

HONR 229L: Climate Change: Science, Economics, and Governance

Discussion #7: Business and the Environment

Ross Salawitch

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Class Web Site: <http://www.atmos.umd.edu/~rjs/class/honr229L>

ELMS Page: <https://myelms.umd.edu/courses/1269254>



24 September 2019

Learning Enrichment Event

Event: [Carbontech on the Hill](#)

Date: Thurs, September 26 Time: 4:30 to 7:30 pm

Location: U.S. Capitol Visitor Center, First St NE, HVC 201, Washington, DC 20515

Speakers: Dr. Marcius Extavour, Carbon XPRIZE, Roxanne Brown, United Steelworkers, and John Litynski, U.S. Department of Energy

Website: <https://www.eventbrite.com/e/carbontech-on-the-hill-registration-70805843183?aff=ebdssbdestsearch>

All non-congressional attendees must be registered.

Third Way, Carbon180, and XPRIZE are excited to host the second annual “Carbontech on the Hill” event, which brings together carbontech innovators from across the country to share their work and progress toward building a new carbon economy.

From jet fuel to plastics and building materials, the carbontech sector is turning the carbon equation on its head; helping to create a world where we remove more carbon than we emit. Not only is the carbontech sector good for climate, it can create and preserve high-paying jobs and secure U.S. leadership in lucrative new industries.

Please join us for a briefing where we’ll explore the tremendous opportunity for carbontech in the United States, and what it could mean for American businesses, workers, and climate efforts.

Sponsors: [Third Way](#), [Carbon180](#), and [XPRIZE](#)

<https://www.thirdway.org/about>

<https://carbon180.org>

<https://www.xprize.org/prizes/carbon>

We'll leave 3:25 pm sharp in front of the Atlantic Bldg, then take campus shuttle to College Park Green Line Station. Welcome to join us 3:25 pm or meet at room venue at 4:30 pm.

Not obligated to stay entire time; welcome to leave whenever you'd like.

If you plan on attending, please register. How many have registered?

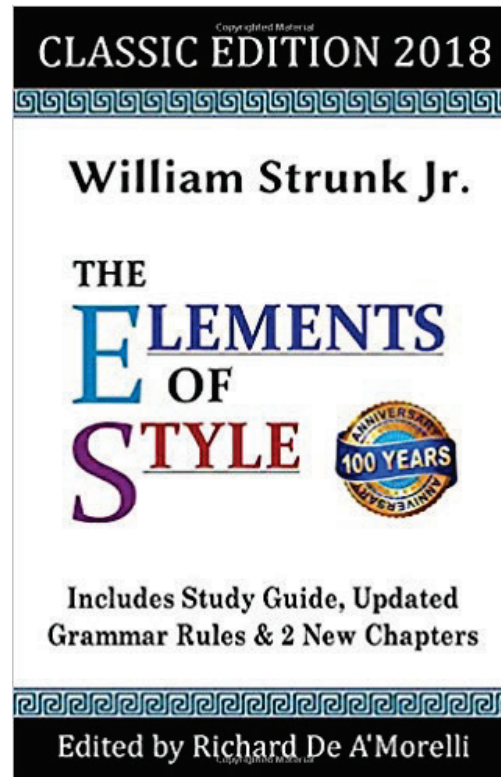
First Paper

- First Paper (**25 %** of final grade)
 - due **14 Nov** **BUT** can be completed well before due date!
 - 5 to 8 pages single spaced; must include references & can include figures, both of which are excluded from the page count
 - expands upon the topic of any class meeting, *other than* class meeting you have or will lead, or explores some other topic related to class
- Various stages for first paper:
 - Thurs, 19 Sept: **description** of paper due
 - <https://myelms.umd.edu/courses/1269254/quizzes/1287072>
 - **While you may change topic after completion of the paper description, please speak with Ross if you intend to change topic**
- **Modest** amount of *independent research* outside of the required readings rather than a summary of the required readings
 - Paper should include citations: can consult <http://lib.guides.umd.edu/citationtools> for info on various citation managers
 - Websites can be cited by either placing URL into reference list with an appropriate descriptive label: i.e. EPA, 2016: <https://www.epa.gov/criteria-air-pollutants/naaqs-table> or by using footnotes
 - Primary sources should be articles in magazines such as *Scientific American* or *Natural Geographic*, journal articles, government reports, or book chapters

First Paper: Early Submission

- If your paper is submitted by **Fri, 1 Nov**, you will be **guaranteed** to get instructor feedback prior to the final deadline on **Thurs, 14 Nov**
- Please submit via email of attached Word file, using subject “HONR 229L: Paper Draft”

Great resource:



https://www.amazon.com/Elements-Style-Classic-Editors-Chapters/dp/1643990004/ref=pd_lpo_sbs_14_t_1

HONR 229L: Climate Change: Science, Economics, and Governance

Hi Everyone,

I'm writing to relate a few matters with regards to HONR 229L.

