

Climate Change, A Numbers Game We're Losing...

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Illustration by Edel Rodriguez

<http://www.rollingstone.com/politics/news/global-warnings-terrifying-new-math-20120719>

Note:

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When it comes to climate change, both what we know, and what we believe, tells us that the current path of reliance on fossil fuels is not viable...

- Science-based (What we have come to know)
100 plus years of research and validation...
 - The Natural Step (TNS) (<http://www.naturalstep.org/>)
 - The International Panel on Climate Change (IPCC) (<http://www.ipcc.ch/>)
- Value-based (What we have come to believe)
100 plus years of witnessing the consequences of fossil fuel extraction and use...
 - The Coalition of Environmentally Responsible Economies (CERES)
 - 350.org

Climate Change (Science-based)

“...if the quantity of carbonic acid increases in geometric progression, the augmentation of the temperature will increase nearly in arithmetic progression.”



Svante Arrhenius - 1896

...first formulated the idea that changes in the levels of carbon dioxide in the atmosphere could substantially alter the surface temperature through the greenhouse effect.

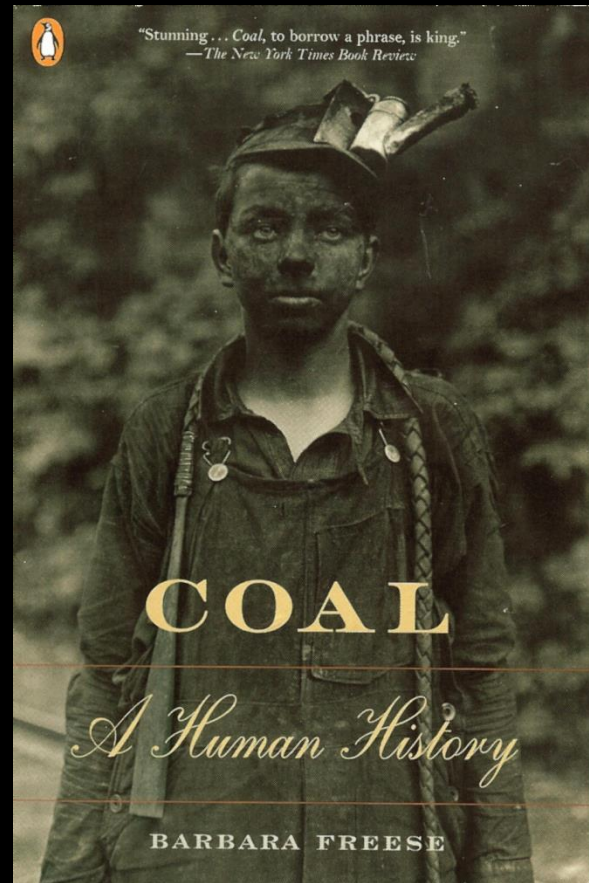
*On the Influence of Carbonic Acid in the Air Upon the Temperature of the Ground",
Philosophical Magazine 1896(41): 237-76*

Arrhenius, Svante

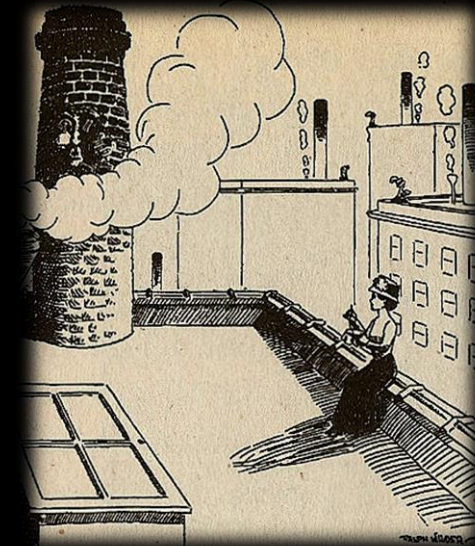
Asking two questions: Who Benefits? Who pays? ...the environment and the species and communities it supports (1909 -1911)



The effects of the bone-softening disease rickets, to which children growing up in smoke filled slums were particularly prone due to lack of sunlight...

