CLIMATE ACCOUNTABILITY INSTITUTE

Press Release — 11 December 2019

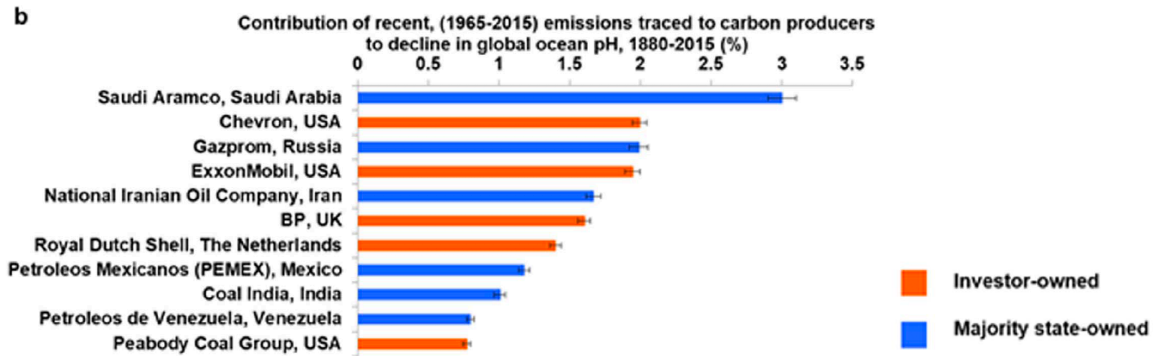
New paper: *Attributing ocean acidification to major carbon producers*

The world's oceans are facing onslaughts from numerous sources, such as nitrogen plumes, micro-plastics, absorption of the preponderance of global warming, shipping pollution, oil spills, overfishing, loss of multiyear arctic ice, acidification, and precipitous decline of coral reefs ("the ocean's nurseries") and fisheries on which millions of people earn a living and provide protein to coastal populations. The chemistry, circulation patterns, heat transport, ecological productivity, even the very volume of world's oceans ($1.3x10^{18}$ m^3) are all changing under human influence. A new paper looks at one of these factors: the acidification of the oceans due to uptake of ~one-quarter of the rising anthropogenic atmospheric carbon dioxide, and traces responsibility for acidification and its regional impact on vulnerable fisheries and shellfisheries to the major producers of oil, natural gas, and coal.

The new analysis uses an energy balance carbon-cycle model to attribute the proportional acidification from the operational and product-related carbon dioxide emissions of the largest 88 oil, natural gas, and coal companies to 2015. This study extends the analysis published in 2017 that attributed the rise in atmospheric CO_2, temperature, and sea level rise to the major carbon producers.[1]

Climate Accountability Institute — in collaboration with Union of Concerned Scientists, Woods Hole Oceanographic Institution, University of Virginia, and the Ocean Conservancy — is releasing a peer-reviewed study that models acidification of the world's oceans from the emissions traced to the largest fossil fuel companies and their products over two periods of time: from 1880 to 2015 and 1965 to 2015.

The results are stunning. More than half of the observed decline in surface ocean pH can be traced to these companies' emissions and products. The twenty largest companies contributed one-fifth of the rise in acidity since 1965, as shown below. The study also analyzed potential loss and damage in regional fisheries with a high risk of damage to productive fisheries, such as the Coral Triangle in the western Pacific, the Gulf of Alaska, the California Current, and the Peru Current.



Recent (1965-2015) contributions to OA by top eleven major carbon producers. See paper for further details.

"We've known for decades that burning fossil fuels is by far the largest driver of ocean acidification, but we weren't able to track how much any one fossil fuel company contributed to the problem, and in what way," said Rachel Licker, lead author and senior climate scientist at the Union of Concerned Scientists. "Scientists can now quantify how much each fossil fuel company's products have caused the oceans to become warmer and more acidic."

"It is increasingly clear that major producers of crude oil, natural gas, and coal have major impacts on the earth's climate with their gigatonne-range operational and product-related emissions of CO_2 and methane. This paper advances our scientific understanding of how the emissions attributed to the

