


Carbon producers' tar pit: dinosaurs beware

The path to holding fossil fuel producers accountability for climate change & climate damages

Richard Heede

Climate Accountability Institute

INET, Edinburgh

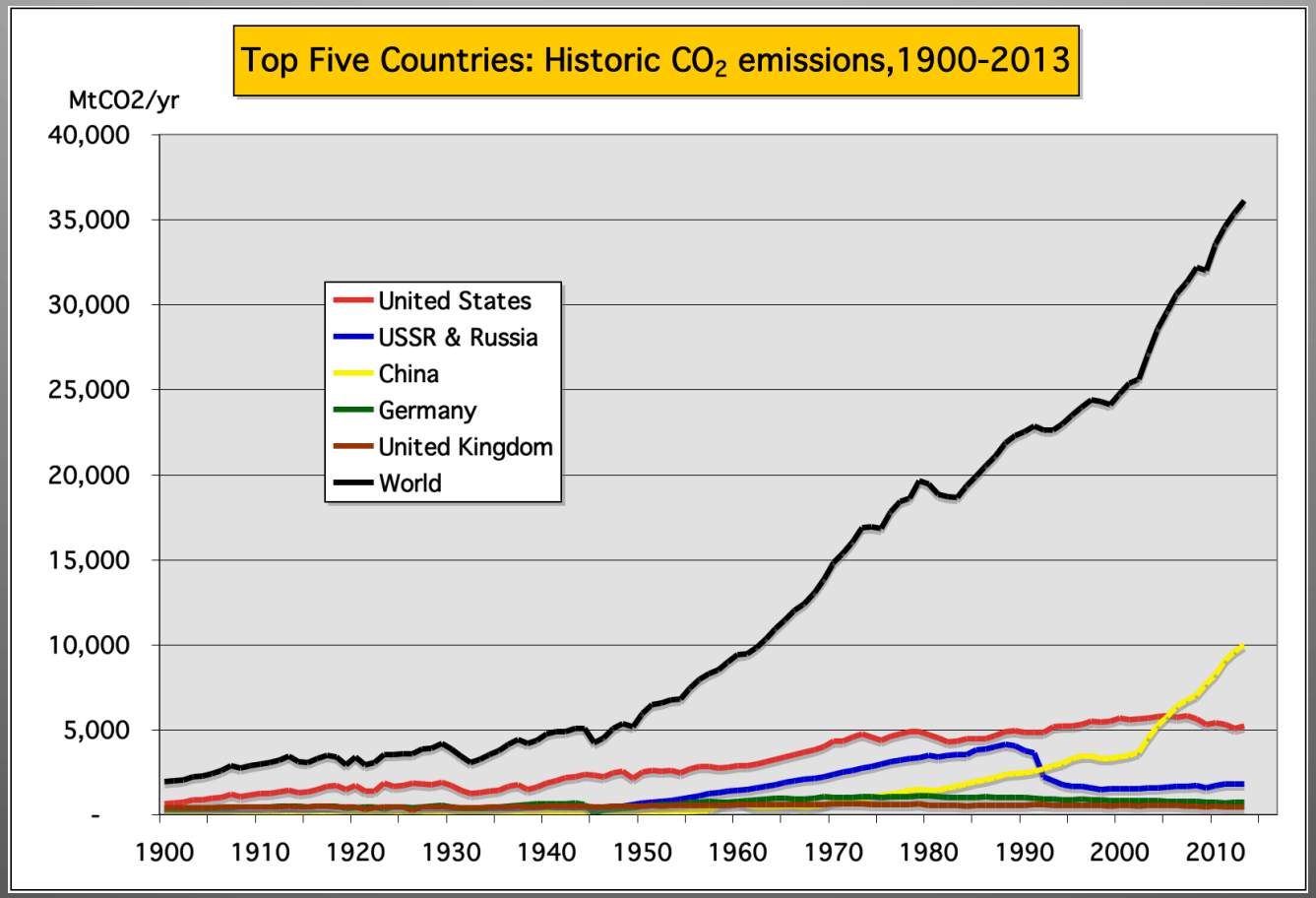
23 October 2017

heede@climateaccountability.org

CLIMATE ACCOUNTABILITY INSTITUTE

UN Framework Convention 1992

- Developed nations "in … their common but *differentiated responsibilities* … should take the lead in combating climate change and the adverse effects thereof."
- Focus is on nation-states, lead by Annex 1 nations based on their responsibility for historic emissions that drive climate change.



Ten largest nations' cumulative fossil fuel & cement CO_2 emissions 1750-2015

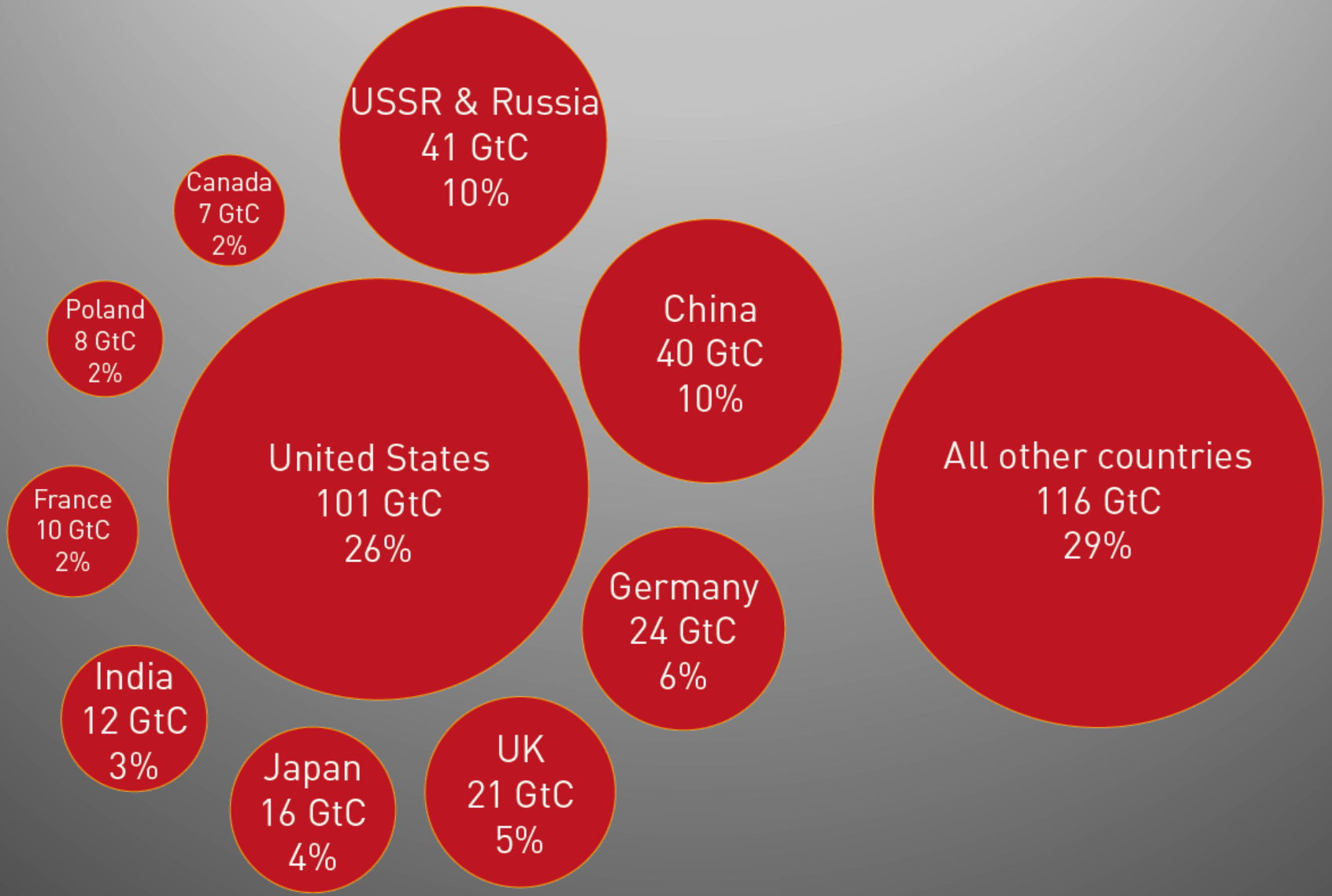


Image courtesy of Carbon Visuals, UK, carbonvisuals.com

Attribute a share of responsibility to carbon *producers*?

