	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC	CD
1																																									
2	ssions from combustion, venting, flaring, and fugitive methane																																			Entity emissions from combustion, venting, flaring, and fugiti						
3																																									
4				Richard Heede																																	Richard Heede					
5				Climate Accountability Institute																																	Climate Accountability Institute					
6				18-Oct-20																																	18-Oct-20					
7												BP, UK																														
8																																									
9																																									
10						1890s										1900s								1900s			1910s												1920s			
11	1885	1886	1887	1888	1889	1890	1891	1892	1893	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	1922	1923	1924	1925
12																																									
13																																									
14																																									
15																													2	2	2	2	3	3	4	6	10	14	17	20	27
16																																									
17																																									
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						2	2	2	2	3	3	4	6	10	14	17	20	27
19																																									
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						0	0	0	0	0	0	0	0	0	0	0	0	0
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						0	0	0	0	0	0	0	0	0	0	0	0	0
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						0	0	0	0	0	0	0	0	0	0	0	0	1
26																																									
27																																									
28																																									
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						2	2	2	2	3	3	4	7	10	14	18	20	27
30																																									
31																																									
32																																									
33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						0	0	0	0	0	0	0	0	0	0	0	0	0
34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						-	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						-	-	-	-	-	-	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						0	0	0	0	0	0	0	0	0	0	0	0	0
37																																									
38																																									
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						0	0	0	0	0	0	0	0	1	1	1	1	1
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						-	-	-	-	-	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						-	-	-	-	-	-	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						0	0	0	0	0	0	0	0	1	1	1	1	1
43																																									
44																																									
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						2	2	2	3	3	3	4	7	11	15	19	21	29
46																																									
47																																									
48	1,019	1,033	1,081	1,198	1,198	1,304	1,359	1,370	1,356	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	3,096	3,554	3,525	3,573
49	278	282	295	327	327	356	371	374	370	383	406	419	440	464	508	534	553	566	617	624	664	708	783	749	785	819	835	879	944	850	838	900	956	936	806	932	803	845	970	962	975
50																																									
51	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%	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%	0.00%	0.00%	0.05%	0.06%	0.07%	0.07%	0.08%	0.09%	0.13%	0.19%	0.35%	0.47%	0.50%	0.57%	0.76%
52																																									
53																																									
54	6.4	6.4	6.8	7.4	7.5	8.0	8.3	8.4	8.2	8.5	9.0	9.3	9.7	10.2	11.2	11.8	12.1	12.4	13.6	13.7	14.4	15.5	17.1	16.3	17.0	17.8	18.1	19.1	20.4	18.4	18.1	19.5	20.6	20.3	17.9	20.6	17.7	19.0	21.3	21.1	21.2
55																																									
56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	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
57																																									
58																																									
59																																									
60																																									
61																																									