I've completed and initial pass of your Paper Descriptions (PD). If I think all elements of your PD are satisfactory, you will see a grade of 1 (1 extra bonus point) plus of course some feedback in the comments section. If there is a request for more information, I've entered a comment detailing the additional specific info that is being requested, along with a grade of 0. If you received a grade of 0, I ask that you either send me a message via ELMS *or* email me once your PD has been modified, so that I can review and, if the new info seems satisfactory, your place holder grade of 0 will be changed to 1.0. Please note the use of 0 and 1 is a super convenient way for me to track within ELMS those PDs that I feel require more info,

For the paper assignment, you are being asked to conduct a modest level of independent research on a topic of interest, telling a story that is based on material **external to the class**. If you need help finding source material, please ask: I'll gladly help. FYI, about half of the PDs have received a request for more info. For the paper, the expectation is that that there will approximately half a dozen sources of information (i.e., references) and that about half or more of these will be scholarly papers (i.e, a journal article). The websites Google Scholar <https://scholar.google.com> and Web of Knowledge <http://apps.webofknowledge.com> are great resources for assembling a set of source material.

For Thursday we will switch gears, using a reading from the famous IPCC (Intergovernmental Panel on Climate Change) that is their attempt to explain the science of climate change to a lay audience. For Thursday, I ask that you have a look at the AT questions before starting the reading, so you can focus on being able to glean from this reading the topics I have chosen for this AT. Some will have an easier time than others in digesting this reading in its entirety. Try to get as much out of this reading as seems possible, given your background. I'll be working with Anne on a discussion for Thurs that goes beyond the ATs, but stops short of covering every aspect of the reading. Also, I have provided an ungraded last AT entry, in which you can write a question related to something in the reading you did not understand, that you'd like me to explain during the last word on Thurs. I'll do my best to address anything submitted by 11:00 am on Thurs (need a few hrs to prepare!).

We'll follow up with two more climate focused readings the week after next: one from an introductory text book on climate change (again, some will have an easier time digesting than others) and a chapter from the Nate Silver's book Signal and Noise, which was the first year book the first time this class was taught:

<https://umdrighnow.umd.edu/news/umd-selects-silvers-signal-and-noise-first-year-book>

I think the Silver reading will be accessible to all. Need to use our psswr of **ATL3408** to open these readings.

Cheers,

Ross

Search entries or author

Filter replies by unread

Show deleted replies

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AT 6, Q 1:

What are the four “road map of factors contributing to failures of group decision making” outlined at the start of Chapter 14?

- 1) A group's failure to anticipate a problem before it arrives**
- 2) A group's failure to perceive the problem when it arrives**
- 3) A group's failure to attempt to solve the problem at hand**
- 4) A group's unsuccessful attempt to solve the problem at hand**

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AT 6, Q 2: Provide an example of a society's **failure to provide** a solution of a vexing problem drawn either from your own experience or else from an example given in a chapter of Diamond's book that has not been assigned. Stat **key factor** essential for the society to not be able to overcome the problem.

- **Gun violence afflicting the United States x 3**
- **Flint water crisis x 2**
- **Chernobyl nuclear disaster in Ukraine**
- **Deforestation and abandonment of farmland in Cameroon**
- **Downfall of Pitcairn and Henderson: Chapter 3 of Collapse**
- **Immigration at the US border :: polarization of society :: inhumane treatment of fellow humans**
- **Britain and France failure to act as Germany broke the Treaty of Versailles**
- **Poverty and the unequal distribution of wealth**
- **War on drugs: uneven amount of socioeconomically and racially biased arrests**

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 - the sheer complexity of this multifaceted issue and the fecklessness of our infamously partisan, dysfunctional, squabbling government make me skeptical that this problem will be ameliorated anytime soon.**
- **Carbon dioxide emissions; largely due to the fact that the U.S. is a capitalist economy**

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AT 6, Q 3:

Provide a real world example of the **rational behavior** on the part of one group that has translated into a disastrous situation for society

- **Animal factory farms mass produce a product with little regard on the environmental impacts like air pollution and water pollution that affects the larger population**
- **Ancient Chinese history is full of court intrigue and scheming groups of officials trying to grab more power for themselves**
- **Stockholders' decisions to pull their money out of the market in 1929**
- **Proliferation of nuclear arms, following development of this weaponry by the US**
- **Use of fertilizers by farmers to increase their crop yield, at the expense of fertilizer run-off causing eutrophication that can have severe effects on water habitats and other food sources**
- **Nestle giving away free samples of baby formula to new mothers in third world countries, leading to dependency on this product**

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- **Nestle giving away free samples of baby formula to new mothers in third world countries, leading to dependency on this product**
- **Cheap clothing made of non-biodegradable materials; when clothes ends up in landfills, microplastics emerge into the water supply**
- **Use of oxybenzone and other synthetic chemicals in sunscreens used by tourists and locals to protect their skin from harmful UV rays: these chemicals accumulate and harm other organisms, such as coral reefs and dolphins.**

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AT 6, Q 3:

Provide a real world example of the **tragedy of the commons**

- **Collapse of the Atlantic northwest cod fishery.** Fishing companies acted for their own self-interest in order to make the highest profit, and completely depleted the population.
- **Catching lobster in Maine.** The fishermen know that the lobster population is dwindling; however, they know that if they do not catch and sell the lobster, someone else will. Therefore, no one is motivated to preserve the lobster population.
- **Buying products from companies who use inhumane cheap labor or even child-slaves abroad to make their products.** These companies such as Nike, Adidas, and Nestle, create cheap products this way and so more people buy the products.
- **Car traffic**
- **Production of fossil fuels**
- **UMD PSYC 100 <https://www.youtube.com/watch?v=CHL3fwtdh7Y>**

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- **Wasting of food at campus diners**

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- **Wasting of food at campus diners**
- **Human activities collectively degrading the atmosphere**

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AT 6, Q 4:

Provide an example of a society's **successful solution** of a vexing problem drawn either from your own experience (i.e., please use an example from outside ant of the assigned readings) or else from something stated in a chapter of Diamond's book that has not been assigned, and state the **key decision** that was essential for the society to overcome the problem.