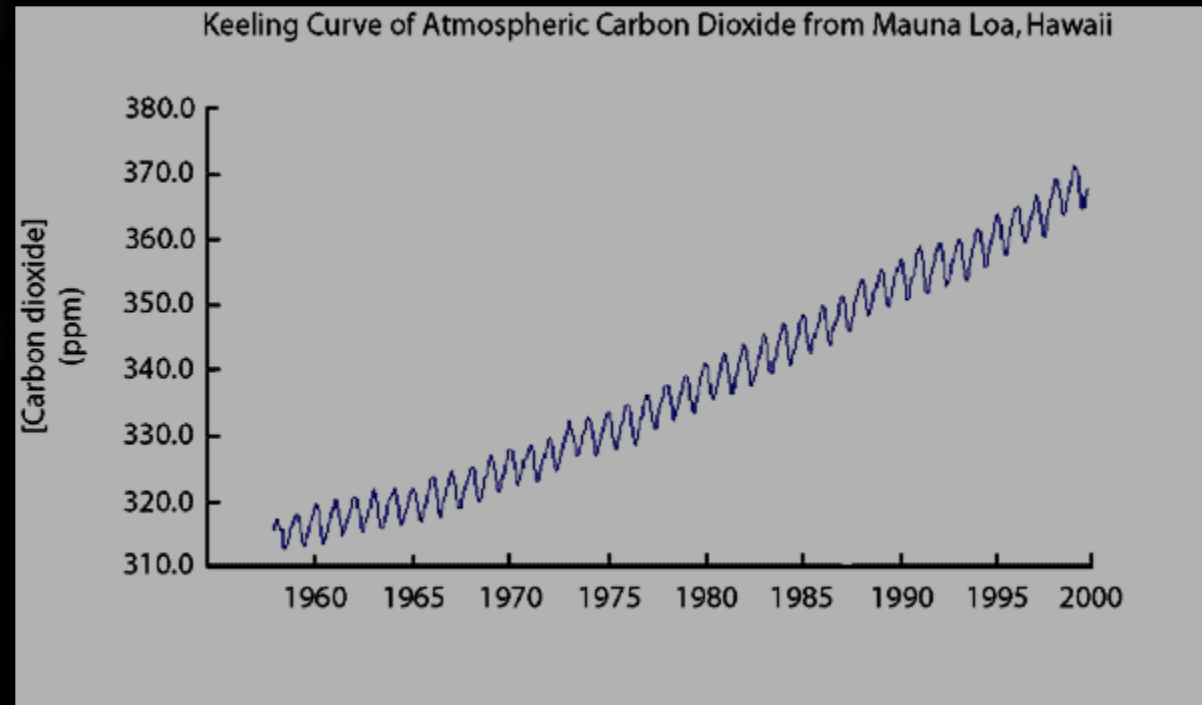
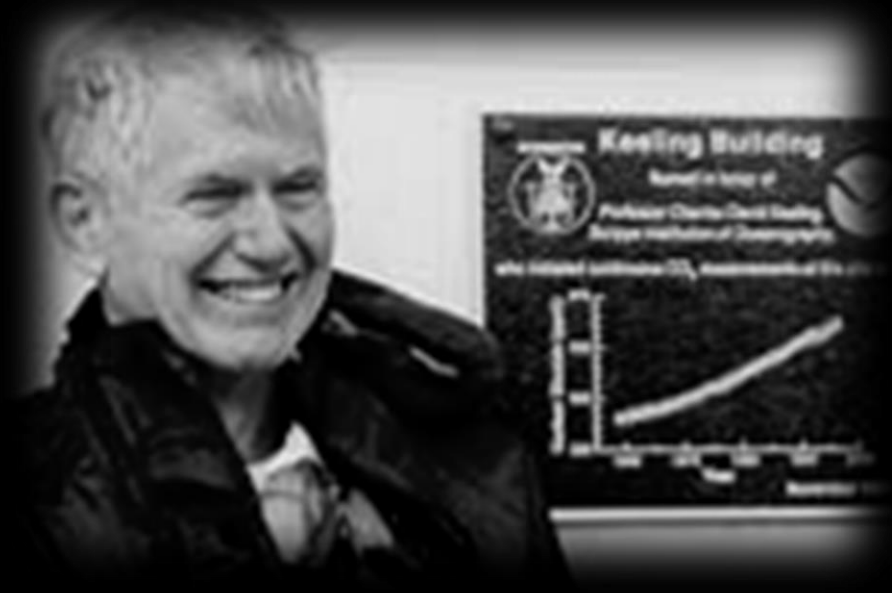


Breaker boys at work in 1911, picking stone and slate from coal as it rushes beneath them on a conveyor belt...



