

Emissioni “scope 1 + 3” delle maggiori compagnie oil&gas 1988-2015, GtCO<sub>2</sub>e e %  
delle emissioni industriali globali 1988-2015

Compagnia oil&gas	Emissioni	Percentuale	Tipologia
Saudi Aramco	40,6	4,5%	NOC
Gazprom (Russia)	35,2	3,9%	NOC
National Iranian Oil	20,5	2,3%	NOC
ExxonMobil (USA)	17,8	2,0%	IOC
Pemex (Messico)	16,8	1,9%	NOC
Royal Dutch Shell (UK/Paesi Bassi)	15,0	1,7%	IOC
China National Petroleum	14,0	1,6%	NOC
BP (UK)	13,8	1,5%	IOC
Chevron (USA)	11,8	1,3%	IOC
PDVSA (Venezuela)	11,0	1,2%	NOC
Abu Dhabi National Oil	10,8	1,2%	NOC
Sonatrach (Algeria)	9,0	1,0%	NOC
Kuwait Petroleum	9,0	1,0%	NOC
Total (Francia)	8,5	0,9%	IOC
ConocoPhillips (USA)	7,5	0,8%	IOC
Petrobras (Brasile)	6,9	0,8%	NOC
Lukoil (Russia)	6,7	0,8%	IOC
Nigerian National Petroleum Corp	6,5	0,7%	NOC
Petronas (Malesia)	6,2	0,7%	NOC
Rosneft (Russia)	5,9	0,7%	NOC
<b>TOTALE 20 (Top 10)</b>	<b>273,6 (196,6)</b>	<b>30,4% (21,9%)</b>	

Grasso, M., Vergine S. 2020. *Tutte le Colpe dei Petrolieri*. Piemme: Milano

# Paths for sharing the emission budget

Pattern	Principle	Criterion
Egalitarian	Equal per Capita	EPC: proportionality to countries' population
	Equal Burdens	EB: proportionality to countries' GDP corrected by a factor equalising marginal abatements costs
	Equal Access	EA: proportionality to countries' population corrected by an energy services factor (heating/cooling needs)
Prioritarian	Historical Responsibility	HR-EPC: proportionality to countries' population corrected by the historical responsibility factor (CO <sub>2</sub> cumulative emissions)
		HR-GF: proportionality to countries' emissions corrected by the historical responsibility factor (CO <sub>2</sub> cumulative emissions)
	Ability to Pay	ATP-BP: proportionality to countries' GDP corrected by the wealth factor (aggregate country's GDP)
	Beneficiary Pays	
Sufficientarian	Survival/Luxury emissions	S/L: proportionality to countries' population only for countries above the threshold of subsistence
Non-Egalitarian	Grandfathering	GF: proportionality to countries' emissions

Grasso, M. 2012. 'Sharing the emission budget', *Political Studies*, 60, 668-686

% of Emission rights

	<b>EPC</b>	<b>EB</b>	<b>EA</b>	<b>HR-EPC</b>	<b>HR-GF</b>	<b>ATP-BP</b>	<b>S/L</b>	<b>GF</b>
<b>China</b>	0.203	0.107	0.205	0.181	0.143	0.097	0.397	0.218
<b>USA</b>	0.046	0.229	0.046	0.037	0.196	0.182	0.090	0.203
<b>Russia</b>	0.022	0.033	0.023	0.022	0.073	0.032	0.044	0.057
<b>India</b>	0.170	0.048	0.165	0.173	0.042	0.047	exempt	0.047
<b>Japan</b>	0.020	0.071	0.020	0.020	0.053	0.067	0.039	0.044
<b>Germany</b>	0.013	0.048	0.013	0.013	0.040	0.046	0.025	0.030
<b>Italy</b>	0.009	0.030	0.009	0.009	0.020	0.030	0.018	0.017
<b>Indonesia</b>	0.034	0.013	0.035	0.036	0.012	0.013	exempt	0.013
<b>Brazil</b>	0.029	0.030	0.029	0.030	0.013	0.029	exempt	0.013

**Carbon-exporting and -importing MEF members. Final two columns show the difference between these two accounting systems [P – C], in absolute (million tonnes CO<sub>2</sub>) and % values**

MEF member	Production-based cumulative emissions (Mt CO <sub>2</sub> )	Consumption-based cumulative emissions (Mt CO <sub>2</sub> )	[P – C] (Mt CO <sub>2</sub> )	[P – C] (%)
South Africa (Exp)	8,166.6	5,805.3	2,361.3	28.9
Russia (Exp)	36,150.4	26,683.7	9,466.7	26.2
China (Exp)	93,059.5	79,202.7	13,856.8	14.9
Australia (Exp)	7,090.5	6,258.9	831.6	11.7
Indonesia (Exp)	6,141.5	5,668.1	473.4	7.7
India (Exp)	25,751.1	23,885.9	1,865.2	7.2
Canada (Imp)	10,693.2	10,952.7	-259.4	-2.4
U.S. (Imp)	114,464.9	118,034.2	-3,569.3	-3.1
Brazil (Imp)	6,492.0	6,788.2	-296.2	-4.6
Mexico (Imp)	8,129.6	8,584.4	-454.8	-5.6
Korea (Imp)	8,755.5	10,117.0	-1,361.5	-15.6
Japan (Imp)	24,907.5	30,171.3	-5,263.8	-21.1
EU (Imp)	83,545.0	101,987.9	-18,442.9	-22.1

Grasso, M. and Roberts, J.T. 'A compromise to break the climate impasse', *Nature Climate Change*, 4, 543-549

	Projected 2012-2050 emissions at current rates (Mt CO <sub>2</sub> )	Baseline shares (Mt CO <sub>2</sub> )	Production-based R&C-corrected shares (Mt CO <sub>2</sub> )	Consumption-based R&C-corrected shares (Mt CO <sub>2</sub> )	Differential (%)	Differential (Mt CO <sub>2</sub> )
Australia (Exp)	14,127	5,900	6,643	6,624	-0.3%	-19
Brazil (Imp)	16,340	6,824	8,572	8,522	-0.6%	-50
Canada (Imp)	20,448	8,540	9,497	9,442	-0.6%	-55
China (Exp)	323,515	135,110	135,975	141,037	3.6%	5,062
EU (Imp)	145,711	60,853	56,368	52,696	-7.0%	-3,672
India (Exp)	81,969	34,233	42,172	42,154	0.0%	-18
Indonesia (Exp)	19,870	8,299	10,677	10,634	-0.4%	-43
Japan (Imp)	45,761	19,111	20,980	20,569	-2.0%	-411
Korea (Imp)	21,753	9,085	10,568	10,477	-0.9%	-91
Mexico (Imp)	17,658	7,374	9,091	9,034	-0.6%	-57
Russia (Exp)	63,739	26,620	29,962	30,579	2.0%	617
South Africa (Exp)	19,963	8,337	10,457	10,463	0.1%	7
U.S. (Imp)	214,819	89,715	69,040	67,769	-1.9%	-1,271