- **Leaded gasoline**
- **Government realized that the lobster population could not survive if current trends continued**
- **Increase in the number of water fountains around our campus has encouraged people to use reusable water bottles instead of single-use, plastic water bottles**
- **Improvement of workplace conditions following unionization**
- **Inca empire: reforestation of land to prevent soil erosion**
- **Modern Costa Rica: reforestation of vast tracts of once deforested land**
- **Dominican Republic: managing deforestation and water supply**
- **Banning of assault weapons and implementation of a national gun buyback program in Australia**
- **Harry Truman's effort to promote vaccines, which led to eradication of polio**
- **Barry Marshall's demonstration that stomach ulcers could be cured by antibiotics, based upon lab work on ummm ... himself!**
- **Martin Luther King Jr.'s non-violent protests that brought about significant political change**
- **Introduction of the Chinese wasp in the US, to combat the Brown Marmorated stink bug**
- **Fall of the USSR to address starvation and social disparities of a large, disparate population**
- **Women's right to vote :: addition of Title IX to the 14th Amendment**
- **FDR's New Deal to lift America out of the Great Depression x 2**

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- **Ozone depletion and how multiple countries decided together to stop using CFCs in spray cans which was later followed by the Montreal Protocol x 3**

Business and the Environment

Eric Festa

9/24/2019





Country?

Country?

Salawati
Rawas

Lake Kutubu

Salawati Oil Field

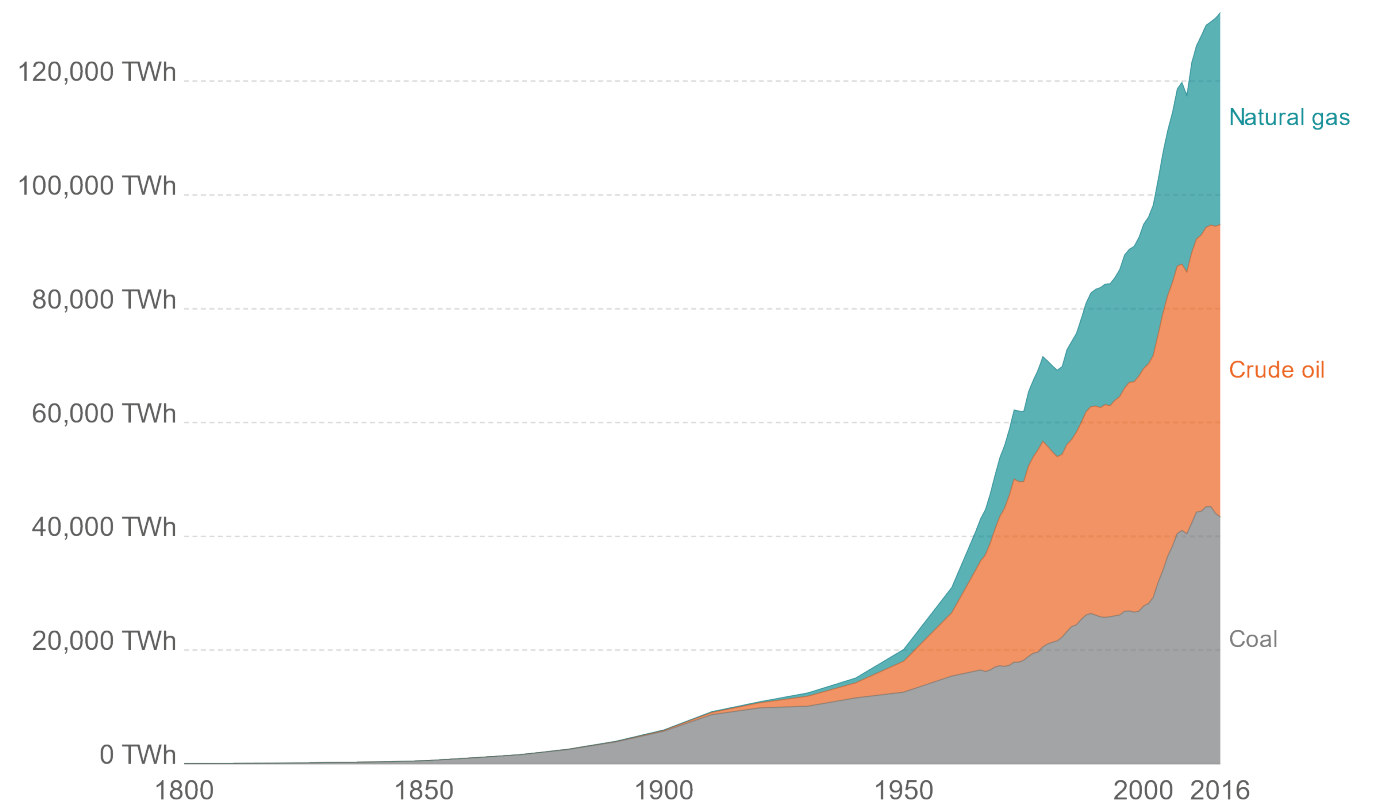


- Heavily deforested for access roads
- Numerous oil spills
- Fruit pigeon hunting
- Natural gas burning: *Wasted opportunity?*

Global fossil fuel consumption

Global primary energy consumption by fossil fuel source, measured in terawatt-hours (TWh).