1909 Cartoon mocking a Chicago women's club to assist the city smoke inspector by watching for non-compliance with early smoke abatement laws.

Climate Change (Science-based)



Charles Keeling at the dedication of the Keeling Building, Mauna Loa Observatory, Hawaii.

Asking two questions: Who Benefits? Who pays?
...the environment and the species and communities it supports (1952)



The great killer smog of December 1952 obscures the streets of central London. Officially it caused the premature death of some 4,000 inhabitants, but this may only be half the actual number...

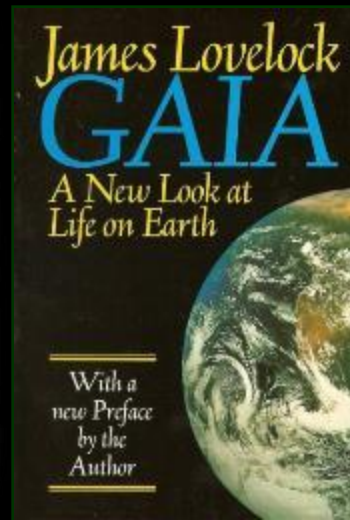
<http://www.portfolio.mvm.ed.ac.uk/studentwebs/session4/27/greatsmog52.htm>

Climate Change (Science-based)

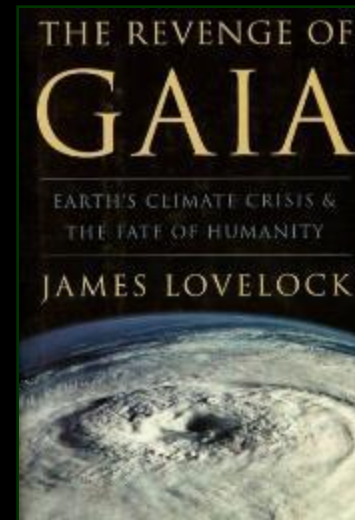
James Lovelock, a story of our place...



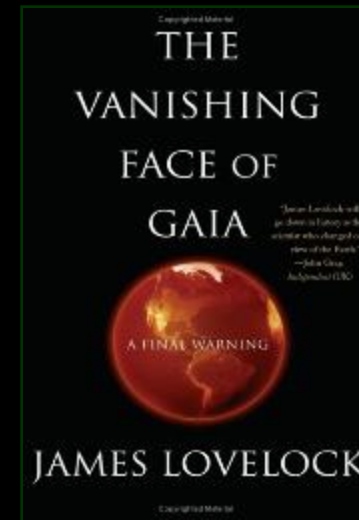
The Gaia Theory



1979



2006



2009

Watson, A.J. and J.E. Lovelock, 1983. Biological homeostasis of the global environment: the parable of Daisyworld. Tellus 35B, 286-289. .

Lovelock invented the electron capture detector, which ultimately assisted in discoveries about the persistence of CFCs and other chemicals

Asking two questions: Who Benefits? Who pays?
...the environment and the species and communities it supports (1960' 1970's ...)



JohnPaul Kusz, strip mine site, Danville, Illinois - 1968

Asking two questions: Who Benefits? Who pays?
...the environment and the species and communities it supports (1960' 1970's ...)