	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	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ
1																																							
2	ve methane																	Entity emissions from combustion, venting, flaring, and fugitive methane																						
3																							Richard Heede																
4																							Climate Accountability Institute																
5																							18-Oct-20																
6																																							
7	BP, UK																								BP, UK														
8																																							
9																																							
10					1930s					1930s					1940s										1950s										1960s				
11	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
12																																							
13																																							
14																																							
15	34	41	43	42	44	37	29	25	27	29	34	42	41	39	37	37	45	51	68	80	94	100	120	119	165	150	131	151	159	200	218	215	247	257	288	304	326	342	387
16							1	1	1	1	1	2	2	2	2	3	3	3	4	4	5	5	7	9	10	13	15	18	19	21	26	29	30	33	42	45	49	53	61
17																																			8	7	8	9	10
18	34	41	43	42	44	37	30	25	28	30	36	43	43	41	39	39	48	54	72	84	99	106	127	128	175	163	146	168	178	221	243	244	277	290	338	356	384	404	457
19																																							
20	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	1	1	1	1	1
21	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	2	2	2	3	3	3	3	4	4	5	5	5	5	6
22	-	-	-	-	-	-	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	2	2	2	2	3	3	3	3
23	-	-	-	-	-	-	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
24	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	4	4	4	5	5	6	7	7	8	8	9	10	11	11	13
26																																							
27																																							
28																																							
29	34	41	43	43	45	37	30	26	29	31	36	44	43	42	40	40	49	56	73	86	101	108	130	131	179	167	150	173	183	227	250	251	284	298	347	366	394	415	470
30																																							
31																																							
32																																							
33	0	0	0	0	0	0	0	0	0	0	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
34	-	-	-	-	-	-	0	0	0	0	0	0	0	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
35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0
36	0	0	0	0	0	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
37																																							
38																																							
39	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	3	4	4	5	5	6	6	9	8	7	8	9	11	12	12	13	14	15	16	18	18	21
40	-	-	-	-	-	-	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	3	4	4	5	5	6	7	8	8	9	12	12	14	15	17
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1
42	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	4	5	5	6	7	8	9	12	12	11	13	14	17	19	20	22	23	28	30	32	34	39
43																																							
44																																							
45	36	44	46	45	47	39	32	28	30	33	39	47	46	45	43	43	53	59	78	91	108	115	139	140	191	179	161	186	197	244	269	270	306	321	375	396	426	449	509
46																																							
47																																							
48	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	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
49	984	1,062	1,066	1,145	1,052	939	847	894	973	1,026	1,130	1,209	1,143	1,191	1,299	1,333	1,341	1,391	1,383	1,161	1,238	1,393	1,469	1,419	1,631	1,767	1,795	1,840	1,865	2,044	2,177	2,270	2,330	2,417	2,550	2,556	2,647	2,797	2,942
50																																							
51	0.95%	1.06%	1.11%	1.02%	1.16%	1.09%	0.98%	0.79%	0.80%	0.82%	0.88%	1.00%	1.04%	0.96%	0.84%	0.82%	1.00%	1.09%	1.44%	2.02%	2.23%	2.12%	2.42%	2.52%	3.00%	2.58%	2.28%	2.57%	2.68%	3.03%	3.13%	3.02%	3.33%	3.36%	3.72%	3.91%	4.07%	4.05%	4.36%
52																																							
53																																							
54	21.2	23.0	22.8	24.4	22.3	19.9	17.9	18.8	20.4	21.0	23.3	24.8	23.4	24.8	26.2	27.0	27.0	27.4	26.9	23.5	24.7	27.6	29.2	28.1	30.4	32.2	32.7	33.1	33.1	35.9	38.4	39.7	40.9	42.7	44.6	44.3	45.1	47.1	49.4
55																																							
56	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	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	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	2.55%	2.59%	2.80%
57																																							
58																																							
59																																							
60																																							
61																																							

