

A STRAW MAN ATTACK ON THE MORAL CASE FOR FOSSIL FUELS

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Synopsis: This article provides a reply to Harvard law professor Jody Freeman’s contribution to this journal, “A Critical Look at *The Moral Case for Fossil Fuels*,” a critique of my 2014 book, *The Moral Case for Fossil Fuels* (MCFF). MCFF argues that the way we have been taught to think about and discuss energy issues is wrong, and that if we follow a better method of thinking, we will conclude that the proper energy policy for the foreseeable future requires increasing our use of fossil fuels—not dramatically and coercively restricting our fossil fuel use. Unfortunately, instead of engaging the book’s method and attempting to refute its evaluations, Freeman’s article ignores the book’s method and significantly misrepresents its major arguments. This response gives a proof that Freeman’s portrayal of MCFF’s method and content is a straw man, and summarizes the actual arguments of the book. It does so primarily through repeated, side-by-side comparisons of unaltered passages by Freeman purporting to describe MCFF’s viewpoint and unaltered passages from MCFF clearly stating its actual viewpoint. In doing this, this article elucidates some of the book’s actual points that readers might benefit from and perhaps be convinced to explore in more detail—and encourages us to increase the level of intellectual precision in our debate so that we can have a constructive conversation about today’s vital energy and environmental issues.

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I. INTRODUCTION

In 2007, as a philosopher analyzing popular thinking on numerous cultural, industrial, and political issues, I concluded that popular thinking and discussion about energy and its associated environmental issues was severely flawed. For

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example, logic dictates that when analyzing any course of action we carefully consider both the positives and negatives of all our alternatives. Yet in popular discussion only the negatives of fossil fuels were considered, while the negatives of “green” sources of energy were all but ignored.

For example, there was a widespread focus on the dangers of coal mining but almost none on the far greater dangers of rare-earth mining required to produce vital components of wind turbines. There was a widespread focus on the alleged wonders of solar and wind but almost none on the unique positives of hydrocarbon (fossil) fuels, such as the unique energy density of liquid hydrocarbon (oil) fuels.

Just as problematically, the consideration of positives and negatives was not *careful*. Vague, equivocal claims, such as “climate change is real,” obscured the vital issue of *magnitude*; whether temperature is increasing geometrically or logarithmically, whether sea levels can be expected to rise twenty feet in several decades (Al Gore’s claim) or two feet in a century makes all the difference in our moral calculations.¹

Without far clearer, more precise thinking, our energy choices were destined to be severely wrong. To make the wrong choices about energy, the technology that powers every other technology, is to make every area of life worse.

I decided to undertake a study of our energy choices using critical thinking methods that were not being deployed in the existing discussions. My approach method led me to conclude that the proper energy policy for the foreseeable future requires increasing our use of fossil fuels—not dramatically and coercively restricting our fossil fuel use.

I presented my findings in my book *The Moral Case for Fossil Fuels* (MCCF), both to offer new, and I believe far more accurate, assessments of the benefits and costs of using rather than restricting fossil fuels, as well as to encourage a far greater degree of precision in the broader debate, turning acrimony into constructive conversation. Thus, even if I was wrong about the magnitudes of the benefits and costs, or those magnitudes changed, we would have a method for decision-making.

That has never been more necessary than at this political moment, when a new administration has promised to dramatically reshape energy policy and many new proposals will be on the table for discussion.

The book has been covered extensively by well-known conservative and libertarian thinkers, who tend to be skeptical of the establishment position that fossil fuels are a self-destructive addiction that we need to rapidly restrict.² Those commentators have both praised the book and offered interesting challenges of particular assessments or policy prescriptions.

1. See generally Pierre-Guy Veer, *8 Highly Inconvenient Facts for Al Gore 10 Years After His Infamous Movie*, THE BLAZE (Jan. 27, 2016, 12:00 PM), <http://www.theblaze.com/contributions/8-highly-inconvenient-facts-for-al-gore-10-years-after-his-infamous-movie/>.

