

THE SUGAR DADDY OF GEOENGINEERING: BILL GATES' FOSSIL FUEL INTERESTS AND FUNDING FOR GLOBAL CLIMATE ENGINEERING

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Bill Gates' approach to our planet's climate is designed to appear sensible, even-handed, and evidence based. A closer look, however, reveals a powerful billionaire with a deep attachment to techno-solutions that don't interfere with the normal functioning of capitalism – and a large financial stake in the continued extraction of fossil fuels.

In a 2010 TED talk, Gates outlined, in carefully crafted messages, what he considered the most effective solutions to climate change¹. His approach, titled “Innovating to Zero” centred on five “energy miracles” he believes the earth needs to avoid catastrophic temperature increases. In Gates' view, those technologies are carbon capture and storage, nuclear energy, wind power, solar power, and solar thermal.

Gates presents the technologies, noting the drawbacks and potential of each one. He makes a show of deferring to evidence and science in each case. This is typical of Gates' rhetoric. A posture of disinterested curiosity shows up in all his public appearances; it is effective and disarming.

As a sort of afterthought to the TED talk, Gates answers a question about solar geoengineering—the idea that engineers could block enough sunlight to offset global temperature increases—with a carefully-prepared answer and an elaborate metaphor:

“If this doesn't work, then what? Do we have to start taking emergency measures to keep the temperature of the earth stable?”

“Yeah, if you get into that situation—it's like, if you've been overeating and you're about to have a heart attack, then where do you go? You may need heart surgery or something. There is a line of research on what's called geoengineering, which are various techniques that would delay the heating to buy us 20 or 30 years to get our act together. Now that's just an insurance policy—you hope that you don't need to do that. Some people say you shouldn't even work on the insurance policy because it might make you lazy, that you'll keep eating because you know heart surgery will be there to save you. I'm not sure that's wise, given the importance of the problem. But now that the geoengineering discussion about 'should that be in the back pocket in case things happen faster or this innovation goes a lot slower than we expect'—...”.

¹ “Innovating to Zero! | Bill Gates - YouTube.” <https://www.youtube.com/watch?v=JaF-fq2Zn7I>

Perhaps disingenuously, Gates leaves the last sentence unfinished. At the time of the talk, Gates had already been funding geoengineering research with millions of dollars for several years.² Geoengineering refers, essentially, to attempts to stop global temperature increases by blocking the sun or sucking carbon out of the air on a massive, global scale—instead of reducing carbon emissions to zero. The potential risks run the gamut from unexpected feedback effects that destabilize the global climate, to droughts and floods in Africa and South America, to land grabs, ecological destabilization, ocean acidification, pollution and growing the political and financial power of the fossil fuel industry. This is a high risk strategy: the consequences we know about are massive, the ones that are unknown could be more so. The process could alter weather patterns locally, regionally and globally, with destabilising geopolitical impacts as well.

In fact, Gates has, through personal funding and investments, been one of the major backers of the most extreme forms of geoengineering research for more than a decade. Prominent geoengineers like Ken Caldeira and David Keith are among his close advisors, and his donations are supporting some of the most controversial proposed experiments.

Gates' heart attack metaphor is flawed in a number of ways. Unlike heart surgery, geoengineering has never been done before, and there is only one patient to try it out on: the planet. Geoengineering is more akin to administering a massive dose of a hypothetical, untested medication that one is certain will have permanent negative effects. In this metaphor, one is uncertain which effects will happen, but there is potential for organ failure, psychosis, or death. In the same way, geoengineering—if implemented—will have global effects covering a range of severity from destructive to fatal, from unanticipated climate destabilization to continental crop failures. The problem is that we don't know which one will happen, and the only way to properly "research" the question is to take that one shot.

Gates' engineering-for-everything mentality and his preference for purely technological solutions are well-known. And like many billionaires, Gates has a blind spot when it comes to questioning the logic of capitalism. Nearly every solution Gates proposes for the climate centres on "innovation" by entrepreneurs, driven by the promise of profits.

But hidden behind Gates' carefully cultivated persona of detached curiosity on climate solutions are significant financial interests in fossil fuel extraction.

