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GLOBAL 500 GREENHOUSE GAS REPORT: THE FOSSIL FUEL ENERGY SECTOR

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The authors would like to thank Carbon Disclosure Project (CDP) and Climate Accountability Institute (CAI) for their close collaboration on the data underlying this report. By collaborating across Thomson Reuters, CDP and CAI data sets, we have been able to build a unique level of transparency into the role played by the Global 500 fossil fuel energy sector in global greenhouse gas emissions.



GLOBAL 500 AND ENERGY OVERVIEW

The Thomson Reuters/BSD Consulting Global 500 GHG Report on Trends¹, published in December 2014, established some new insight on levels of greenhouse gas (GHG) emissions from the largest companies in the world. Chief among them were:

- That operations from these 500 largest companies produce over 10 percent of total GHG emissions each year directly (Scope 1) and indirectly through energy procured for their operations (Scope 2).
- That the quantity of emissions is estimated at about 5 billion tonnes (GtCO_{2e}) annually and has increased by, on average, 1 percent per year between 2010 and 2013.
- That total output of GHG globally needs to decrease on average by about 1.4 percent per year to stay within the standard set by the United Nations to hold global temperature increase to 2 degrees Celsius through 2050, leaving a “gap” in 2013 of 7.3 percent. (See Figure 1.)

Even though it’s an important part of the GHG emission picture, we purposefully did not include GHG emissions estimates from the value or supply chain in our first report. These emissions from the overlapping networks of upstream suppliers or downstream value chains are called “Scope 3” emissions. Calculating Scope 3 emissions from all 500 of the world’s largest businesses would lead inevitably to double counting².

This report, however, focuses on a key subset of 32 energy companies from the Global 500 where risk of double counting Scope 3 emissions is insignificant, when considering a category of Scope 3 called “Use of Product.”³ These data points either are disclosed by companies or can be estimated using company production figures. These companies are the world’s largest fossil fuel producers by capitalization and extract a significant share of coal, oil and gas from the earth for subsequent refinement, transport and marketing to consumers around the globe.

RECENT CHANGE IN THE ENERGY SECTOR

Global conditions have changed significantly since the publication of the first report, referenced above. We are in a time of fossil fuel abundance. New supplies added to the world market have sent the price of oil plummeting by 40-60 percent. Large amounts of new, cheaper carbon are now in our global energy pipeline. This raises important questions around the sources and global impact stemming from this abundance of carbon-intensive energy.

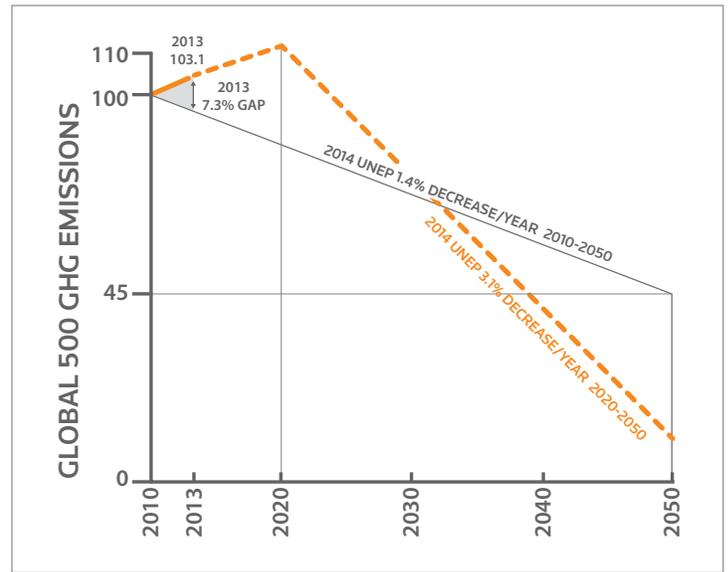


Figure 1. Global 500 GHG Emissions

Questions such as:

- Who are these companies of the Global 500 at the source of this energy pipeline on which the world relies for its energy needs?
- How much of the world’s GHG do these companies and their value chains emit?
- What does the data over the last four years tell us about the trend in emissions from these companies and the fossil fuels they produce versus where we should be trending to remain in compliance with the United Nations standard to stay within a 2 degrees Celsius increase in global temperature?