2. See generally Patrick J. Michaels, *The One Statistic Climate Catastrophists Don’t Want You to Know*, CATO AT LIBERTY BLOG (Nov. 13, 2014, 1:01 PM), <http://www.cato.org/blog/one-statistic-climate-catastrophists-dont-want-you-know>; Jay Lehr & Sterling Burnett, *The Moral Case for Fossil Fuels* (book review), MASTERRESOURCE (Jan. 8, 2015), <https://www.masterresource.org/epstein-alex/epstein-book-review/>; Tim Black, *There is a Moral Case for Fossil Fuels*, SPIKED ONLINE (Aug. 28, 2015), http://www.spiked-online.com/review_of_books/article/there-is-a-moral-case-for-fossil-fuels/17367#.WLEMdPnys2w; Robert

Unfortunately, well-known liberal thinkers, who tend to represent the establishment position, have largely ignored it.³ This has been disappointing, because the purpose of the book is to create a more constructive conversation.

The most prominent liberal commentator on MCFF has been Harvard law professor Jody Freeman, who publicized “A Critical Look at *The Moral Case for Fossil Fuels*” in this journal.⁴ Unfortunately, instead of engaging the book’s method and attempting to refute its evaluations, the article ignores the book’s method and significantly misrepresents the major arguments of the book.

Concerned that many readers of Freeman’s account would be driven away from the real book and its real methodological and evaluative contributions, I asked for the opportunity to respond, and I am grateful to the editors of the *Energy Law Journal* for giving me the opportunity to do so.

The purpose of this response is not to give a point-by-point rebuttal of every criticism and argument that Freeman makes in her piece. Such a rebuttal would require that her criticisms and arguments were of the actual content of the book; they overwhelmingly were not. Thus, the purpose of my response is to give a far more fundamental rebuttal: a proof that Freeman’s portrayal of MCFF’s method and content is a straw man, and to summarize the actual arguments of the book. I will do this primarily through repeated, side-by-side comparisons of unaltered passages by Freeman purporting to describe MCFF’s viewpoint, and unaltered passages from MCFF clearly stating its actual viewpoint.

In doing this, I hope to elucidate some of the book’s actual points that readers might benefit from and perhaps be convinced to explore in more detail. More broadly, I hope to further the book’s mission of increasing the level of intellectual precision in our debate. At a minimum, this includes accurately representing our opponents’ arguments such that the debate is as rich as possible, and all sides are driven to refine their arguments as much as possible.

II. THINKING METHODS

In MCFF, I argue that we have to learn to think clearly and precisely about fossil fuels. Specifically, I highlight three key thinking methods we need to follow:

- Be clear on our standard of value: is our goal to maximize human flourishing or minimize human impact?

Zubrin, *Fossil Fuels and Morality*, NAT’L REV. (Nov. 12, 2014), <http://www.nationalreview.com/article/392503/fossil-fuels-and-morality-robert-zubrin>; Philip Delves Broughton, *Making ‘The Moral Case for Fossil Fuels,’* WALL STREET J. (Dec. 1, 2014), <https://www.wsj.com/articles/book-review-the-moral-case-for-fossil-fuels-by-alex-epstein-1417477909>; see also The McLaughlin Group, *The McLaughlin Group 12/26/14*, YOUTUBE (Dec. 27, 2014), <https://www.youtube.com/watch?v=BW-gLEpyjGY> (John McLaughlin calls Apex Epstein the “most original thinker” of the year).

3. The most prominent ones have included a brief Huffington Post piece by Edward Flattau, which does not address anything beyond the book jacket, and an article by little-known blogger Rob Hopkins. See Edward Flattau, *Fossil Fuel Immorality*, HUFFINGTON POST (Dec. 17, 2014, 2:48 PM), http://www.huffingtonpost.com/edward-flattau/fossil-fuel-immorality_b_6342962.html; see also Rob Hopkins, *Review: “The Moral Case for Fossil Fuels” – Really?*, OUR WORLD (May 5, 2015), <https://ourworld.unu.edu/en/review-the-moral-case-for-fossil-fuels-really>.

