Comparing entity self-reporting of Scopes 1 and 2 emissions to Carbon Majors factors

Background calculations on ancillary emissions of methane and carbon dioxide

Heede, CMS
3-Jul-13

Royal Dutch Shell plc

Carbon Disclosure Project, RDS anno 2010 submission
Section 7: Emissions Methodology
Section 8: Emissions Data (1Jan - 31Dec 2010)
Section 9: Scope 1 Emissions Breakdown
Section 10: Scope 2 Emissions Breakdown
Section 12: Energy
Section 15: Scope 3 Emissions

Shell did not provide CDP data in "OG3.3"

Gross Scope 1	2008	2009	2010
Table OG3.3	tCO2e	tCO2e	tCO2e
Combustion			
Flaring			
Process emissions			
Vented emissions			
Fugitive emissions			
Total	-	-	-

Shell CDP, section 7.4

7.4
Please give the emissions factors you have applied and their origin; alternatively, please attach an Excel spreadsheet with this data

Fuel/Material/Energy	Emission Factor	Unit	Reference
Other: Flare efficiency factor	0.98	Other: fraction	API Compendium 2009, Figure 4-2
Natural gas	2.76	metric tonnes CO2 per metric tonne	API Compendium 2009, Table 4-3
Propane	2.95	metric tonnes CO2e per metric tonne	API Compendium 2009, Table 3-8
Diesel/Gas oil	3.22	metric tonnes CO2 per metric tonne	API Compendium 2009, Table 4-3
Other: Heavy Fuel Oil	3.17	metric tonnes CO2 per metric tonne	API Compendium 2009, Table 4-3
Other: Motor gasoline in cars	0.2	Other: kg CO2 / km	API Compendium 2009, Table A-5
Other: Diesel/Gas oil in trucks	0.94	Other: kg CO2 / km	DEFRA Table 6e - 7d

Gross Scope 1	tCO2e			tCO2e	
Downstream	43,900,000	58.5%	CO2	71,600,000	95.5%
Upstream (other than flaring)	17,300,000	23.0%	CH4	2,800,000	3.7%
Upstream flaring	10,300,000	13.7%	N2O	560,000	0.7%
Shipping	3,400,000	4.5%	HFCs	31,000	0.0%
Other	170,000	0.2%	PFCs	5	0.0%
Total	75,070,000	100.0%	SF6	-	
			Total	74,991,005	100.0%

133,333 tCH4

Gross Scope 2	tCO2e		tCO2e	
	10,000,000	Downstream	6,300,000	64.9%
		Upstream	3,100,000	32.0%
		Other	300,000	3.1%
		Total	9,700,000	100.0%

Energy	table 12.2	MWh		table 12.3	MWh	
	Fuel	237,000,000	89.2%	Other: Own Energy	189,200,000	79.9%
	Electricity	12,100,000	4.6%	Natural gas	33,300,000	14.1%
	Heat	-		Other: Marine Transport Fuel	14,100,000	6.0%
	Steam	16,700,000	6.3%	Other: Road Transport Fuel	200,000	0.1%
	Cooling	-		Total	236,800,000	100.0%
	Total	265,800,000	100.0%			
	1 kWh =	3.60	MJ	Therefore	189,200,000	681,120,000,000 MJ
					681,120	TJ

Gross Scope 3

Other: Refinery Products	475,000,000	669,000,000
Other: Natural Gas	194,000,000	
Other: Transport services Upst	870,000	
Other: Transport services Dow	776,000	
Other: Transfers - sold CO2	656,000	
Franchises (not included in Scc	690,000	
Other: Business Travel - Air	216,000	
Total	672,208,000	

Use of products sold (2009 CI	570,000,000

Oil, IPCC	20.00	kgC/GJ, default C content IPCC
Natural gas IPCC	15.30	kgC/GJ, default carbon content

Case 1: Assume own energy is all natural gas		
heat content nat gas	1.1050	MJ/cf
	6.16398E+11	cf nat gas
	616.40	Bcf own energy (if nat gas)
CME Gas EF	0.017	MtC/Bcf
Gas Carbon	10.23	MtC
Gas CO2	37.50	MtCO2 own energy

Case 2: Assume own energy is all crude oil		
IPCC, heat value	5.78	GJ/bbl
	117,766,673	bbl own energy
CME liquids EF	106.40	kgC/bbl
Liquids Carbon	12,530,221	tC own energy
Liquids CO2	45.95	MtCO2 own energy

Case 3: Assume own energy is average of gas and liquid fuels	
Average gas and liq	41.73 MtCO2 own energy
2/3 gas and 1/3 liq	40.32 MtCO2 own energy

Entity 2010 production and emissions, this study	Crude oil & NGL	Natural gas	
	million bbl	Bcf	
Production	617	3,396	linked
	MtCO2/million bbl	MtCO2/Bcf	
Emission factor	0.371	0.053	linked
	MtCO2	MtCO2	
Emissions	229	181	
	kg CO2/tCO2	kg CO2/tCO2	
Vented CO2 EF	3.83	28.53	
Flaring EF	15.94	1.74	
Fugitive methane	1.92	9.88	kg CH4/tCO2
Fugitive methane	40	207.44	kg CO2e/tCO2

Ancillary emissions, 2010	MtCO2e	MtCO2e	
Vented CO2	0.9	5.2	
Flaring	3.7	0.3	
Fugitive methane	0.4	1.8	MtCH4
Fugitive methane	9.3	37.6	
Total ancillary	13.8	43.1	

Total Shell, 2010:	MtCO2e	MtCO2e	Percent oil	ercent gas
Production	229	181	94.3%	80.8%
Ancillary	14	43	5.7%	19.2%
Total	243	225		

Total Shell, 2010:	MtCO2e	Percent	
Total production	411	87.8%	
Total ancillary	57	12.2%	
Total Shell, 2010	468		
Shell total CH4	tCH4 gas	methane intensity	
This project	2,233,667	5.44	kg CH4/tCO2
Shell self-reported	133,333	0.32	kg CH4/tCO2
Percent of Carbon Majors	5.97%	16.75	multiple

Comparing entity's CDP submission to this study

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	410.7	100.0%	
Ancillary emissions, this study	56.9	13.9%	
Entity total, 2010, this study	467.7	113.9%	100.0%
Product emissions, CDP	669.0	162.9%	
Total scope 3, CDP	672.2	163.7%	
Scope 1, CDP	75.1	18.3%	
Entity Scope 1 + Product emiss. CDP	744.1	181.2%	159.1%
"Own fuel" emissions (CMS)	41.7	10.2%	

Note: we do not add Scope 2 emissions to this comparison table, since primary fuel inputs to electricity are already accounted for.

Carbon Disclosure Project, RDS anno 2010 submission

Protocol: SAR GWP values Section 7: Emissions Methodology

Flare efficiency 0.98 API Compendium 2009, Figure 4.2

Royal Dutch Shell plc

Section 9: Scope 1 Emissions Breakdown

9.2a
Please break down your total gross global Scope 1 emissions by business division

Business Division	Scope 1 metric tonnes CO2e
Downstream	43900000
Upstream (other than flaring)	17300000
Upstream flaring	10300000
Shipping	3400000
Other	170000

9.2c
Please break down your total gross global Scope 1 emissions by GHG type

GHG type	Scope 1 metric tonnes CO2e
CO2	71600000
CH4	2800000
N20	560000
HFCs	31000
PFCs	5
SF6	0

10.2a
Please break down your total gross global Scope 2 emissions by business division

Business division	Scope 2 metric tonnes CO2e
Downstream	6300000
Upstream	3100000
Other	300000

12.2
Please state how much fuel, electricity, heat, steam, and cooling in MWh your organization has consumed

Energy type	MWh
Fuel	237000000
Electricity	12100000
Heat	0
Steam	16700000
Cooling	0

12.3
Please complete the table by breaking down the total "Fuel" figure entered above by fuel type

Fuels	MWh
Other: Own Energy	189200000
Natural gas	33300000
Other: Marine Transport Fuel	14100000
Other: Road Transport Fuel	200000

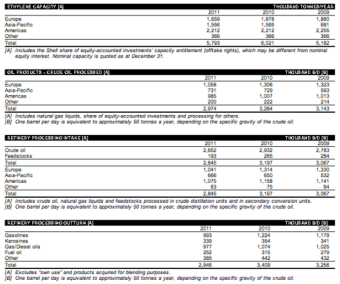
Alternatively, IPCC default	**48.00**	**net calorific value, TJ/Gg**
	15.30	**default carbon content, kgC/GJ**
thus	44,517,647	kgC
	44,518	tC
	0	MtC
	0.16	MtCO2

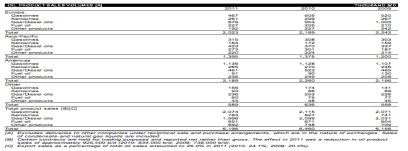
7.4
Please give the emissions factors you have applied and their origin; alternatively, please attach an Excel spreadsheet with this data

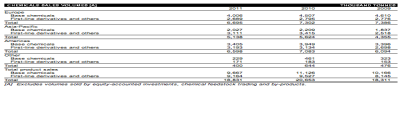
Fuel/Material/Energy	Emission Factor	Unit	Reference
Other: Flare efficiency factor	0.98	Other: fraction	API Compendium 2009, Figure 4-2
Natural gas	2.76	metric tonnes CO2 per metric tonne	API Compendium 2009, Table 4-3
Propane	2.95	metric tonnes CO2e per metric tonne	API Compendium 2009, Table 3-8
Diesel/Gas oil	3.22	metric tonnes CO2 per metric tonne	API Compendium 2009, Table 4-3
Other: Heavy Fuel Oil	3.17	metric tonnes CO2 per metric tonne	API Compendium 2009, Table 4-3
Other: Motor gasoline in cars	0.2	Other: kg CO2 / km	API Compendium 2009, Table A-5
Other: Diesel/Gas oil in trucks	0.94	Other: kg CO2 / km	DEFRA Table 6e - 7d

Sources of Scope 3 emissions	metric tonnes CO2e	Methodology
Other: Refinery Products	475000000	These emissions were determined from the product of Refinery processing outturn and the emission factor for refined projects. The Refinery Processing Outturn number is on page 40 of the publication "Royal Dutch Shell plc Annual Report and Form 20-F for the year ended December 31st 2010". Emission Factors for the refined products are from the IEA publication "CO2 Emissions from Fuel Combustion". We are investigating transitioning to the use of DEFRA factors.
Other: Natural Gas	194000000	These emissions were determined from the product of Natural Gas Production and the emission factor for natural gas. The Natural Gas Production number is on page 32 of the publication "Royal Dutch Shell plc Annual Report and Form 20-F for the year ended December 31st 2010". Emission Factor for natural gas is from the IEA publication "CO2 Emissions from Fuel Combustion". We are investigating transitioning to the use of DEFRA factors.
Other: Transport services Upstream	870000	Includes air, sea and land transport services provided by contractors. A wide range of methods are applied from using the amount of fuel consumed or distance travelled x emission factors. Emission factors are generally taken from the API Compendium or DEFRA.
Other: Transport services Downstream	776000	Emission factors are applied to the kilometres travelled that are recorded as part of safety monitoring program. 0.94 g / Km was used with the source being DEFRA.
Other: Transfers - sold CO2	656000	CO2 sold to other parties for various applications. The quantity is metered.
Franchises (not included in Scope 1 or 2)	690000	These emissions were determined from the product of average electricity consumption per site and a global average grid factor. The average electricity was derived from actual electricity data from the service station network in several major markets. The global grid average factor was derived from a weighted calculation of the number of retail sites in each country multiplied by the country factor. These emissions are scope 2 under equity reporting.
Other: Business Travel - Air	216000	Employee Business Air Travel in 2010: 216,000 tonne CO2e. The calculation was based on DEFRA updated October 2010 method. Our Business travel contribution in 2009 was 211,000 tonne using the October 2010 method.

Royal Dutch Shell plc SEC Form 20-F for 2011
www.sec.gov/edgar/searchedgar/webusers.htm
page 40 (see ref in CDP Scope 3 Emissions)







Shell 20-F, page 41.

Hess Corporation

(data provided by Hess; Shell did not proved data for OG3.3)

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Gross Scope 1	2008	2009	2010
Hess, Table OG3.3	tCO2e	tCO2e	tCO2e
Combustion	5,201,551	5,105,665	5,455,802
Flaring	3,034,570	3,714,342	2,847,295
Process emissions	66,072	60,553	74,222
Vented emissions	1,949,397	119,112	8,204
Fugitive emissions	87,623	83,009	54,440
Total	10,339,213	9,082,681	8,439,963

!!!

Gross Scope 1	tCO2e			tCO2e	
Exploration & production	5,115,756	60.5%	CO2	8,226,711	97.3%
Refining	3,263,815	38.6%	CH4	192,823	2.3%
Retail & marketing	8,949	0.1%	N2O	33,093	0.4%
Storage, transportation, & dist	64,106	0.8%	HFCs		0.0%
Other		0.0%	PFCs		0.0%
Total	8,452,626	100.0%	SF6		0.0%
no data on flaring, venting, CH4			Total	8,452,627	100.0%

9,182 tCH4

Gross Scope 2	
Exploration & production	370,068
Refining	72,959
Retail & marketing	126,633
Storage, transportation, & dist	11,778
Total	581,438

Energy	MWh
Fuel	12,751,728
Electricity	3,476,964
Heat	-
Steam	-
Cooling	-
Total	16,228,692

Fuel energy use is direct, therefore Scope 1

Assume that fuel energy inputs are "own fuel"

1 kWh =	3.60	MJ	Therefore	12,751,728	45,906,220,800 MJ
					45,906 TJ

Case 1: Assume own energy is all natural gas		
heat content nat gas	1.1050	MJ/cf
	41,544,091,222	cf nat gas
	41.54	Bcf own energy (if nat gas)
CME Gas EF	0.017	MtC/Bcf
Gas Carbon	0.69	MtC
Gas CO2	2.53	MtCO2 own energy

Case 2: Assume own energy is all crude oil		
IPCC, heat value	5.78	GJ/bbl
	7,937,255	bbl own energy
CME liquids EF	106.40	kgC/bbl
Liquids Carbon	844,514	tC own energy
Liquids CO2	3.10	MtCO2 own energy

Case 3: Assume own energy is average of gas and liquid fuels		
Average gas & liqui	2.81	MtCO2 own energy
2/3 gas & 1/3 liqui	2.72	MtCO2 own energy

Gross Scope 3	
Use of sold products	40,200,000
Transportation and distributior	32,493
Transportation and distributior	56,840
Other: Business Travel - Air	19,661
total Scope 3	40,308,994

Oil, IPCC	20.00	kgC/GJ, default C content IPCC
Natural gas IPCC	15.30	kgC/GJ, default carbon content

Hess CDP, OG1.2	Proved reserves BOE	Production, 2010 BOE
Crude oil	1,104,000,000	112,055,000
Natural gas	433,000,000	40,515,000
Total	1,537,000,000	152,570,000

Entity 2010 production and emissions, this study	Crude oil & NGL	Natural gas	
	million bbl	Bcf	
Production	112	244	linked
	MtCO2/million bbl	MtCO2/Bcf	
Emission factor	0.371	0.053	linked
	MtCO2	MtCO2	
Emissions	42	13	
	kg CO2/tCO2	kg CO2/tCO2	
Vented CO2 EF	3.83	28.53	
Flaring EF	15.94	1.74	
Fugitive methane	1.92	9.88	kg CH4/tCO2
Fugitive methane	40	207.44	kg CO2e/tCO2

Ancillary emissions, 2010	MtCO2e	MtCO2e	
Vented CO2	0.2	0.4	
Flaring	0.7	0.0	
Fugitive methane	0.1	0.1	MtCH4
Fugitive methane	1.7	2.7	
Total ancillary	2.5	3.1	

Total, 2010:	MtCO2e	MtCO2e	Percent oil	ercent gas
Production	42	13	94.3%	80.8%
Ancillary	3	3	5.7%	19.2%
Total	44	16		

Total, 2010:	MtCO2e	Percent
Total production	55	90.7%
Total ancillary	6	9.3%
Total, 2010	60	

Total CH4	tCH4 gas	methane intensity	
This project	208,947	3.82	kg CH4/tCO2
Self-reported CDP	9,182	0.17	kg CH4/tCO2
Percent of Carbon Majors	4.39%	22.76	multiple

Comparing entity's CDP submission to this study

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	54.7	100.0%	
Ancillary emissions, this study	5.6	10.3%	
Entity total, 2010, this study	60.3	110.3%	100.0%
Product emissions, CDP	40.2	73.5%	
Total scope 3, CDP	40.3	73.7%	
Scope 1, CDP	8.5	15.5%	
Entity Scope 1 + Product emiss. CDP	48.8	89.2%	80.9%
"Own fuel" emissions (CMS)	2.8	5.1%	

Note: we do not add Scope 2 emissions to this comparison table, since primary fuel inputs to electricity are already accounted for.