Attribute a share of responsibility to carbon *producers*?

Historic emissions are the chief drivers of climate change;

Companies have:

- produced the lion's share of the carbon fuels that cause climate change
- mislead consumers, investors, and legislators on climate risk
- the technical skills, capital, and moral responsibility to *reduce net carbon production* in line with science-based target of 2°C – or less

CAI provides the scientific basis for accountability, and for leveraging effective action by fossil fuel producers

Carbon Majors: the process

- Entity threshold of ≥8 MtC in recent year: 90 Carbon Major Entities:
  - 50 investor-owned companies (IOCs)
  - 31 state-owned entities (SOEs)
  - 9 nation-states such as FSU, China, Kazakhstan, Poland, and North Korea
  - 36 coal producers, 54 petroleum, 55 natural gas, 7 cement.
- Earliest production records available, from ~1900 for major investor-owned companies, 1970s for most state-owned entities
- Gather entity data on oil, natural gas, coal, and cement production
  - Annual reports, company histories, SEC filings, entity websites
  - *Oil Gas Journal*, EIA data, National Mining Association, *World Oil*, etc.
- Enter production data in million bbl oil, Bcf natural gas, tonnes coal
- Account for mergers and acquisitions (emissions to extant entity)
- Deduct non-energy uses of produced carbon products (~8% for oil)
- Apply robust and peer-reviewed emission factors

Peabody 1945-2016

CoalPeabodyXstrata.xls

Coal extraction data

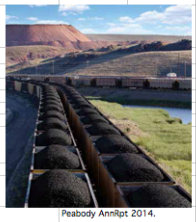
Richard Heede
Climate Mitigation Services
File started: 11 January 2005
Last modified: April 2017

Peabody Energy, USA

www.peabodyenergy.com — St. Louis

yellow column indicates original reported units

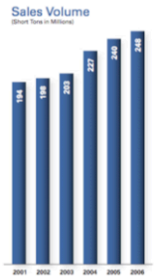
Investor-owned


Peabody AnnRpt 2014.

Production / Extraction data

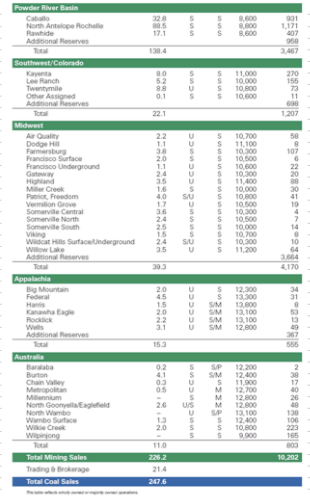
Year	Sub-Bituminous		Bituminous		Total Coal	
	Gross production	Gross production	Gross production	Gross production	Gross production	Gross production
	Million tons/yr	Million tonnes/yr	Million tons/yr	Million tonnes/yr	Million tons/yr	Million tonnes/yr
	Peabody Coal 1883-2010	Sinclair Coal tk - 1954	Black Beauty Coal 1987-2002			

Year	Peabody Coal		Company's St Ellen mine only	Black Beauty		Total Coal	
1944							
1945	0.4	Keystone Manual				0.4	0.4
1946	2.0	interpolated				2.0	1.8
1947	3.5	interpolated				3.5	3.2
1948	5.1	interpolated				5.1	4.6
1949	6.6	interpolated				6.6	6.0
1950	8.2	Peabody AnnRpts				8.2	7.4
1951	13.5					13.5	12.2
1952	10.9	Own production only				10.9	9.9
1953	8.2					8.2	7.4
1954	9.4					9.4	8.5
1955	11.5					11.5	10.4
1956	21.8					21.8	19.8
1957	23.1					23.1	21.0
1958	22.2					22.2	20.1
1959	25.8					25.8	23.4
1960	28.7					28.7	26.0
1961	29.6					29.6	26.8
1962	32.8					32.8	29.8
1963	39.2					39.2	35.6
1964	46.5					46.5	42.2
1965	48.8					48.8	44.3
1966	54.1					54.1	49.0
1967	55.9	interpolated				55.9	50.7
1968	57.8	interpolated				57.8	52.4
1969	59.6	Keystone Manual 1969-1989				59.6	54.1
1970	67.9					67.9	61.6
1971	56.0					56.0	50.8
1972	71.6					71.6	65.0
1973	69.9					69.9	63.4
1974	68.1					68.1	61.8
1975	73.1					73.1	66.3
1976	70.5					70.5	64.0
1977	65.4					65.4	59.3
1978	52.5					52.5	47.6
1979	64.4					64.4	58.4
1980	59.1					59.1	53.6
1981	51.7					51.7	46.9
1982	57.7					57.7	52.3
1983	53.4					53.4	48.5
1984	64.4					64.4	58.4
1985	62.0					62.0	56.2
1986	66.7					66.7	60.5
1987	79.0			4.3	Keystone Manual	83.3	75.6
1988	81.5			4.2	Keystone Manual	85.7	77.7
1989	86.7			4.8	interpolated	91.5	83.0
1990	93.3	Peabody AnnRpts		5.3	interpolated	98.6	89.5
1991	104.4	interpolated		5.9	interpolated	110.3	100.0
1992	115.4	interpolated		6.5	interpolated	121.9	110.6
1993	126.5	interpolated		7.1	interpolated	133.5	121.2
1994	137.5	interpolated		7.6	EIA stats	145.2	131.7
1995	148.6	Peabody AnnRpts		6.7		155.3	140.9
1996	154.2	interpolated		6.6		160.8	145.9
1997	159.7	interpolated		11.3		171.0	155.1
1998	165.3	interpolated		12.8	interpolated	178.1	161.6
1999	170.8	interpolated		14.4	interpolated	185.3	168.1
2000	176.4	Peabody AR 2006		16.0	2000-2002 Black	176.4	160.0
2001	194.0	Peabody AR 2006		20.1	Beauty coal prod	194.0	176.0
2002	198.0	Peabody AR 2006		18.9	is NOT included in	198.0	179.6
2003	203.2	Peabody AR 2006			Peabody total	203.2	184.3
2004	227.0	Peabody AR 2006				227.0	205.9
2005	240.0	Peabody AR 2006				240.0	217.7
2006	248.0	Peabody AR 2006				248.0	225.0
2007	236.1	Peabody AR 2008				236.1	214.2
2008	255.5	Peabody AR 2008	coal sold, 1990-2008			255.5	231.8
2009	243.6	Peabody AR 2010	coal sold includes "trading and brokerage"			243.6	221.0
2010	245.9	Peabody AR 2010	"trading & brokerage" totals 25.4 million sh tons			245.9	223.1
2011	228.9	Peabody AR 2013				228.9	207.7
2012	229.0	Peabody AR 2013				229.0	207.7
2013	222.4	Peabody AR 2013				222.4	201.8
2014	229.6	Peabody 10-K 2015				229.6	208.3
2015	213.7	Peabody 10-K 2015				213.7	193.9
2016	179.8	Peabody 10-K 2016				179.8	163.1
Total	7,093		153	-		7,191	6,524



Peabody Annual Rpt 2006

Peabody's Global Operations



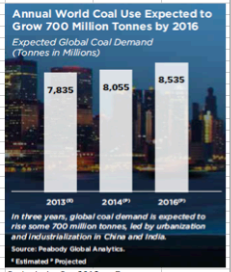
Peabody Annual Rpt 2006
2010 AnnRpt: no heating values rpt'd