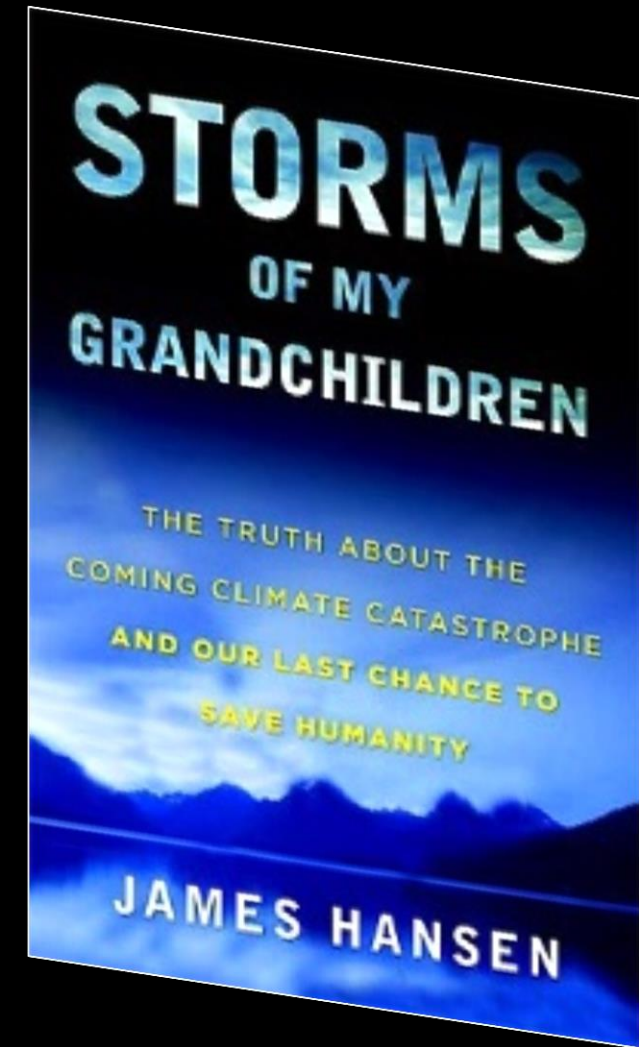
JohnPaul Kusz, strip mine site, Danville, Illinois - 1968

Climate Change (Science-based)



“reduction of CO2 emissions is a top priority..”
“..the world has a 10-year window of opportunity to take decisive action on global warming and avert a weather catastrophe.”

NASA scientist James Hansen - 2006



Milliken , Mary, “World has 10-Year Window to Act on Climate Warming – NASA Expert,” Reuters, September 14, 2006.

Asking two questions: Who Benefits? Who pays?

...the environment and the species and communities it supports (Today...)

Coal? Using fossil fuels...

India to Eclipse China as World's Coal Power...

China is building at least one new coal-fired power plant every week

We have over 100 years of coal reserves available...

50% of the US power comes from Coal...

60% of India's power comes from Coal...

Clean Coal?

A \$5.2 billion taxpayer-supported clean-coal plant in Mississippi incorporates all the latest technology. But at **\$6,800** per kilowatt, it will be the costliest power plant yet built (a gas-fired power station in America costs **\$1,000** per kW). At those prices, coal is going to stay dirty.

REUTERS/Ahmad Masood

Workers drill at an open cast coal field at Dhanbad district in the eastern Indian state of Jharkhand.

Read more: <http://www.businessinsider.com/coal-the-fuel-of-the-future-unfortunately-2014-4#ixzz30412uRPx>



Climate Change (Science-based)

Climate Change 2014: Mitigation of Climate Change - International Panel on Climate Change (IPCC)

4.8°C

Global greenhouse gas emissions increased by the equivalent of ten billion tons of carbon dioxide (CO₂) between 2000 and 2010, according to a new report by the Intergovernmental Panel on Climate Change, and half of all human CO₂ emissions between 1750 and 2010 have occurred in the last forty years.

Without additional efforts to significantly cut emissions, global temperatures could hit a staggering **4.8°C** above preindustrial temperatures by the end of the century, with potentially disastrous consequences for humanity, ecosystems, and sustainable development.

This is the third of three Working Group Reports, which make up the IPCC's fifth Assessment Report on climate change. The report, produced by 235 authors from 58 countries analyzed approximately 1200 climate scenarios investigating the economic, technological and institutional requirements for meeting global climate goals. Based on this analysis, the report found that stabilizing global temperature rise at **2°C** over pre-industrial temperatures—the limit considered by many scientists to be safe—will require lowering greenhouse gas emissions by as much as **70%** compared to 2010 numbers by mid-century and reaching near-zero emissions by 2100.