Entity emissions from combustion, venting, flaring, and fugitive methane

Richard Heede
Climate Accountability Institute
18-Oct-20

BP, UK

	DR	DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ	FA	FB	FC	FD
1																																								
2																																								
3																																								
4																																								
5																																								
6																																								
7																																								
8																																								
9																																								
10	1960s					1970s										1980s										1990s														
11	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
12																																								
13																																								
14																																								
15	411	459	499	549	606	692	749	816	818	768	641	647	669	775	678	560	542	534	511	492	467	440	448	369	351	331	313	301	302	301	291	295	293	313	315	261	262	274	287
16	66	71	76	82	94	99	102	107	105	97	89	89	89	88	87	79	80	75	72	78	81	79	82	89	108	110	114	113	114	119	122	132	131	149	118	148	168	170	168
17	12	19	20	19	23	23	20	22	22	18	18	19	19	15	59	44	44	45	44	57	56	59	58	56	55													13	15
18	490	549	595	650	723	814	872	945	946	883	748	755	776	877	825	684	666	655	628	628	604	578	588	514	514	441	427	414	416	420	413	426	425	462	434	410	430	457	470
19																																								
20	2	2	2	2	2	3	3	3	3	3	2	2	3	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21	7	7	8	9	10	11	12	13	13	12	10	10	11	12	11	9	9	9	8	8	7	7	7	6	6	5	5	5	5	5	5	5	5	5	5	4	4	4	5
22	4	4	4	5	5	6	6	6	6	6	5	5	5	5	5	5	5	4	4	4	5	5	5	5	6	6	7	6	7	7	7	8	8	9	7	8	10	10	10
23	2	2	2	2	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	4	4	4	3	4	5	5	5
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	14	15	17	18	20	22	24	26	25	24	20	21	21	23	21	18	18	17	16	17	16	16	16	15	16	16	16	16	16	16	16	17	17	19	17	18	20	20	20
26																																								
27																																								
28																																								
29	503	564	611	668	743	836	896	971	971	906	769	775	797	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
30																																								
31																																								
32																																								
33	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
34	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.2	0.2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
36	1	2	2	2	2	2	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
37																																								
38																																								
39	22	25	27	30	33	37	40	44	44	41	35	35	36	42	37	30	29	29	28	27	25	24	24	20	19	18	17	16	16	16	16	16	16	17	17	14	14	15	15
40	18	20	21	23	26	27	28	30	29	27	25	25	25	24	24	22	22	21	20	22	22	22	23	25	30	30	32	31	31	33	34	36	36	41	33	41	47	47	46
41	1	2	2	2	3	3	2	2	3	2	2	2	2	2	7	5	5	5	5	6	6	7	7	6	6	-	-	-	-	-	-	-	-	-	-	-	-	1	2
42	42	46	50	54	61	67	71	76	76	70	61	62	63	68	67	57	56	55	53	55	54	52	53	51	55	48	48	47	48	49	49	52	52	58	50	55	61	63	64
43																																								
44																																								
45	545	611	661	723	804	903	966	1,047	1,047	976	830	837	860	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
46																																								
47																																								
48	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	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
49	3,079	3,222	3,325	3,507	3,740	4,050	4,214	4,410	4,644	4,624	4,618	4,863	4,996	5,180	5,318	5,292	5,149	5,110	5,159	5,309	5,498	5,576	5,757	5,977	6,067	6,153	6,286	6,089	6,162	6,207	6,340	6,540	6,578	6,555	6,639	6,830	6,887	7,038	7,378
50																																								
51	4.46%	4.78%	5.02%	5.20%	5.42%	5.63%	5.80%	6.01%	5.71%	5.35%	4.54%	4.35%	4.35%	4.74%	4.34%	3.62%	3.63%	3.59%	3.41%	3.31%	3.08%	2.90%	2.87%	2.42%	2.39%	2.03%	1.92%	1.93%	1.91%	1.92%	1.85%	1.85%	1.83%	2.00%	1.85%	1.71%	1.78%	1.85%	1.81%
52																																								
53																																								
54	51.3	53.4	54.7	57.2	60.6	86.8	92.3	99.4	112.6	112.5	105.2	117.3	114.8	122.9	119.4	110.5	93.4	92.8	89.4	86.3	87.0	86.8	84.9	92.0	93.2	90.0	89.1	89.9	89.7	90.1	89.9	91.9	89.3	84.0	82.0	82.6	83.0	82.8	88.0
55																																								
56	2.91%	3.11%	3.28%	3.40%	3.60%	2.77%	2.74%	2.73%	2.40%	2.23%	2.08%	1.88%	1.95%	1.96%	2.02%	1.85%	2.15%	2.10%	2.10%	2.26%	2.21%	2.15%	2.24%	1.97%	2.11%	1.91%	1.94%	1.89%	1.90%	1.95%	1.96%	2.03%	2.08%	2.47%	2.17%	2.38%	2.61%	2.73%	2.58%
57																																								
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Entity emissions from combustion, venting, flaring, and fugitive methane