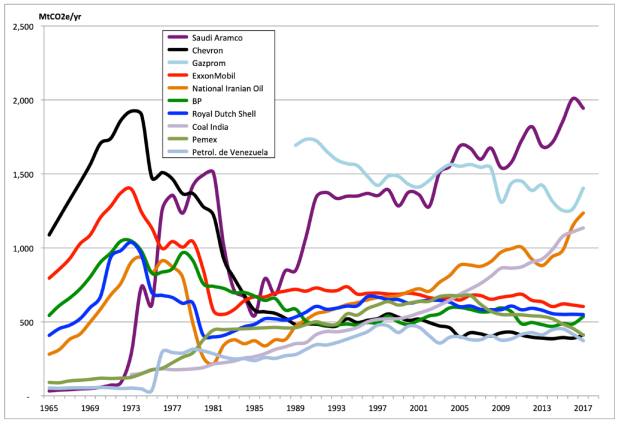
[1] Ekwurzel, B., J. Boneham, M. W. Dalton, R. Heede, R. J. Mera, M. R. Allen, & P. C. Frumhoff (2017) The rise in global atmospheric CO_2, surface temperature, and sea level from emissions traced to major carbon producers, *Climatic Change*, vol. 144:579-590.

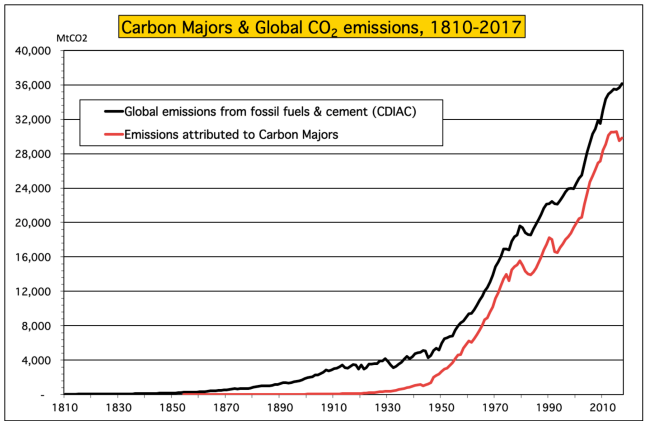
Richard Heede *heede@climateaccountability.org* | *Climate Accountability Institute* *www.climateaccountability.org* | *1626 Gateway Road, Snowmass, Colorado, 81654, USA 970-343-0707*

leading fossil fuel companies have deleterious impacts on the crucial web of life of the world's oceans," said study co-author Richard Heede, director of Climate Accountability Institute.

The authors used a dataset published by Climate Accountability Institute and adapted the methodology from a 2017 study, which for the first time linked global climate impacts — global temperature increase and sea level rise — to product-related emissions of specific fossil fuel producers.

"As impacts worsen and become more costly, frontline communities and affected industries are now calling on fossil fuel companies to take responsibility for their outsized contribution to the problem," said Peter Frumhoff, report co-author and director of science and policy at UCS.





Left: Top Ten oil, gas, & coal emissions (scope 1 & 3). Right: Carbon Majors & Global CO_2 1810-2017. Graphics: R. Heede.

Key findings:

- Emissions traced to 88 major carbon producers contributed to over half of the observed increase in ocean acidification since 1880 (~56 percent) and 1965 (~51 percent);
- More than one-fifth (~23 percent) of that increased acidity since 1965 could be traced to just 20 largest investor-owned and majority state-owned companies, including BP, Chevron, ExxonMobil, and Shell;
- Regions that face disproportionately high risk of damage from ocean acidification include the Coral Triangle, Bering Sea and Gulf of Alaska, Peru Current, Arctic, and California Current;
- Increasing ocean acidification of the California Current further stresses fisheries along the U.S. West Coast that provide more than 43,000 jobs that are already being impacted by warming ocean waters.;
- Similarly, ocean acidification of the Gulf of Alaska further stresses fisheries in the region that provide more than 53,000 jobs that are already being impacted by warming ocean waters;
- In the Coral Triangle, which includes Indonesia, Malaysia, Philippines, Papua New Guinea, Solomon Islands and Timor Leste, increasing acidification further stresses fisheries that provide 4.3 million jobs;
- In the Peru Current, increasing acidification further stresses fisheries in Chile that provide 90,000 jobs.

Respectfully,

Director, Climate Accountability Institute.

About Climate Accountability Institute

CAI is an independent research institute focusing on anthropogenic climate change, dangerous interference with the climate system, tracing emissions of carbon dioxide to oil, gas, and coal companies' production of carbon fuels, modelling the rise in temperature and sea level rise, risk reduction strategies, and disclosure requirements regarding GHG emissions. CAI gratefully acknowledges financial support from Union of Concerned Scientists, Wallace Global Fund, and Rockefeller Brothers Fund. www.climateaccountability.org

Richard Heede
heede@climateaccountability.org
Climate Accountability Institute
www.climateaccountability.org
1626 Gateway Road, Snowmass, Colorado, 81654, USA 970-343-0707