Hess Corporation

9.2a
Please break down your total gross global Scope 1 emissions by business division

Business Division	Scope 1 metric tonnes CO2e
Exploration & Production	5115756
Refining	3263815
Retail & Marketing	8949
Storage, transportation and distribution	64106

9.2c
Please break down your total gross global Scope 1 emissions by GHG type

GHG type	Scope 1 metric tonnes CO2e
CO2	8226711
CH4	192823
N20	33093

10.2a
Please break down your total gross global Scope 2 emissions by business division

Business division	Scope 2 metric tonnes CO2e
Exploration & Production	370068
Refining	72959
Retail & Marketing	126633
Storage, transportation and distribution	11778

Hess CDP, section 7.4

7.4
Please give the emissions factors you have applied and their origin; alternatively, please attach an Excel spreadsheet with this data

Fuel/Material/Energy	Emission Factor	Unit	Reference
Distillate fuel oil No 2	163.05	lb CO2 per million BTU	API Compendium of GHG Emissions
Natural gas	117.07	lb CO2 per million BTU	API Compendium of GHG Emission
Petroleum coke	225.78	lb CO2 per million BTU	API Compendium of GHG Emissions
Residual fuel oil	171.96	lb CO2 per million BTU	API Compendium of GHG Emissions

BP

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BP did not provide OG3.3 data on combustion or other Scope 1 details

Gross Scope 1	2008	2009	2010
Table OG3.3	tCO2e	tCO2e	tCO2e
Combustion			
Flaring			
Process emissions			
Vented emissions			
Fugitive emissions			
Total	-	-	-

Protocol and methodology:
BP Environmental Performance Reporting Requirements, API, and IPIECA

Gross Scope 1	tCO2e			tCO2e		
Exploration & production	28,820,000	44.4%	CO2	60,240,000	92.8%	
Refining and marketing	32,680,000	50.3%	CH4	4,680,000	7.2%	222,857 tCH4
Other business	3,420,000	5.3%	N2O	none		
		0.0%	HFCs			
		0.0%	PFCs			
Total	64,920,000	100.0%	SF6			
			Total	64,920,000	100.0%	

65,030,000 Scope 1, 2009
64,920,000 Scope 1, 2010

Fuel energy use is direct, therefore Scope 1

Gross Scope 2		Energy	MWh	Fuel	CDP Table 12.3	MWh
Exploration & production	1,870,000	Fuel	244,900,000	Other: Self generated fuel gas and refine		190,800,000
Refining and marketing	8,030,000	Electricity (impor	34,430,000	Other: Other hydrocarbons. Includes: res		29,100,000
Other business	100,000	Heat	-	Natural gas		25,000,000
		Steam (imported)	16,330,000	Total		244,900,000
Total	10,000,000	Cooling	-	Note: Appears to all own fuel		
		Total	295,660,000			

Assume that fuel energy inputs are "own fuel"

1 kWh =	3.60 MJ	Therefore	244,900,000	881,640,000,000 MJ
				881,640 TJ

9,590,000 Scope 2, 2009
10,000,000 Scope 2, 2010

Case 1: Assume own energy is all natural gas		
heat content nat gas	1.1050	MJ/cf
	797,864,253,394	cf nat gas
	797.86	Bcf own energy (if nat gas)
CME Gas EF	0.017	MtC/Bcf
	13.24	MtC own energy
Result	48.54	MtCO2 own energy

Case 2: Assume own energy is all crude oil & products		
IPCC, heat value	5.78	GJ/bbl
	152,436,883	bbl own energy
CME liquids EF	106.40	kgC/bbl
Liquids Carbon	16,219,086	tC own energy
Liquids CO2	59.48	MtCO2 own energy

Case 3: Assume own energy is average of gas and liquid fuels	
Average gas & liqui	54.01 MtCO2 own energy
2/3 gas & 1/3 liqui	52.19 MtCO2 own energy

Gross Scope 3	tCO2e	
Use of sold products	573,000,000	BP, 2010
Transportation and distributior	not provided	
Transportation and distributior	not provided	
Other: Business Travel - Air	not provided	
total Scope 3	573,000,000	

Oil, IPCC	20.00	kgC/GJ, default C content IPCC
Natural gas IPCC	15.30	kgC/GJ, default carbon content

BP did not provide OG data

	Proved reserves	Production, 2010
	BOE	BOE
Crude oil		
Natural gas		
Total	-	-

Entity 2010 production and emissions, this study	Crude oil & NGL	Natural gas	
	million bbl	Bcf	
Production	867	3,066	linked
	MtCO2/million bbl	MtCO2/Bcf	
Emission factor	0.371	0.053	linked
	MtCO2	MtCO2	
Emissions	322	164	
	kg CO2/tCO2	kg CO2/tCO2	
Vented CO2 EF	3.83	28.53	
Flaring EF	15.94	1.74	
Fugitive methane	1.92	9.88	kg CH4/tCO2
Fugitive methane	40.39	207.44	kg CO2e/tCO2

Ancillary emissions, 2010	MtCO2e	MtCO2e	
Vented CO2	1.2	4.7	
Flaring	5.1	0.3	
Fugitive methane	0.6	1.6	MtCH4
Fugitive methane	13.0	34.0	
Total ancillary	19.4	38.9	

Total, 2010:	MtCO2e	MtCO2e	Percent oil	ercent gas
Production	322	164	94.3%	80.8%
Ancillary	19	39	5.7%	19.2%
Total	341	203		

Total, 2010:	MtCO2e	Percent
Total production	486	89.3%
Total ancillary	58	10.7%
Total, 2010	544	

Total CH4	tCH4 gas	methane intensity	
This project	2,237,610	4.61	kg CH4/tCO2
Self-reported CDP	222,857	0.46	kg CH4/tCO2
Percent of Carbon Majors	9.96%	10.04	multiple

Comparing entity's CDP submission to this study

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	485.7	100.0%	
Ancillary emissions, this study	58.3	12.0%	
Entity total, 2010, this study	544.0	112.0%	100.0%
Product emissions, CDP	573.0	118.0%	
Total scope 3, CDP	573.0	118.0%	
Scope 1, CDP	64.9	13.4%	
Entity Scope 1 + Product emiss. CDP	637.9	131.3%	117.3%
"Own fuel" emissions (CMS)	54.0	11.1%	

Note: we do not add Scope 2 emissions to this comparison table, since primary fuel inputs to electricity are already accounted for.
Note: in the case of BP, the "Fuel" data provide above is fairly clearly their own fuel.

BP

Fuel/Material/Energy	Emission Factor	Unit	Reference
Other: Various but particularly relevant to self generated fuel gas and refinery fuel gas.		Other: Various	For significant sources as appropriate for specific operation (see 7.2a above)
Natural gas	56.1	Other: kg of CO2 per GJ	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories
Liquefied petroleum gas (LPG)	63.1	Other: kg of CO2 per GJ	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories
Jet kerosene	71.5	Other: kg of CO2 per GJ	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories
Kerosene	71.9	Other: kg of CO2 per GJ	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories
Crude oil	73.3	Other: kg of CO2 per GJ	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories
Residual fuel oil	77.4	Other: kg of CO2 per GJ	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories

BP CDP 2010 ,section 7.4

Fuels	MWh
Other: Self generated fuel gas and refinery fuel gas	190800000
Other: Other hydrocarbons. Includes: residual fuel oil; FCC coke; diesel; and petrochemical residues	29100000
Natural gas	25000000

CDP Table 12.3

Exxon Mobil

Carbon Disclosure Project, RDS anno 2010 submission
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(data provided by Hess; Shell and BP did not proved data for OG3.3)

Gross Scope 1	2008	2009	2010	2011
Table OG3.3	tCO2e	tCO2e	tCO2e	tCO2e
Combustion			not provided	
Flaring	15,800,000	12,400,000	9,800,000	11,200,000
Process emissions			not provided	
Vented emissions			not provided	
Fugitive emissions			not provided	
Total	15,800,000	12,400,000	9,800,000	

Rex Tillerson Chairman & CEO, signed off or approved CDP response
Protocol and methodology: IPCC SAR GWP
IPIECA 2003, and API 2009 Equity share

Gross Scope 1	tCO2e			tCO2e	
Upstream	61,000,000	46.2%	CO2	128,000,000	97.0%
Downstream	53,000,000	40.2%	CH4	3,000,000	2.3%
Chemicals	18,000,000	13.6%	Other, combined	1,000,000	0.8%
		0.0%	HFCs		
		0.0%	PFCs		
Total	132,000,000	100.0%	SF6		
			Total	132,000,000	100.0%

142,857 tCH4

Entity 2010 production and emissions, this study	Crude oil & NGL	Natural gas	
	million bbl	Bcf	
Production	884	4,434	linked
	MtCO2/million bbl	MtCO2/Bcf	
Emission factor	0.371	0.053	linked
	MtCO2	MtCO2	
Emissions	328	237	
	kg CO2/tCO2	kg CO2/tCO2	
Vented CO2 EF	3.83	28.53	
Flaring EF	15.94	1.74	
Fugitive methane	1.92	9.88	kg CH4/tCO2
Fugitive methane	40.39	207.44	kg CO2e/tCO2

Ancillary emissions, 2010	MtCO2e	MtCO2e	
Vented CO2	1.3	6.8	
Flaring	5.2	0.4	
Fugitive methane	0.6	2.3	MtCH4
Fugitive methane	13.3	49.1	
Total ancillary	19.8	56.3	

Gross Scope 2		Energy	MWh
Upstream	2,000,000	Fuel	360,000,000,000
Downstream	7,000,000	Electricity (impor	35,000,000,000
Chemicals	6,000,000	Heat	
		Steam (imported	15,000,000,000
Total	15,000,000	Cooling	
		Total	410,000,000,000

CDP Table 12.3

Fuel energy use is direct, therefore Scope 1

Fuel	MWh	reduced by 10^-3	
Refinery gas	140,000,000,000	140,000,000	38.9%
Natural gas	130,000,000,000	130,000,000	36.1%
Other Types Combi	90,000,000,000	90,000,000	25.0%
Total	360,000,000,000	360,000,000	100.0%

Note: Appears to be all own fuel
Original data may be off by +10^3

Total, 2010:	MtCO2e	MtCO2e	Percent oil	ercent gas
Production	328	237	94.3%	80.8%
Ancillary	20	56	5.7%	19.2%
Total	348	293		

Total, 2010:	MtCO2e	Percent
Total production	565	88.1%
Total ancillary	76	11.9%
Total, 2010	641	

Assume that fuel energy inputs are "own fuel"

1 kWh =	3.60	MJ	Therefore	360,000,000	############	MJ
					1,296,000	TJ

Total CH4	tCH4 gas	methane intensity	
This project	2,972,023	5.26	kg CH4/tCO2
Self-reported CDP	142,857	0.25	kg CH4/tCO2
Percent of Carbon Majors	4.81%	20.80	multiple

9,590,000 Scope 2, 2009
10,000,000 Scope 2, 2010

Case 1: Assume own energy is all natural gas

heat content nat gas	1.1050	MJ/cf
	1,172,850,678,733	cf nat gas
	1,173	Bcf own energy (if nat gas)
CME Gas EF	0.017	MtC/Bcf
	19.46	MtC own energy
Result	71.36	MtCO2 own energy

Case 2: Assume own energy is all crude oil & products

IPCC, heat value	5.78	GJ/bbl
	224,080,351	bbl own energy
CME liquids EF	106.40	kgC/bbl
Liquids Carbon	23,841,858	tC own energy
Liquids CO2	87.43	MtCO2 own energy

Case 3: Assume own energy is average of gas and liquid fuels

Average gas & liqui	79.39	MtCO2 own energy
2/3 gas & 1/3 liqui	76.72	MtCO2 own energy

Gross Scope 3	tCO2e	
Use of sold products	1,600,000	XOM, New Zealand only
Transportation and distributior	na	274,500,000
Transportation and distributior	na	
Other: Business Travel - Air	na	
total Scope 3	1,600,000	

Oil, IPCC	20.00	kgC/GJ, default C content IPCC
Natural gas IPCC	15.30	kgC/GJ, default carbon content

OG 1.1 and 1.2	Proved reserves BOE	Production, 2010 BOE	OG 5.1 ducts available for sale BOE
Crude oil	8,890,000,000	884,000,000	2,341,000,000
Unconventional (sar	2,783,000,000		
Natural gas	13,136,000,000	739,000,000	739,000,000
Total	24,809,000,000	1,623,000,000	

Comparing entity's CDP submission to this study

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	565.3	100.0%	
Ancillary emissions, this study	76.1	13.5%	
Entity total, 2010, this study	641.4	113.5%	100.0%
Product emissions, CDP	1.6	0.3%	
Total scope 3, CDP	1.6	0.3%	
Scope 1, CDP	132.0	23.4%	
Entity Scope 1 + Product emiss. CDP	133.6	23.6%	20.8%
"Own fuel" emissions (CMS)	79.4	14.0%	

Note: we do not add Scope 2 emissions to this comparison table, since primary fuel inputs to electricity are already accounted for.
Note: presumed own fuel. Original data in error(10^-3).

Exxon Mobil

Section 7.4: Methodology, emission factors

Fuel/Material/Energy	Emission Factor	Unit	Reference
Natural gas	130.07	lb CO2e per million BTU	API GHG Compendium, 2009
Refinery gas	133.82	lb CO2e per million BTU	API GHG Compendium, 2009
Petroleum coke	237.00	lb CO2e per million BTU	API GHG Compendium, 2009
Distillate fuel oil No 4	176.81	lb CO2e per million BTU	API GHG Compendium, 2009
Residual fuel oil	182.76	lb CO2e per million BTU	API GHG Compendium, 2009
Other: Low BTU Gas	278.00	lb CO2e per million BTU	API GHG Compendium, 2009

Section 9.2

9.2a
Please break down your total gross global Scope 1 emissions by business division

Business Division	Scope 1 metric tonnes CO2e
Upstream	61000000
Downstream	53000000
Chemicals	18000000

9.2c
Please break down your total gross global Scope 1 emissions by GHG type

GHG type	Scope 1 metric tonnes CO2e
CO2	128000000
CH4	3000000
Other: Other GHG Combined	1000000

Section 12.2

12.2
Please state how much fuel, electricity, heat, steam, and cooling in MWh your organization has consumed

Energy type	MWh
Fuel	360000000000
Electricity	35000000000
Heat	0
Steam	15000000000
Cooling	0

12.3
Please complete the table by breaking down the total "Fuel" figure entered above by fuel type

Fuels	MWh
Refinery gas	140000000000
Natural gas	130000000000
Other: Other Types Combined	90000000000