OurWorld
in Data



Source: Vaclav Smil (2017). Energy Transitions: Global and National Perspective & BP Statistical Review of World Energy
OurWorldInData.org/fossil-fuels/ • CC BY-SA

<https://ourworldindata.org/fossil-fuels>



Kutubu Oil Field

- Few access roads
- Chevron -WWF partnership
- Forest management and protection
- Traveler regulations
- More difficult environment



Motivation



Preventing
environmental & PR
disasters

Pictured: Exxon Valdez (1989)

<https://www.hakaimagazine.com/news/wounded-wilderness-the-exxon-valdez-oil-spill-30-years-later/>



Bottom - up
pressure from area
natives

What about Salawati?

<https://reliefweb.int/report/papua-new-guinea/el-nino-affects-million-people-png-highlands>



Cost of countries'
increasing
environmental
standards

<https://www.latimes.com/business/story/2019-08-07/money-market-funds-wont-keep-you-safe-from-negative-yields>

Bougainville Island



Source: Google Maps

An autonomous region of
Papua New Guinea

- **Population:** ~250,000
(2011)

Bougainville Island

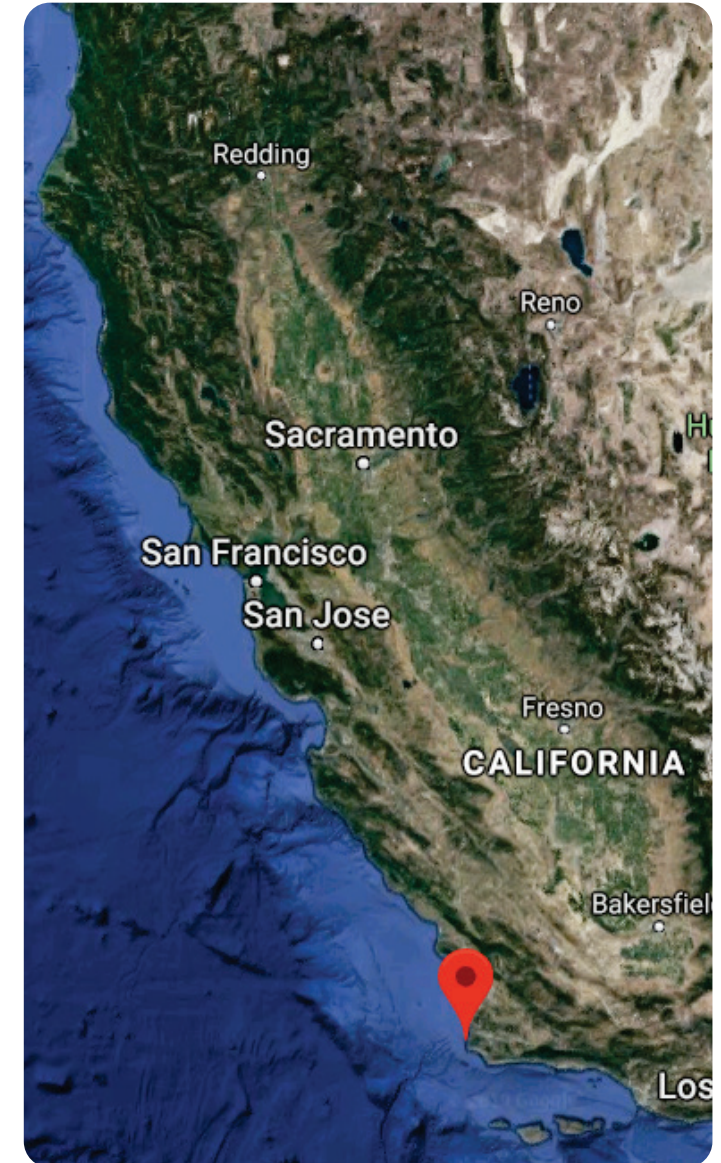
- Home to the Panguna copper mine, opened in 1972
- Mine caused environmental damage and deepened socioeconomic rifts among locals
- Shut down in 1989, sparked civil war (ended in ceasefire, 1998)
 - Current leadership supports Panguna's reopening
- Independence referendum to be held in November
 - “Do you agree for Bougainville to have: (1) Greater Autonomy (2) Independence?”
 - <http://bougainville-referendum.org/>



<https://www.abc.net.au/news/2017-05-04/bougainville-mine-moves-to-reopen-government-backing/8495496>

Point Arguello

- Just off the coast of California
- Oil discovered by Chevron in 1981
- Residents wary of an oil spill like one in Santa Barbara in 1969
- Became too expensive as oil prices dropped in the 1980s
- Chevron exited in the late 1990s
- Kutubu field (1992) gave Chevron the chance to prove itself environmentally
 - Later won contract with Norway (\$\$\$)



