

	DO	DP	DQ	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			
1	Entity emissions from combustion, venting, flaring, and fugitive methane																																								
2																																									
3	Richard Heede Climate Accountability Institute 18-Oct-20																																								
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6																																									
7	Equinor, Norway																																								
8																																									
9																																									
10	1960s									1970s									1980s									1990s													
11	1962	1963	1964	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			
12																																									
13																																									
14																																									
15																																									
16																																									
17																																									
18	-	-									0	0	0	0	2	3	4	8	12	18	20	23	30	48	51	54	62	64	69	69	85	94	99	111	109	112	120	142	189		
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	0	0	0	0	0	0	1
21	-	-									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	1	1	2
22	-	-																																							
23	-	-																																							
24	-	-																																							
25	-	-									0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.6	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	5	
26																																									
27																																									
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29	-	-																																							
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34	-	-																																							
35	-	-																																							
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39	-	-																																							
40	-	-																																							
41	-	-																																							
42	-	-																																							
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44																																									
45	-	-																																							
46																																									
47																																									
48	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	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			
49	2,647	2,797	2,942	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			
50	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%	0.02%	0.02%	0.04%	0.07%	0.10%	0.11%	0.13%	0.16%	0.26%	0.26%	0.27%	0.31%	0.30%	0.32%	0.32%	0.38%	0.43%	0.45%	0.50%	0.48%	0.48%	0.52%	0.62%	0.81%			
51																																									
52																																									
53	45.1	47.1	49.4	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			
54	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%	0.04%	0.06%	0.08%	0.11%	0.11%	0.13%	0.18%	0.19%	0.19%	0.26%	0.23%	0.24%	0.24%	0.29%	0.30%	0.33%	0.36%	0.35%	0.40%	0.57%	0.80%	0.98%			
55																																									
56																																									
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58																																									
59																																									
60																																									
61																																									

	FA	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN	FO	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB	GC	GD	GE	GF
1	Entity emissions from combustion, venting, flaring, and fugitive methane																															
2	Richard Heede Climate Accountability Institute 18-Oct-20																															
3	Equinor, Norway																															
4	to 2015																															
5	2000s																2010s										Cumulative		Cumulative			
6	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	MtCO2e		MtCO2e								
7	(except where noted)																						V (V = verified)		(except where noted)							
8	146	144	151	154	155	149	143	145	143	142	131	127	131	128	133	140	140	138	136	3,945	Entity CO2 emissions				kg CO2/tCO2				to 2015			
9	37	39	47	52	58	69	71	72	78	81	81	77	93	84	84	85	89	100	104	1,736	Oil & NGLs	MtCO2	linked	3,532	Oil & NGLs: Flaring	MtCO2	linked	1,443				
10	184	183	198	206	214	218	214	217	222	223	212	204	225	212	216	226	229	238	240	5,681	Coal	MtCO2	linked	-	Coal	MtCO2	linked	-				
11	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	15	Combustion total	MtCO2	sum	4,974	Oil & NGLs: Venting	MtCO2	calculated	14				
12	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	63	Oil & NGLs: Flaring	MtCO2	calculated	56	Own fuel use	MtCO2	calculated	83				
13	2	2	3	3	3	4	4	4	4	5	5	4	5	5	5	5	5	6	6	99	Natural Gas: Venting	MtCO2	calculated	41	Natural Gas: Flaring	MtCO2	calculated	3				
14	1	1	1	1	2	2	2	2	2	2	2	3	2	2	2	2	3	3	3	50	Venting & Flaring total	MtCO2	sum	196	Cement	MtCO2	linked	-				
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	Total CO2 emissions	MtCO2	sum	5,170	row 18+24+26							
16	6	6	7	8	8	9	9	9	10	10	10	9	11	10	10	10	11	11	12	230	summed scope 1 CO2 & CH4 (for UCS carbon intensity project, Jan17)											
17	-																						V		-							
18	190	189	205	213	222	227	223	227	232	233	221	213	235	222	226	236	240	249	252	5,911	Entity methane emissions	MtCH4	calculated	7	Methane: Oil & NGLs	MtCH4	calculated	14				
19	36										37	39	40	39	37	44	40	40	41	43	47	48	8	Methane: Natural Gas	MtCH4	calculated	-	Methane: Coal	MtCH4	calculated	21	
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	GWP											
21	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	Methane: Oil & NGLs	MtCO2e	calculated	190	Methane: Natural Gas	MtCO2e	calculated	399				
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	25	Methane: Coal	MtCO2e	calculated	-	Total methane emissions	MtCO2e	sum	589				
23	8	8	8	8	8	8	8	8	8	8	7	7	7	7	7	8	8	7	7	212	Total attributed emissions	MtCO2e	sum	5,759	(per IPCC SAR)							
24	10	11	13	14	16	19	20	20	22	22	22	21	26	23	23	24	25	28	29	480	CDIAC CO2 emissions	MtCO2	calculated	1,505,476	CDIAC sums December 2019							
25	18	19	21	23	25	27	27	28	29	30	29	28	33	30	30	31	32	35	36	-	Oil, Natural Gas, Coal, Flaring, & Cement	Mt Carbon	calculated	0.37%	Entity percent of total CO2 emissions	Percent	calculated	0.34%				
26	208	208	226	236	246	254	251	254	261	263	251	241	268	252	256	267	272	284	288	6,604	Entity percent of total CH4 emissions	Percent	calculated	0.32%	CDIAC/EDGAR methane							
27	25,025	25,235	25,788	27,034	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	1,612,851	Tg CH4											
28	6,830	6,887	7,038	7,378	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	440,166	Percent											
29	0.76%	0.75%	0.80%	0.79%	0.78%	0.78%	0.74%	0.73%	0.73%	0.74%	0.67%	0.62%	0.68%	0.64%	0.64%	0.67%	0.68%	0.70%	0.69%	0.37%	-											
30	82.6	83.0	82.8	88.0	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	6,971	-											
31	0.79%	0.80%	0.91%	0.92%	0.95%	1.02%	0.99%	1.00%	1.04%	1.07%	1.00%	0.92%	1.04%	0.93%	0.91%	0.95%	0.97%	1.04%	1.05%	0.35%	-											
32	Heede 29-Aug-20 Offsheet calculation of Scope 1 + Scope 3 / production for oil and gas																															

Cell: FY48

Comment: Rick Heede:

CAI compares entity emissions to the CDIAC / Global Carbon Project (www.globalcarbonproject.org) annual estimate of carbon dioxide emissions from fossil fuels and cement production. The CAI Carbon Majors methodology is based on the CDIAC methodology; 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. Gol, 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 Liener, Danica Lombardozzi, Gregg Marland, Patrick C. McGuire, Joe R. Melton, Nicolas Metz, David R. Munro, Julia E. M. S. Nabel, Shin-Ichiro Nakaoka, Craig Neill, Abdrahman M. Omar, Tsunee 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 Zaehele. 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 from 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 datasets.
 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