2.0°C
70%

Institute for Governance and Sustainable Development <http://iqsd.org/> - 2014-10-16
http://www.enn.com/press_releases/4254 - 2014-04-22

The Numbers

- **2.0°C.**

The upper limit increase if we are to have a chance...

Note: Given our current path, the increase in global temperature by the end of the century will likely reach 4.8°C.

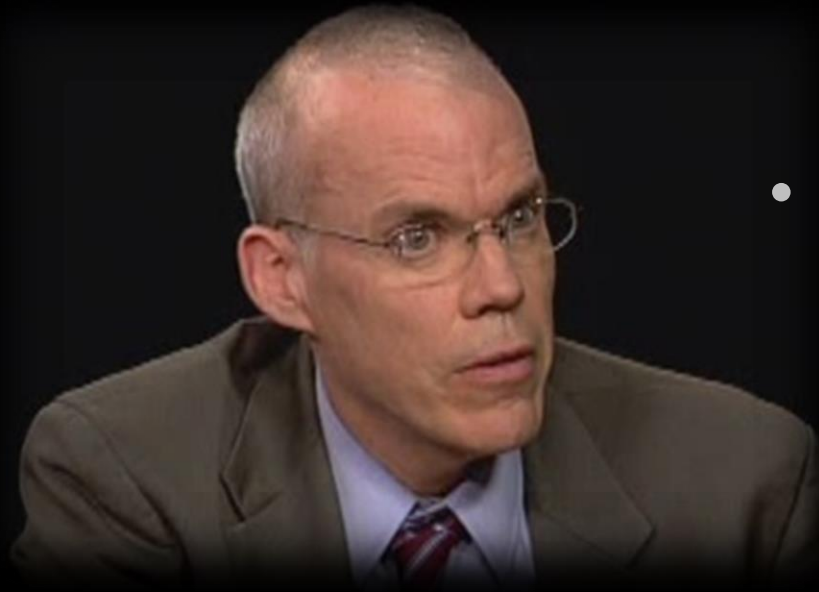
- **565 Gigatons of carbon.**

The amount of carbon we can emit by mid-century if we are to stand a chance...