S = steam
M = metallurgical
P = pulverized

EIA & NMA data shown for comparison

tons produced, US
119.3
139.0
142.8
142.5
157.1
165.5
140.6
146.1
149.6
156.8

tons produced, world
200.0
212.0
223.7
220.5



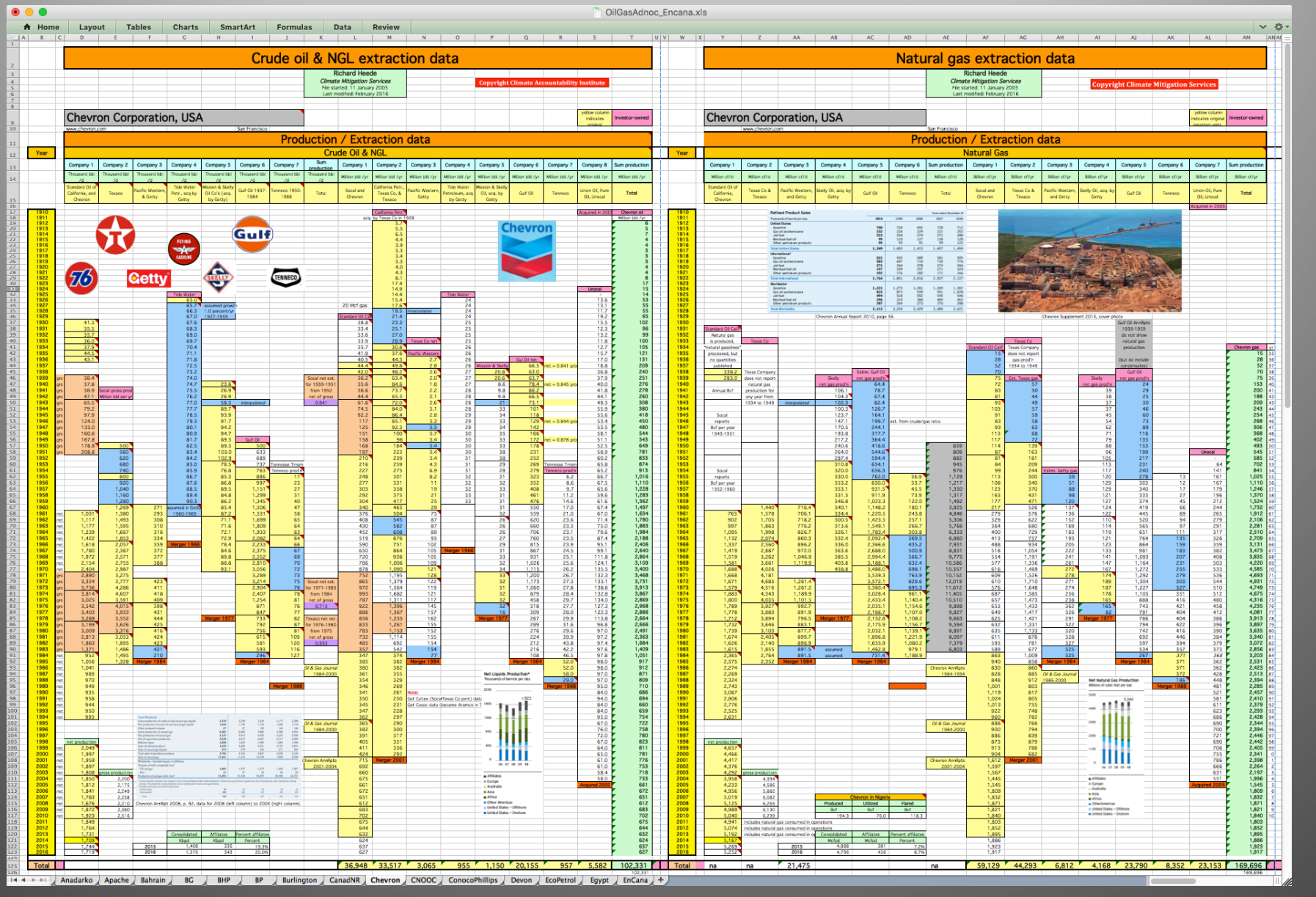
Peabody AnnRpt 2013, p. 7.

Coal Types:	Lignite	0.00%	Thermal coal (on ave)	92.88%	Metallurgical	7.12%	100.00%

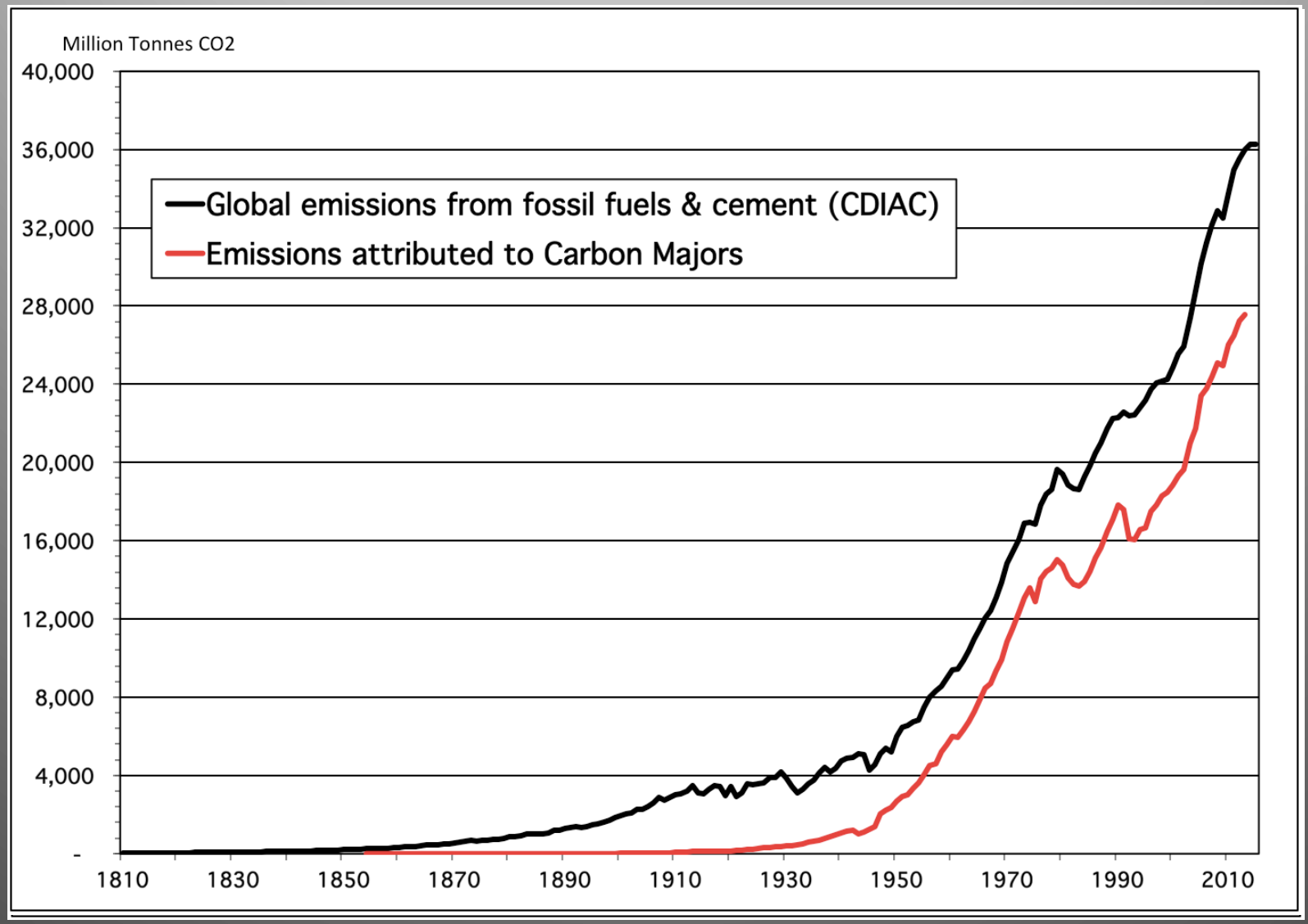
2016 only: 176 million tons

Peabody | Pittsburgh & Midway | Poland | RAG | RWE | Rio Tinto | Shell Coal | Russia | Sasol | Singareni | Luminant TXU | UK Coal | Ukraine | We