In this second report on the Global 500 and GHG emissions, we will examine the answers to these questions by compiling the emissions (Scopes 1 and 2) of 32 energy sector companies, and from the fossil fuels they produce (Scope 3: Use of Product), and then compare the overall trend with where we need to be to stay within 2 degrees Celsius of global warming. This is based on GHG emissions and fossil fuel production data reported by the companies themselves, or on secondary source estimates, e.g., Thomson Reuters ASSET4.

¹ Thomson Reuters/BSD Consulting 2014. *Global 500 Greenhouse Gases Performance, 2010-2013: 2014 Report on Trends*

² E.g., counting a single supplier’s emissions twice as reported by a downstream customer and by an upstream supplier to that supplier.

³ “Use of Product” is a subcategory of Scope 3 that captures the release of CO₂ when a product, in this case fossil fuels, is consumed.

WHY FOCUS ON THESE 32?

There are a couple of reasons to focus on this group of entities. The first reason is that the use of products from these firms emits significant quantities of carbon dioxide (CO₂), the dominant greenhouse gas. Fueling transportation systems, heating buildings, powering industry, and building infrastructure around the world using fossil fuels provided by the energy industry creates economic progress as well as large and growing emissions of greenhouse gases.

The second reason has to do with measurement of emissions. Unlike other sectors of the Global 500, the use of products from the energy sector creates a predictable level of emissions that can then be accurately estimated, either by the companies themselves or by researchers in a peer-reviewed study⁴ when the companies themselves do not directly report on their GHG emissions.

Collectively, we can't manage what we can't measure, but in this case, we can measure and create transparency around the single most important GHG-producing sector in the global economy.

Finally, this is not a naming and shaming exercise. These are all companies that provide vital energy services to the global economy and for our collective transportation, heating and electrical needs. They also are the companies that can provide leadership for the next generation of low-carbon energy and/or respond to the leadership from competitors, regulators or consumers. The other choice, a high likelihood of catastrophic climate change, is a grim one. It is these companies' value chains, and their customers in particular (which includes all fossil fuel users), which bear a burden of leadership and environmental stewardship, and it is the purpose of this report to bring transparency to the role of this sector to help us all manage our collective GHG footprint.⁵

THE QUANTITY: ONE-THIRD OF OUR GHG COMES FROM JUST 32 ENERGY PROVIDERS

When total GHG emissions from the operations and use of the products from these 32 energy companies are analyzed, we find that 31 percent of GHG emitted globally (CDIAC 2013)⁶, on an annual basis, comes from these companies⁷ and humanity's use of their products. See chart on following page.



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⁴ These 32 companies were also chosen because they are part of another recent and important peer-reviewed study done on 90 entities and their GHG emissions since the industrial revolution. See Heede, Richard (2014) Tracing anthropogenic CO₂ and methane emissions to fossil fuel and cement producers 1854-2010, *Climatic Change*, vol. 122(1): 229-241; doi:10.1007/s10584-013-0986-y. Open Access.

⁵ The authors of this report wish to invite any of the companies mentioned to provide updated figures on their emissions. These updates will be incorporated into the report, which will in turn create additional transparency and clarity around the GHG emissions picture.

⁶ Boden, T. A., G. Marland, & R. J. Andres (2013) Global, Regional, and National Fossil-Fuel CO₂ Emissions, Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., USA doi 10.3334/CDIAC/00001_V2013.

⁷ Note that when a company directly reports its GHG emissions, as is the case with roughly two-thirds of the companies in this report, we have used the self-reported number from either Thomson Reuters or CDP data sources; in the event a company does not report its global GHG emissions, for Scopes 1 and 2, we employ Thomson Reuters estimation methodologies; for Scope 3, we employ Climate Accountability Institute's peer-reviewed estimates based on company-reported fossil fuel production data. See Heede, Richard (2014) Tracing anthropogenic CO₂ and methane emissions to fossil fuel and cement producers 1854-2010, *Climatic Change*, vol. 122(1): 229-241; doi:10.1007/s10584-013-0986-y. Open Access & privately communicated data for 2013.