- **2,795 Gigatons of carbon.**

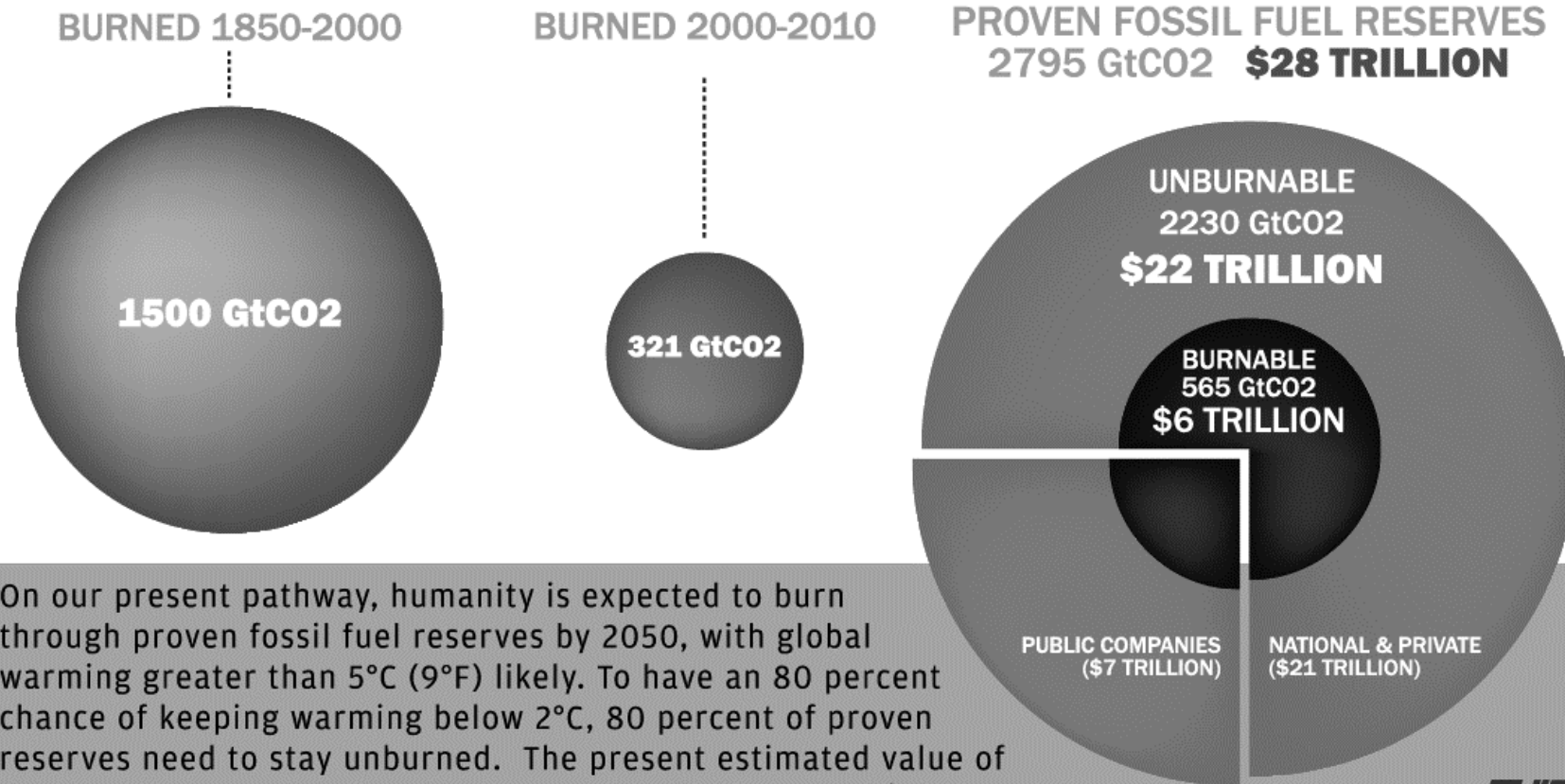
The amount of carbon already contained in the proven coal, oil and gas reserves of fossil fuel companies and the countries that act like fossil fuel companies...

We must reduce CO² emissions by 70% By 2050!



Bill McKibben: "Global Warming's Terrible New Math,"
Rolling Stone, August 2, 2012.

THE \$22 TRILLION CARBON BUBBLE



On our present pathway, humanity is expected to burn through proven fossil fuel reserves by 2050, with global warming greater than 5°C (9°F) likely. To have an 80 percent chance of keeping warming below 2°C, 80 percent of proven reserves need to stay unburned. The present estimated value of these civilization-threatening reserves is approximately \$22 trillion.

**THINK
PROGRESS**

Sources: Meinshausen et al. 2009; Allen et al. 2009; Sokolov et al. 2009; Carbon Tracker Initiative 2011. Carbon reserves as of the start of 2011; since then approximately 50 gigatons of carbon dioxide have been burned. Total fossil reserves are projected to be four times larger than proven reserves, and exploration for new reserves continues.

Climate Change (Values-based)