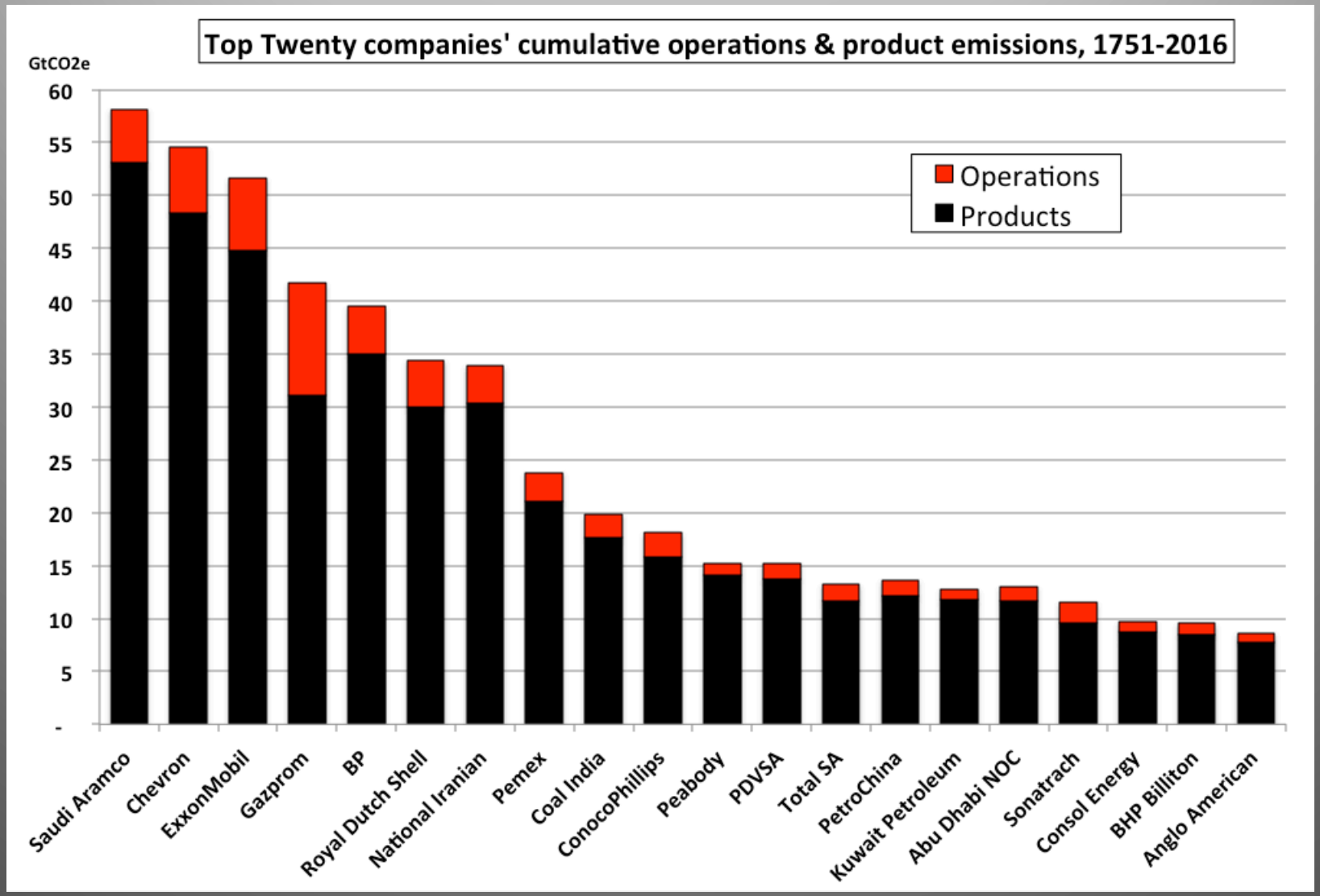
Chevron 1912-2016



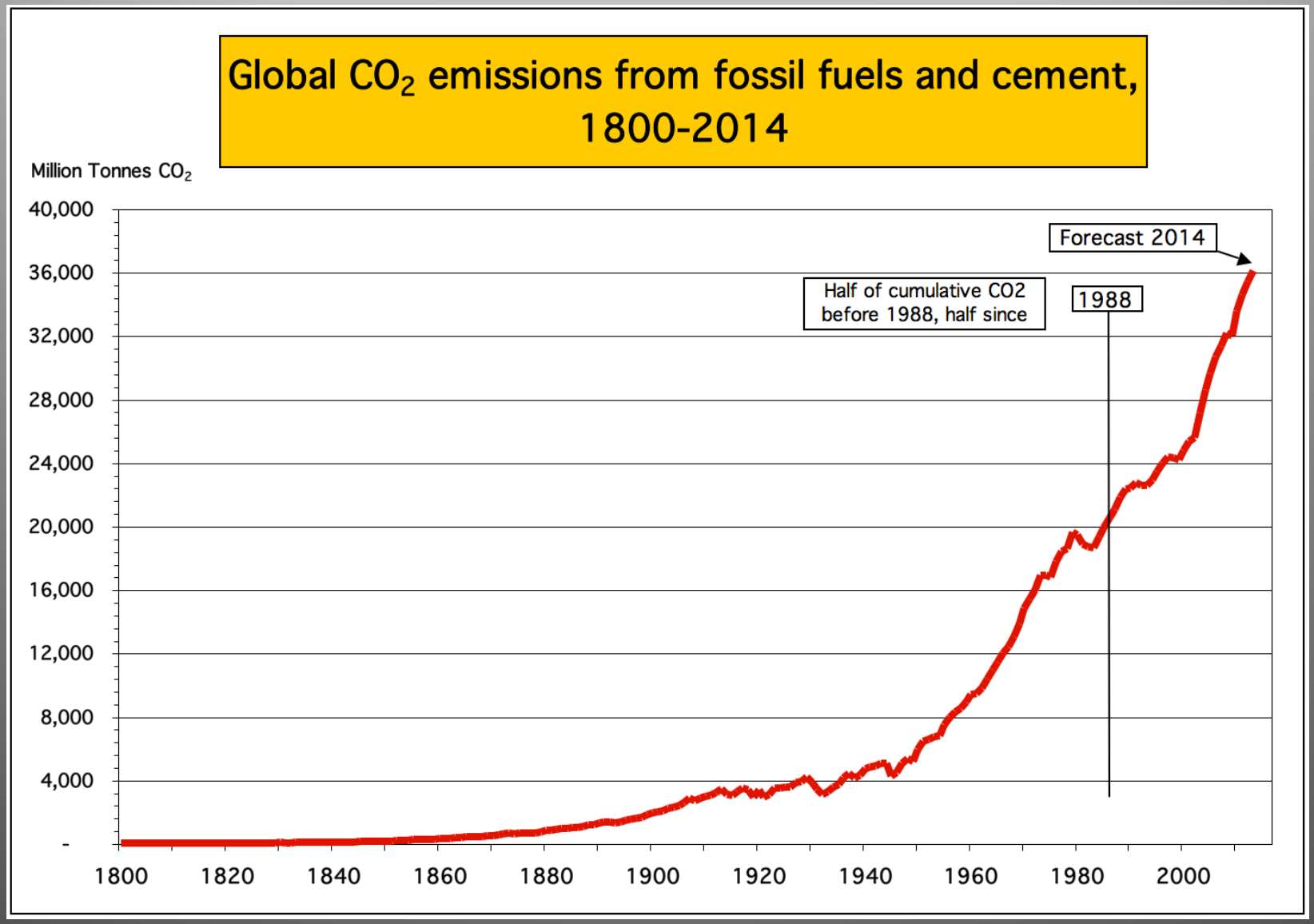
Two-thirds of CO_2 emissions since 1751 traced to ninety fossil fuel and cement producers