Section 5: Climate Risks, 5.1a: risks driven by regulation

ID	Risk driver	Description	Potential impact	Timeframe	Direct/ Indirect	Likelihood	Magnitude of impact
IA	International agreements	Rising greenhouse gas emissions pose risks to society and ecosystems that could be significant. Since most of these emissions are energy-related, any integrated approach to meeting the world's growing energy need over the coming decades will incorporate strategies to address the risk of climate change. In recognition of the long-term nature of the risks from climate change, the climate policy debate has shifted from a focus primarily on targets to limit near-term emissions to also include consideration of long-term emissions pathways that ultimately stabilize GHG concentrations. As well, international and national attention also have turned to focus on adaptation as a strategy to mitigate risk. There has been extensive international focus on the costs and benefits of policies to reduce GHG emissions and address the risk of climate change. New technologies will be required to make deep reductions in GHG emissions, and the cost of these new technologies is not known at this time. Of course, the overall cost will also depend on the policy framework, especially the extent of global participation. The U.S. DOE study, Scenarios of Greenhouse Gas Emissions and Atmospheric Concentrations, examined what costs for CO2 emissions would be necessary to achieve several stabilization scenarios. CO2 costs depend on a number of factors, including assumptions about the cost and availability of future technologies to reduce emissions. Along each stabilization pathway, costs rise with time, and costs are greater for lower, more stringent targets. For reference, a cost of $100 per metric ton of CO2 would be equivalent to adding about $40 per barrel to the cost of oil, or about $0.92 per gallon of gasoline. Throughout the world, national and regional policymakers are considering a variety of legislative and regulatory options to mitigate GHG emissions and to develop capacity to adapt to potential impacts. In our view, assessing options requires an understanding of their likely effectiveness, scale and cost, as well as their implications for economic growth and quality of life.	Increased operational cost	1-5 years	Direct	Unknown	Unknown
CT	Carbon taxes	A carbon tax avoids the costs and complexity of having to build a new market for securities traders or the necessity of adding a new layer of regulators and administrators to police companies and consumers. And a carbon tax can be more easily implemented. It could be levied under the current tax code without requiring significant new infrastructure or enforcement bureaucracies. A carbon tax is also the most efficient means of reflecting the cost of carbon in all economic decisions—from investments made by companies to meet their fuel needs to the product choices made by consumers. In addition, such a tax should be made revenue neutral. There should be reductions or changes to other taxes—such as income or excise taxes—to offset the impacts of the carbon tax on the economy.	Increased operational cost	1-5 years	Direct	Unknown	Unknown
C&T	Cap and trade schemes	One policy option that is intended to reduce emissions—and which has received much attention—is a cap-and-trade system. Before we rush to enact such a system, we must ask whether it can best achieve our shared goal of actually reducing greenhouse gas emissions. Cap-and-trade systems inevitably introduce unnecessary cost and complexity that undercut their effectiveness. It is important to remember that a cap-and-trade system requires a new market infrastructure for traders to trade emissions allowances. This new "Wall Street" of emissions brokers will take the emphasis away from the goal of reducing carbon emissions and focus on trading on price volatility instead.	Increased operational cost	Current	Direct	Very likely	Unknown
ER	Emission reporting obligations	Current and pending greenhouse gas regulations may also increase our compliance costs, such as monitoring and reporting. These requirements could make our products more expensive and reduce demand for hydrocarbons, as well as shifting hydrocarbon demand toward relatively lower-carbon sources such as natural gas.	Increased operational cost	Current	Direct	Very likely	Low
EE	Product efficiency regulations and standards	Efficiency or specific product regulations or standards, such as CAFE standards, may exceed the technological or economic limitations of specific processes or products thereby increasing costs to consumers or reducing supplies in the marketplace	Increased operational cost	1-5 years	Direct	More likely than not	Unknown
UNC	Uncertainty surrounding new regulation	ExxonMobil's financial and operating results are subject to a variety of risks inherent in the global oil and gas business. Many of these risk factors are not within the Company's control and could adversely affect our business, our financial and operating results or our financial condition. Due to concern over the risk of climate change, a number of countries have adopted, or are considering the adoption of, regulatory frameworks to reduce greenhouse gas emissions. These include adoption of cap and trade regimes, carbon taxes, increased efficiency standards, and incentives or mandates for renewable energy. These requirements could make our products more expensive and reduce demand for hydrocarbons, as well as shifting hydrocarbon demand toward relatively lower-carbon sources such as natural gas. Current and pending greenhouse gas regulations may also increase our compliance costs, such as monitoring or sequestering emissions.	Increased operational cost	Current	Direct	More likely than not	Unknown
REG	General environmental regulations, including planning	Throughout the world, national and regional policymakers are considering a variety of legislative and regulatory options to mitigate GHG emissions and to develop capacity to adapt to potential impacts. In our view, assessing options requires an understanding of their likely effectiveness, scale and cost, as well as their implications for economic growth and quality of life. Policy options and their overall effect upon the Corporation vary greatly from country to country and are not predictable. These requirements could make our products more expensive and reduce demand for hydrocarbons, as well as shifting hydrocarbon demand toward relatively lower-carbon sources such as natural gas.	Increased operational cost	1-5 years	Direct	More likely than not	Unknown

Conoco

2009 data; get 2010

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Conoco did not provide Scope 1 details

Gross Scope 1	2008	2009	2010	2011
Table OG3.3	tCO2e	tCO2e	tCO2e	tCO2e
Combustion		not provided	not provided	
Flaring				
Process emissions				
Vented emissions				
Fugitive emissions				
Total	-	-	-	

Protocol and methodology: IPCC SAR GWP
API Compendium: Operational control

Gross Scope 1		tCO2e			tCO2e		
E & P		20,987,446	15.9%	CO2	55,785,049	42.3%	
Gas processing		4,703,565	3.6%	CH4	4,894,075	3.7%	233,051 tCH4
Refining		29,899,470	22.7%	Other, combined		0.0%	
Other		5,088,641	3.9%	HFCs			
			0.0%	PFCs			
	Total	60,679,122	46.0%	SF6			
				Total	60,679,124	46.0%	

60,679,122 Scope 1, 2010

CDP Table 12.3

Fuel energy use is direct, therefore Scope 1

Gross Scope 2		Energy	MWh	Fuel	MWh	
E & P	959,759	Fuel		Refinery gas		0.0%
Gas processing	547,938	Electricity (impor	8,180,486	Natural gas		0.0%
Refining	5,604,150	Heat		Other Types Combined		0.0%
Other	493,072	Steam (imported	9,909,171	Total	230,208,028	0.1%
Total	7,604,919	Cooling				
		Total	18,089,657			

Total only, no details provided

7,604,919 Scope 2, 2010

Assume "Total" minus electricity and steam

1 kWh =	3.60	MJ	Therefore	212,118,371	763,626,135,600	MJ
					763,626	TJ

Entity 2010 production and emissions, this study	Crude oil & NGL	Natural gas	
	million bbl	Bcf	
Production	502	2,330	linked
	MtCO2/million bbl	MtCO2/Bcf	
Emission factor	0.371	0.053	linked
	MtCO2	MtCO2	
Emissions	186	124	
	kg CO2/tCO2	kg CO2/tCO2	
Vented CO2 EF	3.83	28.53	
Flaring EF	15.94	1.74	
Fugitive methane	1.92	9.88	kg CH4/tCO2
Fugitive methane	40.39	207.44	kg CO2e/tCO2

Ancillary emissions, 2010	MtCO2e	MtCO2e	
Vented CO2	0.7	3.6	
Flaring	3.0	0.2	
Fugitive methane	0.4	1.2	MtCH4
Fugitive methane	7.5	25.8	
Total ancillary	11.2	29.6	

Total, 2010:	MtCO2e	MtCO2e	Percent oil	ercent gas
Production	186	124	94.3%	80.8%
Ancillary	11	30	5.7%	19.2%
Total	197	154		

Total, 2010:	MtCO2e	Percent
Total production	311	88.4%
Total ancillary	41	11.6%
Total, 2010	352	

Total CH4	tCH4 gas	methane intensity	
This project	1,588,050	5.11	kg CH4/tCO2
Self-reported CDP	233,051	0.75	kg CH4/tCO2
Percent of Carbon Majors	14.68%	6.81	multiple

Case 1: Assume own energy is all natural gas

heat content nat gas	1.1050	MJ/cf
	691,064,376,109	cf nat gas
	691	Bcf own energy (if nat gas)
CME Gas EF	0.017	MtC/Bcf
	11.47	MtC own energy
Result	42.05	MtCO2 own energy

Case 2: Assume own energy is all crude oil & products

IPCC, heat value	5.78	GJ/bbl
	132,032,108	bbl own energy
CME liquids EF	106.40	kgC/bbl
Liquids Carbon	14,048,045	tC own energy
Liquids CO2	51.51	MtCO2 own energy

Case 3: Assume own energy is average of gas and liquid fuels

Average gas & liqui	46.78	MtCO2 own energy
2/3 gas & 1/3 liqui	45.20	MtCO2 own energy

Gross Scope 3	tCO2e	
Use of sold products		not provided
Transportation and distribution of sold products		
Transportation and distribution		
Other: Business Travel - Air		
total Scope 3	-	

Oil, IPCC	20.00	kgC/GJ, default C content IPCC	
Natural gas IPCC	15.30	kgC/GJ, default carbon content	

OG 1.1 and 1.2	Proved reserves BOE	Production, 2010 BOE	OG 5.1 Products available for sale BOE
Crude oil	4,904,000,000	511,654,750	
Heavy oil	1,381,000,000	26,720,249	
Natural gas	4,041,000,000	296,684,167	
Total	10,326,000,000	835,059,166	-

Comparing entity's CDP submission to this study

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	310.8	100.0%	
Ancillary emissions, this study	40.8	13.1%	
Entity total, 2010, this study	351.6	113.1%	100.0%
Product emissions, CDP	-	0.0%	
Total scope 3, CDP	-	0.0%	
Scope 1, CDP	60.7	19.5%	
Entity Scope 1 + Product emiss. CDP	60.7	19.5%	17.3%
"Own fuel" emissions (CMS)	46.8	15.1%	

Note: we do not add Scope 2 emissions to this comparison table, since primary fuel inputs to electricity are already accounted for.
Note: presumed own fuel. Original data in error(10^-3).

Conoco

12.4
Where it will facilitate a better understanding of your business, requested.)

Business Division	Scope 1 Metric tonnes CO2-e
E&P	20987446
Gas Processing	4703565
Refining	29899470
Other	5088641

13.4
Where it will facilitate a better understanding of your business, requested.)

Business division name	Metric tonnes CO2-e
E&P	959759
Gas Processing	547938
Refining	5604150
Other	493072

OG1.2
GHG emissions from flaring of gas

Year Ending	Volume of gas flared (m3)
2004	53031
2005	41474
2006	44534
2007	36095
2008	30308
2009	33926

Only partial data provided:

12.6
Please break down your total gross global Scope 1 emissions by GHG type. (Only data for the current reporting

GHG Type	Scope 1 Emissions (Metric tonnes)	Scope 1 Emissions (Metric tonnes CO2-e)
CO2	55785049.00	55785047
CH4	233051.00	4894075

¿
Is question 12.8 relevant to your company?

Yes

12.8
Please give the total amount of fuel in MWh that your organization has consumed during the reporting year.

230208028

¿
Is question 12.10 relevant to your company?

Yes

12.10
Please complete the table by breaking down the total figure by fuel type.

Fuels	MWh

12.12

Pemex

Pemex did not provide Scope 1 details

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Gross Scope 1	2008	2009	2010	2011
Table OG3.3	tCO2e	tCO2e	tCO2e	tCO2e
Combustion			not provided	
Flaring				
Process emissions				
Vented emissions				
Fugitive emissions				
Total	-	-	-	

Protocol and methodology: IPCC SAR GWP
API Compendium: Operational control

Entity 2010 production and emissions, this study

	Crude oil & NGL	Natural gas	
	million bbl	Bcf	
Production	1,078	2,562	linked
	MtCO2/million bbl	MtCO2/Bcf	
Emission factor	0.371	0.053	linked
	MtCO2	MtCO2	
Emissions	400	137	
	kg CO2/tCO2	kg CO2/tCO2	
Vented CO2 EF	3.83	28.53	
Flaring EF	15.94	1.74	
Fugitive methane	1.92	9.88	kg CH4/tCO2
Fugitive methane	40.39	207.44	kg CO2e/tCO2

Gross Scope 1	tCO2e			tCO2e	
E & P		0.0%	CO2		0.0%
Gas processing		0.0%	CH4		0.0%
Refining		0.0%	Other, combined		0.0%
Other		0.0%	HFCs		
		0.0%	PFCs		
Total	-	0.0%	SF6		
			Total	-	0.0%

- tCH4

60,679,122 Scope 1, 2010

Ancillary emissions, 2010	MtCO2e	MtCO2e	
Vented CO2	1.5	3.9	
Flaring	6.4	0.2	
Fugitive methane	0.8	1.4	MtCH4
Fugitive methane	16.2	28.4	
Total ancillary	24.1	32.5	

CDP Table 12.3

Gross Scope 2	Energy	MWh
Upstream	Fuel	
Downstream	Electricity (imported?)	
Chemicals	Heat	
	Steam (imported?)	
Total -	Cooling	
	Total	-

Fuel energy use is direct, therefore Scope 1

Fuel	MWh	
Refinery gas		0.0%
Natural gas		0.0%
Other Types Combined		0.0%
Total	-	

Note: Appears to be all own fuel
Original data may be off by +10^3

Total, 2010:	MtCO2e	MtCO2e	Percent oil	ercent gas
Production	400	137	94.3%	80.8%
Ancillary	24	33	5.7%	19.2%
Total	424	169		

Total, 2010:	MtCO2e	Percent
Total production	537	90.5%
Total ancillary	57	9.5%
Total, 2010	594	

Assume that fuel energy inputs are "own fuel"

1 kWh =	3.60	MJ	Therefore	#REF!	#REF!	MJ
					#REF!	TJ

Total CH4	tCH4 gas	methane intensity	
This project	2,122,534	3.95	kg CH4/tCO2
Self-reported CDP	-	-	kg CH4/tCO2
Percent of Carbon Majors	0.00%	#DIV/0!	multiple

Case 1: Assume own energy is all natural gas

heat content nat gas	1.1050	MJ/cf
	#REF!	cf nat gas
	#REF!	Bcf own energy (if nat gas)
CME Gas EF	0.017	MtC/Bcf
	#REF!	MtC own energy
Result	#REF!	MtCO2 own energy

Case 2: Assume own energy is all crude oil & products

IPCC, heat value	5.78	GJ/bbl
	#REF!	bbl own energy
CME liquids EF	106.40	kgC/bbl
Liquids Carbon	#REF!	tC own energy
Liquids CO2	#REF!	MtCO2 own energy

Case 3: Assume own energy is average of gas and liquid fuels

Average gas & liqui	#REF!	MtCO2 own energy
2/3 gas & 1/3 liqui	#REF!	MtCO2 own energy

Comparing entity's CDP submission to this study

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	537.3	100.0%	
Ancillary emissions, this study	56.6	10.5%	
Entity total, 2010, this study	593.9	110.5%	100.0%
Product emissions, CDP	-	0.0%	
Total scope 3, CDP	-	0.0%	
Scope 1, CDP	-	0.0%	
Entity Scope 1 + Product emiss. CDP	-	0.0%	0.0%
"Own fuel" emissions (CMS)	#REF!	#REF!	

Note: we do not add Scope 2 emissions to this comparison table, since primary fuel inputs to electricity are already accounted for.
Note: presumed own fuel. Original data in error(10^-3).