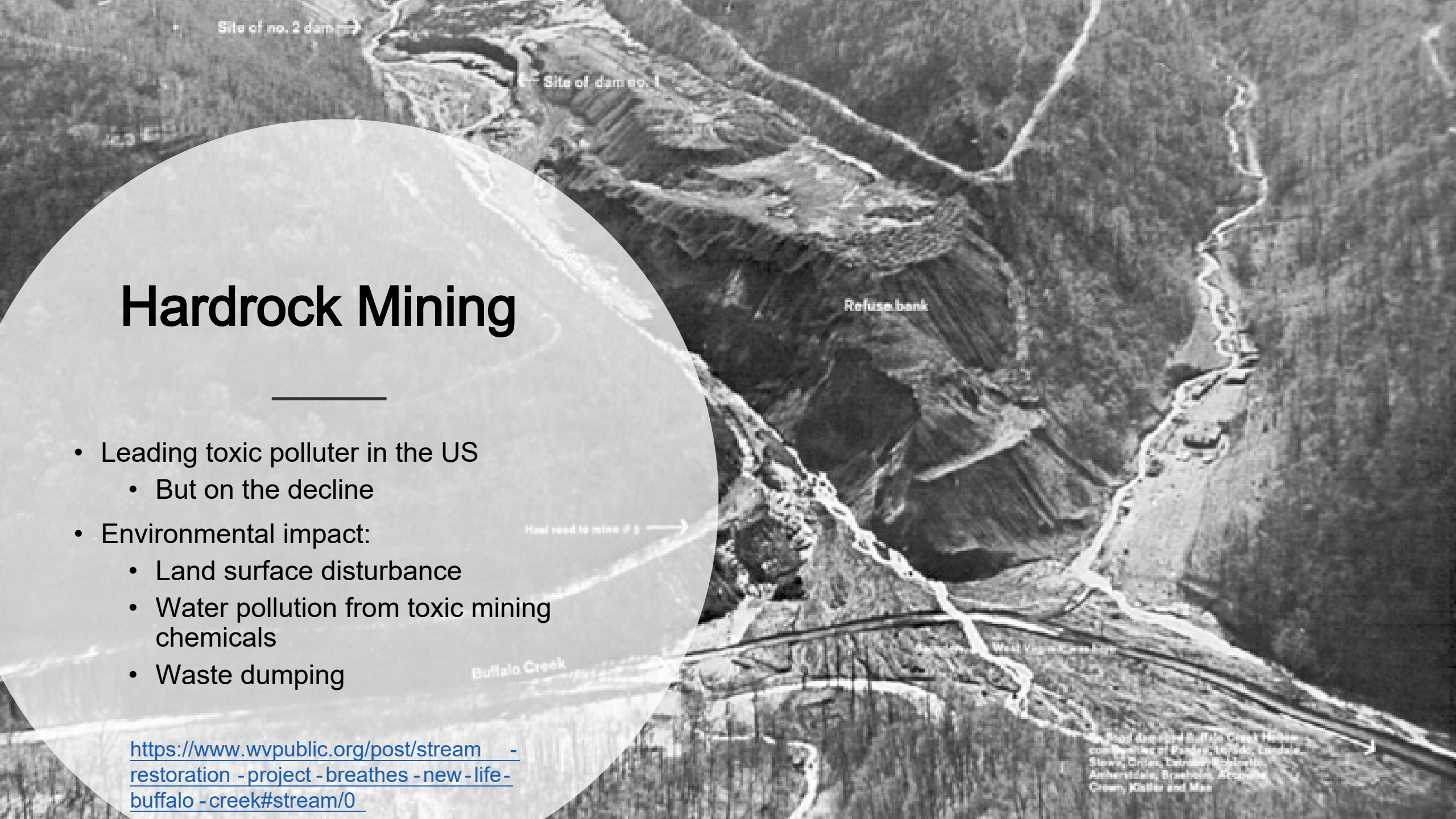
More on Chevron

- “...the court found that Chevron [and subsidiary Texaco] deliberately dumped billions of gallons of toxic oil waste [in Ecuador]. The waste was dumped in the Amazon rainforest on indigenous lands.”
 - \$9.5 billion fine handed down last year
- “We’ve had our cows die... They drank the water where the oil had spilled. Back then, that whole area was full of crude oil. The water there was filthy. They came and stopped the leak and they just left all of the crude oil there. It’s pure crude there. In the middle, it’s a thick ooze and you’d sink right down into it.”

Hardrock Mining

- Leading toxic polluter in the US
 - But on the decline
- Environmental impact:
 - Land surface disturbance
 - Water pollution from toxic mining chemicals
 - Waste dumping

<https://www.wvpublic.org/post/stream-restoration-project-breathes-new-life-buffalo-creek#stream/0>



Buffalo Creek Damaged Buffalo Creek River
contaminated by lead, cadmium, barium,
silver, chromium, cyanide, selenium,
ammonia, brass, zinc, arsenic,
chromium, nickel and manganese

Motivation



Significantly higher
and more lengthy
cleanup costs

<https://www.denverpost.com/2015/10/22/review-gold-king-mine-spill-was-preventable-disaster-potential-not-understood/>



Industry pressure to
keep prices low

<https://www.mrw.co.uk/knowledge-centre/material-focus-precious-metals/10029978.article>

Which metal is used in everything from batteries in electronic devices and vehicles to gasoline refinement to pressure -resistant materials in airplanes?