For example, at the time of his 2010 TED Talk, Gates had already been a major shareholder in Canadian National (CN) Railroads for at least four years. CN was—and is—making big profits by shipping crude oil from Canada's tar sands to market. Rapidly-expanding tar sands extraction has been stymied by a number of campaigns led by Indigenous communities and climate activists to stop construction and expansion of pipelines. In this context, Canada's railroads (of

² *The Planet Remade: How Geoengineering Could Change the World*, by Oliver Morton (2015), page 102

which CN is one of two major operators) have become an alternative oil pipeline, shipping over 400,000 barrels per day in January 2020³. For comparison purposes, the Trans-Mountain Pipeline that Canada's government is attempting to expand currently has a capacity of 300,000 barrels per day.



"Tar sands, Alberta (2008)", by Dru Oja Jay, Dominion, is licensed under CC BY 2.0 (<https://creativecommons.org/licenses/by/2.0/>).

Tar sands operations are among the dirtiest and most environmentally destructive forms of fossil fuel extraction. In some cases, the land is strip mined to remove the bituminous sand below. The 2013 explosion of an oil train killed 42 people in Quebec⁴. In the aftermath, despite posting record profits, CN has pushed its workers to work longer hours and dismissed safety concerns from union representatives⁵.

Since 2011, Gates has been the single largest shareholder in CN, and his holdings have increased over time. Through Cascadia Investment Fund⁶, which he controls, and through the Bill and Melinda Gates Foundation, he has gradually

³ "Crude-by-Rail Shipments Hit Record High over 400,000 Bpd in January." *630CHED*. <https://globalnews.ca/news/6708937/crude-by-rail-shipments-hit-record-high-over-400000-bpd-in-january/>

⁴ "Lac-Mégantic Rail Disaster." *Wikipedia*, July 25, 2020. https://en.wikipedia.org/w/index.php?title=Lac-M%C3%A9gantic_rail_disaster&oldid=969494782

⁵ "Federal Govt. Should Respect Labour Rights in CN Strike | National Union of Public and General Employees." <https://nupge.ca/content/federal-govt-should-respect-labour-rights-cn-strike>

⁶ "Cascade Investment." *Wikipedia*, June 16, 2020. https://en.wikipedia.org/w/index.php?title=Cascade_Investment&oldid=962804357

increased his holdings of CN stock to 16.7% of the company⁷. That means that in 2019, Gates' Cascadia and the Foundation received⁸ around US\$190 million in dividends alone.⁹ Steep growth¹⁰ in oil-by-rail exports has accounted for the company's record-high profits and steady profit growth¹¹.

Though Gates has sold a lot of his holdings in Microsoft, he still owns about US\$70 billion in stock of the now-US\$1 trillion company. Microsoft has invested heavily in pursuing oil giants, signing deals with Exxon Mobil, Chevron, Shell, and BP¹². Despite a recent pledge to be "carbon negative by 2030," the company's cloud services web site advertises "oil and gas solutions" that will "increase drilling hit rates," "improve reservoir production" and "extend asset life cycles¹³." In other words, they're helping oil companies extract more oil, at a time when we should be doing anything but. (And according to a former employee, Microsoft allegedly also helped oil companies to conduct surveillance of their workers¹⁴).

Gates is not a disinterested observer seeking solutions to the climate crisis. In addition to being a billionaire who made his fortune skirting government regulations and dominating competitors with monopolistic practices, he holds a very significant financial stake in the continued expansion of the fossil fuel industry. His shares in CN Rail alone are worth US\$10.9 billion.¹⁵

If the planet stays within what scientists say is our maximum "carbon budget," oil companies will see vast assets disappear from their balance sheets – estimated at between \$1 trillion and \$4 trillion. This is the "carbon bubble."¹⁶

Geoengineering is the fossil fuel industry's final escape hatch—its only chance to keep on extracting and burning in order to recuperate some of those US\$1.6 trillion in soon-to-be stranded assets.

⁷ "CNI - Canadian National Railway Co Shareholders - CNNMoney.Com."

<https://money.cnn.com/quote/shareholders/shareholders.html?symb=CNI&subView=institutional>

⁸ "CNR Dividend Yield, History & Payout Ratio (Canadian National Railway)."

<https://www.marketbeat.com/stocks/TSE/CNR/dividend/>

⁹ Cascadia holds 101,400,770 shares; Bill and Melinda Gates Foundation holds 17,126,874 shares, for a total of 118,527,644 shares. At an annual dividend of CAD\$2.19 per share, that's around US\$190 million (based on conversion rates of July 15, 2020).