Top 20 companies, percent of global, 1751-2016



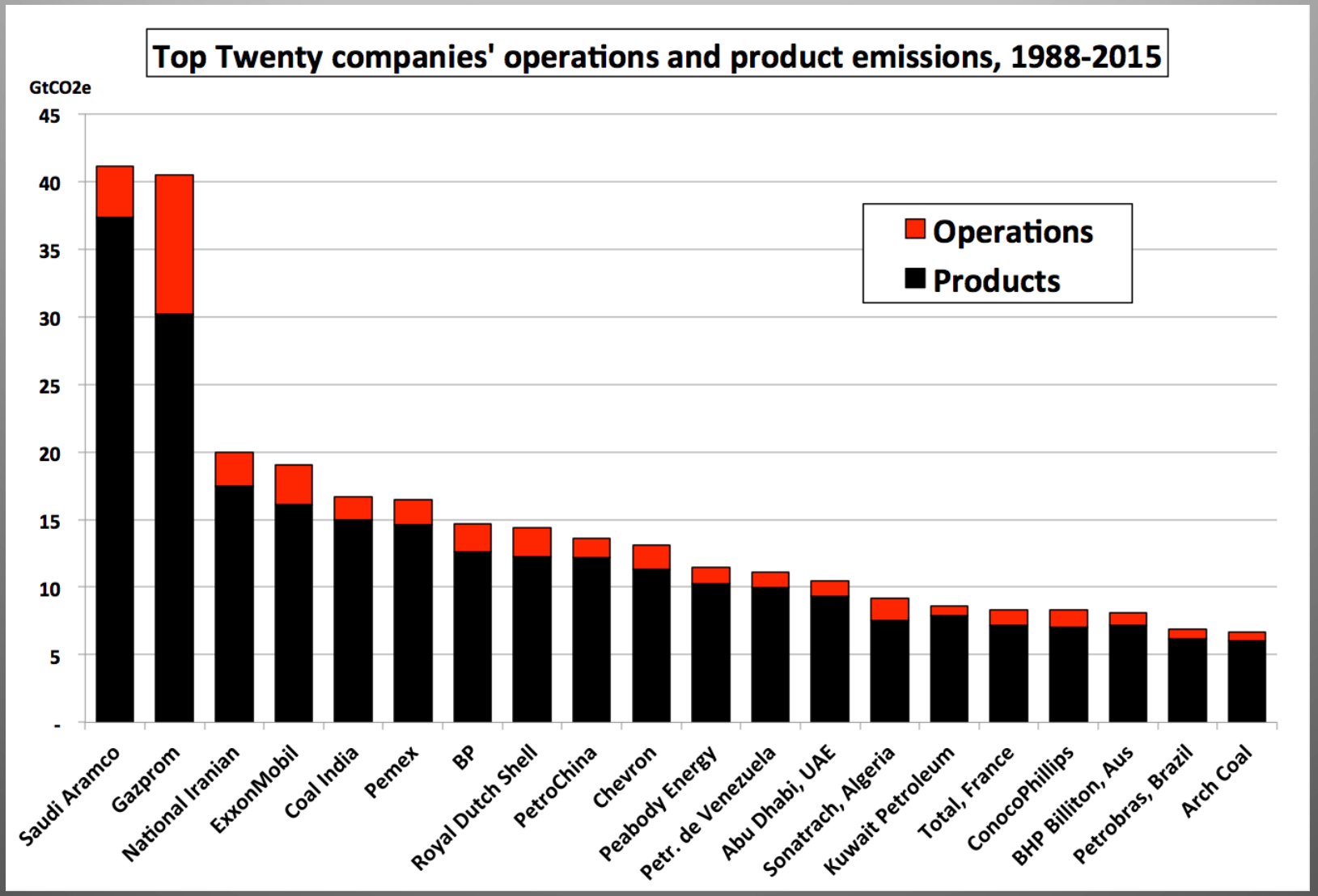
Half of all historic CO_2 since 1988



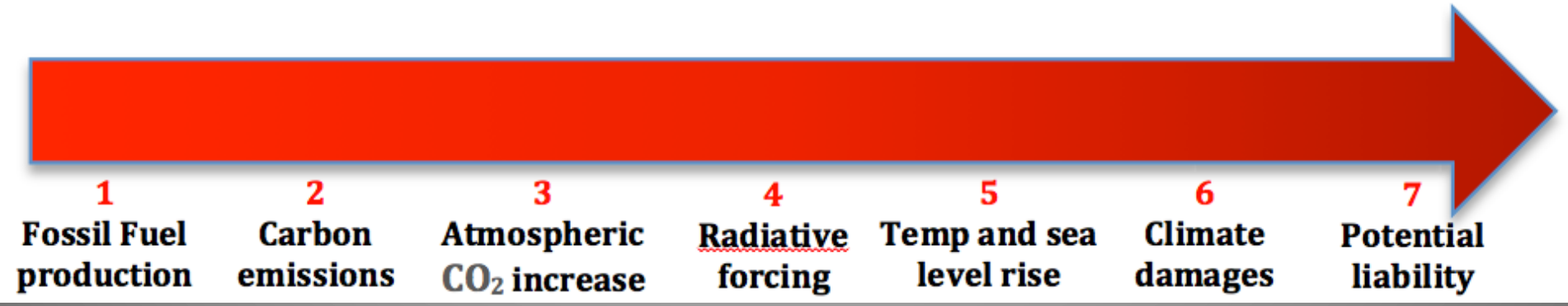
What the fossil fuel industry knew, and when

- Early warnings in 1965: President Johnson alerts Congress;
- 1970s: early oil & gas company studies on climate change
- 1979: US National Research Council report
- 1970s-1980s: Exxon internal research, report to management (*InsideClimate News, Los Angeles Times,* & *Merchants of Doubt*)
- 1988: IPCC established
- 1990: first assessment report
- 1995: second assessment report: “a discernible human influence on global climate”

Top 20 companies, percent of global, 1988-2015



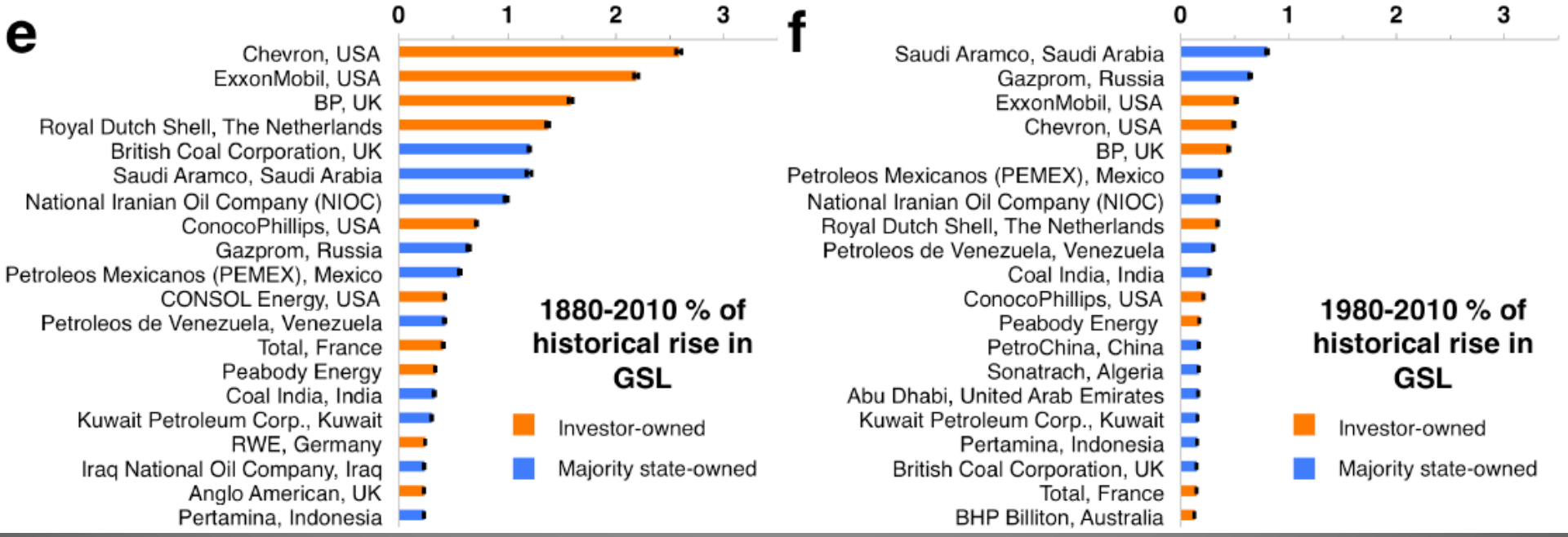
Pathway to accountability



Phase 1 - 2: Heede (2014) Tracing anthropogenic CO_2 and methane emissions to fossil fuel and cement producers 1854-2010, *Climatic Change;*

Phase 3 - 5: Ekwurzel et al. (2017) The rise in global atmospheric CO_2, surface temperature, and sea level from emissions traced to major carbon producers, *Climatic Change*.

Sea level rise attributed to company emissions, 1980-2010 (1% = 1.77 mm)



Ekwurzel et al. (2017) The rise in global atmospheric CO_2, surface temperature, and sea level from emissions traced to major carbon producers, *Climatic Change*.

