

## ANNEX D:

### UPDATED DETAILS OF CARBON MAJORS PUBLICATIONS

In the first iteration of his research, Mr. Heede found that 90 Carbon Major Entities are responsible for an estimated 914 billion tonnes of CO<sub>2</sub>-equivalent (GtCO<sub>2</sub>e) of cumulative world emissions of industrial CO<sub>2</sub> and methane between 1854 and 2010. These entities cumulatively produced 985 billion barrels (bbl) of crude oil and Natural Gas Liquids (NGLs) (79 billion bbl were used for non-energy products), 2,248 trillion cubic feet (Tcf) of natural gas, and 163 billion tonnes of various ranks of coal.<sup>1</sup> This is equivalent to 63% of estimated global industrial emissions of CO<sub>2</sub> and methane from fossil fuel combustion, flaring, venting, fugitive or vented methane, own fuel use, and cement between 1751 and 2010.<sup>2</sup> This research has undergone an update since then, which is included below in table 3.

**Table 1: Numbers by source for all CMEs<sup>3</sup>**

Source	Total GtCO <sub>2</sub> e linked to CMEs	Global <sup>4</sup> 1751-2010 GtCO <sub>2</sub> e	% of global (of 100%) from CMEs	% of total Carbon producers
Oil&NGLs	365.7	472.0	77.5	40
Coal	329.6	642.5	51.3	36.05
Natural Gas	120.1	176.1	68.2	13.14
Cement	13.2	32.5	40.6	1.45
Flaring	6.0	12.6	47.9	0.66
Vented CO <sub>2</sub>	4.8	Not applicable	Not applicable	0.53
Own fuel use	7.1	Not applicable	Not applicable	0.78
Fugitive Methane	67.6	114.6	59.0	7.40
<b>Sum</b>	<b>914.3</b>	<b>1,450.3</b>	<b>63%</b>	<b>100%</b>

<sup>1</sup> Heede, R. *Carbon Majors: Accounting for Carbon and Methane Emissions 1854-2010, Methods and Results Report*, Climate Mitigation Services, April, 2014. p.18. available at: <http://climateaccountability.org/pdf/MRR%209.1%20Apr14R.pdf>

<sup>2</sup> Heede, Richard. *Carbon Majors: Accounting for Carbon and Methane Emissions 1854-2010, Methods and Results Report*, Climate Mitigation Services, April, 2014. available at: <http://climateaccountability.org/pdf/MRR%209.1%20Apr14R.pdf>

<sup>3</sup> Table based on research results from Heede, R. *Carbon Majors: Accounting for Carbon and Methane Emissions 1854-2010, Methods and Results Report*, Climate Mitigation Services, April, 2014. p.17. available at: <http://climateaccountability.org/pdf/MRR%209.1%20Apr14R.pdf>

<sup>4</sup> Global CO<sub>2</sub> combustion data from CDIAC, methane from Stern&Kaufmann and European Commission JRC data

**Table 2: Percentage of emissions per Carbon Major Entity (CME) 1751 - 2010<sup>5</sup>**

CME	Number	Cumulative Gt CO <sub>2</sub> e	Percentage of total 914 CME	Percentage of total 1,450.33 CDIAC <sup>6</sup>
<b>Investor-owned company</b>	50 companies	315	34.5%	21.72%
<b>State-owned company</b>	31 enterprises	288	31.5%	19.86%
<b>State</b>	9 former and current states	312	34.1%	21.51%
<b>Total carbon producers analysed in the research</b>	90 carbon majors	914	100%	63%
<b>Total CDIAC global emissions 1750-2010</b>		1,450.33	100%	100%

**Table 3: Percentage of emissions per Carbon Major Entity (CME) 1751 - 2013<sup>7</sup>**

CME	Number	Cumulative Gt CO <sub>2</sub> e	Percentage of total 1015 CME	Percentage of total 1,565.348 CDIAC <sup>8</sup>
<b>Investor-owned company</b>	51 companies	338	33.3%	21.57%
<b>State-owned company</b>	30 enterprises	315	31%	20.11%
<b>State</b>	9 former and current states	362	35.7%	23.10%

<sup>5</sup> Table based on research results from Heede, Richard. *Carbon Majors: Accounting for Carbon and Methane Emissions 1854-2010, Methods and Results Report*, Climate Mitigation Services, April, 2014. available at: <http://climateaccountability.org/pdf/MRR%209.1%20Apr14R.pdf>

<sup>6</sup> The Carbon Dioxide Information and Analysis Center (CDIAC) emissions database for fossil fuel CO<sub>2</sub>, flaring, and cement production from 1751 through 2010 totals 1,323 GtCO<sub>2</sub>, and 1,450 GtCO<sub>2</sub>e *with methane emissions*.

<sup>7</sup> Table based on research results from Heede, Richard. *2015. Carbon Major Entities Cumulative Emission to 2013 Ranked*, Climate Accountability Institute. February, 2015. Made available to Greenpeace Southeast Asia and Greenpeace International upon request in April 2016.

<sup>8</sup> The Carbon Dioxide Information and Analysis Center (CDIAC) emissions database for fossil fuel CO<sub>2</sub>, flaring, and cement production from 1751 through 2013 totals 1,443 GtCO<sub>2</sub>, and 1,565 GtCO<sub>2</sub>e *with methane emissions*.

<b>Total carbon producers analysed in the research</b>	90 carbon majors	1014	100%	64,78%
<b>Total CDIAC global emissions 1751-2013</b>		1,565.348	100%	100%