Energy companies emitting a total of 31% of GHG on an annual basis – 2013 and 2010

Organization	Incorporated Country	2013	2013	2013	2010	2010	2010	Disclosure and Estimate Methods*
		Scope 1 & 2 Metric Tonnes CO ₂ e	Scope 3 Use of Product Metric Tonnes CO ₂ e	Scope 1, 2, 3 Use of Product Metric Tonnes CO ₂ e	Scope 1 + 2 Metric Tonnes CO ₂ e	Scope 3 Use of Product Metric Tonnes CO ₂ e	Scope 1, 2, 3 Use of Product Metric Tonnes CO ₂ e	
Anadarko Petroleum Corporation	USA	15,353,887	97,780,895	113,134,781.65	2,371,282	80,325,058	82,696,339	Scope 2 not disclosed in 2010; for Scope 3, Climate Accountability Institute estimates used
Anglo American	UK	17,011,771	169,702,324	186,714,095.00	19,999,891	177,618,320	197,618,211	Scopes 1, 2 and 3 disclosed by the company
Apache Corporation	USA	9,900,000	96,618,173	106,518,173.44	10,900,000	83,342,650	94,242,649	Scopes 1 and 2 disclosed; for Scope 3, Climate Accountability Institute estimates used
BG Group	UK	6,974,079	87,695,000	94,669,079.00	7,974,747	88,692,000	96,666,747	Scopes 1, 2 and 3 disclosed by the company
BHP Billiton	UK	46,700,000	360,592,000	407,292,000.00	45,731,137	324,100,000	369,831,137	Scopes 1, 2 and 3 disclosed by the company
BP	UK	55,770,000	422,000,000	477,770,000.00	74,920,000	573,000,000	647,920,000	Scopes 1, 2 and 3 disclosed by the company
Canadian Natural Resources Limited	Canada	18,993,055	77,627,994	96,621,049.28	18,210,358	81,860,334	100,070,692	Scopes 1 and 2 disclosed; for Scope 3, Climate Accountability Institute estimates used
Chevron Corporation	USA	61,571,049	363,000,000	424,571,049.00	66,619,864	404,000,000	470,619,864	Scopes 1, 2 and 3 disclosed by the company
China Petroleum & Chemical Corporation	China	249,454,634	338,246,080	587,700,713.54	254,526,244	304,869,701	559,395,945	ASSET4 Scopes 1 and 2 estimates and Climate Accountability Institute Scope 3 estimates used
Coal India	India	0	820,167,862	820,167,862.40	0	765,007,574	765,007,574	ASSET4 Scopes 1 and 2 estimates and Climate Accountability Institute Scope 3 estimates used
ConocoPhillips	USA	27,386,414	188,145,599	215,532,013.00	68,005,000	512,000,000	580,005,000	Scopes 1, 2 and 3 disclosed by the company
Devon Energy Corporation		8,635,660	86,537,141	95,172,800.81	6,091,102	76,807,604	82,898,705	Disclosed Scopes 1 and 2 for 2013 but not for Scope 2 2010; for Scope 3, Climate Accountability Institute estimates used
Ecopetrol Sa	Colombia	8,034,144	88,345,104	96,379,247.79	6,072,260	81,097,018	87,169,278	Disclosed Scopes 1 and 2; for Scope 3, Climate Accountability Institute estimates used
Eni SpA	Italy	48,055,680	282,342,097	330,397,777.00	62,561,965	268,438,000	330,999,965	Scopes 1, 2 and 3 disclosed by the company
Exxon Mobil Corporation	USA	148,000,000	529,368,800	677,368,799.73	147,000,000	565,279,473	712,279,472	Disclosed Scopes 1 and 2; for Scope 3 Climate Accountability Institute estimates used as partial disclosure only by ExxonMobil