Gross Scope 3	tCO2e
Use of sold products	
Transportation and distribution of sold products	
Transportation and distribution	
Other: Business Travel - Air	
total Scope 3	-

Oil, IPCC	20.00	kgC/GJ, default C content IPCC
Natural gas IPCC	15.30	kgC/GJ, default carbon content

OG 1.1 and 1.2	Proved reserves BOE	Production, 2010 BOE	OG 5.1 ducts available for sale BOE
Crude oil			
Unconventional (sands, bitumen)			
Natural gas			
Total			

Pemex

No CDP reports for Pemex

Statoil

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(data provided by Hess; Shell and BP did not proved data for OG3.3)

Gross Scope 1	2008	2009	2010	2011
Table OG3.3	tCO2e	tCO2e	tCO2e	tCO2e
Combustion			11,247,069	
Flaring			1,339,501	
Process emissions			968,399	
Vented emissions			na	
Fugitive emissions			624,738	
Total	-	-	14,179,707	

Signed off by: Oddvar Levang, Senior Advisor Corporate Climate Unit
Protocol and methodology: IPCC SAR GWP
Combination IPIECA and GRI Operational control

Gross Scope 1	tCO2e			tCO2e	
Offshore installations	8,563,754	60.4%	CO2	13,478,626	95.1%
Onshore plants	5,242,321	37.0%	CH4	701,082	4.9%
Drilling Rigs	308,906	2.2%	Other, combined	na	
Retail	64,057	0.5%	HFCs	na	
Other	669	0.0%	PFCs	na	
Total	14,179,707	100.0%	SF6	na	
			Total	14,179,708	100.0%

33,385 tCH4

14,179,708 Scope 1, 2010

Gross Scope 2		Energy	MWh
Offshore installations	8,563,754	Fuel	61,183,969
Onshore plants	5,242,321	Electricity (impor	3,424,493
Drilling Rigs	308,906	Heat	15,151
Retail	64,057	Steam (imported	-
Other	669	Cooling	348
Total	14,179,707	Total	64,623,961

Table 10.2 is erroneous

227,613 Scope 2, 2010

CDP Table 12.3

Fuel energy use is direct, therefore Scope 1

Fuel	MWh	Percent
Liquids	2,644,769	4.3%
Gases	54,803,600	89.6%
Other & coking coal	3,740,616	6.1%
Total	61,188,985	100.0%

Note: Appears to be all own fuel

Assume that Hess Fuel energy inputs are "own fuel"

1 kWh =	3.60	MJ	Therefore	61,188,985	220,280,346,000	MJ
					220,280	TJ

Case 1: Assume own energy is all natural gas		
heat content nat gas	1.1050	MJ/cf
	199,348,729,412	cf nat gas
	199	Bcf own energy (if nat gas)
CME Gas EF	0.017	MtC/Bcf
	3.31	MtC own energy
Result	12.13	MtCO2 own energy

Case 2: Assume own energy is all crude oil & products		
IPCC, heat value	5.78	GJ/bbl
	38,086,803	bbl own energy
CME liquids EF	106.40	kgC/bbl
Liquids Carbon	4,052,386	tC own energy
Liquids CO2	14.86	MtCO2 own energy

Case 3: Assume own energy is average of gas and liquid fuels		
Average gas & liqui	13.49	MtCO2 own energy
2/3 gas & 1/3 liqui	13.04	MtCO2 own energy

Gross Scope 3	tCO2e	
Use of sold products		na
Transportation and distribution of sold products		
Transportation and distribution		
Other: Business Travel - Air	37,000	Stats from travel agent
total Scope 3	37,000	

Oil, IPCC	20.00	kgC/GJ, default C content IPCC
Natural gas IPCC	15.30	kgC/GJ, default carbon content

OG 1.1 and 1.2	Proved reserves BOE	Production, 2010 BOE	OG 5.1 ducts available for sale BOE
Crude oil			
Unconventional (sands, bitumen)			
Natural gas			
Total	2,124,000,000	621,000,000	

Entity 2010 production and emissions, this study	Crude oil & NGL	Natural gas	
	million bbl	Bcf	
Production	370	1,509	linked
	MtCO2/million bbl	MtCO2/Bcf	
Emission factor	0.371	0.053	linked
	MtCO2	MtCO2	
Emissions	137	81	
	kg CO2/tCO2	kg CO2/tCO2	
Vented CO2 EF	3.83	28.53	
Flaring EF	15.94	1.74	
Fugitive methane	1.92	9.88	kg CH4/tCO2
Fugitive methane	40	207.44	kg CO2e/tCO2

Ancillary emissions, 2010	MtCO2e	MtCO2e	
Vented CO2	0.5	2.3	
Flaring	2.2	0.1	
Fugitive methane	0.3	0.8	MtCH4
Fugitive methane	5.6	16.7	
Total ancillary	8.3	19.2	

Total, 2010:	MtCO2e	MtCO2e	Percent oil	ercent gas
Production	137	81	94.3%	80.8%
Ancillary	8	19	5.7%	19.2%
Total	146	100	100%	100%

Total, 2010:	MtCO2e	Percent
Total production	218	88.8%
Total ancillary	27	11.2%
Total, 2010	246	

Total CH4	tCH4 gas	methane intensity	
This project	1,060,917	4.86	kg CH4/tCO2
Self-reported CDP	33,385	0.15	kg CH4/tCO2
Percent of Carbon Majors	3.15%	31.78	multiple

Comparing entity's CDP submission to this study

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	218.1	100.0%	
Ancillary emissions, this study	27.4	12.6%	
Entity total, 2010, this study	245.5	112.6%	100.0%
Product emissions, CDP	-	0.0%	
Total scope 3, CDP	0.0	0.0%	
Scope 1, CDP	14.2	6.5%	
Entity Scope 1 + Product emiss. CDP	14.2	6.5%	#DIV/0!
"Own fuel" emissions (CMS)	13.0	6.0%	

Note: we do not add Scope 2 emissions to this comparison table, since primary fuel inputs to electricity are already accounted for.
Note: presumed own fuel. Original data in error(10^-3).

Sleipner & Snovhit captured and injecte	1,250,000	tCO2

Statoil

9.2b
Please break down your total gross global Scope 1 emissions by facility

Facility	Scope 1 metric tonnes CO2e
Offshore installations	8563754
Onshore plants	5242321
Drilling Rigs	308906
Retail	64057
Other	669

9.2c
Please break down your total gross global Scope 1 emissions by GHG type

GHG type	Scope 1 metric tonnes CO2e
CH4	701082
CO2	13478626

12.2
Please state how much fuel, electricity, heat, steam, and cooling in MWh your organization has consumed

Energy type	MWh
Fuel	61183969
Electricity	3424493
Heat	15151
Steam	
Cooling	348

12.3
Please complete the table by breaking down the total "Fuel" figure entered above by fuel type

Fuels	MWh
Butane	65109
Coking coal	2779628
Diesel/Gas oil	2558302
Natural gas	47604418
Residual fuel oil	20140
Motor gasoline	18
Propane	1200
Refinery gas	7199182
Other:	960988

Butane	65,109
Diesel / Gas oil	2,558,302
Residual fuel oil	20,140
Motor gasoline	18
Propane	1,200
Total Liquids	2,644,769

Natural gas	47,604,418
Refinery gas	7,199,182
Total Gases	54,803,600

Coking coal	2,779,628
Other:	960,988
Solids & other	3,740,616

Scope 1	
Exploration, production & gas processin	11,886,280
Storage, transportation & distribution	77,139
Speciality operations	669
Refining	2,151,562
Retail & marketing	64,057
Total	14,179,707

Erroneous: repeats Scope 1 emissions (Table 9.2)

10.2a
Please break down your total gross global Scope 2 emissions by business division

Business division	Scope 2 metric tonnes CO2e
CSO GBS	801
DPN	2678
DPNA	20282
MPR	128954
SFR	74825
TPD	72

10.2b
Please break down your total gross global Scope 2 emissions by facility

Facility	Scope 2 metric tonnes CO2e
Offshore instalaltions	8563754
Onshore plants	5242321
Drilling rigs	308906
Retail	64057
Other	669

Capture pathway in CCS	Captured CO2 (metric tonnes CO2)	Percentage transferred in	Percentage transferred out
Gas stream separation from natural gas purification	1250000	100%	

OG4.7
Please provide masses in metric tonnes of gross CO2 injected and stored for purposes of CCS during the reporting year according to injection and storage pathway

Injection and storage pathway	Injected CO2 (metric tonnes CO2)	Percentage of injected CO2 intended for long-term (>100 year) storage	Year in which injection began	Cumulative CO2 injected and stored (metric tonnes CO2)
CO2 injected into a geological formation or saline formation for long-term storage	1250000	100%	1996	17000000

Sleipner injected CO2:	1,250,000	tCO2

OG2.3
Please provide masses of gross Scope 1 GHG emissions in units of metric tonnes CO2e for the organization's c
2011 are forward-looking estimates

Segment	2005	2006	2007	2008	2009	2010	2011
Exploration, production & gas processing						11886280	
Storage, transportation & distribution						77139	
Speciality operations						669	
Refining						2151562	
Retail & marketing						64057	

OG2.4
Please provide masses of gross Scope 2 GHG emissions in units of metric tonnes CO2e for the organization's c
2011 are forward-looking estimates

Segment	2005	2006	2007	2008	2009	2010	2011
Exploration, production & gas processing						39558	
Storage, transportation & distribution						1020	
Speciality operations						801	
Refining						111408	
Retail & marketing						74825	

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Section 12: Energy
Section 15: Scope 3 Emissions

(data provided by Hess; Shell and BP did not proved data for OG3.3)

Gross Scope 1	2008	2009	2010	2011
Table OG3.3	tCO2e	tCO2e	tCO2e	tCO2e
Combustion	39,789,714	34,344,819	40,736,072	44,565,263
Flaring	7,550,027	13,053,364	8,763,147	9,586,883
Process emissions	7,992,933	7,932,726	8,759,603	9,583,006
Vented emissions	1,695,387	1,108,971	1,207,793	1,321,326
Fugitive emissions	357,139	427,503	490,525	536,634
Total	57,385,200	56,867,383	59,957,140	65,593,112

Protocol and methodology: IPCC SAR GWP
API Compendium: Operational control

4E+05
#####
#####
#####

Entity 2010 production and emissions, this study	Crude oil & NGL	Natural gas	
	million bbl	Bcf	
Production	749	890	linked
	MtCO2/million bbl	MtCO2/Bcf	
Emission factor	0.371	0.053	linked
	MtCO2	MtCO2	
Emissions	278	48	

Gross Scope 1	tCO2e			tCO2e	
Exploration and Production Bra	20,857,506	34.8%	CO2	55,426,773	92.4%
Refining, Transportation and M	22,500,929	37.5%	CH4	4,108,710	6.9%
Gas and Power Brazil	9,127,579	15.2%	N2O	421,658	0.7%
Distribution Brazil	11,057	0.0%	HFCs	na	
Corporate	634,655	1.1%	PFCs	na	
International	6,825,414	11.4%	SF6	na	
Total	59,957,141	100.0%	Total	59,957,141	100.0%

195,653 tCH4

	kg CO2/tCO2	kg CO2/tCO2	
Vented CO2 EF	3.83	28.53	
Flaring EF	15.94	1.74	
Fugitive methane	1.92	9.88	kg CH4/tCO2
Fugitive methane	40	207.44	kg CO2e/tCO2

Ancillary emissions, 2010	MtCO2e	MtCO2e	
Vented CO2	1.1	1.4	
Flaring	4.4	0.1	
Fugitive methane	0.5	0.5	MtCH4
Fugitive methane	11.2	9.9	
Total ancillary	16.7	11.3	

59,957,142 Scope 1, 2010

CDP Table 12.3

Gross Scope 2		Energy	MWh
Exploration and Production Bra	193,689	Fuel	187,998,577
Refining, Transportation and M	428,609	Electricity (impor	7,201,387
Gas and Power Brazil	64,931	Heat	
Distribution Brazil	258	Steam (imported	3,875,794
Corporate	1,044	Cooling	
International	567,690	Total	199,075,758
Total	1,256,221		

Fuel energy use is direct, therefore Scope 1

Fuel	MWh	
Liquids	29,203,100	15.5%
Gases	139,917,217	74.4%
Other (coke)	18,878,260	10.0%
Total	187,998,577	100.0%

Note: Appears to be all own fuel

Total, 2010:	MtCO2e	MtCO2e	Percent oil	ercent gas
Production	278	48	94.3%	80.8%
Ancillary	17	11	5.7%	19.2%
Total	295	59		

Total, 2010:	MtCO2e	Percent
Total production	326	92.1%
Total ancillary	28	7.9%
Total, 2010	354	

Assume that Hess Fuel energy inputs are "own fuel"

1 kWh =	3.60	MJ	Therefore	187,998,577	676,794,877,200	MJ
					676,795	TJ

1,256,222 Scope 2, 2010

Case 1: Assume own energy is all natural gas		
heat content nat gas	1.1050	MJ/cf
	612,484,051,765	cf nat gas
	612	Bcf own energy (if nat gas)
CME Gas EF	0.017	MtC/Bcf
	10.16	MtC own energy
Result	37.27	MtCO2 own energy

Case 2: Assume own energy is all crude oil & products		
IPCC, heat value	5.78	GJ/bbl
	117,018,853	bbl own energy
CME liquids EF	106.40	kgC/bbl
Liquids Carbon	12,450,654	tC own energy
Liquids CO2	45.66	MtCO2 own energy

Case 3: Assume own energy is average of gas and liquid fuels		
Average gas & liqui	41.46	MtCO2 own energy
2/3 gas & 1/3 liqui	40.06	MtCO2 own energy

Gross Scope 3	tCO2e
Use of sold products	504,059,819
Transportation and distribution of sold products	
Transportation and distribution	
Other: Business Travel - Air	
total Scope 3	504,059,819

Oil, IPCC	20.00	kgC/GJ, default C content IPCC
Natural gas IPCC	15.30	kgC/GJ, default carbon content

OG 1.1 and 1.2	Proved reserves BOE	Production, 2010 BOE	OG 5.1 ducts available for sale BOE
Crude oil	15,142,690,000	786,648,000	
Unconventional (sands, bitumen)			
Natural gas	843,310,000	156,220,000	
Total	15,986,000,000	942,868,000	-

Product sales	Table OG 5.1	BOE
Other: Oil Products (exports)		71,905,000
Other: Crude Oil (exports)		184,690,000
Other: Alcohol, Nitrogen and others		36,135,000
Other: Oil products		715,035,000
Natural gas (excluding LNG)		116,070,000
Total		1,123,835,000

Comparing entity's CDP submission to this study			
		Percent of Product emissions,	
	MtCO2e	this study	
Product emissions, this study	325.6	100.0%	
Ancillary emissions, this study	28.0	8.6%	
Entity total, 2010, this study	353.7	108.6%	100.0%
Product emissions, CDP	504.1	154.8%	
Total scope 3, CDP	504.1	154.8%	
Scope 1, CDP	60.0	18.4%	
Entity Scope 1 + Product emiss. CDP	564.0	173.2%	159.5%
"Own fuel" emissions (CMS)	40.1	12.3%	

Natural gas	Crude oil & NGL	Natural gas	
Production	749	890	linked
Emission factor	0.371	0.053	linked
Emissions	278	48	

Total CH4	tCH4 gas	methane intensity	
This project	1,004,815	3.09	kg CH4/tCO2
Self-reported CDP	195,653	0.60	kg CH4/tCO2
Percent of Carbon Majors	19.47%	5.14	multiple

Note: we do not add Scope 2 emissions to this comparison table, since primary fuel inputs to electricity are already accounted for.
Note: presumed own fuel. Original data in error(10^-3).

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Table 10.2 a (details at left)

10.2a
Please break down your total gross global Scope 2 emissions by business division

Business division	Scope 2 metric tonnes CO2e
Exploration and Production Brazil	193688.95
Refining, Transportation and Marketing Brazil	428609.02
Gas and Power Brazil	64930.71
Distribution Brazil	258.34
Corporate	1044.12
International	567689.70

9.2a
Please break down your total gross global Scope 1 emissions by business division

Business Division	Scope 1 metric tonnes CO2e
Exploration and Production Brazil	20857505.94
Refining, Transportation and Marketing Brazil	22500929.27
Gas and Power Brazil	9127578.69
Distribution Brazil	11057.41
Corporate	634654.96
International	6825414.24

Tables 12.2 and 12.3

12.2
Please state how much fuel, electricity, heat, steam, and cooling in MWh your organization has consumed during the reporting year

Energy type	MWh
Fuel	187998577
Electricity	7201387
Heat	
Steam	3875794
Cooling	

9.2c
Please break down your total gross global Scope 1 emissions by GHG type

GHG type	Scope 1 metric tonnes CO2e
CO2	55426772.91
CH4	4108709.82
N20	421657.78

12.3
Please complete the table by breaking down the total "Fuel" figure entered above by fuel type

Fuels	MWh
Diesel/Gas oil	10533034
Distillate fuel oil No 1	18290089
Natural gas	117550826
Other: Residual Gas	1644389
Liquefied petroleum gas (LPG)	260279
Other: FCCU residual coke	18878260
Refinery gas	20722002
Other: Includes naphtha, kerosene, alcohol and exported steam and electricity energy.	119698

Summed by fuel from table 12.3

Diesel / Gas oil	10,533,034
Distillate fuel oil No 1	18,290,089
Liquefied petroleum gas (LPG)	260,279
Other: Includes naphtha, kerosene, alc	119,698
Total liquids	29,203,100
Natural gas	117,550,826
Other: Residual Gas	1,644,389
Refinery gas	20,722,002
Total gases	139,917,217
Other: FCCU residual coke	18,878,260
Solids (coke)	18,878,260

OG5.1
Please provide values for annual sales of the hydrocarbon types (in units of BOE) for the years given in the following table. T organization. The values for 2011 are forward-looking estimates

Product	2005	2006	2007	2008	2009	2010
Natural gas (excluding LNG)	83220000	88695000	90520000	113880000	86870000	116070000
Other: Oil products	605170000	620135000	629625000	642400000	640210000	715035000
Other: Alcohol, Nitrogen and others	10220000	9125000	22265000	27375000	40880000	36135000
Other: Crude Oil (exports)	91250000	122275000	128845000	160235000	174470000	184690000
Other: Oil Products (exports)	91980000	86870000	95630000	85410000	82855000	71905000

OG1.2
Please provide values for proved reserves of each of the hydrocarbon types (in units of BOE) for 2010.

