	59	51	39	27
522																												
523																												
524															314	269	220	194	145	149	152	160	159	157	157	164	152	154
525															1.3	1.1	0.9	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6
526															350	300	245	216	162	166	169	178	177	175	175	182	169	171
527																												
528																												
529																												
530																												
531																												
532																												
533																												
534	20	27	30	32	30	31	32	32	32	31	32	33	33	31	33	30	28	28	31	31	31	31	28	25	26	27	26	27
535	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
536	22	31	34	36	33	34	35	36	36	34	35	36	37	35	36	34	31	32	34	34	34	35	31	28	29	30	29	30
537																												
538																												
539	12	12	12	12	13	13	13	13	13	14	14	16	17	16	19	18	19	10	7	11	10	9	42	32	41	44	46	48
540	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.2	0.2	0.2
541	14	13	14	14	14	14	14	15	15	15	16	18	19	18	21	20	21	12	8	13	11	10	47	36	45	49	51	53
542																												
543																												
544																												
545																												
546																												
547																												
548																												
549																					4	29	30	34	34	38	39	40
550																					0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2
551																					5	32	33	37	38	43	44	46
552																												
553																												
554	0.5	0.6	0.7	0.8	0.8	0.7	0.5	2	3	4	5	5	6	7	7	7	9	10	12	13	14	14	23	24	23	22	20	21
555	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
556	1	1	1	1	1	1	1	2	4	5	6	6	8	8	8	9	11	12	14	15	16	16	26	27	26	25	23	24
557																												
558																												
559																												
560																												
561																												
562																												
563																												
564													246	216	180	152	135	130	127	130	124	122	138	164	196	235	235	212
565													0.5	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.5
566													259	227	189	160	143	137	134	137	131	128	146	173	207	250	250	225
567																												
568																												
569																												
570	**15,272**	**15,754**	**15,230**	**14,547**	**14,186**	**14,124**	**14,427**	**14,943**	**15,647**	**16,216**	**17,093**	**17,723**	**18,491**	**18,285**	**16,870**	**16,747**	**17,343**	**17,795**	**18,314**	**18,676**	**19,133**	**19,764**	**20,287**	**20,830**	**21,025**	**22,574**	**23,855**	**25,234**
571	**53**	**55**	**54**	**53**	**53**	**54**	**57**	**60**	**62**	**65**	**69**	**70**	**71**	**71**	**68**	**67**	**69**	**71**	**73**	**74**	**76**	**79**	**81**	**83**	**85**	**91**	**96**	**102**
572	1,495	1,551	1,523	1,493	1,494	1,516	1,588	1,677	1,745	1,829	1,926	1,949	1,999	1,975	1,899	1,876	1,933	1,975	2,036	2,075	2,118	2,207	2,259	2,333	2,391	2,553	2,688	2,843
573	16,767	17,306	16,753	16,040	15,679	15,641	16,015	16,620	17,392	18,045	19,019	19,672	20,490	20,260	18,769	18,623	19,276	19,771	20,350	20,751	21,251	21,972	22,546	23,163	23,415	25,126	26,542	28,076
574																												
575																												
576	**18,979**	**19,485**	**19,392**	**18,865**	**18,725**	**18,903**	**19,453**	**20,146**	**20,433**	**21,095**	**21,902**	**22,232**	**22,547**	**23,032**	**22,313**	**22,580**	**22,742**	**23,232**	**23,963**	**24,103**	**24,018**	**24,326**	**25,025**	**25,235**	**25,788**	**27,034**	**28,308**	**29,264**
577																												
578	123	119	110	93	93	89	86	87	87	85	92	93	90	89	90	90	90	90	92	89	84	82	83	83	83	88	92	95
579																												