Gazprom OAO	Russia	127,039,403	1,132,907,074	1,259,946,477.06	137,184,240	1,078,565,454	1,215,749,693	Disclosed Scope 1 for 2010 but not Scope 2; for 2013, Scopes 1 and 2 ASSET4 used; for Scope 3, Climate Accountability Institute estimates used
Glencore Xstrata plc	Switzerland	39,147,586	772,000,000	811,147,586.00	11,208,000	197,668,842	208,876,841	Scopes 1 and 2 disclosed for 2013, ASSET4 for 2010; Scope 3 for 2013 disclosed; Scope 3 for 2010 Climate Accountability Institute estimates
Hess Corporation	USA	6,531,638	13,900,000	20,431,638.00	9,034,065	40,200,000	49,234,065	Scopes 1, 2 and 3 disclosed by the company
Lukoil	Russia	0	285,705,443	285,705,442.82	0	296,355,546	296,355,545	Climate Accountability Institute Scope 3 estimates used
Marathon Oil Corporation	USA	4,780,000	63,388,850	68,168,850.20	18,809,000	51,830,110	70,639,110	Disclosed Scopes 1 and 2 in 2010; for 2013 ASSET4 used; for Scope 3 Climate Accountability Institute estimates used
Occidental Petroleum Corporation	USA	17,700,000	99,715,758	117,415,758.01	17,800,000	97,713,581	115,513,581	Disclosed Scopes 1 and 2; for Scope 3, Climate Accountability Institute estimates used
PETROCHINA Company Limited	China	310,518,999	496,220,848	806,739,846.67	299,678,526	544,629,824	844,308,350	ASSET4 Scopes 1 and 2 estimates and Climate Accountability Institute Scope 3 estimates used
Petróleo Brasileiro SA – Petrobras	Brazil	73,374,716	499,634,090	573,008,805.81	61,213,363	504,059,819	565,273,182	Scopes 1, 2 and 3 disclosed by the company
Repsol	Spain	15,252,544	113,870,504	129,123,048.00	25,438,767	147,000,000	172,438,767	Scopes 1, 2 and 3 disclosed by the company
Rio Tinto	UK	37,800,000	139,000,000	176,800,000.00	44,600,000	122,000,000	166,600,000	Scopes 1, 2 and 3 disclosed by the company
Rosneft	Russia	61,908,943	642,741,073	704,650,016.15	37,785,363	338,033,281	375,818,644	Scopes 1 and 2 ASSET4 estimates used; for Scope 3 Climate Accountability Institute estimates used
Royal Dutch Shell	Netherlands	83,000,000	600,000,000	683,000,000.00	85,000,000	670,000,000	755,000,000	Scopes 1, 2 and 3 disclosed by the company, except 2010 Scope 3 where ASSET4 reported value used
RWE AG	Germany	167,200,000	67,520,000	234,720,000.00	170,200,000	79,710,000	249,910,000	Scopes 1, 2 and 3 disclosed by the company
Sasol Limited	South Africa	70,304,000	4,831,761	75,135,761.00	74,981,000	103,886,352	178,867,352	Scopes 1, 2 and 3 disclosed by the company, except 2010 Scope 3, where Climate Accountability Institute estimates used
Statoil ASA	Norway	16,443,826	278,018,695	294,462,521.00	14,407,321	290,140,200	304,547,520	Scopes 1 and 2 disclosed by the company; Scope 3 for 2013 disclosed, and for 2010, Climate Accountability Institute estimates used
Suncor Energy Inc.	Canada	20,534,584	155,850,107	176,384,690.87	19,228,524	151,039,108	170,267,632	Disclosed Scopes 1 and 2; for Scope 3 Climate Accountability Institute estimates used
Total	France	50,300,000	550,000,000	600,300,000.00	57,000,000	627,000,000	684,000,000	Scopes 1, 2 and 3 disclosed by the company
TOTAL		1,823,676,611	9,923,473,272	11,747,149,883.25	1,874,552,020	9,726,269,850	11,600,821,870	