¹⁰ Government of Canada, National Energy Board. "NEB – Canadian Crude Oil Exports by Rail – Monthly Data." Last modified August 21, 2020. <https://www.cer-rec.gc.ca/nrg/sttstc/crdlndptrlmprdct/stt/cndncrdlxprtssl-eng.html>

¹¹ "Crude-by-Rail and Container Traffic Push CN Rail to Record Revenues of Nearly \$4B." *Global News*. <https://globalnews.ca/news/5675640/record-cn-revenues-crude-by-rail/>

¹² "Microsoft's Climate Bullshit | REDD-Monitor." <https://redd-monitor.org/2020/03/29/microsofts-climate-bullshit/>

¹³ "Azure for Energy | Microsoft Azure." <https://azure.microsoft.com/en-ca/industries/energy/>

¹⁴ Wood, Charlie. "An Anonymous Microsoft Engineer Appears to Have Written a Chilling Account of How Big Oil Might Use Tech to Track Its Workers' Every Move." *Business Insider*. <https://www.businessinsider.com/microsoft-engineer-says-big-oil-surveilling-oil-workers-using-tech-2019-11>

¹⁵ 118,527,644 shares at a value of CAD\$125.06 is CAD\$14.8 billion, or US\$10.9 billion (based on share prices and conversion rates of July 15, 2020).

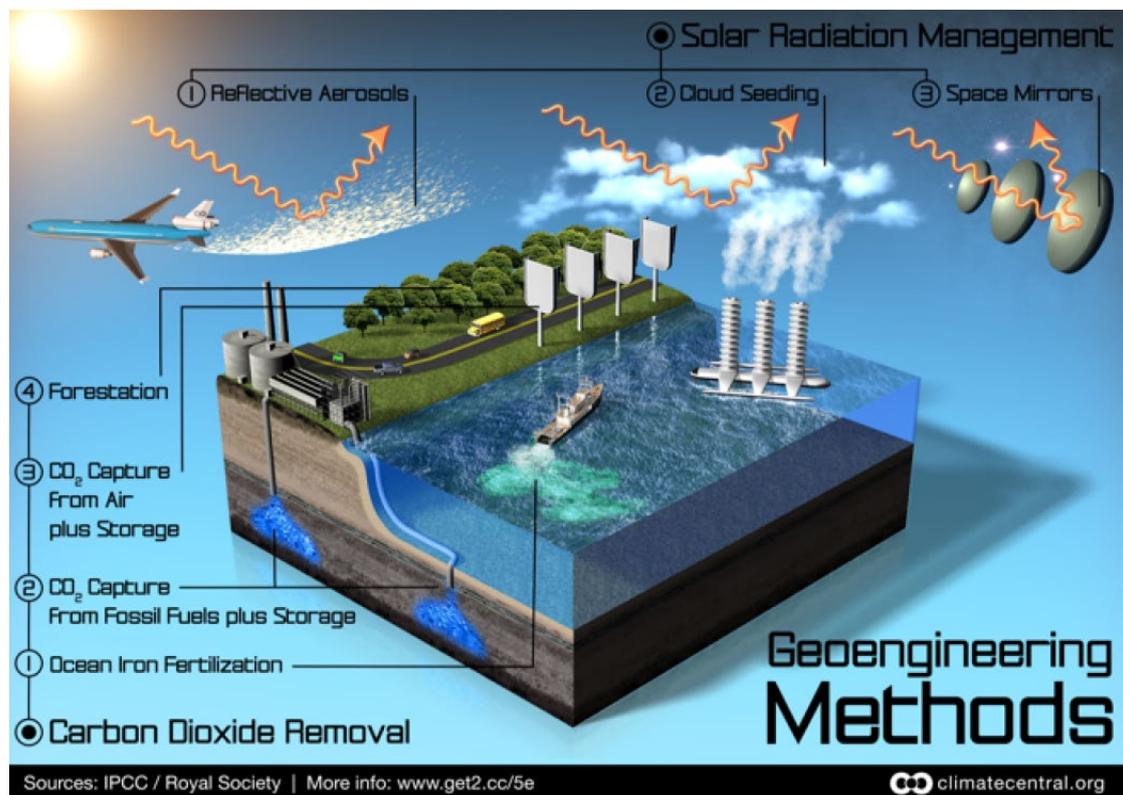
¹⁶ Fiona Harvey Environment correspondent, "What Is the Carbon Bubble and What Will Happen If It Bursts?" *The Guardian*, June 4, 2018, sec. Environment. <https://www.theguardian.com/environment/2018/jun/04/what-is-the-carbon-bubble-and-what-will-happen-if-it-bursts>

According to a report from CIEL, since the 1970s, oil companies have been investing in and supporting geoengineering¹⁷. However, they have kept a lower profile when it comes to more extreme forms of solar geoengineering (i.e. blocking sunlight).