Product	Proved reserves (BOE), 2010	Date of assessment
Natural gas	843310000	Fri 31 Dec 2010
Other: Oil and Condensate	15142690000	Fri 31 Dec 2010

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(data provided by Hess; Shell and BP did not proved data for OG3.3)

Gross Scope 1	2008	2009	2010	2011
Table OG3.3	tCO2e	tCO2e	tCO2e	tCO2e
Combustion			37,388,863	
Flaring			9,709,155	
Process emissions			10,294,591	
Vented emissions			3,667,934	
Fugitive emissions			1,071,053	
Total	-	-	62,131,596	

Signed off by: Laura Verduzco, Lead Planning Engineer, Chevron Energy Technology Co.
Protocol and methodology: IPCC SAR GWP
API Compendium: Equity share

Entity 2010 production and emissions, this study	Crude oil & NGL	Natural gas	
	million bbl	Bcf	
Production	702	1,840	linked
	MtCO2/million bbl	MtCO2/Bcf	
Emission factor	0.371	0.053	linked
	MtCO2	MtCO2	
Emissions	261	98	
	kg CO2/tCO2	kg CO2/tCO2	
Vented CO2 EF	3.83	28.53	
Flaring EF	15.94	1.74	
Fugitive methane	1.92	9.88	kg CH4/tCO2
Fugitive methane	40	207.44	kg CO2e/tCO2

Gross Scope 1	tCO2e			tCO2e		
Upstream	39,925,209	64.3%	CO2	56,705,174	91.3%	
Downstream	21,280,504	34.2%	CH4	5,147,631	8.3%	245,125 tCH4
Other	930,331	1.5%	N2O	276,399	0.4%	
		0.0%	Other: HFC, PFC,	6,841	0.0%	
		0.0%				
Total	62,136,044	100.0%	Total	62,136,045	100.0%	

62,136,044 Scope 1, 2010

Ancillary emissions, 2010	MtCO2e	MtCO2e	
Vented CO2	1.0	2.8	
Flaring	4.2	0.2	
Fugitive methane	0.5	1.0	MtCH4
Fugitive methane	10.5	20.4	
Total ancillary	15.7	23.4	

Gross Scope 2		Energy	MWh
Upstream	2,557,743	Fuel	128,306,734
Downstream	1,697,948	Electricity (impor	5,903,978
Chemicals	228,128	Heat	
		Steam (imported	7,361,713
Total	4,483,819	Cooling	
		Total	141,572,425

CDP Table 12.3
Fuel energy use is direct, therefore Scope 1

Fuel	MWh	
Total liquids	78,228,110	61.0%
Total gases	50,078,618	39.0%
Other Types Combined		
Total	128,306,728	

Note: Appears to be all own fuel

Total, 2010:	MtCO2e	MtCO2e	Percent oil	ercent gas
Production	261	98	94.3%	80.8%
Ancillary	16	23	5.7%	19.2%
Total	276	122		

Total, 2010:	MtCO2e	Percent
Total production	359	90.2%
Total ancillary	39	9.8%
Total, 2010	398	

4,483,820 Scope 2, 2010

Assume that Hess Fuel energy inputs are "own fuel"

1 kWh =	3.60	MJ	Therefore	128,306,728	461,904,220,800	MJ
					461,904	TJ

Total CH4	tCH4 gas	methane intensity	
This project	1,472,471	4.10	kg CH4/tCO2
Self-reported CDP	245,125	0.68	kg CH4/tCO2
Percent of Carbon Majors	16.65%	6.01	multiple

Case 1: Assume own energy is all natural gas

heat content nat gas	1.1050	MJ/cf
	418,012,869,502	cf nat gas
	418	Bcf own energy (if nat gas)
CME Gas EF	0.017	MtC/Bcf
	6.94	MtC own energy
Result	25.43	MtCO2 own energy

Case 2: Assume own energy is all crude oil & products

IPCC, heat value	5.78	GJ/bbl
	79,863,935	bbl own energy
CME liquids EF	106.40	kgC/bbl
Liquids Carbon	8,497,419	tC own energy
Liquids CO2	31.16	MtCO2 own energy

Case 3: Assume own energy is average of gas and liquid fuels

Average gas & liqui	28.30	MtCO2 own energy
2/3 gas & 1/3 liqui	27.34	MtCO2 own energy

Comparing entity's CDP submission to this study

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	359.0	100.0%	
Ancillary emissions, this study	39.1	10.9%	
Entity total, 2010, this study	398.1	110.9%	100.0%
Product emissions, CDP	404.0	112.5%	
Total scope 3, CDP	404.0	112.5%	
Scope 1, CDP	62.1	17.3%	
Entity Scope 1 + Product emiss. CDP	466.1	129.8%	117.1%
"Own fuel" emissions (CMS)	27.3	7.6%	

Note: we do not add Scope 2 emissions to this comparison table, since primary fuel inputs to electricity are already accounted for.
Note: presumed own fuel. Original data in error(10^-3).

Gross Scope 3	tCO2e	
Use of sold products	404,000,000	see comment
Transportation and distributior	na	
Transportation and distributior	na	
Other: Business Travel - Air	na	
total Scope 3	404,000,000	

Oil, IPCC	20.00	kgC/GJ, default C content IPCC
Natural gas IPCC	15.30	kgC/GJ, default carbon content

CDP, OG1.2	Proved reserves BOE	Production, 2010 BOE	OG 5.1 ducts available for sale BOE
Crude oil	6,503,000,000	701,895,000	
Unconventional (sands, bitumen)		-	
Natural gas	4,041,833,333	306,600,000	
Total	10,544,833,333	1,008,495,000	-

Table OG 5.1	Product sales BOE, 2010
Natural gas (excluding LNG)	634,187,500
Other: Natural Gas Liquids	97,090,000
Other: Gasoline	445,665,000
Other: Other refined products	690,580,000
Total	1,867,522,500

Chevron

Chevron OG 3.3

OG3.3

Please provide masses of gross Scope 1 GHG emissions released to atmosphere in units of metric tonnes CO2e ' flaring, process emissions, vented emissions, fugitive emissions. The values required for 2011 are forward-lookin

Category	2005	2006	2007	2008	2009	2010	2011
Combustion						37388863	
Flaring						9709155	
Process emissions						10294591	
Vented emissions						3667934	
Fugitive emissions						1071053	

CDP Table 12.3, sorted by fuel

Crude oil	692,831
Diesel / Gas oil	27,672,600
Distillate fuel oil No	11,124
Jet gasoline	2,269,291
Kerosene	181
Liquefied petroleum	9,851
Propane	7,263
Residual fuel oil	40,329,217
Waste oils	181,228
Distillate fuel oil No	102,358
Distillate fuel oil No	8
Motor gasoline	6,952,158
Total liquids	78,228,110

Natural gas	28,537,767
Liquefied Natural Gi	17
Refinery gas	21,540,834
Total gases	50,078,618

OG1.2

Please provide values for proved reserves of each of the hydrocarbon types (in units of BOE) for 2010. '

Product	Proved reserves (BOE), 2010	Date of assessment
Natural gas	4041833333	Fri 31 Dec 2010
Light & medium oils	6503000000000	Fri 31 Dec 2010

Chevron's "oils" datum is 6.5 trillion bbls; probably meant to be 6.5 billion bbls.

Chevron CDP 2010

9.2a

Please break down your total gross global Scope 1 emissions by business division

Business Division	Scope 1 metric tonnes CO2e
Upstream	39925209
Downstream	21280504
Other	930331

9.2c

Please break down your total gross global Scope 1 emissions by GHG type

GHG type	Scope 1 metric tonnes CO2e
CO2	56705174
CH4	5147631
N20	276399
Other: HFC, PFC and SF6	6841

9.2d

Please break down your total gross global Scope 1 emissions by activity

Activity	Scope 1 metric tonnes CO2e
Combustion	37388863
Flaring and Venting	13377089
Other	11370092

12.2

Please state how much fuel, electricity, heat, steam, and cooling in MWh your organization has consumed

Energy type	MWh
Fuel	128306734
Electricity	5903978
Heat	
Steam	7361713
Cooling	

12.3

Please complete the table by breaking down the total "Fuel" figure entered above by fuel type

Fuels	MWh
Crude oil	692831
Diesel/Gas oil	27672600
Distillate fuel oil No 3	11124
Jet gasoline	2269291
Kerosene	181
Liquefied Natural Gas (LNG)	17
Liquefied petroleum gas (LPG)	9851
Natural gas	28537767
Propane	7263
Refinery gas	21540834
Residual fuel oil	40329217
Waste oils	181228
Distillate fuel oil No 4	102358
Distillate fuel oil No 2	8
Motor gasoline	6952158

Total

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(data provided by Hess; Shell and BP did not proved data for OG3.3)

Gross Scope 1	2008	2009	2010	2011
Table OG3.3	tCO2e	tCO2e	tCO2e	tCO2e
Combustion			not provided	
Flaring				
Process emissions				
Vented emissions				
Fugitive emissions				
Total	-	-	-	

Signed off by : Gérard Moutet – Vice President Climate and Energy
Protocol and methodology: IPCC SAR GWP
IPIECA 2003 Operational control

Gross Scope 1	tCO2e		Table 9.2	tCO2e	
Upstream	26,000,000	50.4%	CO2	47,600,000	0.0%
Downstream	20,200,000	39.1%	CH4	2,800,000	0.0%
Chemicals	5,400,000	10.5%	Other, combined	1,200,000	0.0%
		0.0%	HFCs		
		0.0%	PFCs		
Total	51,600,000	100.0%	SF6		
			Total	-	0.0%

51,600,000 Scope 1, 2010

133,333 tCH4

Gross Scope 2		Energy	MWh
Upstream		Fuel	133,100,000
Downstream		Electricity (impor	21,300,000
Chemicals		Heat	500,000
		Steam (imported	7,800,000
Total	-	Cooling	-
		Total	162,700,000

5,400,000 Scope 2, 2010

CDP Table 12.3

Fuel energy use is direct, therefore Scope 1

Fuel	MWh	
Other: Solid fuels (c	10,000,000	0.0%
Other: Liquid fuels	12,900,000	0.0%
Other: Gas fuels	110,200,000	0.0%
Total	133,100,000	

Note: Appears to be all own fuel

1 kWh =	3.60	MJ	Therefore	133,100,000	479,160,000,000	MJ
					479,160	TJ

Entity 2010 production and emissions, this study	Crude oil & NGL	Natural gas	
	million bbl	Bcf	
Production	599	2,347	linked
	MtCO2/million bbl	MtCO2/Bcf	
Emission factor	0.371	0.053	linked
	MtCO2	MtCO2	
Emissions	222	125	
	kg CO2/tCO2	kg CO2/tCO2	
Vented CO2 EF	3.83	28.53	
Flaring EF	15.94	1.74	
Fugitive methane	1.92	9.88	kg CH4/tCO2
Fugitive methane	40	207.44	kg CO2e/tCO2

Ancillary emissions, 2010	MtCO2e	MtCO2e	
Vented CO2	0.9	3.6	
Flaring	3.5	0.2	
Fugitive methane	0.4	1.2	MtCH4
Fugitive methane	9.0	26.0	
Total ancillary	13.4	29.8	

Total, 2010:	MtCO2e	MtCO2e	Percent oil	ercent gas
Production	222	125	94.3%	80.8%
Ancillary	13	30	5.7%	19.2%
Total	236	155		

Total, 2010:	MtCO2e	Percent
Total production	348	89.0%
Total ancillary	43	11.0%
Total, 2010	391	

Total CH4	tCH4 gas	methane intensity	
This project	1,666,277	4.79	kg CH4/tCO2
Self-reported CDP	133,333	0.38	kg CH4/tCO2
% of this study	8.00%	12.50	multiple

Case 1: Assume own energy is all natural gas		
heat content nat gas	1.1050	MJ/cf
	433,628,959,276	cf nat gas
	433.6	Bcf own energy (if nat gas)
CME Gas EF	0.017	MtC/Bcf
	7.19	MtC own energy
Result	26.38	MtCO2 own energy

Case 2: Assume own energy is all crude oil & products		
IPCC, heat value	5.78	GJ/bbl
	82,847,485	bbl own energy
CME liquids EF	106.40	kgC/bbl
Liquids Carbon	8,814,865	tC own energy
Liquids CO2	32.32	MtCO2 own energy

Case 3: Assume own energy is average of gas and liquid fuels		
Average gas & liqui	29.35	MtCO2 own energy
2/3 gas & 1/3 liqui	28.36	MtCO2 own energy

Gross Scope 3	tCO2e
Use of sold products	627,000,000
Transportation & distribution c	6,600,000
	na
Other: Business Travel - Air	na
total Scope 3	633,600,000

Oil, IPCC	20.00	kgC/GJ, default C content IPCC
Natural gas IPCC	15.30	kgC/GJ, default carbon content

	Proved reserves	Production, 2010	OG 5.1 ducts available for sale
OG 1.1 and 1.2	BOE	BOE	BOE
Crude oil			
Unconventional (sands, bitumen)			
Natural gas			
Total			

Comparing entity's CDP submission to this study

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	347.7	100.0%	
Ancillary emissions, this study	43.2	12.4%	
Entity total, 2010, this study	390.9	112.4%	#DIV/0!
Product emissions, CDP	627.0	180.3%	
Total scope 3, CDP	633.6	182.2%	
Scope 1, CDP	51.6	14.8%	
Entity Scope 1 + Product emiss. CDP	678.6	195.2%	#DIV/0!
"Own fuel" emissions (CMS)	28.4	8.2%	

Note: we do not add Scope 2 emissions to this comparison table, since primary fuel inputs to electricity are already accounted for.
Note: presumed own fuel. Original data in error(10^-3).