What is
this
country?

Cobalt & Consumer Technology



Democratic Republic of the Congo

60%

Global cobalt production

Used for:

- Batteries in electronic devices and vehicles
- Gasoline refinement
- Pressure-resistant material (e.g. airplanes)

US Response

- DRC has production issues such as child labor and political instability
 - US is the largest consumer of cobalt
 - Inactive Blackbird mine (Idaho) has over 3.8 million tons of waste rock
- **2012:** First US cobalt mine in 30 years opens in Idaho
 - Partially in response to predicted cobalt shortage
- **2018:** Mine set to meet targets
- **2019:** Scaling back production due to high supply from overseas

Logging

- Diamond: Deforestation destroys value of forests
 - Recreation
 - Carbon filter
 - Greater rainfall
 - 50-80% of the world's terrestrial plant and animal species
- Aloysius' story – industry silences opponents and bribes governments
- Forest Stewardship Council (1993)



- FSC-labeled plywood outsold unlabeled plywood of the same price by at least **19%**
- **37%** bought labeled plywood when it cost **2%** more
- Proves public's environmental awareness/power of the purse
 - Also pressured by the Rainforest Action Network



Your Thoughts

a // What was the company you chose?

b // What is this company doing to help the environment?

c // Do you think this company's actions are meaningful for helping the environment?

Slide 2 Images

- <https://www.bloomberg.com/news/articles/2017-03-06/u-s-oil-industry-becomes-refiner-to-the-world-as-exports-boom>
- <https://112.international/society/law-on-enhanced-accountability-for-illegal-logging-timber-export-comes-into-force-in-ukraine-35566.html>
- <https://whatisnewinecomaterials.wordpress.com/tag/the-hardrock-mining-reform-and-reclamation-act-of-2015/>

Data & Image Sources

- <https://ourworldindata.org/fossil-fuels>
- <https://reliefweb.int/report/papua-new-guinea/el-nino-affects-million-people-png-highlands>
- https://en.wikipedia.org/wiki/Autonomous_Region_of_Bougainville
- <https://www.abc.net.au/news/2017-05-04/bougainville-mine-moves-to-reopen-government-backing/8495496>
- https://en.wikipedia.org/wiki/Panguna_mine
- <https://www.usnews.com/news/best-countries/articles/2019-07-01/bougainville-independence-vote-will-ripple-across-pacific>
- <https://www.latimes.com/archives/la-xpm-1991-06-18-fi-1089-story.html>
- <https://www.geoexpro.com/articles/2015/06/png-lands-on-the-petroleum-map>
- <https://www.mrw.co.uk/knowledge-centre/material-focus-precious-metals/10029978.article>
- <https://www.denverpost.com/2015/10/22/review-gold-king-mine-spill-was-preventable-disaster-potential-not-understood/>
- <https://www.ostermanconsult.com/services/surface-hard-rock-mining/>
- <https://www.abc.net.au/news/2017-05-08/tasmanian-logging-family-tells-their-life-story/8505742>
- <https://www.technologyreview.com/s/425273/high-tech-demand-sparks-return-of-cobalt-mines/>
- <https://investingnews.com/daily/resource-investing/battery-metals-investing/cobalt-investing/top-cobalt-producing-countries-congo-china-canada-russia-australia/>
- <https://www.streetwisereports.com/article/2018/05/29/the-only-us-based-primary-cobalt-mine-is-nearing-production.html>
- https://www.postregister.com/messenger/news/idaho-cobalt-project-scales-back/article_20e1a63c-73fe-58ac-9927-6ff8e2ee373f.html

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Last Word: Business and the Environment

Ross Salawitch

Further Information: Rare Earth Metals

Nearly every item with an on-off switch contains rare earths.

From 1940 to 1990, the United States produced and mined its own rare earths. One huge mine in southern California, called Mountain Pass, was the biggest resource in the U.S. The invention of the color TV in the mid-1960s, which required the rare earth europium to produce the color red, put Mountain Pass on the map. Up until the late 1980s, the mine was the world's biggest supplier of rare earths.

But cell phones aren't the only products affected by the monopoly. They are found in electric cars, wind turbines, solar cells, and batteries—key components of a future powered by alternative energy. Demand for rare earths is high and certain to grow in the coming decades. A hybrid Toyota Prius, for example, uses nearly 20 pounds of rare earths in its battery alone. There are more than 2 million Priuses on the road, and it's just one of many hybrid and electric vehicles being sold today. A restricted supply of rare earths could thwart efforts to wean ourselves off oil.

<http://www.pbs.org/wgbh/nova/next/physics/rare-earth-elements-in-cell-phones/>

Further Information: Rare Earth Metals

It wouldn't last. Mountain Pass was shut down in 2002, having been knocked out by a one-two punch of environmental violations and globalized markets. One of the dirty little secrets about rare-earth mining is that a major by-product is radioactive waste in the form of thorium. As early as 1985, ground-water samples showed the tailing ponds were leaking. By the late 1990s, Mountain Pass had leaked 300,000 gallons on seven separate occasions, spoiling the surrounding desert, which is habitat for the endangered desert tortoise. But the real knockout blow came from China, which has its own substantial deposits. It also had cheap labor, so it could mine the minerals at lower prices. Deng Xiaoping, an influential politician in China, recognized the importance of rare earths in 1992, when he said, "The Middle East has oil, but China has rare earths." Production in China grew rapidly between 1990-2000, from 16,000 to 73,000 metric tons, an increase of 450%. Meanwhile, production in other countries dropped by 60%.