Richard Heede
Climate Accountability Institute
18-Oct-20

BP, UK

2000s						2010s											Cumulative		Entity emissions						to 2015	to 2016	to 2017	to 2018
2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	MtCO2e								Cumulative MtCO2e	Cumulative MtCO2e	Cumulative MtCO2e	Cumulative MtCO2e
																	(except where noted)	V	(V = verified)						(except where noted)	(except where noted)	(except where noted)	(except where noted)
																			Entity CO2 emissions			kg CO2/tCO2		to 2015	to 2016	to 2017	to 2018
343	347	336	327	326	344	322	292	279	273	261	277	278	306	297			V 28,146	V	Oil & NGLs	MtCO2	linked			27,265	27,543	27,849	28,146
166	164	164	159	163	165	164	127	144	138	138	139	138	152	169			V 6,852	V	Natural Gas	MtCO2	linked			6,394	6,531	6,683	6,852
																	V 918		Coal	MtCO2	linked			918	918	918	918
509	512	500	486	488	509	486	420	423	411	400	417	416	458	466			35,917	V	Combustion total	MtCO2	sum			34,577	34,993	35,451	35,917
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			108		Oil & NGLs: Venting	MtCO2	calculated	3.83	linked	104	106	107	108
5	6	5	5	5	5	5	5	4	4	4	4	4	5	5			449		Oil & NGLs: Flaring	MtCO2	calculated	15.94	linked	435	439	444	449
9	9	9	9	9	9	9	7	8	8	8	8	8	9	10			392		Own fuel use	MtCO2	calculated	57.26	linked	366	374	383	392
5	5	5	5	5	5	5	4	4	4	4	4	4	4	5			196		Natural Gas: Venting	MtCO2	calculated	28.53	linked	182	186	191	196
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			12		Natural Gas: Flaring	MtCO2	calculated	1.74	linked	11	11	12	12
21	21	21	20	21	21	21	17	18	17	17	18	18	19	21			1,156		Venting & Flaring total	MtCO2	sum			1,099	1,116	1,136	1,156
																	-		Cement	MtCO2	linked						
530	533	521	506	509	530	506	436	441	428	417	434	433	477	487			V 37,073		Total CO2 emissions	MtCO2	sum		row 18+24+26	35,676	36,109	36,586	37,073
		84	82	83	86	83	68	73	70	70	71	71	78	83			summed scope 1 CO2 & CH4		(for UCS carbon intensity project, Jan17)									
																			Entity methane emissions			kg CH4/tCO2					
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			54		Methane: Oil & NGLs	MtCH4	calculated	1.92	linked	52	53	54	54
2	2	2	2	2	2	2	1	1	1	1	1	1	1	2			68		Methane: Natural Gas	MtCH4	calculated	9.88	linked	63	65	66	68
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			4		Methane: Coal	MtCH4	calculated	4.03	linked	4	4	4	4
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			V 126		Total methane emissions	MtCH4	sum			119	121	123	126
																			Entity methane emissions			GWP					
18	19	18	18	18	19	17	16	15	15	14	15	15	17	16			1,516		Methane: Oil & NGLs	MtCO2e	calculated	28		1,468	1,483	1,500	1,516
46	45	45	44	45	46	45	35	40	38	38	39	38	42	47			1,895		Methane: Natural Gas	MtCO2e	calculated	28		1,768	1,807	1,849	1,895
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			104		Methane: Coal	MtCO2e	calculated	28		104	104	104	104
64	64	63	62	62	64	63	51	55	53	52	53	53	58	63			3,515	V	Total methane emissions	MtCO2e	sum	(per IPCC SAR)		3,341	3,394	3,452	3,515
595	597	584	568	571	595	569	487	496	481	469	488	486	536	549			V 40,588	V	Total attributed emissions	MtCO2e	sum			39,017	39,503	40,039	40,588
28,308	29,264	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				1,505,476	1,540,727	1,576,408	1,612,851
7,726	7,986	8,250	8,497	8,693	8,573	9,011	9,316	9,459	9,504	9,576	9,581	9,620	9,738	9,946			V 440,166		Oil, Natural Gas, Coal, Flaring, & Cement	Mt Carbon							
																	CDIAC sums December 2019											
1.87%	1.82%	1.72%	1.63%	1.60%	1.69%	1.53%	1.28%	1.27%	1.23%	1.19%	1.24%	1.23%	1.34%	1.34%			2.30%		Entity percent of total CO2 emissions	Percent				2.37%	2.34%	2.32%	2.30%
91.7	94.7	98.4	99.5	101.2	99.9	105.1	109.5	113.4	115.2	118.2	117.8	118.4	120.0	122.7			V 6,971		CDIAC/EDGAR methane	Tg CH4				6,610	6,728	6,848	6,971
2.51%	2.42%	2.30%	2.21%	2.21%	2.30%	2.13%	1.66%	1.73%	1.64%	1.58%	1.62%	1.60%	1.74%	1.83%			1.80%		Entity percent of total CH4 emissions	Percent				1.80%	1.80%	1.80%	1.80%

Cell: FY48
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.

Cell: FY54
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

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