4. Jody Freeman, *A Critical Look at “The Moral Case for Fossil Fuels”*, 36 *Energy L.J.* 327 (2015).

- Think big picture: look precisely at the positives and negatives of all the alternatives.
- Use experts as advisers, not authorities: demand clear explanations from experts of what they know, what they don't know, and how they know it—and use that information to form our own big picture assessment of the best way to promote human flourishing.

These methods are present in every chapter of the book, and they are the keys to understanding and evaluating the book's arguments. Using that methodology, MCFF argues that cheap, plentiful, reliable energy is of vital importance to human flourishing. Fossil fuels have been mankind's best source of cheap, plentiful, reliable energy, supplying more than 85% of the energy that fuels our cars, heats our homes, and powers our hospitals.⁵ That will continue for the foreseeable future: while many countries want to replace fossil fuels with solar and wind, and have used a lot of their citizens' money to prop up solar and wind companies, no one has been able to figure out a cost-effective, scalable process to take sunlight and wind, which are dilute and intermittent forms of energy, and turn them into cheap, plentiful, reliable energy.

I conclude that, if we look at the full context of our energy choices by the standard of human flourishing, humanity should use more fossil fuels—along with other cheap, plentiful, reliable sources of energy such as nuclear, hydro, and any other cost-competitive source—not less.

At no point in her review does Freeman even attempt to summarize the book's methodology. Instead, she repeatedly violates the book's call for precision by systematically misrepresenting MCFF's arguments and conclusions.

III. THE NEAR-TERM ECONOMIC SUPERIORITY OF FOSSIL FUELS

There are over seven billion people in the world who need cheap, plentiful, reliable energy to flourish. Nearly three billion have virtually no energy by our standards, which means we need vastly more energy.⁶

It is extremely difficult to produce cheap, plentiful, reliable energy. In the entire history of humanity, only three industries have achieved this on any scale: the fossil fuel industry, the nuclear industry, and the hydroelectric power industry.

As I show in MCFF, the fossil fuel industry produces over 85% of the world's energy because it is the only industry that has figured out how to produce cheap, plentiful, reliable energy for electricity, transportation, and heating on a scale of billions.⁷

Since the energy industry is the industry that powers every other industry, the fossil fuel industry increases productivity and prosperity in every area of life, from agriculture (diesel-powered farm equipment) to hospitals (24/7 electricity).

5. BEYOND PETROLUUM, STATISTICAL REVIEW OF WORLD ENERGY (2016), <http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>.

6. INT'L ENERGY AGENCY, ENERGY ACCESS DATABASE (2017), <http://www.worldenergyoutlook.org/resources/energydevelopment/energyaccessdatabase/>.

7. BEYOND PETROLEUM, *supra* note 5.

The only industries besides the fossil fuel industry that can produce cheap, plentiful, reliable energy on a scale of hundreds of millions of people, let alone billions, are the nuclear and hydroelectric industries, which are widely opposed by environmentalists.⁸ Even without this opposition fossil fuels would still be irreplaceable for decades to come. Hydro is limited by lack of suitable locations. Nuclear has the long-term potential to expand greatly, but is many decades away from scaling to the level of billions.⁹ For these reasons, any restriction on fossil fuel use would do devastating damage. This must be factored into all policy debates over restricting fossil fuels to reduce CO₂ or other byproducts.

In MCFE, I call for people being free to use the best energy at any point in time—including wind and solar if they ever become practical. But I insist that we be honest about the prospects for any form of energy, including the fact that even with expensive subsidies and mandates, wind and solar provide an extremely costly 1.9%¹⁰ of the world's energy because these industries have not solved the two basic problems: the “intermittency problem” and the “diluteness problem.”