Into this void has stepped Bill Gates, who's carefully cultivated philanthropic image appears to be a relative public relations coup for the fossil fuel players who would like to drive geoengineering but can't show their faces.

Climate geoengineering refers to large-scale human intervention in the climate, and it includes projects that could alter marine and terrestrial ecosystems and atmosphere.

Geoengineers have divided these into two major categories: carbon dioxide removal (the idea of removing CO₂ from the air on a massive, global scale, which appears on Gates' list of "miracle" technologies) and solar geoengineering (the idea of blocking a portion of sunlight to temporarily cool the planet).



Carbon Dioxide Removal (CDR) proposals are the more mainstream of the two; there are dozens of research projects running around the world but so far they either haven't proven that they can remove any CO₂, or only that they remove currently tiny amounts of CO₂ from the air – while being too energy-intensive and

¹⁷ "Fuel to the Fire: How Geoengineering Threatens to Entrench Fossil Fuels and Accelerate the Climate Crisis (Feb 2019)." *Center for International Environmental Law*, n.d. <https://www.ciel.org/reports/fuel-to-the-fire-how-geoengineering-threatens-to-entrench-fossil-fuels-and-accelerate-the-climate-crisis-feb-2019/>

expensive to make sense. Their proponents speculate, however, that they will eventually remove billions of tonnes per year from the atmosphere, either storing it underground or using it to produce synthetic fuels (in which case it ends up in the atmosphere again).

Direct Air Capture (DAC) is a form of CDR where fans suck in vast amounts of air, push it through substances that absorb carbon dioxide molecules, and then process the substances to remove the carbon. The processes of removing the carbon require high heat, and thus large amounts of energy.

Bio-Energy with Carbon Capture and Storage (BECCS) is another form of CDR. It involves growing biomass (e.g. wood), burning it in a power plant, capturing the carbon (using a similar process to DAC) before it enters the atmosphere, and then storing it underground. In theory, carbon is thus removed from the atmosphere by plant growth, and kept out when it is buried. However, many questions have been raised about the full-life-cycle impacts of BECCS, as it would demand millions of hectares of land (by one estimate the equivalent of the entire landmass of India). Its land and water needs would severely compete with food production, and devastate ecosystems. Though it has been discredited in many climate circles, it persists as a policy idea and has been prominently featured by the Intergovernmental Panel on Climate Change (IPCC) in its Fifth Assessment Report.

Carbon Capture and Storage (which generally refers to capturing carbon before it is emitted) is on Gates' list of "miracle" technologies that need to be developed. It's also at the top of oil companies' wishlists. The top investors in CCS technologies have been oil companies, who own much of the intellectual property around related techniques. Microsoft's plan to achieve "net zero" emissions lean heavily on unidentified carbon removal techniques to offset the company's fossil fuel use¹⁸.

Along with tar sands billionaire N. Murray Edwards and Chevron, Gates is a major investor in Carbon Engineering, a Canada-based Direct Air Capture firm. CE's founder and chief scientist David Keith, a Gates advisor since the mid-2000s, is at the centre of what journalist Eli Kintisch called the "geoclique"—a small group of people who are driving geoengineering¹⁹.

There are some – including the IPCC – who don't consider carbon dioxide removal to be geoengineering. If, however, these projects were to reach the proposed scale, in order to really influence the climate, the impacts would be global and profoundly negative. Many CDR proposals require massive amounts of energy to function, and its rapid growth could slow the climate transition. It also requires massive infrastructure, and some forms (e.g. Bio-Energy with Carbon Capture and Storage, or BECCS) require land covering the equivalent of several

¹⁸ "Microsoft Will Be Carbon Negative by 2030." *The Official Microsoft Blog*. Last modified January 16, 2020. <https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/>

¹⁹ Hamilton, Clive. "The Clique That Is Trying to Frame the Global Geoengineering Debate | Clive Hamilton." *The Guardian*. Last modified December 5, 2011. <http://www.theguardian.com/environment/2011/dec/05/clique-geoengineering-debate>

countries. Storage of billions of tonnes of carbon raises major questions about leaks, pollution, and the massive infrastructure required.