Total

7.4

Please give the emissions factors you have applied and their origin; alternatively, please attach an Excel spreadsheet with this data

Fuel/Material/Energy	Emission Factor	Unit	Reference
Natural gas	2.7	metric tonnes CO2e per metric tonne	EU ETS Monitoring reporting guidelines
Other: Liquid fuel	3.1	metric tonnes CO2e per metric tonne	EU ETS Monitoring reporting guidelines

12.2

Please state how much fuel, electricity, heat, steam, and cooling in MWh your organization has consumed

Energy type	MWh
Fuel	133100000
Electricity	21300000
Heat	500000
Steam	7800000
Cooling	0

12.3

Please complete the table by breaking down the total "Fuel" figure entered above by fuel type

Fuels	MWh
Other: Solid fuels (coke)	10000000
Other: Liquid fuels	12900000
Other: Gas fuels	110200000

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(data provided by Hess; Shell and BP did not proved data for OG3.3)

Gross Scope 1	2008	2009	2010	2011
Table OG 3.3	tCO2e	tCO2e	tCO2e	tCO2e
Combustion	37,370,878	36,657,105	39,092,381	
Flaring	16,535,835	13,730,862	13,827,931	
Process emissions	na	na	na	
Vented emissions	2,390,697	2,182,202	2,340,032	
Fugitive emissions	5,697,802	5,085,594	5,415,779	
Total	61,995,212	57,655,763	60,676,123	

Signed off by: Fusco Rosanna - Environment Manager
Protocol and methodology: IPCC SAR GWP
API Compendium: Operational control

Gross Scope 1	tCO2e			tCO2e		
Exploration & Production	31,223,404	51.5%	CO2	53,591,096	88.3%	
Gas & Power	15,794,439	26.0%	CH4	7,085,027	11.7%	337,382 tCH4
Refining & Marketing	7,756,953	12.8%	Other, combined	na	0.0%	
Petrochemical	4,642,424	7.7%	HFCs	na		
Engineering & Construction	1,176,396	1.9%	PFCs			
Corporate and financial compa	72,917	0.1%	SF6			
Others	9,590	0.0%	Total	60,676,123	100.0%	
Total	60,676,123	100.0%				

60,676,123 Scope 1, 2010

CDP Table 12.3

Fuel energy use is direct, therefore Scope 1

Gross Scope 2		Energy	MWh	Fuel	MWh	Percent	Percent of gases
Exploration & Production	168,741	Fuel	178,392,987	Natural gas	117,238,956	65.7%	78.6%
Gas & Power	312,470	Electricity (impor	32,333,000	Refinery gas	31,887,361	17.9%	21.4%
Refining & Marketing	562,223	Heat	10,277,650	Liquefied petroleum	467,553	0.3%	
Petrochemical	755,290	Steam (imported	20,362,746	Motor gasoline	213,750	0.1%	
Engineering & Construction	34,476	Cooling	-	Diesel / Gas oil	9,484,406	5.3%	
Corporate and financial compa	3,329	Total	241,366,383	Residual fuel oil	10,033,747	5.6%	
Others	49,313			Petroleum coke	5,047,930	2.8%	
Total	1,885,842			Other: Mostly coke	4,019,282	2.3%	
				Total	178,392,985	100.0%	

Note: Appears to be all own fuel

1,885,842 Scope 2, 2010

1 kWh =	3.60	MJ	Therefore	MWh 178,392,985	642,214,746,000	MJ
					642,215	TJ

Entity 2010 production and emissions, this study	Crude oil & NGL	Natural gas	
	million bbl	Bcf	
Production	364	1,657	linked
	MtCO2/million bbl	MtCO2/Bcf	
Emission factor	0.371	0.053	linked
	MtCO2	MtCO2	
Product emissions	135	89	
	kg CO2/tCO2	kg CO2/tCO2	
Vented CO2 EF	3.83	28.53	
Flaring EF	15.94	1.74	
Fugitive methane	1.92	9.88	kg CH4/tCO2 applied rate
Fugitive methane	40	207.44	kg CO2e/tCO2

Ancillary emissions, 2010	MtCO2e	MtCO2e	
Vented CO2	0.5	2.5	
Flaring	2.2	0.2	
Fugitive methane	0.3	0.9	MtCH4
Fugitive methane	5.5	18.4	
Total ancillary	8.1	21.0	

Total, 2010:	MtCO2e	MtCO2e	Percent oil	ercent gas
Production	135	89	94.3%	80.8%
Ancillary	8	21	5.7%	19.2%
Total	143	110		

Total, 2010:	MtCO2e	Percent
Total production	224	88.5%
Total ancillary	29	11.5%
Total, 2010	253	

Total CH4	tCH4 gas	methane intensity	
This project	1,134,666	5.07	kg CH4/tCO2
Self-reported CDP	337,382	1.51	kg CH4/tCO2
% of this study	29.73%	3.36	multiple

Case 1: Assume own energy is all natural gas

heat content nat gas	1.1050	MJ/cf
	581,189,815,385	cf nat gas
	581	Bcf own energy (if nat gas)
CME Gas EF	0.017	MtC/Bcf
	9.64	MtC own energy
Result	35.36	MtCO2 own energy

Case 2: Assume own energy is all crude oil & products

IPCC, heat value	5.78	GJ/bbl
	111,039,896	bbl own energy
CME liquids EF	106.40	kgC/bbl
Liquids Carbon	11,814,501	tC own energy
Liquids CO2	43.32	MtCO2 own energy

Case 3: Assume own energy is average of gas and liquid fuels

Average gas & liqui	39.34	MtCO2 own energy
2/3 gas & 1/3 liqui	38.02	MtCO2 own energy

Comparing entity's CDP submission to this study

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	223.7	100.0%	
Ancillary emissions, this study	29.2	13.0%	
Entity total, 2010, this study	252.9	113.0%	100.0%
Product emissions, CDP	268.4	120.0%	
Total scope 3, CDP	268.7	120.1%	
Scope 1, CDP	60.7	27.1%	
Entity Scope 1 + Product emiss. CDP	329.4	147.3%	130.3%
"Own fuel" emissions (CMS)	38.0	17.0%	

Note: we do not add Scope 2 emissions to this comparison table, since primary fuel inputs to electricity are already accounted for.
Note: presumed own fuel. Original data in error(10^-3).

Gross Scope 3	tCO2e	
Use of sold products	268,438,000	Sales times Efs
Purchased goods and services	268,729	API Compendium
Business travel	30,590	EPA Climate Leaders
Total Scope 3	268,737,319	

Oil, IPCC	20.00	kgC/GJ, default C content IPCC
Natural gas IPCC	15.30	kgC/GJ, default carbon content

BP CDP, OG1.2	Proved reserves BOE	Production, 2010 BOE
Crude oil	3,623,000,000	363,905,000
Natural gas	3,221,981,982	298,576,577
Total	6,844,981,982	662,481,577

Products available for sale

OG 5.1	BOE
Other: Hydrocarbon production sol	638,000,000
Natural gas (excluding LNG)	617,301,600
Liquefied natural gas (LNG)	95,400,000
Other: Liquids	363,905,000
Total	1,714,606,600

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Fuel/Material/Energy	Emission Factor	Unit	Reference
Natural gas	1.96	Other: kg CO2/m3	CO2: Natural Gas - EU-ETS Italian Deliberation 14/2009
Refinery gas	3.12	metric tonnes CO2 per metric tonne	CO2: Refinery fuel gas - EU-ETS Italian Deliberation 14/2009
Diesel/Gas oil	3.17	metric tonnes CO2 per metric tonne	CO2: Diesel - EU-ETS Italian Deliberation 14/2009
Other: Flaring	1.86	Other: kg CO2/m3	CO2: Flare combustion - eni protocol Rev.01
Other: Associated Gas	3.48	Other: kg CO2/m3	CO2: Gas derived from oil - EU-ETS Italian Deliberation 14/2009
Other: Fuel Oil	3.14	metric tonnes CO2 per metric tonne	CO2: Fuel Oil - EU-ETS Italian Deliberation 14/2009
Other: Flared Gas	3.03	metric tonnes CO2 per metric tonne	CO2: Flared gas (butane) - EU-ETS Italian Deliberation 14/2009
Liquefied petroleum gas (LPG)	3.02	metric tonnes CO2 per metric tonne	CO2: LPG - EU-ETS Italian Deliberation 14/2009
Natural gas	54.60	Other: gr CH4/tonne	CH4: Natural Gas API Compendium Table 4.4a AP-42 Tab 1.4.2 (7/98) converted by LHV=49.6 GJ/ton
Natural gas	0.04	Other: gr CH4/tonne	CH4: Boilers/Heaters/Furnaces natural gas Eni Protocol rev1 Tab.3-4
Natural gas	0.84	Other: gr CH4/tonne	CH4: Compression Gas turbines, Eni Protocol Rev.01 Tab D3-5
Refinery gas	1.43	Other: kg CH4/tonne	CH4: Eni Protocol Refinery FG assumed to contain 30% mol of CH4 density = 0.75 Kg/Nm3 Destruction efficiency = 99.5%
Other: Flared Gas	0.60	Other: kg CH4/m3	CH4: Flare combustion fuel gas, Eni Protocol (Tab D2-3 98 % conversion)
Diesel/Gas oil	0.18	Other: kg CH4/tonne	CH4: Diesel combustion in engines: EEMS - Air emissions calculations-dec 2002
Other: Fuel Oil	0.65	Other: kg CH4/tonne	CH4: Fuel Oil, API Compendium
Liquefied petroleum gas (LPG)	0.96	Other: gr CH4/GJ	CH4: LPG API Compendium Tbl 4-4a
Natural gas	49.20	Other: gr N2O /tonne	N2O: Natural gas API Compendium Table 4-4a @ 50.208 GJ/ton
Refinery gas	34.09	Other: gr N2O /tonne	N2O: Refinery FG EF as Natural Gas API Compendium Table 4.4a converted by 3,405E-5 ton/ton
Other: Flared Gas	0.07	Other: gr N2O /Sm3	N2O: Flare combustion process gas: Eni Protocol (default density=0.80306 kg/m3 and EEMS Tbl)
Other: Fuel Oil	90.80	Other: gr N2O /tonne	N2O: Fuel Oil, API Compendium
Liquefied petroleum gas (LPG)	4.42	Other: gr N2O /GJ	N2O: LPG, API Compendium

ENI SpA, CDP 2010, 7.4 Efs

Business Division	Scope 1 metric tonnes CO2e
Exploration & Production	31223404
Gas & Power	15794439
Refining & Marketing	7756953
Petrochemical	4642424
Engineering & Construction	1176396
Corporate and financial companies	72917
Others	9590

9.2c
Please break down your total gross global Scope 1 emissions by GHG type

GHG type	Scope 1 metric tonnes CO2e
CO2	53591096
CH4	7085027

9.2d
Please break down your total gross global Scope 1 emissions by activity

Activity	Scope 1 metric tonnes CO2e
Combustion & Process	39092381
Flaring	13827931
Venting	2340032
Fugitive Emission	5415779

CDP 9.2

10.2a
Please break down your total gross global Scope 2 emissions by business division

Business division	Scope 2 metric tonnes CO2e
Exploration & Production	168741
Gas & Power	312470
Refining & Marketing	562223
Petrochemical	755290
Engineering & Construction	34476
Corporate and financial companies	3329
Others	49313

9.2c
Please break down your total gross global Scope 1 emissions by GHG type

GHG type	Scope 1 metric tonnes CO2e
CO2	53591096
CH4	7085027

9.2d
Please break down your total gross global Scope 1 emissions by activity

Activity	Scope 1 metric tonnes CO2e
Combustion & Process	39092381
Flaring	13827931
Venting	2340032
Fugitive Emission	5415779

Summaries linked to worksheets above

Richard Heede
Climate Accountability Institute
15-Jul-13

Royal Dutch Shell

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	410.7	100.0%	
Ancillary emissions, this study	56.9	13.9%	Product emissions
Entity total, 2010, this study	467.7	113.9%	CDP/This study
Product emissions, CDP	669.0	162.9%	162.9%
Total scope 3, CDP	672.2	163.7%	
Scope 1, CDP	75.1	18.3%	Entity total
Entity Scope 1 + Product emi	744.1	181.2%	CDP/This study
"Own fuel" emissions (CMS)	41.7	10.2%	159.1%
Methane rate, this study	5.44	kg CH4/tCO2	
Methane rate, CDP-reported	0.32	kg CH4/tCO2	

ConocoPhillips

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	310.8	100.0%	
Ancillary emissions, this study	40.8	13.1%	roduct emissior
Entity total, 2010, this study	351.6	113.1%	CDP/This study
Product emissions, CDP	-	0.0%	0.0%
Total scope 3, CDP	-	0.0%	
Scope 1, CDP	60.7	19.5%	Entity total
Entity Scope 1 + Product emiss. CDP	60.7	19.5%	CDP/This study
"Own fuel" emissions (CMS)	46.8	15.1%	17.3%
Methane rate, this study	5.11	kg CH4/tCO2	
Methane rate, CDP-reported	0.75	kg CH4/tCO2	

Chevron

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	359.0	100.0%	
Ancillary emissions, this study	39.1	10.9%	uct emissions
Entity total, 2010, this study	398.1	110.9%	P/This study
Product emissions, CDP	404.0	112.5%	112.5%
Total scope 3, CDP	404.0	112.5%	
Scope 1, CDP	62.1	17.3%	ntity total
Entity Scope 1 + Product emiss. CDP	466.1	129.8%	P/This study
"Own fuel" emissions (CMS)	27.3	7.6%	117.1%
Methane rate, this study	4.10	kg CH4/tCO2	
Methane rate, CDP-reported	0.68	kg CH4/tCO2	

Hess Corporation

	MtCO2e	0 nt of Product emissions, this study	
Product emissions, this study	54.7	100.0%	
Ancillary emissions, this study	5.6	10.3%	Product emissions
Entity total, 2010, this study	60.3	110.3%	CDP/This study
Product emissions, CDP	40.2	73.5%	74%
Total scope 3, CDP	40.3	73.7%	
Scope 1, CDP	8.5	15.5%	Entity total
Entity Scope 1 + Product emi	48.8	89.2%	CDP/This study
"Own fuel" emissions (CMS)	2.8	5.1%	80.9%
Methane rate, this study	3.82	kg CH4/tCO2	
Methane rate, CDP-reported	0.17	kg CH4/tCO2	

Pemex

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	537.3	100.0%	
Ancillary emissions, this study	56.6	10.5%	roduct emissior
Entity total, 2010, this study	593.9	110.5%	CDP/This study
Product emissions, CDP	-	0.0%	0.0%
Total scope 3, CDP	-	0.0%	
Scope 1, CDP	-	0.0%	Entity total
Entity Scope 1 + Product emiss. CDP	-	0.0%	CDP/This study
"Own fuel" emissions (CMS)	#REF!	#REF!	0.0%
Methane rate, this study	3.95	kg CH4/tCO2	
Methane rate, CDP-reported	-	kg CH4/tCO2	

Total

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	347.7	100.0%	
Ancillary emissions, this study	43.2	12.4%	uct emissions
Entity total, 2010, this study	390.9	112.4%	P/This study
Product emissions, CDP	627.0	180.3%	180.3%
Total scope 3, CDP	633.6	182.2%	
Scope 1, CDP	51.6	14.8%	ntity total
Entity Scope 1 + Product emiss. CDP	678.6	195.2%	P/This study
"Own fuel" emissions (CMS)	28.4	8.2%	173.6%
Methane rate, this study	4.79	kg CH4/tCO2	
Methane rate, CDP-reported	0.38	kg CH4/tCO2	

BP

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	485.7	100.0%	
Ancillary emissions, this study	58.3	12.0%	Product emissions
Entity total, 2010, this study	544.0	112.0%	CDP/This study
Product emissions, CDP	573.0	118.0%	118.0%
Total scope 3, CDP	573.0	118.0%	
Scope 1, CDP	64.9	13.4%	Entity total
Entity Scope 1 + Product emi	637.9	131.3%	CDP/This study
"Own fuel" emissions (CMS)	54.0	11.1%	117.3%
Methane rate, this study	4.61	kg CH4/tCO2	
Methane rate, CDP-reported	0.46	kg CH4/tCO2	

Statoil

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	218.1	100.0%	
Ancillary emissions, this study	27.4	12.6%	roduct emissior
Entity total, 2010, this study	245.5	112.6%	CDP/This study
Product emissions, CDP	-	0.0%	0.0%
Total scope 3, CDP	0	0.0%	
Scope 1, CDP	14.2	6.5%	Entity total
Entity Scope 1 + Product emiss. CDP	14.2	6.5%	CDP/This study
"Own fuel" emissions (CMS)	13.0	6.0%	5.8%
Methane rate, this study	4.86	kg CH4/tCO2	
Methane rate, CDP-reported	0.15	kg CH4/tCO2	

ENI

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	223.7	100.0%	
Ancillary emissions, this study	29.2	13.0%	uct emissions
Entity total, 2010, this study	252.9	113.0%	P/This study
Product emissions, CDP	268.4	120.0%	120.0%
Total scope 3, CDP	268.7	120.1%	
Scope 1, CDP	60.7	27.1%	ntity total
Entity Scope 1 + Product emiss. CDP	329.4	147.3%	P/This study
"Own fuel" emissions (CMS)	38.0	17.0%	130.3%
Methane rate, this study	5.07	kg CH4/tCO2	
Methane rate, CDP-reported	1.51	kg CH4/tCO2	

Exxon Mobil

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	565.3	100.0%	
Ancillary emissions, this study	76.1	13.5%	Product emissions
Entity total, 2010, this study	641.4	113.5%	CDP/This study
Product emissions, CDP	1.6	0.3%	0.3%
Total scope 3, CDP	1.6	0.3%	
Scope 1, CDP	132.0	23.4%	Entity total
Entity Scope 1 + Product emi	133.6	23.6%	CDP/This study
"Own fuel" emissions (CMS)	79.4	14.0%	20.8%
Methane rate, this study	5.26	kg CH4/tCO2	
Methane rate, CDP-reported	0.25	kg CH4/tCO2	