Impacts: sea level rise & land loss, 1980-2010

	Emissions GtCO2	SLR mm	Land Loss km^2
Saudi Aramco:	36.6	1.43	602
Gazprom:	27.2	1.14	482
ExxonMobil:	18.7	0.92	386
BP:	16.2	0.80	335
Chevron:	16.0	0.88	370
Royal Dutch Shell:	13.4	0.61	256
Peabody Coal:	9.0	0.30	128

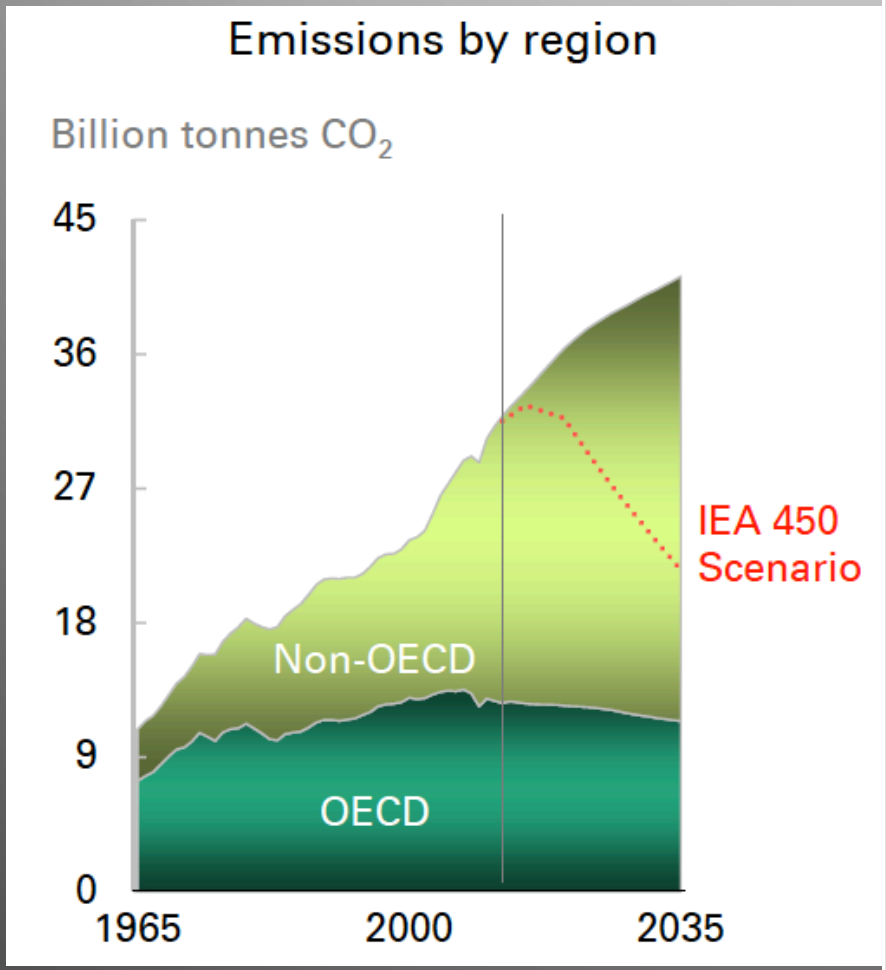
Sources:

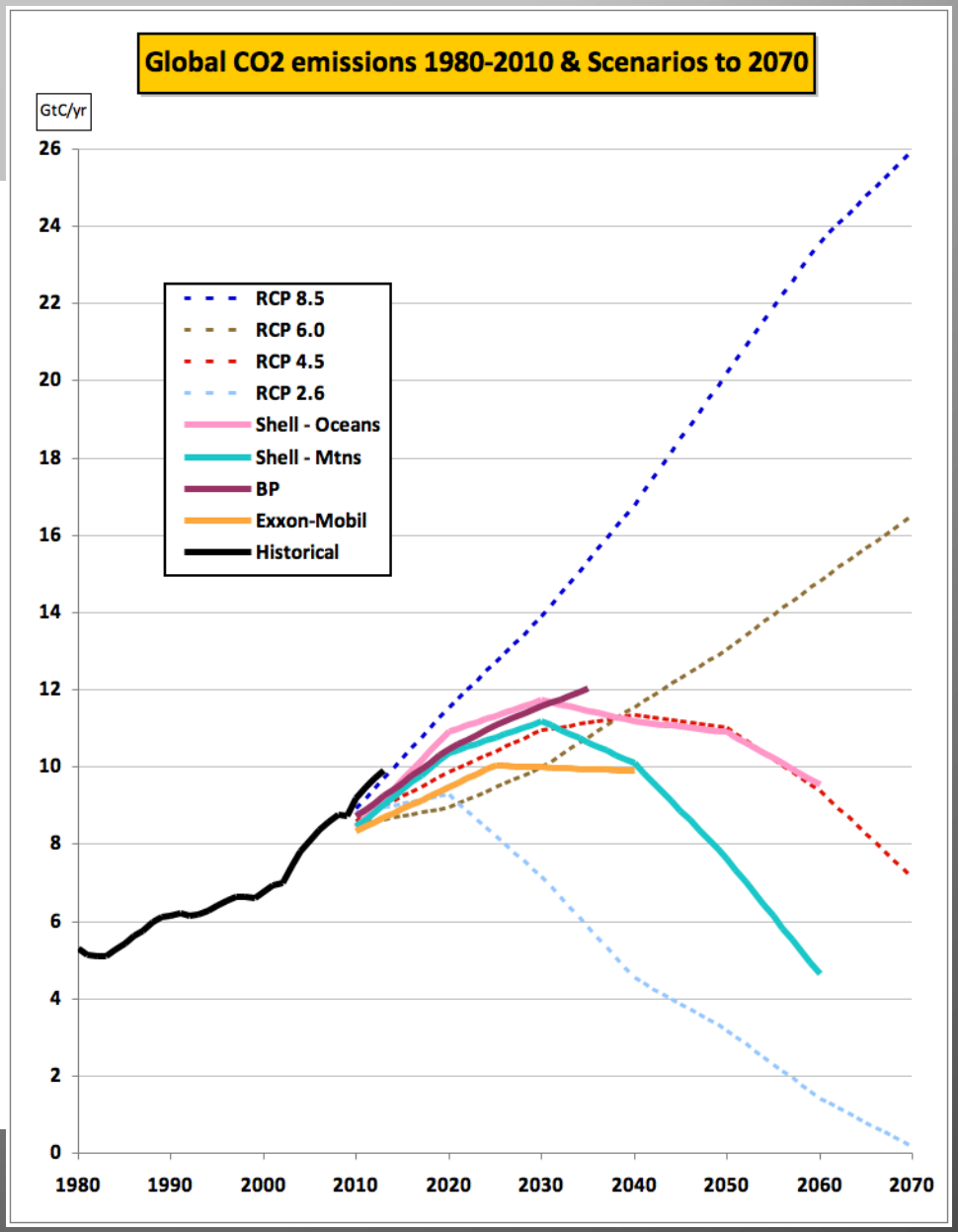
Emissions: Climate Accountability Institute

SLR: Ekwurzel et al. (2017)

Land Loss: CIESIN/Columbia data, calculations by R. Heede

Does it look like success?





Investigations, litigation, and harassment

- Peruvian farmer v. RWE (German lignite producer: 0.47% of global CO_2)
- New York & Mass AG investigation of ExxonMobil for consumer and investor fraud
- Philippines Commission on Human Rights investigation of 40 “Carbon Majors”
- Marin County, San Mateo County, Imperial Beach complaint against 20 major carbon producers re: sea level rise adaptation costs
- City of San Francisco and City of Oakland suit against 5 major oil and gas companies (Shell, BP, Chevron, ExxonMobil, ConocoPhillips) re: SLR
- US House Committee on Science, Space, & Technology investigate and subpoena Climate Accountability Institute & colleagues & funders
- Lamar Smith, SST Chairman, alleges our coordinated attempt to “deprive companies, non-profit organizations, and scientists of their First Amendment rights and ability to fund and conduct scientific research free intimidation and threats of prosecution.” Mr Smith demands our records; we do not comply
- ExxonMobil lawyers follow with subpoena of CAI and other NGOs; case pending in Southern District of New York

Testimonials

“Like the Carbon Majors analysis that it builds on, this report demonstrates the growing precision with which major carbon producers’ responsibility for climate change and climate impacts can be quantified, allocated and, ultimately, litigated”

— Carroll Muffett, Center for International Environmental Law

“Investor-owned companies have long understood the harm of their products, yet carried out a decades-long campaign to sow doubts about those harms in order to ensure fossil fuels would remain central to global energy production. Companies knowingly violated the most basic moral principle of ‘do no harm,’ and now they must remedy the harm they caused.”