<http://www.pbs.org/wgbh/nova/next/physics/rare-earth-elements-in-cell-phones/>

Can learn more at <http://www.pbs.org/wgbh/nova/physics/hunting-elements.html>

Where do you think this photo was taken?



Colorado EPA Spill: 'The Magnitude Of It, You Can't Even Describe It'

POSTED 9:28 AM, AUGUST 10, 2015, BY CNN WIRE

DURANGO, Colorado (CNN)-

The city of Durango and La Plata County, Colorado, have declared a state of emergency after a federal cleanup crew accidentally released mine waste into the water.



A federal cleanup crew accidentally caused a big, and potentially hazardous, mess in Colorado, according to the Environmental Protection Agency. (Credit: Ian Lucier)

An estimated 1 million gallons of waste water spilled out of an abandoned mine area in the southern part of the state last week, turning the Animas River orange and prompting the Environmental Protection Agency to tell locals to avoid it.

"This action has been taken due to the serious nature of the incident and to convey the grave concerns that local elected officials have to ensure that all appropriate levels of state and federal resources are brought to bear to assist our community not only in actively managing this tragic incident but also to recover from it," said La Plata County Manager Joe Kerby.

According to the EPA, the spill occurred when one of its teams was using heavy equipment to enter the Gold King Mine, a suspended mine near Durango. Instead of entering the mine and beginning the process of pumping and treating the contaminated

water inside as planned, the team accidentally caused it to flow into the nearby Animas River. Before the spill, water carrying "metals pollution" was flowing into a holding area outside the mine.

Colorado Parks and Wildlife officials have been watching for any effects on wildlife since the incident began on Wednesday. They are optimistic that the effects of the spill on terrestrial wildlife will be minimal, the EPA said. Fish are more sensitive to changes in water.

Officials said they believe the spill carried heavy metals, mainly iron, zinc and copper, from the mine into a creek that feeds into the Animas River. From there, the orange water plugged steadily along through the small stretch of winding river in southern Colorado and across the state border to New Mexico where the Animas meets the San Juan River.

<http://fox40.com/2015/08/10/colorado-epa-spill-the-magnitude-of-it-you-cant-even-describe-it/>
https://en.wikipedia.org/wiki/2015_Gold_King_Mine_waste_water_spill

August 2018:

Exxon Mobil and Chevron will join global energy giants in climate initiative, reversing position

Tom DiChristopher | @tdichristopher

Published 9:49 AM ET Thu, 20 Sept 2018 | Updated 2:26 PM ET Thu, 20 Sept 2018

- Exxon Mobil, Chevron and Occidental Petroleum will become the first U.S. energy companies to join the Oil and Gas Climate Initiative.
- Members pledge to cut emissions and boost energy efficiency and contribute to a \$1 billion fund to support clean tech and business models.
- The initiative was launched in 2014 and currently has 10 members.

U.S. oil giants [Exxon Mobil](#), [Chevron](#) and [Occidental Petroleum](#) will join a coalition that aims to reduce greenhouse gas emissions from the oil and gas industry.

The move marks a reversal for the American oil heavyweights, which did not join the Oil and Gas Climate Initiative when it was formed in 2014. The initiative currently has 10 members, including European oil majors [Total](#), [Royal Dutch Shell](#) and [BP](#), as well as state oil companies [Saudi Aramco](#), Mexico's [Pemex](#) and China's [CNPC](#).

States have also sued big oil firms over the cost of mitigating the impact of climate change, though [several of the suits have been dismissed](#).

[Exxon, Chevron and Occidental will become official members on Monday.](#)

<https://www.cnbc.com/2018/09/20/exxon-mobil-and-chevron-will-join-oil-and-gas-climate-initiative.html>

August 2018:

Why it matters: The companies are the first U.S.-based members of the group, called the Oil and Gas Climate Initiative. This is one of the strongest signs yet of how America's biggest oil companies, under pressure from investors and lawsuits, are joining most other U.S. corporations in working to reduce greenhouse gas emissions despite President Trump reversing America's course on the matter.

The group's purpose is twofold:

1. Work toward cleaner operations, particularly in the area of emissions of methane, a potent greenhouse gas that's the primary component of natural gas. These efforts are continuing and growing despite Trump repealing methane regulations.
2. Investment in new technologies, for which members contribute to a \$1 billion investment fund. The primary goal is to commercialize technologies that capture carbon dioxide, but also include ones like reducing methane emissions, lowering transportation sector pollution and improving energy efficiency. The new member companies will contribute \$100 million to the fund, according to a press release issued after publication of this story.

The other side: Environmentalists and others skeptical of the industry say commitments by oil companies to address climate change ring largely hollow absent more aggressive action urging governments to price carbon emissions. The group's mission is expressly not geared toward influencing any government policy.

Between the lines: CEOs of several major, publicly traded oil companies say they support carbon taxes and back a separate group writing a proposal for one. But the companies are not actively lobbying Congress to embrace the policy. That disconnect will grow harder to reconcile as their public commitments to address climate change, such as through groups like this, grow.