Keith is also the most well known advocate for solar geoengineering, a term that covers various efforts to block sunlight from reaching earth or reflect it back into space on a massive scale. Along with Ken Caldeira, he manages the Fund for Innovative Climate and Energy Research (FICER)²⁰. Gates had given FICER at least US\$4.6 million as of 2012, and further donations are unknown, though the web site notes that research grants come from “Bill Gates from his personal funds” (i.e. not the Bill and Melinda Gates Foundation).

For years, FICER was the main source of financing for research related to solar geoengineering. Two of the North American solar geoengineering projects that are closest to testing—Keith’s SCoPEX, and the California-based Marine Cloud Brightening Project—have received funding from FICER. According to a 2012 *Guardian* report²¹, about half of FICER’s funding was then going to Caldeira and Keith’s projects, but it had also funded an initiative to advance governance of solar geoengineering (SRMGI)²², and contributed to a Novim report on geoengineering, which was convened by Dr. Steven E. Koonin, Chief Scientist for multinational oil and gas company BP²³.

Keith’s current research project is the Stratospheric Controlled Perturbation Experiment (SCoPEX), an attempt to conduct an open-air test of solar geoengineering technology by spraying various substances into the stratosphere from a balloon. The experiment has been repeatedly delayed, but if it moves forward, it would be a violation of the provisions of the moratorium on geoengineering passed by the 196 countries who are party to the United Nations Convention on Biodiversity.

In his book *The Planet Remade*, journalist Oliver Morton calls Gates the “sugar daddy” of geoengineering (p. 156) and concludes that

“Keith and Caldeira would have been leaders in the field based on their work but having this fund at their disposal gave them extra heft. It has allowed them to support work that would otherwise not have been supported, and create space for discussions that might otherwise not have taken place.” (p. 157)

Because changing the amount of sunlight that reaches earth is so dangerous and difficult to understand without doing it at scale and over a long period of time, solar geoengineering has received less mainstream discussion—for

²⁰ “Fund for Innovative Climate and Energy Research.” <https://keith.seas.harvard.edu/FICER>

²¹ Vidal, John, environment editor. “Bill Gates Backs Climate Scientists Lobbying for Large-Scale Geoengineering.” *The Guardian*, February 6, 2012, sec. Environment. <https://www.theguardian.com/environment/2012/feb/06/bill-gates-climate-scientists-geoengineering>

²² “SRMGI – Solar Radiation Management Governance Initiative Is an International, NGO-Driven Project That Seeks to Expand the Global Conversation around the Governance of SRM Geoengineering Research,” n.d. <https://www.srmgi.org/>

²³ Blackstock, J. J., D. S. Battisti, K. Caldeira, D. M. Eardley, J. I. Katz, D. W. Keith, A. A. N. Patrinos, D. P. Schrag, R. H. Socolow, and S. E. Koonin. “Climate Engineering Responses to Climate Emergencies.” *arXiv:0907.5140 [physics]* (July 31, 2009). <http://arxiv.org/abs/0907.5140>

now. Few open-air tests of solar geoengineering have been announced. Of those announced, most have been cancelled or delayed after opposition and protests.

David Keith's favoured proposal is to spray tens of thousands of tonnes of aerosols, potentially sulphur dioxide, into the stratosphere, blocking sunlight before it reaches the earth. Keith, who according to the same *Guardian* report, received direct annual funding from Gates circa 2012, wrote a book advocating for solar geoengineering. He took a strategy of embracing the shocking nature of spraying tens of thousands of tonnes of "sulphuric acid" into the stratosphere, defending the position that "we need to talk about it". He even allowed himself to be the butt of several cruel jokes on the satirical show the Colbert Report in order to convey his ideas, which he describes as a last resort if other climate strategies fall through²⁴.

Another one of Gates' connections to geoengineering stretches back to 1986, when Nathan Myhrvold joined Microsoft when his company was acquired by Gates' software giant. Myhrvold was a close collaborator for 14 years. "I don't know anyone I would say is smarter than Nathan," Gates told a reporter in the 1990s. "He stands out even in the Microsoft environment." Myhrvold is also a geoengineering enthusiast, and a proponent of injecting the stratosphere with sulphur dioxide.