Rather than address these arguments, Freeman sets up and knocks down the straw man claim that no other energy could *ever* compete with fossil fuels.

Freeman writes:

The article disputes Epstein's central claim that because fossil energy has delivered enormous social benefits in the past, there is absolutely no reason to change course and diversify our energy supply in the future.¹¹

Yet MCFE champions fossil fuels, not because they were good in the past, but because—if all energy producers are left to compete on a free market—fossil fuels will continue to be the best source of cheap, plentiful, reliable energy for the foreseeable future.

The most forward-looking policy toward energy use is to always use the most competitive form of energy. I like to call the most competitive ones *progressive energy*, because they are part of a process of continual improvement, of finding the best way to get energy from the Earth's effectively unlimited stockpile of potential energy resources.

Our concern for the future should not be running out of energy resources; it should be running out of the *freedom* to create energy resources, including our number-one energy resource today, fossil fuels.¹²

8. See *End the Nuclear Age*, GREENPEACE, <http://www.greenpeace.org/international/en/campaigns/nuclear/> (last visited Feb. 26, 2017); *Nuclear Free Future*, SIERRA CLUB, <http://www.sierraclub.org/nuclear-free> (last visited Feb. 24, 2017); *Climate and Energy*, FRIENDS OF THE EARTH, <http://www.foe.org/projects/climate-and-energy> (last visited Feb. 24, 2017); Tica Minami, *Damn the Dam: The Threat One Mega-Dam Poses to the Amazon and Those Who Live There*, GREENPEACE (March 21, 2016), <http://www.greenpeace.org/international/en/news/Blogs/makingwaves/damn-the-dam-the-threat-one-mega-dam-poses-to/blog/55933>; Letter from Glen Brand, Director, Sierra Club Maine, to Energy, Utilities, and Technology Committee of the Maine Legislature (March 19, 2015), <http://www.sierraclub.org/sites/www.sierraclub.org/files/sce-authors/u446/SC%20ME%20LD%20132%20testimony%20big%20hydro%202015.pdf>.

9. See U.S. ENERGY INFO. ADMIN., INTERNATIONAL ENERGY OUTLOOK 2016 (May 11, 2016), <http://www.eia.gov/outlooks/ieo>.

10. BEYOND PETROLEUM, *supra* note 5.

11. Freeman, *supra* note 4, at 327.

12. ALEX EPSTEIN, THE MORAL CASE FOR FOSSIL FUELS 76 (2014).

Freeman writes:

Epstein argues that fossil energy has been the main driver of human flourishing historically and that it is uniquely capable of continuing to support human flourishing in perpetuity, making it the morally preferable global energy choice for the future. . . . No other fuel can ever be as plentiful, reliable, and cheap as fossil energy, according to Epstein, and none can promise to deliver anything close to the same degree of net human benefit.¹³

Yet MCFF encourages energy producers to find increasingly better ways of providing cheap, plentiful, reliable energy—including alternatives like nuclear or potentially even solar.

Ultimately, a resource is just matter and energy transformed via human ingenuity to meet human needs. Well, the planet we live on is 100[%] matter and energy, 100% potential resource for energy and anything else we would want. To say we've only scratched the surface is to significantly understate how little of this planet's potential we've unlocked. We already know that we have enough of a combination of fossil fuels and nuclear power to last thousands and thousands of years, and by then, hopefully, we'll have fusion (a potential, far superior form of nuclear power) or even some hyperefficient form of solar power.¹⁴

Freeman writes:

He argues or implies, among other things, that renewable energy has virtually no potential to supplement or compete with fossil energy. . . .¹⁵

Yet MCFF explains why our focus should not be “renewable” energy, but cheap, plentiful, reliable energy—including from hydro and nuclear sources.