580	22,421	22,827	22,485	21,481	21,323	21,407	21,870	22,582	22,862	23,472	24,479	24,842	25,066	25,526	24,829	25,091	25,266	25,750	26,536	26,604	26,370	26,621	27,338	27,561	28,106	29,499	30,876	31,917
581																												
582	74.8%	75.8%	74.5%	74.7%	73.5%	73.1%	73.2%	73.6%	76.1%	76.9%	77.7%	79.2%	81.7%	79.4%	75.6%	74.2%	76.3%	76.8%	76.7%	78.0%	80.6%	82.5%	82.5%	84.0%	83.3%	85.2%	86.0%	88.0%
583																												
584	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
585																												
586																												
587	5,429	5,546	4,939	4,530	4,307	4,255	4,291	4,407	4,453	4,810	4,841	5,023	5,494	5,627	5,591	5,523	5,899	6,093	6,439	6,591	7,130	7,746	7,977	8,297	8,555	8,729	8,895	8,959
588	4,663	4,887	4,606	4,300	3,837	3,603	3,575	3,700	4,110	4,163	4,773	7,227	7,541	7,720	7,836	7,883	8,059	8,115	8,329	8,633	8,822	8,823	9,048	9,051	8,852	9,465	9,886	10,597
589	6,675	6,873	7,208	7,209	7,536	7,782	8,149	8,513	8,829	9,072	9,405	7,421	7,456	6,912	5,342	5,217	5,318	5,563	5,582	5,527	5,300	5,403	5,520	5,815	6,008	6,932	7,761	8,520
590	16,767	17,306	16,753	16,040	15,679	15,641	16,015	16,620	17,392	18,045	19,019	19,672	20,490	20,260	18,769	18,623	19,276	19,771	20,350	20,751	21,251	21,972	22,546	23,163	23,415	25,126	26,542	28,076
591																												

	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB	GC	GD	GE	GF	GG
472																								
473																			Sonangol, Angola				90	
474	101	124	139	134	136	125	128	129	125	130	129	124	120			V	2,712		Carbon dioxide	MtCO2		94.78%		
475	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.2			V	5		Methane	MtCH4		5.22%		
476	106	131	146	141	143	132	134	136	131	137	136	131	127			V	2,861		Total entity emissions	MtCO2e		100.00%		
477																	2,861	check						
478																			Sonatrach, Algeria				91	
479	377	380	381	342	346	335	319	319	313	431	350	341	341			V	11,099		Carbon dioxide	MtCO2		87.06%		
480	2.1	2.1	2.1	1.9	1.9	1.8	1.7	1.8	1.7	2.7	2.0	2.0	2.1			V	59		Methane	MtCH4		12.94%		
481	436	439	440	395	399	385	368	368	362	506	407	398	398			V	12,749		Total entity emissions	MtCO2e		100.00%		
482																	12,749	check						
483																			Southwestern, USA				92	
484	4	7	11	17	24	29	33	38	45	57	51	53	56			V	461		Carbon dioxide	MtCO2		80.55%		
485	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.4	0.4	0.4			V	4		Methane	MtCH4		19.45%		
486	5	8	14	22	29	36	41	48	56	71	63	65	68			V	572		Total entity emissions	MtCO2e		100.00%		
487																	572	check						
488																			Suncor, Canada				93	
489	100	103	98	77	99	98	88	88	133	144	87	95	100			V	2,228		Carbon dioxide	MtCO2		91.63%		
490	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2			V	7		Methane	MtCH4		8.37%		
491	109	111	107	83	106	104	94	94	140	152	91	100	106			V	2,432		Total entity emissions	MtCO2e		100.00%		
492																	2,432	check						
493																			Syrian Petroleum, Syria				94	
494	45	42	41	42	46	41	21	13	9	8	8	6	7			V	1,440		Carbon dioxide	MtCO2		92.43%		
495	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0			V	4		Methane	MtCH4		7.57%		
496	49	46	45	46	51	45	24	15	10	10	9	8	8			V	1,558		Total entity emissions	MtCO2e		100.00%		
497																	1,558	check						
498																			Taihelyo, Japan				95	
499	11	10	10	9	9	8	9	10	22	22	15	16	16			V	518		Carbon dioxide	MtCO2		100.00%		
500																V	-		Methane	MtCH4		0.00%		
501	11	10	10	9	9	8	9	10	22	22	15	16	16			V	518		Total entity emissions	MtCO2e		100.00%		
502																	518	check						
503																			Teck Resources, Canada				96	
504	26	28	36	50	62	61	66	68	71	67	74	71	70			V	910		Carbon dioxide	MtCO2		89.85%		
505	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3			V	4		Methane	MtCH4		10.15%		