Lead

We Need an Apartheid-style Boycott to Save the Planet

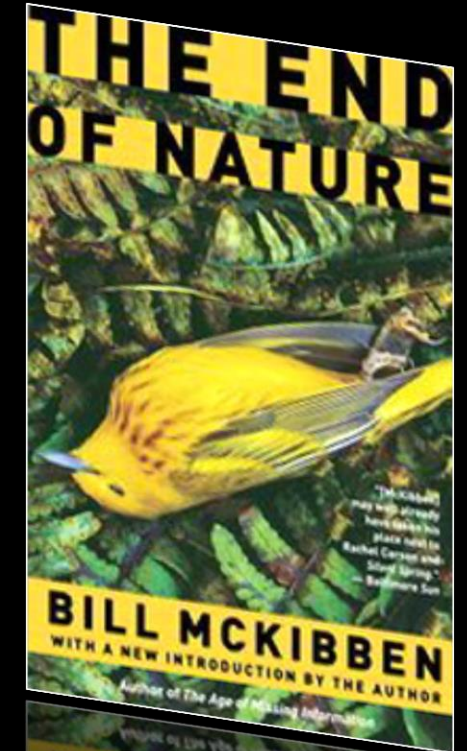
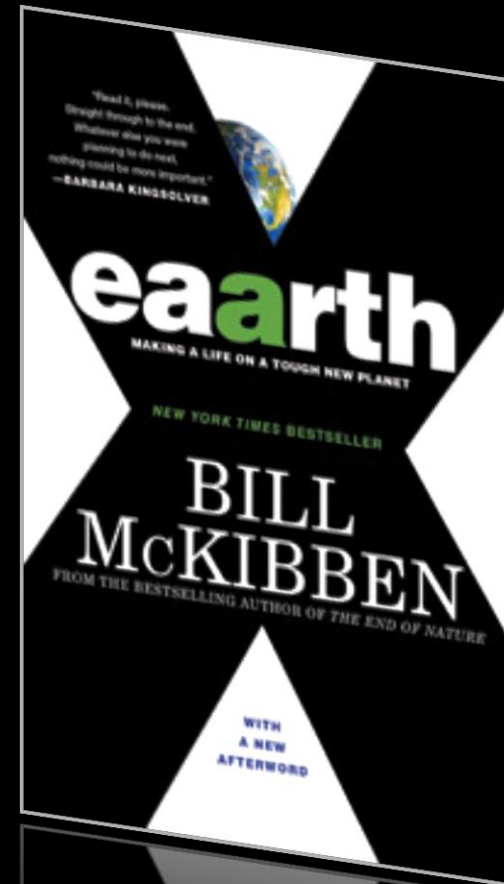
“People of conscience need to break their ties with corporations financing the injustice of climate change.”

The Guardian, April 10, 2014



Climate Change (Values-based)

Bill McKibben is an author and environmentalist. His 1989 book *The End of Nature* is regarded as the first book for a general audience about climate change, and has appeared in 24 languages. He is a founder of 350.org, the first planet-wide, grassroots climate change movement. 350.org is named for the safe level of Carbon Dioxide in the atmosphere, 350 parts per million.



Climate Change (Values-based)



Divest and Invest

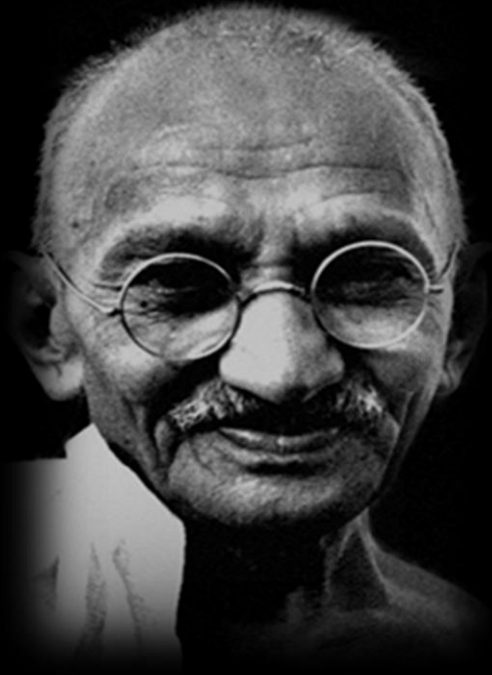
Ellen Dorsey is executive director of the Wallace Global Fund and a catalyst in the coalition of 17 foundations known as [Divest-Invest Philanthropy](#). Thomas Van Dyck is Senior Vice President – Financial Advisor at RBC Wealth Management, and founder of [As You Sow](#), a shareholder advocacy foundation.

<http://billmoyers.com/episode/putting-the-freeze-on-global-warming/>

What can I (we) do?

- Reconnect with and learn from Nature...
- Listen to and learn from the Science
- Join real efforts that connect with your values...
- Divest from fossil fuel and Invest in renewable fuel ...
- Vote on your ballot and with your pocketbook...
- Lead...

If we act boldly and act now,
Climate Change is a numbers game that can be won...



Mahatma Gandhi

“The future depends on what you do today.”



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