<https://www.axios.com/exxon-mobil-chevron-global-industry-climate-group-33d5f4e6-d636-4b70-929b-c83a2e22e834.html>

Oil and Gas Climate Initiative

Delivering solutions for a sustainable
low-emissions future

A catalyst for change

OGCI is a voluntary CEO-led initiative taking practical actions on climate change. OGCI members leverage our collective strength to lower carbon footprints of energy, industry, transportation value chains via engagements, policies, investments and deployment.

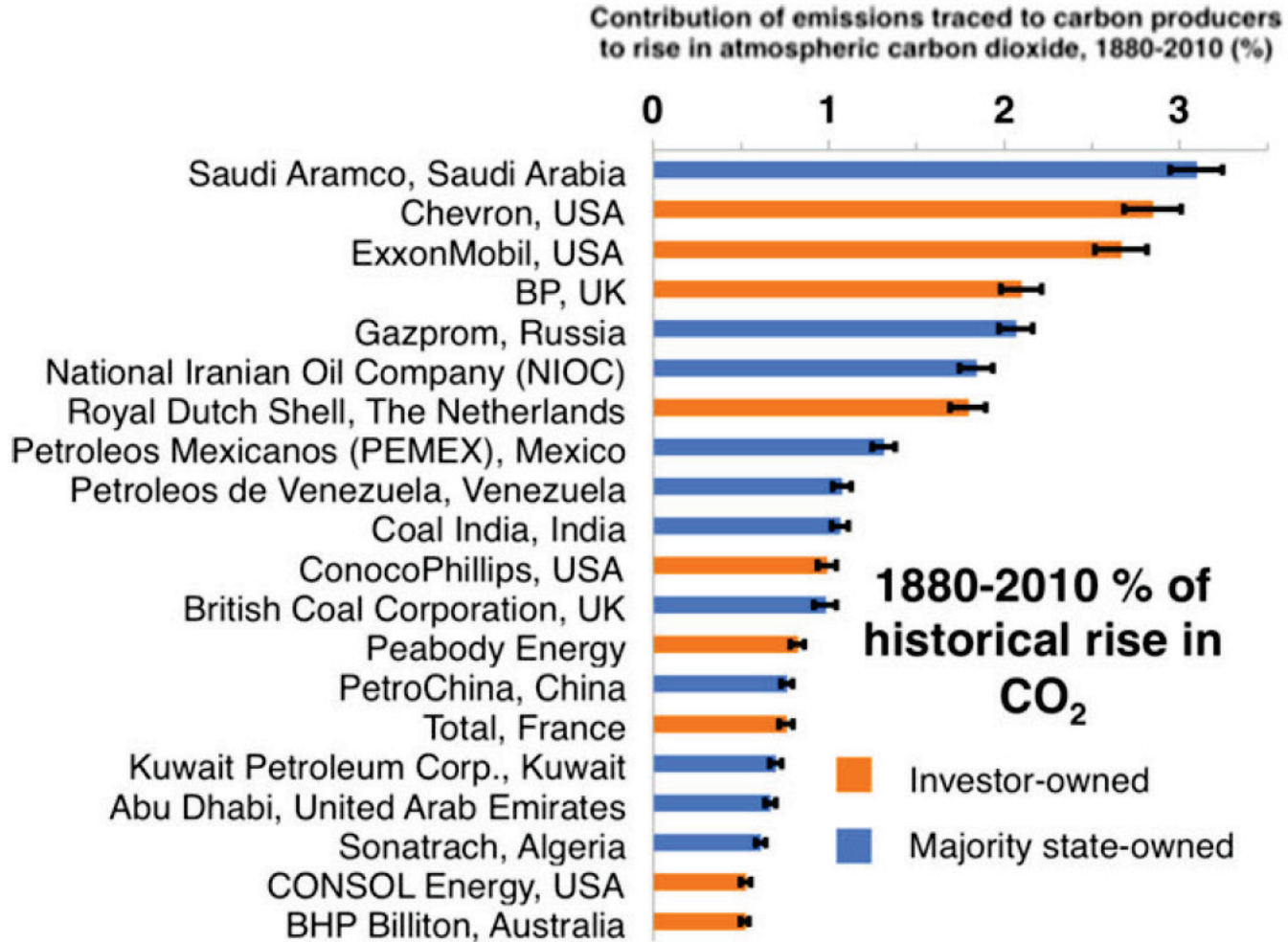


ExxonMobil



<http://oilandgasclimateinitiative.com>

Before you rush out to buy stock in Chevron:



<https://link.springer.com/content/pdf/10.1007%2Fs10584-017-1978-0.pdf>

Greta Thunberg

Greta Thunberg to world leaders: 'How dare you - you have stolen my dreams and my childhood' - video



'You have stolen my dreams and my childhood with your empty words,' climate activist Greta Thunberg has told world leaders at the 2019 UN climate action summit in New York. In an emotionally charged speech, she accused them of ignoring the science behind the climate crisis, saying: 'We are in the beginning of a mass extinction and all you can talk about is money and fairy tales of eternal economic growth - how dare you!'

<https://www.youtube.com/watch?v=v33ro5IGHQg>

<https://www.theguardian.com/environment/video/2019/sep/23/greta-thunberg-to-world-leaders-how-dare-you-have-stolen-my-dreams-and-my-childhood-video>