506	29	31	40	56	69	68	73	76	79	75	82	79	78			V	1,013		Total entity emissions	MtCO2e		100.00%		
507																	1,013	check						
508																			Total, France				97	
509	337	341	345	343	363	299	293	293	272	299	312	327	356			V	13,590		Carbon dioxide	MtCO2		90.85%		
510	1.5	1.5	1.5	1.5	1.7	1.5	1.5	1.5	1.4	1.5	1.6	1.6	1.7			V	49		Methane	MtCH4		9.15%		
511	378	383	388	384	410	341	334	334	312	341	357	373	404			V	14,958		Total entity emissions	MtCO2e		100.00%		
512																	14,958	check						
513																			TurkmenGaz, Turkmenistan				98	
514	111	120	121	73	85	118	129	140	147	154	147	150	124			V	2,385		Carbon dioxide	MtCO2		81.80%		
515	0.9	1.0	1.0	0.5	0.7	0.9	1.0	1.1	1.2	1.2	1.2	1.2	1.0			V	19		Methane	MtCH4		18.20%		
516	136	147	148	88	103	145	157	171	180	189	180	184	151			V	2,915		Total entity emissions	MtCO2e		100.00%		
517																	2,915	check						
518										Divested Dec2015									UK Coal, UK				99	
519	24	20	19	17	18	18	15	12	10	5						V	792		Carbon dioxide	MtCO2		89.85%		
520	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0						V	3		Methane	MtCH4		10.15%		
521	26	22	21	19	20	20	17	14	11	5						V	882		Total entity emissions	MtCO2e		100.00%		
522																	882	check						
523																			Ukraine (coal)				100	
524	157	164	164	152	147	160	167	164	117	88	91	87	88			V	4,292		Carbon dioxide	MtCO2		89.85%		
525	0.6	0.7	0.7	0.6	0.6	0.6	0.7	0.7	0.5	0.4	0.4	0.4	0.4			V	17		Methane	MtCH4		10.15%		
526	175	182	183	169	164	178	186	183	130	98	101	97	98			V	4,777		Total entity emissions	MtCO2e		100.00%		
527																	4,777	check						
528																			Vale, Brazil				101	
529		6	10	14	18	19	17	21	21	16	25	29	28			V	226		Carbon dioxide	MtCO2		89.85%		
530		0.02	0.04	0.06	0.07	0.08	0.07	0.09	0.09	0.06	0.10	0.12	0.11			V	1		Methane	MtCH4		10.15%		
531		7	11	15	20	21	19	24	24	18	28	32	32			V	251		Total entity emissions	MtCO2e		100.00%		
532																	251	check						
533																			Vistra, USA				102	
534	25	24	25	25	30	35	34	32	32	32	26	27	15			V	1,201		Carbon dioxide	MtCO2		89.85%		
535	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			V	5		Methane	MtCH4		10.15%		
536	28	27	28	28	34	39	38	35	36	36	29	30	17			V	1,337		Total entity emissions	MtCO2e		100.00%		
537																	1,337	check						
538																			Westmoreland Mining, USA				103	
539	47	48	46	38	47	35	34	66	71	84	87	63	53			V	2,028		Carbon dioxide	MtCO2		89.85%		
540	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.2			V	8		Methane	MtCH4		10.15%		
541	52	53	51	43	52	38	38	73	79	94	97	70	59			V	2,257		Total entity emissions	MtCO2e		100.00%		
542																	2,257	check						
543																			Whitehaven Coal, Australia				104	
544	4	6	5	7	8	10	11	17	21	28	36	40	40			V	232		Carbon dioxide	MtCO2		89.85%		
545	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.07	0.08	0.11	0.14	0.16	0.16			V	1		Methane	MtCH4		10.15%		
546	4	7	6	8	9	12	12	19	23	31	40	45	45			V	258		Total entity emissions	MtCO2e		100.00%		
547																	258	check						
548																			Wintershall, Germany				105	
549	40	41	45	49	48	37	39	44	48	53	58	57	61			V	868		Carbon dioxide	MtCO2		86.56%		
550	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4			V	5		Methane	MtCH4		13.44%		
551	45	47	52	57	57	42	45	51	57	63	69	68	73			V	1,002		Total entity emissions	MtCO2e		100.00%		
552																	1,002	check						
553																			Woodside, Australia				106	
554	25	28	27	29	26	23	29	29	32	32	32	29	30			V	627		Carbon dioxide	MtCO2		85.01%		
555	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2			V	4		Methane	MtCH4		14.99%		
556	28	32	31	33	29	26	34	35	38	38	39	35	37			V	738		Total entity emissions	MtCO2e		100.00%		
557																	738	check						