— Henry Shue, Oxford University, Politics & International Relations

In closing

"Fossil-fuel companies should be held accountable for the effects of climate change. Legal warfare has a two-fold aim: to overhaul transgressors' business models so that they are in line with the global commitment to phase out fossil fuels and limit temperature rises to 1.5°C; and to get them to pay for damages resulting from global warming. Climate litigation is the inevitable result of a failure of two decades of talks. But it is also an important way of reframing the climate crisis as a human rights emergency."

— *The Guardian* Editorial Board, 10 Sep 2017

Ekwurzel, B., J. Boneham, M. W. Dalton, R. Heede, R. J. Mera, M. R. Allen, & P. C. Frumhoff (2017) The rise in global atmospheric CO_2, surface temperature, and sea level from emissions traced to major carbon producers, *Climatic Change*, vol. 144:579-590

Heede, Richard, & Naomi Oreskes (2016): Potential emissions of CO_2 and methane from proven reserves of fossil fuels, *Global Environmental Change,* vol. 36:12-20.

Frumhoff, P., R. Heede, & N. Oreskes (2015) The climate responsibilities of industrial carbon producers, *Climatic Change*, vol. 132:157-171.

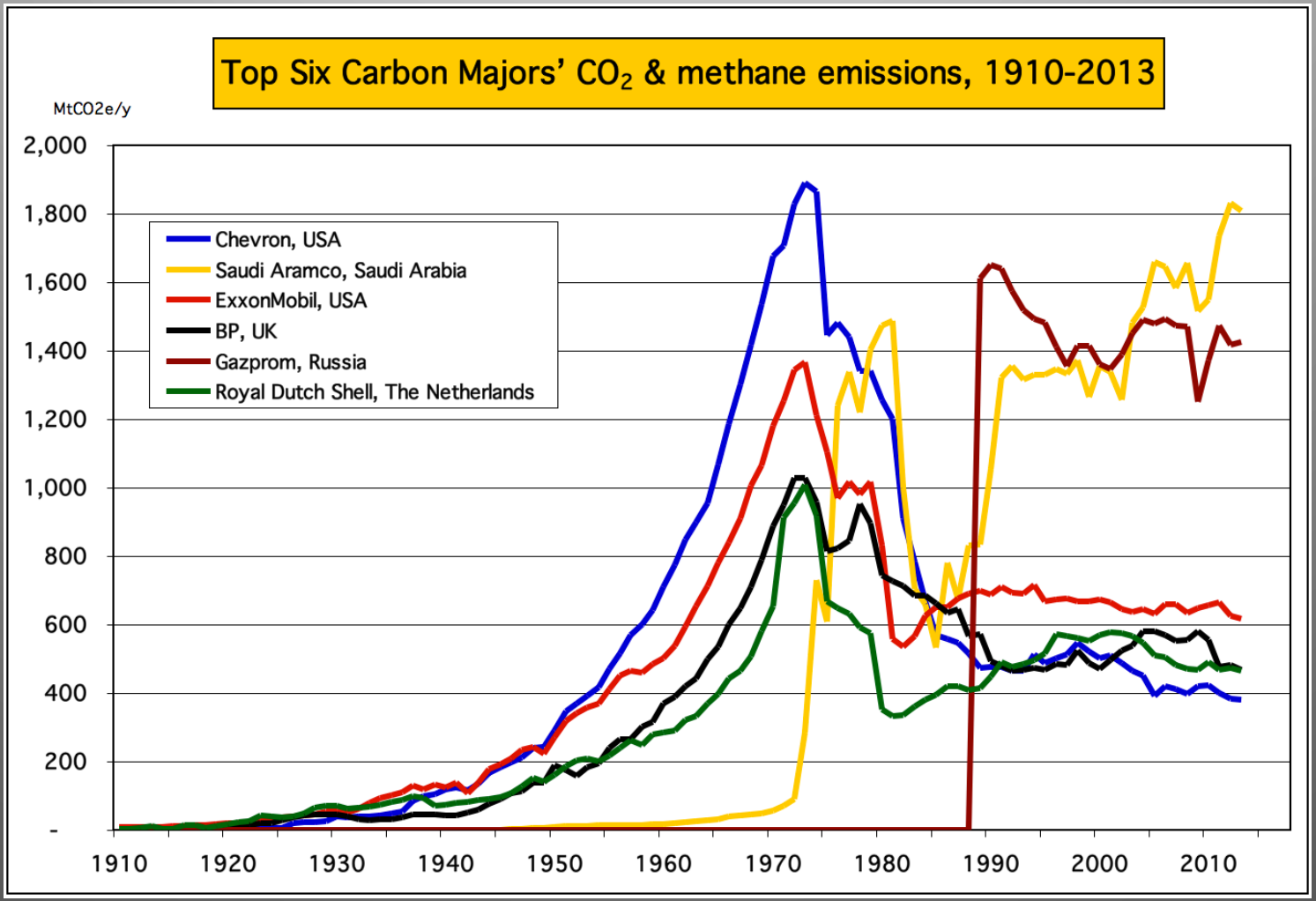
Heede, Richard (2014) Tracing anthropogenic CO_2 and methane emissions to fossil fuel and cement producers 1854-2010, *Climatic Change*, vol. 122(1): 229-241.

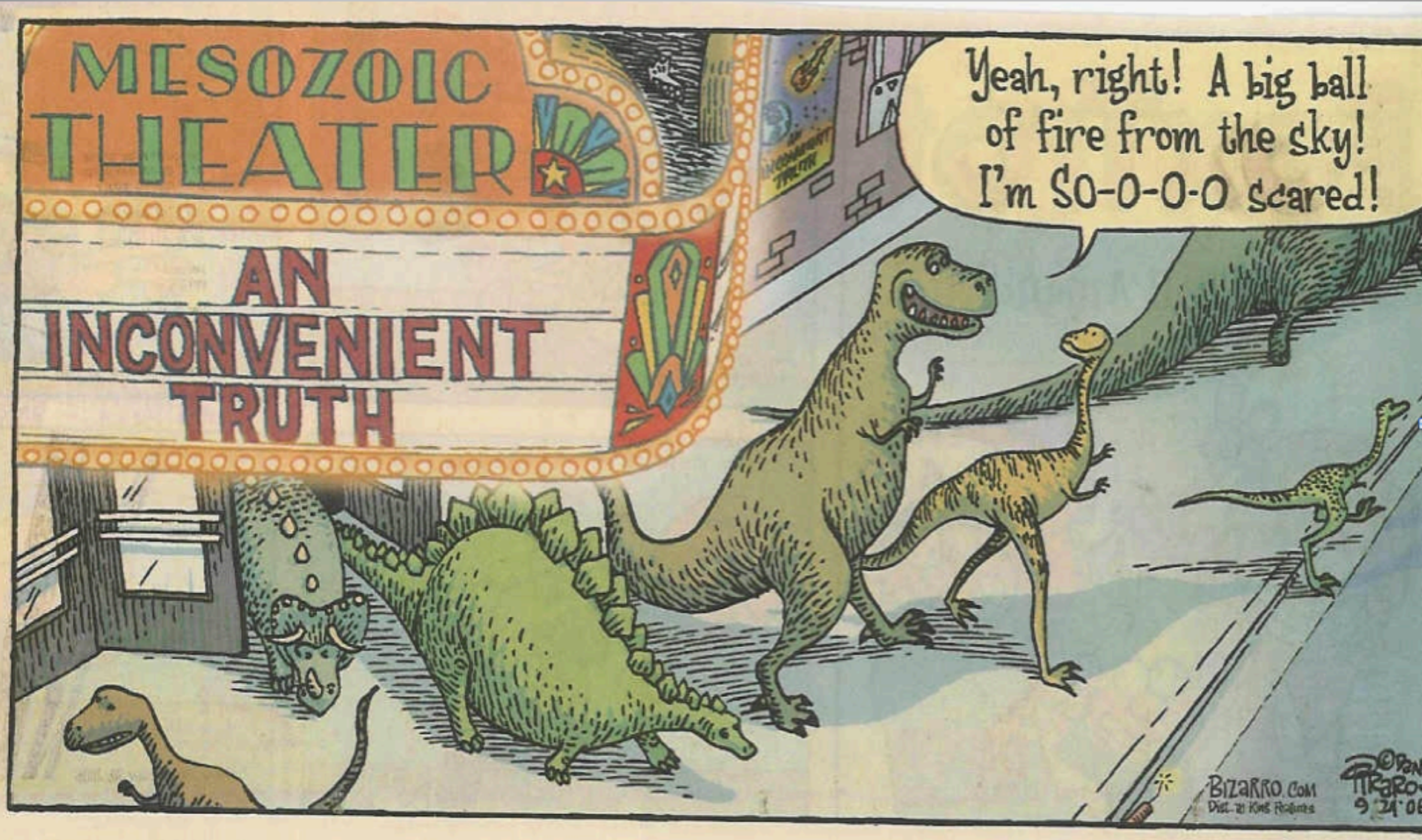
Starr, Douglas (2016) The carbon accountant: Richard Heede pins much of the responsibility for climate change on just 90 companies, others think that's a copout, *Science*, vol. 353:858-861.