Myhrvold reportedly took Bill Gates and Warren Buffet on a tour of Canada's tar sands mining operations²⁵. One of the byproducts of tar sands processing is vast quantities of sulphur, which is stored in giant yellow pyramids outside of the Syncrude refinery, viewable from the highway. Myhrvold marvelled at the possibilities of burning that sulphur to make sulphur dioxide, and pumping it into the stratosphere via a hose suspended from a series of balloons.

"So you can put one little pumping facility up there," Myhrvold enthused, "and with one corner of one of those sulfur Mountains, you control the whole global warming problem for the Northern Hemisphere." That idea forms the basis for "Stratoshield," a project of Myhrvold's Intellectual Ventures, an investment fund that seeks to profit from inventions that anticipate trends and future developments. The Stratoshield consists of a very long hose—30 kilometres long—stretching from the ground to the stratosphere with balloons, each of which houses a small pumping station that would keep a steady stream of sulphur dioxide flowing into the sky. A "string of pearls," in Myhrvold's words, that would "spritz the stratosphere with a fine mist," a veil of 100,000 tonnes per year of sulphur dioxide that would encircle the planet.

Who is behind the "Stratoshield"? It's unclear, but FICER co-director Ken Caldeira works as an "inventor" for Intellectual Ventures and has co-authored a

²⁴ "David Keith - The Colbert Report (Video Clip)." *Comedy Central*. <http://www.cc.com/video-playlists/kw3fj0/the-opposition-with-jordan-klepper-welcome-to-the-opposition-w--jordan-klepper/lv0hd2>

²⁵ "Superfreakonomics: Everything You Know about Global Warming Is Wrong." *Carolina Huddle*. <https://www.carolinahuddle.com/boards/topic/34241-superfreakonomics-everything-you-know-about-global-warming-is-wrong/>

paper with Myhrvold²⁶. Caldeira has also speculated publicly that a government of a “vulnerable country” like Bangladesh could unilaterally implement solar geoengineering²⁷. In addition to the stratospheric shield, Intellectual Ventures has also proposed weather modification technology using ocean cooling²⁸.

In a chapter of the book *Superfreakonomics*, which sold over 7 million copies, Myhrvold discusses climate at length with the authors, and makes the case for injecting sulphur into the stratosphere. After quoting Myhrvold for several pages on the theme of “*Everything you know about Global Warming is wrong*,”²⁹ the authors reach the conclusion that reducing carbon emissions doesn’t make sense. Spending money on “*anti-carbon initiatives, without thinking things through*” would be “*a huge drag on the world economy*.” What would work?. “*Once you eliminate the moralism and the angst*,” the authors say about Myhrvold’s “Stratoshield” plan, “*the task of reversing global warming boils down to a straightforward engineering problem*.”

Gates, who is still close with Myhrvold, has invested in Intellectual Ventures, which includes “Stratoshield” under its umbrella of inventions. He and Myhrvold appear to share the view that capitalism is the main force that will lift—and has lifted—the poor people of the world out of poverty³⁰.

Myhrvold later backtracked and denied portraying solar geoengineering as a solution. He now opts for the more politically correct “it’s a last resort” approach.

The “last resort” rhetoric echoes how Gates talks on the rare occasions when he speaks about his support for geoengineering. But the facts outlines here—the much more aggressive pro-geoengineering stance portrayed in *Superfreakonomics*, coupled with Myhrvold’s proximity to Gates, and Gates’ investments in transportation of tar sands oil—raise significant questions about Gates’ real privately-held views about geoengineering technologies, and what is driving his investments in them.

²⁶ “Not Only Is the Warming Hiding in the Ocean, It’s Hiding in the Future Too.” *Watts Up With That?* Last modified October 1, 2013. <https://wattsupwiththat.com/2013/09/30/not-only-is-the-warming-hiding-in-the-ocean-its-hiding-in-the-future-too/>

²⁷ “What If the Most Vulnerable Nations Decided to Hack the Climate?” *Undark Magazine*. Last modified July 18, 2016. <https://undark.org/2016/07/18/plan-b-for-bangladesh-geoengineering-climate-change/>

²⁸ “Climate Science » Intellectual Ventures Lab.” Last modified March 11, 2013. https://web.archive.org/web/20130311145011/http://intellectualventureslab.com/?page_id=258

²⁹ *Ibid.*

³⁰ Gates, Bill. “Is There a Crisis in Capitalism?” *Gatesnotes.Com*. <https://www.gatesnotes.com/Books/The-Future-of-Capitalism>