558																			YPF, Argentina				107	
559		79	76	69	66	61	60	61	68	68	68	66	64			V	805		Carbon dioxide	MtCO2		88.26%		
560		0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3			V	4		Methane	MtCH4		11.74%		
561		90	86	78	75	69	68	68	77	76	77	75	72			V	912		Total entity emissions	MtCO2e		100.00%		
562																	912	check						
563										Delete									Yukos, Russian Federation				108	
564																V	2,742		Carbon dioxide	MtCO2		94.69%		
565																V	5		Methane	MtCH4		5.31%		
566																V	2,896		Total entity emissions	MtCO2e		100.00%		
567																	2,896	check	Copyright Climate Accountability Institute					
568																								
569													(including venting, flaring, own fuel)				CarbMajors sum to 2018		All entitites					
570	25,906	26,689	27,473	27,692	29,046	29,703	30,819	31,208	31,058	31,127	30,089	30,384	31,237			V	1,135,541		Carbon dioxide	MtCO2		90.20%		
571	105	108	112	112	119	121	126	128	126	126	121	125	129			V	4,405		Methane	MtCH4				
572	2,942	3,037	3,140	3,145	3,326	3,396	3,525	3,570	3,521	3,530	3,398	3,487	3,621			V	123,350		Methane	MtCO2e		9.80%		
573	28,848	29,726	30,612	30,837	32,372	33,099	34,344	34,778	34,579	34,657	33,488	33,871	34,858				1,258,891		Total all Carbon Major Entities	MtCO2e		100.00%		
574																	1,258,891	check		sum of entities above				
575							CDIAC CO2 includes flaring			CDIAC / GCP CO2 updated December 2019														
576	30,231	31,135	31,854	31,414	33,018	34,136	34,660	34,825	35,089	35,106	35,251	35,681	36,443			V	1,612,851		CDIAC CO2 emissions	MtCO2				
577											methane updated January 2020													
578	98	100	101	100	105	109	113	115	118	118	118	120	123			V	6,971		CDIAC/EDGAR methane	Tg CH4		146,394	MtCO2e	
579																								
580	32,986	33,922	34,688	34,212	35,961	37,202	37,835	38,051	38,398	38,405	38,567	39,041	39,878			V	1,808,043		CDIAC CO2 plus methane emissions	MtCO2e				
581													(excluding CME venting, flaring, own fuel)											
582	87.5%	87.6%	88.3%	90.1%	90.0%	89.0%	90.8%	91.4%	90.1%	90.2%	86.8%	86.8%	87.4%				69.63%		Carbon Majors of global CO2 plus methane	percent				
583																			(excluding CME venting, flaring, own fuel)					
584	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		MtCO2e		Ownership categories					
585																								
586																								
587	8,984	9,061	9,131	9,119	9,197	8,597	8,813	8,891	8,911	8,920	8,361	8,307	8,386			V	404,305		Investor-owned	MtCO2e		IOC	32.1%	
588	10,667	10,894	11,261	10,906	11,309	11,586	11,961	12,107	12,182	12,693	12,941	13,033	13,346			V	393,519		State-owned	MtCO2e		SOE	31.3%	
589	9,197	9,771	10,219	10,811	11,866	12,916	13,569	13,780	13,487	13,044	12,186	12,530	13,126			V	461,068		Nation-States	MtCO2e		Nation-State	36.6%	
590	28,848	29,726	30,612	30,837	32,372	33,099	34,344	34,778	34,579	34,657	33,488	33,871	34,858				1,258,891		Total Carbon Majors	MtCO2e		Total		
591																								

Cell: FT104
Comment: Rick Heede:
Coal India was corrected for 1973-2016 by re-inserting the missing calculation of metallurgical coal (~4% of total) at SumCoal / Coal India. This correction was re-linked to Entities AbuDhabi-Czech.xls and reflected in full here. Emissions for each year thus differ from the 1850-2015 dataset.

Cell: GB576
Comment: Rick Heede:
CAI compares entity emissions to the CDIAC / Global Carbon Project (www.globalcarbonproject.org) annual estimate of carbon dioxideee emissions from fossil fuels and cement production. The CAI Carbon Majors methodology is based on the CDIAC methdology; see: Heede, Richard (2019) Carbon Majors: Accounting for carbon and methane emissions 1854-2010 Methods & Results Report, ISBN 978-3-659-57841-0, OmniScriptum, Riga, 148 pp.