CLIMATE ACCOUNTABILITY INSTITUTE

Rick Heede, Director, Climate Accountability Institute
climateaccountability.org; carbonmajors.org;
heede@climateaccountability.org
Snowmass, Colorado
+1-970-343-0707

- Global emissions 1751-2013: 1,443 $GtCO_2$
- Carbon Majors cumulative: 939 $GtCO_2$ (65 %)
- State-owned oil and gas companies gaining on investor-owned




MESOZOIC THEATER
AN INCONVENIENT TRUTH
Yeah, right! A big ball of fire from the sky! I'm SO-O-O-O scared!
BIZARRO.COM

Human actions have increased atmospheric CO_2 from ~280 to 400 ppm

Where did this carbon come from?

Who is responsible?

First, who emitted it? (The normative focus is on emitters and nations)

Congress and industry response: investigation, subpoenas, & harassment

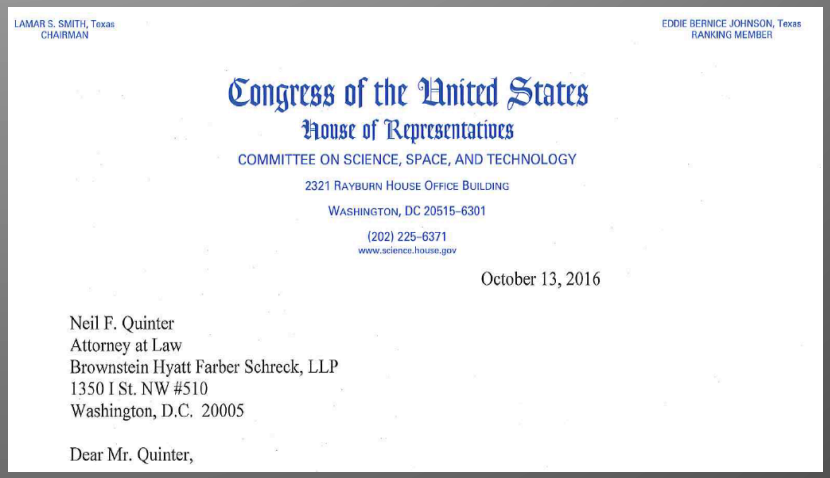
- House Science Committee launched investigation of CAI, UCS, 350.org, Greenpeace, Rockefeller Brothers Fund, climate lawyer Matt Pawa, and others
- Lamar Smith (R-TX, Chairman) issued subpoena for my emails & materials, followed by ExxonMobil subpoena
- Alleged conspiracy to "deprive companies … of their First Amendment rights and ability to … conduct scientific research free from intimidation and threats of prosecution."
- I have refused to comply on the basis of my First Amendment rights of free speech and assembly and the lack of oversight authority
- Attorneys General of New York and Massachusetts are investigating ExxonMobil for investor and consumer fraud
- Philippine Commission on Human Rights are investigating 40 Carbon Majors for human rights violations
- What's next?

Congressional bullying on behalf of Big Oil

Boston Globe - editorial

12 Sep 2016

Rep. Lamar Smith, R-Texas. Charles Dharapak/AP/File 2012



LAMAR S. SMITH, Texas
CHAIRMAN

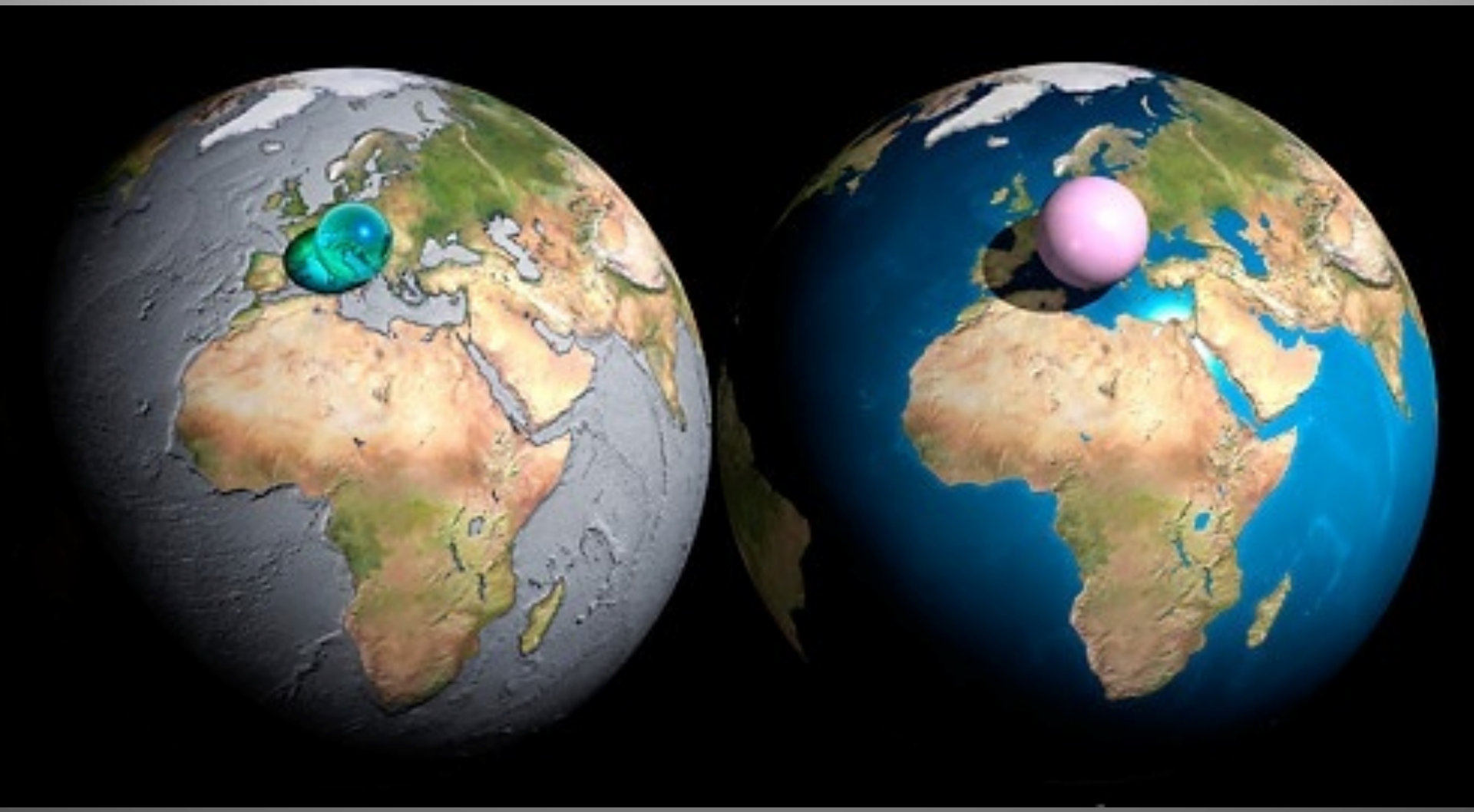
EDDIE BERNICE JOHNSON, Texas
RANKING MEMBER

Congress of the United States
House of Representatives
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
2321 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-6301
(202) 225-6371
www.science.house.gov

October 13, 2016

Neil F. Quinter
Attorney at Law
Brownstein Hyatt Farber Schreck, LLP
1350 I St. NW #510
Washington, D.C. 20005

Dear Mr. Quinter,



Sphere of all water on earth, r = ~700 km

Sphere of atmosphere at Standard Temperature & Pressure