Petrobras

	MtCO2e	Percent of Product emissions, this study	
Product emissions, this study	325.6	100.0%	
Ancillary emissions, this study	28.0	8.6%	roduct emissior
Entity total, 2010, this study	353.7	108.6%	CDP/This study
Product emissions, CDP	504.1	154.8%	154.8%
Total scope 3, CDP	504.1	154.8%	
Scope 1, CDP	60.0	18.4%	Entity total
Entity Scope 1 + Product emiss. CDP	564.0	173.2%	CDP/This study
"Own fuel" emissions (CMS)	40.1	12.3%	159.5%
Methane rate, this study	3.09	kg CH4/tCO2	
Methane rate, CDP-reported	0.60	kg CH4/tCO2	

Product emission, Carbon Majors	MtCO2e	"Own fuel," CDP est MtCO2e	Combustion MtCO2e	% own fuel %
Royal Dutch Shell	411	41.7		10.2%
Hess Corporation	55	2.8	5.5	5.1%
BP	486	54.0		11.1%
Exxon Mobil	565	79.4		14.0%
ConocoPhillips	311	46.8		15.1%
Pemex				
Statoil	218	13.0	11.2	6.0%
Petrobras	326	40.1	40.7	12.3%
Chevron	359	27.3	37.4	7.6%
Total	348	28.4		8.2%
ENI	224	38.0	39.1	17.0%
Total, average	**3,301**	**371.5**		**11.3%**
			simple average	10.7%

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Summaries linked to worksheets above

Richard Heede
Climate Accountability Institute
6-Aug-13

Sources:
IPIECA Guidelines
IPIECA Saving Energy
IPIECA, OGP Energy Efficiency
Nyboer, Canadian Refineries

Raw data from main tables

(prior to re-allocating "gas" to natural gas and refinery gas in porly-defined datasets)

	"Own fuel," C	Own fuel (gas)	Own fuel (oil)	Total own fuel	Percent gas
	MtCO2e	MWh	MWh	MWh	%
Royal Dutch Shel	41.7	222,500,000	14,300,000.0	236,800,000	93.96%
Hess Corporatior	2.8			12,751,728	0.00%
BP	54.0	215,800,000	29,100,000	244,900,000	88.12%
Exxon Mobil	79.4	130,000,000	230,000,000	360,000,000	36.11%
ConocoPhillips	46.8	na	na	230,208,028	
Pemex	-				
Statoil	13.0	54,803,600	6,385,385.0	61,188,985	89.56%
Petrobras	40.1	139,917,217	48,081,360.0	187,998,577	74.42%
Chevron	27.3	50,078,618	78,228,110.0	128,306,728	39.03%
Total	28.4	110,200,000	22,900,000	133,100,000	82.79%
ENI	38.0	117,238,956	61,154,029.0	178,392,985	65.72%
Total, average	**372**	**1,040,538,391**	**490,148,884**	**1,773,647,031**	**58.67%**
			simple average	177,364,703	

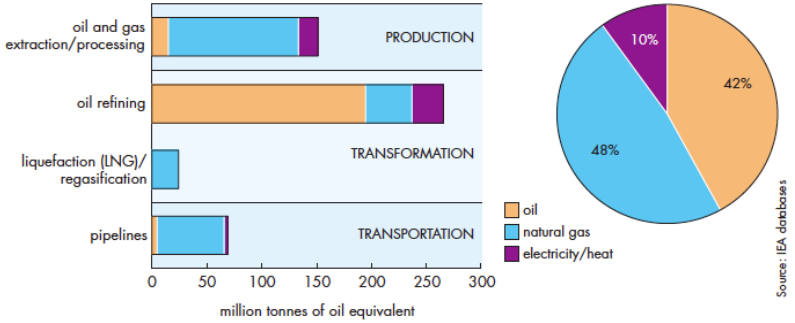
Raw data from main tables

(prior to re-allocating "gas" to natural gas and refinery gas in porly-defined datasets)

	"Own fuel," C	Own fuel (gas)	Own fuel (oil)	Total own fuel	Percent gas	
	MtCO2e	MWh	MWh	MWh	%	
Royal Dutch Shel	41.7	157,641,271	79,158,729	236,800,000	66.57%	236,800,000
Hess Corporatior	2.8	8,380,370	4,371,358	12,751,728	65.72%	12,751,728
BP	54.0	150,392,783	94,507,217	244,900,000	61.41%	244,900,000
Exxon Mobil	79.4	130,000,000	230,000,000	360,000,000	36.11%	360,000,000
ConocoPhillips	46.8	151,291,537	78,916,491	230,208,028	65.72%	230,208,028
Pemex						
Statoil	13.0	36,016,645	25,172,340	61,188,985	58.86%	61,188,985
Petrobras	40.1	91,952,878	96,045,699	187,998,577	48.91%	187,998,577
Chevron	27.3	50,078,618	78,228,110	128,306,728	39.03%	128,306,728
Total	28.4	72,422,876	60,677,124	133,100,000	54.41%	133,100,000
ENI	38.0	117,238,956	61,154,029	178,392,985	65.72%	34.28%
Total, average	**372**	**965,415,934**	**808,231,097**	**1,773,647,031**	54.43%	45.57%
			simple average	177,364,703		

Figure 2: World energy consumption along the oil and gas supply chain, 2004

(Covers only those countries for which data are available)



IPIECA Saving Energy Figure 2.

IPIECA Saving Energy rpt (2007)		
	Percent of total	Percent Gas/Oil
Elec / heat	10.0%	
natural gas	48.0%	53.33%
oil	42.0%	46.67%
	100.0%	100.0%

Page 4: Globally, the energy consumed by the oil and gas industry is estimated to amount to approximately 10 per cent of gross oil and gas production, or about 600 million tonnes of oil equivalent (Mtoe) a year, based on 2004 data.1

FN #1: In part: "In 2004, consumption for all these activities amounted to 513 Mtoe." (excludes tankers etc).

3July13 note: entity links to oil & gas production and oil EF worksheets corrected. Result: cell AG767 up from 48.3 to 59.2 kgCo2/tCO2

Note: average rate computed over compined oil and gas emissions

	CH4 rate CMS	CH4 rate CDP	Multiple	Percent	Product emission, Carbon Majors	"Own fuel," CMS es	Scope 1 total	Scope 1 "comb.	Scope 1 of Prod.	"Comb" of Prod	"Comb" of Prod	adjusted	
	kg CH4/tCO	kg CH4/tCO2			MtCO2e	MtCO2e	MtCO2e	MtCO2e	%	%	kgCO2/tCO2	kgCO2/tCO2	
Royal Dutch Shel	5.44	0.32	16.75	6.0%	Royal Dutch Shell	411	41.7	75.1	not provided	18.3%			
Hess Corporatior	3.82	0.17	22.76	4.4%	Hess Corporation	55	2.8	8.5	5.5	15.5%	10.0%	99.80	53.23
BP	4.61	0.46	10.04	10.0%	BP	486	54.0	64.9	not provided	13.4%			
Exxon Mobil	5.26	0.25	20.80	4.8%	Exxon Mobil	565	79.4	132.0	not provided	23.4%			
ConocoPhillips	5.11	0.75	6.81	14.7%	ConocoPhillips	311	46.8	60.7	not provided	19.5%			
Pemex					Pemex								
Statoil	4.86	0.15	31.78	3.1%	Statoil	218	13.0	14.2	11.2	6.5%	5.2%	51.57	27.50
Petrobras	3.09	0.60	5.14	19.5%	Petrobras	326	40.1	60.0	40.7	18.4%	12.5%	125.10	66.72
Chevron	4.10	0.68	6.01	16.6%	Chevron	359	27.3	62.1	37.4	17.3%	10.4%	104.15	55.55
Total	4.79	0.38	12.50	8.0%	Total	348	28.4	51.6	not provided	14.8%			
ENI	5.07	1.51	3.36	29.7%	ENI	224	38.0	60.7	39.1	27.1%	17.5%	174.75	93.20
Total	46.15	5.28	8.74	11.4%	**Total, average**	**3,301**	**371.5**	**589.7**	**133.9**	17.9%	not applicable	not applicable	na	Percent
average	4.62	0.53	8.74						simple average	17.4%	11.1%	111.07	**59.24**	5.92%
High / low factor	1.42	9.85											linked to SumRanking	

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Cell: F10
Comment: Rick Heede:
CDP form: "OG3.3 Please provide masses of gross Scope 1 GHG emissions released to atmosphere in units of metric tonnes CO2e for the whole organization broken down by emissions categories: combustion, flaring, process emissions, vented emissions, fugitive emissions." Shell did not provide data for any items requested. CMS, March 2013.

Cell: F20
Comment: Rick Heede:
Shell presumably uses API Compendium and its protocol for fugitive methane.

Cell: B45
Comment: Rick Heede:
Shell CDP 2010, Section 15.1: Scope 3 Emissions: 475 MtCO2e.
"These emissions were determined from the product of Refinery processing outturn and the emission factor for refined projects. The Refinery Processing Outturn number is on page 40 of the publication "Royal Dutch Shell plc Annual Report and Form 20-F for the year ended December 31st 2010". Emission Factors for the refined products are from the IEA publication "CO2 Emissions from Fuel Combustion". We are investigating transitioning to the use of DEFRA factors."

Cell: B46
Comment: Rick Heede:
Shell CDP 2010, Section 15.1: Scope 3 Emissions: 194 MtCO2e.
"These emissions were determined from the product of Natural Gas Production and the emission factor for natural gas. The Natural Gas Production number is on page 32 of the publication "Royal Dutch Shell plc Annual Report and Form 20-F for the year ended December 31st 2010". Emission Factor for natural gas is from the IEA publication "CO2 Emissions from Fuel Combustion". We are investigating transitioning to the use of DEFRA factors."

Cell: B54
Comment: Rick Heede:
Shell plc 2009 CDP rpt, section 15.1: Scope 3: Use of Products Sold: 570 MtCO2e. "The activity data is taken from pages 33 and 40 of the 2011 Annual Report. The following emission factors (tonne CO2 / tonne of product) were assigned to each product, i.e. Gasoline = 3.07, Kerosene = 3.17, Gas Oil = 3.18, Fuel Oil = 3.08, LPG = 2.95, Natural Gas = 2.65. We improved the estimation method in 2011. The boundary used to report refinery products and natural gas production are those used for financial reporting and do not align with the traditional GHG boundaries defined by the GHG Protocol. The Refinery Outturn data reflects Shell subsidiaries, the 50% Shell interest in Motiva in the USA and instances where Shell owns the crude or feedstock processed by a refinery. Some equity-accounted investments are not included. The natural gas production includes Shell subsidiaries and the Shell share of equity accounted investments. See the assurance statement for more details."

Cell: U57
Comment: Rick Heede:
Net calorific value of natural gas shown as 48.0 TJ/Gg (range from 46.5 to 50.4 TJ/Gg), IPCC 2006 Guidelines vol 2, ch. 1: Introduction, Table 1.2.
Also lists crude oil at 42.3 TJ/Gg, and coal from 11.9 to 28.2 TJ/Gg.
Nowhere does the IPCC show conversions or default values for TJ or Gg per cubic meter of natural gas, or, for that matter, for crude oil or coal.
Thus we resort to UN heating value above.

Cell: C58
Comment: Rick Heede:
The IPCC default value for crude oil is 20.0 kgC/GJ (range from 19.4 to 20.6 kgC/GJ). IPCC Guidelines 2006 Volume 2: Energy, chapter 1: Introduction, Table 1.3. Also listed as 56,100 kgCO2/TJ in Table 2.2 at right. IPCC 2006 Guidelines vol 2, ch. 2: Stationary Combustion, Table 2.2.

Cell: U58
Comment: Rick Heede:
The IPCC default value for natural gas is 15.3 kgC/GJ (range from 14.8 to 15.9 kgC/GJ). IPCC Guidelines 2006 Volume 2: Energy, chapter 1: Introduction, Table 1.3. Also listed as 56,100 kgCO2/TJ in Table 2.2 at right. IPCC 2006 Guidelines vol 2, ch. 2: Stationary Combustion, Table 2.2.

Cell: C59
Comment: Rick Heede:
The IPCC default value for natural gas is 15.3 kgC/GJ (range from 14.8 to 15.9 kgC/GJ). IPCC Guidelines 2006 Volume 2: Energy, chapter 1: Introduction, Table 1.3. Also listed as 56,100 kgCO2/TJ in Table 2.2 at right. IPCC 2006 Guidelines vol 2, ch. 2: Stationary Combustion, Table 2.2.

Cell: L60
Comment: Rick Heede:
This is estsimated by CMS from entity data provided to CDP under the "Energy" and "Fuel" sections. However, fuel types, energy and carbon content, and (especially) whether the fuel is all or partially their own fuel rather than purchased is seldom unambiguous.

Cell: B107
Comment: Rick Heede:
Hess CDP 2010, Section 15.1: Scope 3 Emissions: 40.2 MtCO2e.
"Used product sales (residual oi, diesel, gasoline and natural gas) and EPA GHG emission factors from Tables MM-1 and NN-1 in Subparts MM and NN of US EPA's Mandatory Reporting of Greenhouse Gases rule. The EPA factors for natural gas

combustion were adjusted upwards to account for our gas production in Southeast Asia which has higher than average CO2 content."

Cell: L113
Comment: Rick Heede:
This is estsimated by CMS from entity data provided to CDP under the "Energy" and "Fuel" sections. However, fuel types, energy and carbon content, and (especially) whether the fuel is all or partially their own fuel rather than purchased is seldom unambiguous.

Cell: C120
Comment: Rick Heede:
The IPCC default value for crude oil is 20.0 kgC/GJ (range from 19.4 to 20.6 kgC/GJ). IPCC Guidelines 2006 Volume 2: Energy, chapter 1: Introduction, Table 1.3. Also listed as 56,100 kgCO2/TJ in Table 2.2 at right. IPCC 2006 Guidelines vol 2, ch. 2: Stationary Combustion, Table 2.2.

Cell: C121
Comment: Rick Heede:
The IPCC default value for natural gas is 15.3 kgC/GJ (range from 14.8 to 15.9 kgC/GJ). IPCC Guidelines 2006 Volume 2: Energy, chapter 1: Introduction, Table 1.3. Also listed as 56,100 kgCO2/TJ in Table 2.2 at right. IPCC 2006 Guidelines vol 2, ch. 2: Stationary Combustion, Table 2.2.

Cell: L132
Comment: Rick Heede:
CDP 2010, for BP, section 7.2a: "We use the BP Environmental Performance Reporting Requirements. These Requirements comprise detailed reporting instructions and calculation methodologies covering a wide range of environmental parameters including GHG emissions. The reporting boundaries and emissions calculation approach are consistent with both The Greenhouse Gas Protocol and the IPIECA/API/OGP Petroleum Industry Guidelines for Reporting GHG Emissions. The BP Guidelines recommend a tiered approach to calculating emissions requiring the use of approaches (tiers) based on determination of fuel consumption and fuel properties for major sources rather than the use of generic emission factors. For minor sources and where we consider that it is not feasible to determine actual fuel properties BP defaults to IPCC emission factors (see 7.4). For industry specific "process" emissions the BP Guidelines recommend emission factors from the API Compendium of Greenhouse Gas Emission Methodologies for the Oil and Gas Industry."

Cell: B171
Comment: Rick Heede:
BP CDP 2010, Section 15.1: Scope 3 Emissions: 573 MtCO2e.
"Customer emissions - an estimate of the carbon dioxide emissions resulting from the combustion of BP's total reported production of natural gas, natural gas liquids and refinery throughputs. Emissions are estimated by applying global average emission factors from IPCC."

Cell: L179
Comment: Rick Heede:
This is estsimated by CMS from entity data provided to CDP under the "Energy" and "Fuel" sections. However, fuel types, energy and carbon content, and (especially) whether the fuel is all or partially their own fuel rather than purchased is seldom unambiguous.