* Note that when GHG values are not directly disclosed by the company to CDP, an estimate is determined either by ASSET4 (Scopes 1 & 2) or by Climate Accountability Institute (Scope 3) using other data disclosed by the company; if there is a zero value, then there was not enough company-disclosed data of any kind to derive an estimate.

A few additional points to consider:

- Over the most recent four-year period for which we have data, the Scope 3: Use of Product emissions of these 32 companies increased by 2 percent, and total emissions by 1.3%.
- Adding in the Scope 1 and 2 emissions reported by these companies, we have a total of 11.75 GtCO₂ emitted, or 31 percent of the world's total (CDIAC 2013).
- Achieving a new level of transparency, this table contains the best estimates of the most important sector in the global economy related to greenhouse gas emissions, inviting further analysis, comparison and debate.

THE "GAP" MATTERS MOST

Perhaps most important is the fact that GHG emissions are a natural part of our planet's life cycle, if kept within the limits of our biosphere's capacity. Using fossil fuels has enabled spectacular economic development since the industrial revolution. The upward trajectory in global GDP has brought with it a commensurate increase in atmospheric GHG concentrations. Fortunately, ecosystems are sufficiently resilient to absorb a great deal of environmental change, but human CO₂ emissions threaten to exceed the biosphere's absorptive capacity. It is important, therefore, to present the planetary context for the trends we describe in order to know if they really matter.

The key question is: are anthropogenic GHG emissions from the use of fossil fuels exceeding planetary boundaries, beyond which ecosystems collapse and catastrophic climate change is likely? Unfortunately, with a very high degree of probability, the answer is yes, if we do not manage to significantly decrease GHG emissions.

As in the first report, the United Nations' latest scientific guidance⁸ shows how GHG emissions should be decreasing in order to stay within a 2-degree warming scenario. If we overlay this with the story from these 32 entities and perform a gap analysis of the total (Scopes 1, 2 and 3: Use of Product) GHG footprints of these companies, we arrive at the following conclusions:

- The emissions gap is widening. For the recent four-year period for which data is available, from 2010 to 2013, emissions increased by 1.3 percent when they should have been decreasing by 1.4 percent per year. This represents a gap of about 5.5 percent (646 Mio MT CO₂e) over the four-year time period.
- The volume of emissions is significant. These emissions represent roughly one-third of the global annual total, a figure two times higher than the total Scope 1 and 2 emissions from the entire Global 500. (See Figure 2).

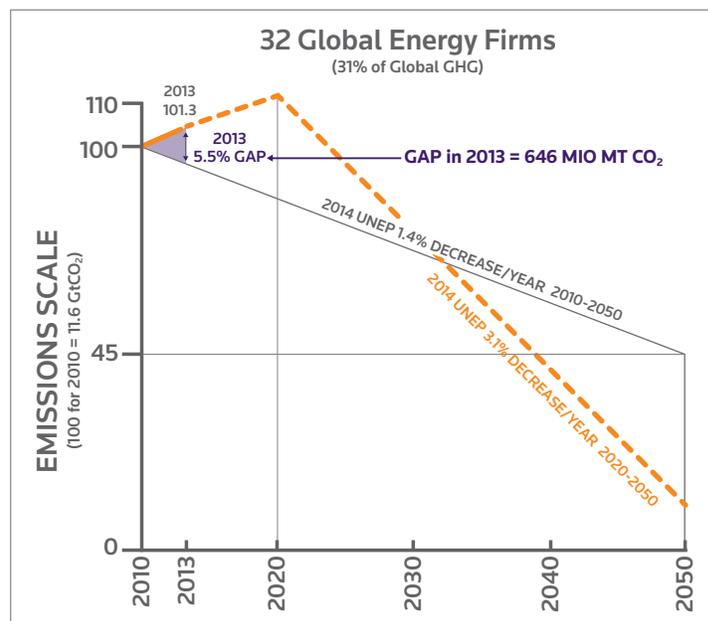


Figure 2. 32 Global Energy Firms

A TIME FOR LEADERSHIP

The companies highlighted in this report have contributed significantly to the welfare of humanity. They have organized massive resources and explored for much-needed energy in the most inhospitable parts of our planet. They have responded to global demand for highly useful energy sources, and have done so using an incredibly successful business model.

Now together, as consumers, regulators, investors and producers, we are at a crossroads, and we all need to play a part if we are to bring emissions back into line within planetary boundaries. In one sense, consumption begins with consumers; energy companies are only going to produce what consumers will buy. But another increasingly important role is the part played by the energy sector itself to deploy its considerable political, financial and technical resources for advances in energy innovation and the related financial and policy frameworks. The authors of this report, in a spirit of constructive transparency, profoundly hope that these shapers of society will show us all a new, prosperous, and at the same time sustainable pathway forward. This is a crucial time for company leadership.

⁸ UNEP 2014. The Emissions Gap Report 2014. United Nations Environment Programme (UNEP), Nairobi.

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