

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			
1	Entity emissions from combustion, venting, flaring, and fugitive methane																																				
2																																					
3																																					
4																																					
5																																					
6																																					
7	015																											Repsol, Spain (acq. Talisman May 2015)									
8																																					
9																																					
10	1960s				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		
12																																					
13																																					
14																																					
15			0.0	0.2	0.3	0.5	1	1	1	1	1	1	2	2	3	4	5	6	8	9	10	11	12	13	15	74	78	81	86	87	64	65	77	86	86		
16																																					
17			0	0	0	1	1	1	1	1	1	1	2	2	3	4	5	6	8	9	10	11	12	13	15	74	78	81	86	87	66	69	84	97	99		
18																																					
19																																					
20																																					
21																																					
22	-	-	0	0	0	1	1	1	1	1	1	1	2	2	3	4	5	6	8	9	10	11	12	13	15	110	120	129	131	112	97	101	119	135	139		
23																																					
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	
25	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
29	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
30																																					
31																																					
32																																					
33	-	-	0.0	0.2	0.3	1	1	1	1	1	1	1	2	2	2	3	4	5	7	8	9	10	11	13	14	15	115	125	135	137	116	100	104	123	139	143	
34																																					
35																																					
36																																					
37	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
40	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
41																																					
42																																					
43	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
46	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
47																																					
48																																					
49	-	-	0	0	0	1	1	1	1	1	1	1	2	2	2	3	4	6	7	8	9	11	12	13	14	16	129	141	152	154	128	111	114	134	151	156	
50																																					
51																																					
52	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		
53	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		
54																																					
55	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%	0.02%	0.02%	0.03%	0.03%	0.04%	0.05%	0.05%	0.06%	0.06%	0.07%	0.07%	0.054%	0.057%	0.061%	0.061%	0.050%	0.045%	0.046%	0.044%	0.060%	0.060%		
56																																					
57																																					
58	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		
59	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%	0.02%	0.02%	0.02%	0.03%	0.03%	0.03%	0.059%	0.061%	0.067%	0.068%	0.047%	0.043%	0.042%	0.044%	0.046%	0.048%		
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Cell: FY52

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, Melke 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 Peregón, 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: FY58

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