Cell: C184
Comment: Rick Heede:
The IPCC default value for crude oil is 20.0 kgC/GJ (range from 19.4 to 20.6 kgC/GJ). IPCC Guidelines 2006 Volume 2: Energy, chapter 1: Introduction, Table 1.3. Also listed as 56,100 kgCO2/TJ in Table 2.2 at right. IPCC 2006 Guidelines vol 2, ch. 2: Stationary Combustion, Table 2.2.

Cell: C185
Comment: Rick Heede:
The IPCC default value for natural gas is 15.3 kgC/GJ (range from 14.8 to 15.9 kgC/GJ). IPCC Guidelines 2006 Volume 2: Energy, chapter 1: Introduction, Table 1.3. Also listed as 56,100 kgCO2/TJ in Table 2.2 at right. IPCC 2006 Guidelines vol 2, ch. 2: Stationary Combustion, Table 2.2.

Cell: B234
Comment: Rick Heede:
Exxon Mobil CDP 2010, Section 15.1: Scope 3 Emissions: 1.6 MtCO2e.
"NOTE: THIS IS NOT TOTAL CORPORATION DATA. ONLY NEW ZEALAND SCOPE 3 SUBMITTED UNDER REGULATORY REPORTING REQUIREMENT. According to the International Energy Agency, approximately 90 percent of petroleum-related GHG emissions are generated when customers use our products and the remaining 10 percent are generated by industry operations."
15.3
How do your absolute Scope 3 emissions for the reporting year compare to the previous year? "This is our first year of estimation."

Cell: E235
Comment: Rick Heede:
US Scope 3 only, XOM's 2012 response for 2011 data; New Zealand also: at 3.2 MtCO2e.

Cell: L242

Comment: Rick Heede:
This is estsimated by CMS from entity data provided to CDP under the “Energy” and “Fuel” sections. However, fuel types, energy and carbon content, and (especially) whether the fuel is all or partially their own fuel rather than purchased is seldom unambiguous.

Cell: C247
Comment: Rick Heede:
The IPCC default value for crude oil is 20.0 kgC/GJ (range from 19.4 to 20.6 kgC/GJ). IPCC Guidelines 2006 Volume 2: Energy, chapter 1: Introduction, Table 1.3. Also listed as 56,100 kgCO2/TJ in Table 2.2 at right. IPCC 2006 Guidelines vol 2, ch. 2: Stationary Combustion, Table 2.2.

Cell: C248
Comment: Rick Heede:
The IPCC default value for natural gas is 15.3 kgC/GJ (range from 14.8 to 15.9 kgC/GJ). IPCC Guidelines 2006 Volume 2: Energy, chapter 1: Introduction, Table 1.3. Also listed as 56,100 kgCO2/TJ in Table 2.2 at right. IPCC 2006 Guidelines vol 2, ch. 2: Stationary Combustion, Table 2.2.

Cell: L306
Comment: Rick Heede:
This is estsimated by CMS from entity data provided to CDP under the “Energy” and “Fuel” sections. However, fuel types, energy and carbon content, and (especially) whether the fuel is all or partially their own fuel rather than purchased is seldom unambiguous.

Cell: C311
Comment: Rick Heede:
The IPCC default value for crude oil is 20.0 kgC/GJ (range from 19.4 to 20.6 kgC/GJ). IPCC Guidelines 2006 Volume 2: Energy, chapter 1: Introduction, Table 1.3. Also listed as 56,100 kgCO2/TJ in Table 2.2 at right. IPCC 2006 Guidelines vol 2, ch. 2: Stationary Combustion, Table 2.2.

Cell: C312
Comment: Rick Heede:
The IPCC default value for natural gas is 15.3 kgC/GJ (range from 14.8 to 15.9 kgC/GJ). IPCC Guidelines 2006 Volume 2: Energy, chapter 1: Introduction, Table 1.3. Also listed as 56,100 kgCO2/TJ in Table 2.2 at right. IPCC 2006 Guidelines vol 2, ch. 2: Stationary Combustion, Table 2.2.

Cell: B362
Comment: Rick Heede:
Exxon Mobil CDP 2010, Section 15.1: Scope 3 Emissions: 1.6 MtCO2e.
“NOTE: THIS IS NOT TOTAL CORPORATION DATA. ONLY NEW ZEALAND SCOPE 3 SUBMITTED UNDER REGULATORY REPORTING REQUIREMENT. According to the International Energy Agency, approximately 90 percent of petroleum-related GHG emissions are generated when customers use our products and the remaining 10 percent are generated by industry operations.”
15.3
How do your absolute Scope 3 emissions for the reporting year compare to the previous year? “This is our first year of estimation.”

Cell: E363
Comment: Rick Heede:
US Scope 3 only, XOM’s 2012 response for 2011 data; New Zealand also: at 3.2 MtCO2e.

Cell: L370
Comment: Rick Heede:
This is estsimated by CMS from entity data provided to CDP under the “Energy” and “Fuel” sections. However, fuel types, energy and carbon content, and (especially) whether the fuel is all or partially their own fuel rather than purchased is seldom unambiguous.

Cell: C375
Comment: Rick Heede:
The IPCC default value for crude oil is 20.0 kgC/GJ (range from 19.4 to 20.6 kgC/GJ). IPCC Guidelines 2006 Volume 2: Energy, chapter 1: Introduction, Table 1.3. Also listed as 56,100 kgCO2/TJ in Table 2.2 at right. IPCC 2006 Guidelines vol 2, ch. 2: Stationary Combustion, Table 2.2.

Cell: C376
Comment: Rick Heede:
The IPCC default value for natural gas is 15.3 kgC/GJ (range from 14.8 to 15.9 kgC/GJ). IPCC Guidelines 2006 Volume 2: Energy, chapter 1: Introduction, Table 1.3. Also listed as 56,100 kgCO2/TJ in Table 2.2 at right. IPCC 2006 Guidelines vol 2, ch. 2: Stationary Combustion, Table 2.2.

Cell: H444
Comment: Rick Heede:
Proved reserves: Proved oil and gas reserves were estimated to be 5,325 mmboe at year end 2010. This is split into: 2,124 mmbbls of oil and NGL and 17,965 bcf natural gas. Statoil’s proved reserves of bitumen in America is included as oil....as

they represent less than 3% of our proved reserves which is regarded as immaterial.

Cell: I444
Comment: Rick Heede:
Production: Entitlement production in 2010 equalled 621 mmboe. This is split into: 352 mmbbls crude oil and 1,509 bcf natural gas. Crude oil includes natural gas liquids (NGL), condensate and bitumen. Production of immaterial quantity of bitumen is included in crude oil production.

Cell: B490
Comment: Rick Heede:
Petrobras, CDP 2010: 504 MtCO2.
"According to the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard (draft November 2010), Petrobras scope 3 emissions 'Use of Sold Products' are estimated using a mass balance approach, considering that 100% of sold oil products suffered, at some point in their life cycle stage, the combustion process, releasing their carbon content. The products included are diesel, gasoline, fuel oil, naphtha, LPG, aviation kerosene, natural gas and others. For this year, Scope 3 emissions included the international sales. Please, take note that naphtha products may include ethylene that could result in emissions only after 200 years. However, to be conservative, Petrobras estimates all products to be converted to GHG in the current year. These emissions are stated on the basis of IPCC 2006 GNGGI emission factors and verified production of goods delivered to the market – production numbers of Petrobras used in this calculation are the ones officially stated in the Company's financial balance sheet and can be considered to be accurate and adequate. The numbers were checked to be according to the above mentioned references by the consulting firm ERM Brazil as part of the support in preparing Petrobras' yearly emissions inventory."

Cell: B554
Comment: Rick Heede:
Chevron, CDP, 2010: "Scope 3 CO2 emissions from our crude oil, NGL, natural gas and coal product streams for 2010 were calculated as follows: 1. For CO2 emissions estimate for coal product stream: a. Used data provided by Chevron Mining on the quantity and typical heating value of coal produced at the Kemmerer and North River mines during 2010 to calculate a mass-weighted average heating value for the coal produced in 2010. b. Used the heating value to calculate the energy content of coal produced in 2010. c. Applied the CO2 combustion emissions factor (EF) in the 2009 API Compendium EF for sub-bituminous coal (EF = 0.0971 tonnes CO2 per MMBtu on a HHV basis, source – 2009 API Compendium, Table 4.3, Page 4-19) to calculate CO2 emissions from coal produced in 2010. 2. For CO2 emissions estimate for natural gas product stream: a. Applied API Compendium high heating value (HHV) for processed natural gas (HHV = 1,027 Btu per ft^3, source – 2009 API Compendium, Table 3.8, Page 3-20) to calculate the energy content of natural gas products. b. Subtracted out of U.S. and international natural gas production figures for 2010 the natural gas that was consumed in operations during 2010. c. Applied the CO2 EF for natural gas of 0.0531 tonnes CO2 per MMBtu (2009 API Compendium, Table 4.3) to calculate emissions from 2010 natural gas product streams. 3. For CO2 emissions estimate for liquids (crude oil + natural gas liquids (NGL)) product stream: a. Separated out natural gas liquids production from crude oil production for 2010 based on data provided by Upstream Finance so as to enable a more accurate CO2 emissions estimate for the liquids product stream. b. Made the assumption that a barrel of NGL has about 2/3rds the energy content of a barrel of crude oil (HHV = 2/3 * 5.8 MMBtu per barrel, source of crude oil HHV – 2009 API Compendium, Table 3.8, Page 3-20) to calculate the energy content of NGL produced in 2010. c. Applied the CO2 combustion emissions factor (EF) from the 2009 API Compendium for natural gas liquids (EF = 0.0643 tonnes CO2 per MMBtu on a HHV basis (2009 API Compendium, Table 4.3, Page 4-18) to the natural gas liquids produced for 2010."
Further information: "*The Scope 3 emissions number provided in question 15.1 (404 million) is lower than the 410 million metric tons Chevron reported to the CDP last year as our 2009 Scope 3 emissions, and also differs from the number reported in Chevron's 2010 Corporate Responsibility Report (418 million). The number reported in the current CDP questionnaire is based a on a revised methodology which does not include emissions from natural gas products used in our operations and was calculated applying emission factors from the 2009 version of the API Compendium. This methodology more accurately reflects the GHG emissions resulting from the end use of Chevron's products. Without this methodology change, our 2010 Scope 3 emissions would be calculated to be 418 million metric tons (as reported in the 2010 Corporate Responsibility Report), 2% greater than the 410 million metric tons we reported to the CDP last year. *Emissions from marketing and transportation of oil and gas products, as well as lubricants and chemicals are estimated by the business units and input into CGERS, Chevron's GHG accounting tool as part of our Scope 1 emissions."

Cell: I571
Comment: Rick Heede:
Chevron, table OG 1.1: zero unconventional in 2010, 9.49 milllion bbl in 209, and 9.86 million bbl in 2008.

Cell: B618
Comment: Rick Heede:
Total, CDP: "see details in attached file: Q15.1 - Scope 3: use of products sold."

Cell: B619
Comment: Rick Heede:
Total, CDP: "see details in attached file: "Corporate Directive - GHG emissions_V7 - Appendix 7"

Cell: B684
Comment: Rick Heede:
ENI, section 15.1, Scope 3, "use of sold products." Eni usually estimates the GHG indirect emissions generated by the use of sold hydrocarbon products on the basis of sales multiplied by the relevant average emission factors assuming their complete combustion. GHG emissions are estimated by multiplying the amount of oil products (46,80 million toe) and natural gas (75810 million m3) sold to customers, by the relevant average emission factors.

Cell: B685
Comment: Rick Heede:
Purchased good and services: "Engines emissions are calculated based API Compendium methodologies, on fuel consumption and Equipment specific combustion emission factors; flaring and venting emissions are also calculated based on the API Compendium."

Cell: B686

Comment: Rick Heede:
"Eni refers to US-EPA Climate Leaders/ Optional Emissions from Commuting, Business Travel and Product Transport, may 2008. The activity data (distance, transport type, number of travels) are provided internally by Human Resourses Business Travel Management. COVERAGE: 46% of the total employees. Eni, in order to reduce environment impact from business travel, eni is encouraging videoconferencing system in order to reduce GHG emissions. Starting from 2005, Eni headquarters rely on 630 fixed videoconferencing systems in meeting rooms and 370 portable systems for smaller employee groups meetings. Videocall integrated with the VoIP phone system is also available for many users in Eni (2,000 webcam on 30,000 IP phones in 2009; 4,000 expected in 2010)."

Cell: B717
Comment: Rick Heede:
Note that most entities analyzed here estimate product emissions considerably higher (Shell's, for example, is 50 percent higher) than the Carbon Majors estimate. This is explained, in part, by differing methodologies. This study estimates emissions on the basis of each entity's fossil fuel production, deducting for non-energy fuels sequestered, whereas the CDP-reporting entities are based on sales of natural gas and petroleum products -- including products refined from refinery inputs, regardless of crude oil input ownership.

Cell: B721
Comment: Rick Heede:
This is estsimated by CMS from entity data provided to CDP under the "Energy" and "Fuel" sections. However, fuel types, energy and carbon content, and (especially) whether the fuel is all or partially their own fuel rather than purchased is seldom unambiguous.

Cell: C722
Comment: Rick Heede:
The Carbon Majors study applies CH4 emission rates of 1.83 kgCH4/tCO2 from combustion (net of non-energy uses) of produced liquids, and 9.91 kgCH4/tCO2 from combustion of gases. Thus the CH4 rate varies with each entity's oil and gas production.

Cell: C723
Comment: Rick Heede:
oil and gas producers account for their fugitive methane emissions (often on API Compendium or IPIECA protocol), but their details are not revealed in sustainability reporting or in their voluntary reports to Carbon Disclosure Project. The API Compendium, for example, relies on equipment counts and emissions rates per hour -- assuming that detailed monitoring is not carried out (which is nearly impossible on thousands of emission sources). The EPA has published revised emission rates -- generally much higher -- that are not reflected in the Compendium. Note also that the entity-reported methane emission rates vary by a factor of 9.2 (Low: Statoil; high: ENI).

Cell: B735
Comment: Rick Heede:
This is estsimated by CMS from entity data provided to CDP under the "Energy" and "Fuel" sections. However, fuel types, energy and carbon content, and (especially) whether the fuel is all or partially their own fuel rather than purchased is seldom unambiguous.

Cell: B749
Comment: Rick Heede:
This is estsimated by CMS from entity data provided to CDP under the "Energy" and "Fuel" sections. However, fuel types, energy and carbon content, and (especially) whether the fuel is all or partially their own fuel rather than purchased is seldom unambiguous.

Cell: N775
Comment: Rick Heede:
PIECA, OGP, API (2011) Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions, 2nd edition, London, 84 pp. PDF in Protocols / API IPIECA / IPIECA Guidelines May11.pdf

Cell: N776
Comment: Rick Heede:
IPIECA (2007) Saving Energy in the Oil and Gas Industry, IPIECA, London, 17 pp., IPIECA&OGP SavingEnergyInOil&GasIndustry 2007.pdf. See Figure 2 "World energy consumption along the oil & gas supply chain, 2004" (42 % oil, 48 % gas, 10 % elec/heat). Oil tanker fuel: no data.

Cell: N777
Comment: Rick Heede:
PIECA, OGP (2011?) Energy Efficiency: Improving Energy Use From Production To Consumer, 2 pp.

Cell: N778
Comment: Rick Heede:
Nyboer, John (2011) A Review of Energy Consumption in Canadian Oil Refineries 1990, 1994 to 2009, Prepared for Canadian Petroleum Products Institute and Canadian Industry Program for Energy Conservation, by Canadian Industrial Energy End-use Data and Analysis Centre, Simon Fraser University, March 2011, 73 pp., cieedac.sfu.ca

Cell: J812
Comment: Rick Heede:
FN #1: Comprehensive data on energy consumption by oil and gas companies around the world is not available. The IEA compiles and publishes data, where available, on the own use of energy by country and fuel type in crude oil and natural gas

production, oil refining, gas liquefaction/regasification, and pipeline transportation. In 2004, consumption for all these activities amounted to 513 Mtoe. However, this understates the total amount of energy used by the oil and gas industry worldwide, as data is not available for some countries, especially in the developing world. In addition, no breakdown of the use of transport fuels is to hand for any country, so it is not possible to estimate precisely how much of this energy consumption is used by the oil and gas industry for the distribution of oil products by tankers, barges, railcars and road trucks.