Reference of the full global carbon budget 2019: Pierre Friedlingstein, Matthew W. Jones, Michael O'Sullivan, Robbie M. Andrew, Judith Hauck, Glen P. Peters, Wouter Peters, Julia Pongratz, Stephen Sitch, Corinne Le Quéré, Dorothee C. E. Bakker, Josep G. Canadell, Philippe Ciais, Rob Jackson, Peter Anthoni, Leticia Barbero, Ana Bastos, Vladislav Bastrikov, Meike Becker, Laurent Bopp, Erik Buitenhuis, Naveen Chandra, Frédéric Chevallier, Louise P. Chini, Kim I. Currie, Richard A. Feely, Marion Gehlen, Dennis Gilfillan, Thanos Gkritzalis, Daniel S. Goll, Nicolas Gruber, Sören Gutekunst, Ian Harris, Vanessa Haverd, Richard A. Houghton, George Hurtt, Tatiana Ilyina, Atul K. Jain, Emilie Joetzjer, Jed O. Kaplan, Etsushi Kato, Kees Klein Goldewijk, Jan Ivar Korsbakken, Peter Landschützer, Siv K. Lauvset, Nathalie Lefèvre, Andrew Lenton, Sebastian Lienert, Danica Lombardozzi, Gregg Marland, Patrick C. McGuire, Joe R. Melton, Nicolas Metzl, David R. Munro, Julia E. M. S. Nabel, Shin-Ichiro Nakaoka, Craig Neill, Abdirahman M. Omar, Tsuneo Ono, Anna Peregon, Denis Pierrot, Benjamin Poulter, Gregor Rehder, Laure Resplandy, Eddy Robertson, Christian Rödenbeck, Roland Séférian, Jörg Schwinger, Naomi Smith, Pieter P. Tans, Hanqin Tian, Bronte Tilbrook, Francesco N Tubiello, Guido R. van der Werf, Andrew J. Wiltshire, Sönke Zaehle. Global Carbon Budget 2019, Earth Syst. Sci. Data, 2019. https://doi.org/10.5194/essd-11-1783-2019
See also: Gilfillan, D., Marland, G., Boden, T. and Andres, R.: Global, Regional, and National Fossil-Fuel CO2 Emissions, available at: https://energy.appstate.edu/CDIAC, last access: 27 September 2019.

Cell: C578
Comment: Rick Heede:
This study's total fugitive and vented methane from oil and natural gas systems and coal mining are summed here and compared to CDIAC's estimate for 1860 to 1969 (Stern & Kaufmann, 1998). CAI uses revised data rom EDGAR for 1970-2015, with extrapolation by CAI for 2016-2018 (based on growth of emissions from oil, gas, and coal production).There is a non-linearity at 1969/1970 btw dataasets.
Methane emissions may be revised if a more comprehensive and integrated dataset becomes available.
Furthermore, the Stern & Kaufman does not estimate methane emissions from oil (only gas-related CH4). The most recent EDGAR Nov19 datasets aggregate methane emissions from the Oil & Gas sector. CAI disaggregates methane from oil and methane from gas on the basis of an earlier EDGAR dataset 1970-2008 that reports CH4 from oil and gas separately. CAI uses this average allocation of ~695% from gas and ~30.5% from oil to estimate methane emissions from both sectors. This, given the fluctuations of methane emissions --the proportion from natural gas increases over time (from 50% in 1970 to 76% in 2008) -- this disaggregation is only approximate.

Stern, David I., & Robert K. Kaufmann (1998) "Annual Estimates of Global Anthropogenic Methane Emissions: 1860-1994," in Trends Online: A Compendium of Data on Global Change, Carbon Dioxide Information Analysis Center, Oak Ridge National Lab., U.S. DOE, Oak Ridge, Tenn., U.S.A. http://cdiac.esd.ornl.gov/trends/meth/ch4.htm#flaring

Crippa, M., G. Oreggioni, D. Guizzardi, M. Muntean, E. Schaaf, E. Lo Vullo, E. Solazzo, F. Monforti-Ferrario, J.G.J. Olivier, & E. Vignati (2019) Fossil CO2 and GHG emissions of all world countries - 2019 Report, Publications Office of the European Union, Luxembourg. ISBN 978-92-76-11100-9. https://edgar.jrc.ec.europa.eu/overview.php?vP_GHG

Cell: GB578
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