One lesson of the failure of renewables is that *renewable* is not a useful criterion for a good energy source. It says only that one of the inputs is derived from the sun; it says nothing about how long the other inputs will last, and, most important, it says nothing about whether the technology can generate energy that is cheap, plentiful, and reliable. There's no reason to aspire to use an energy technology that we will use forever. The real question is: For the relevant time horizon, what's the most efficient combination of elements that we can transform efficiently into the kind of energy we need in a way that is cheap, plentiful, and reliable?

And so far in history, there has been one necessary ingredient to that: instead of spending huge amounts of resources concentrating and storing a dilute and intermittent source, working with a source that nature has already concentrated and stored for us— such as water (hydropower), the forces holding an atom together (nuclear power), or the powerful chemical bonds of the copious amounts of ancient, dead plants lying around from previous eons (fossil fuels).

It is their preconcentrated, prestored, plentiful energy content that has made fossil fuels—and to a much less but still important extent hydroelectric power and nuclear power—cheap, plentiful, reliable energy sources.¹⁶

Freeman writes:

13. Freeman, *supra* note 4, at 327, 330.

14. EPSTEIN, *supra* note 12, at 180.

15. Freeman, *supra* note 4, at 327.

16. EPSTEIN, *supra* note 12, at 58-59.

But Epstein refuses even to engage in such an analysis, asserting with no credible basis that renewable energy could *never* be worthwhile.¹⁷

Yet MCFE doesn't dismiss the possibility that solar, wind, and biofuels could one day provide cheap, plentiful, reliable energy—it simply demands that we honestly acknowledge the fact that it hasn't happened yet and there is no evidence it will happen any time in the foreseeable future.

Here's the bottom line with solar, wind, and biofuels—the three types of energy typically promoted in renewables mandates. There is zero evidence that solar, wind, and biomass energy can meaningfully supplement fossil fuel energy, let alone replace it, let alone provide the energy growth that is desperately needed. If, in the future, those industries are able to overcome the many intractable problems involved in making dilute, unreliable energy into cheap, plentiful, reliable energy on a world scale, that would be fantastic. But it is dishonest to pretend that anything like that has happened or that there is a reason to think it will happen.¹⁸

MCFE argues that we face a choice between whether we should be free to use the best energy at any given point in time and to leave all energy producers free to innovate and compete on an even playing field—or to restrict the best form of energy and subsidize unproven, uncompetitive sources of energy. That—not some blind denial that other forms of energy could ever compete with fossil fuels—is the argument Freeman's critique needed to identify and address.

IV. THE CLIMATE-RELATED IMPACTS OF FOSSIL FUELS

In MCFE, I argue that, to assess the climate-related impacts of fossil fuel use, we have to carefully assess the consequences to human flourishing of: (1) the warming impact of CO₂; (2) the fertilizing effect of CO₂; and (3) the energy effect of affordable energy for all climate danger.

The warming impact of CO₂ is mild and quite possibly positive—in no way does it justify restricting fossil fuel use whatsoever. It is a proven but little-known fact that the greenhouse effect of CO₂ is a diminishing, logarithmic effect; each molecule of CO₂ warms less than the last.¹⁹

The belief that increases in CO₂ will cause runaway warming are based on speculative climate dynamics represented in models that have utterly failed to predict climate.²⁰ Global average temperatures and CO₂ levels are near all-time lows from a geological perspective; today's CO₂ levels are an estimated 5% of their all-time high (a highly fertile period).²¹ Warming is almost universally desired among civilizations, with cold-related deaths dramatically greater than heat-related

17. Freeman, *supra* note 4, at 333.

18. EPSTEIN, *supra* note 12, at 57-58.

19. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, IPCC THIRD ASSESSMENT REPORT: CLIMATE CHANGE: 1.3 HUMAN-INDUCED CLIMATE VARIATIONS: 1.3.1 HUMAN INFLUENCE ON THE CLIMATE SYSTEM 93 (2001) ("It is because of these effects of partial saturation that the radiative forcing is not proportional to the increase in the carbon dioxide concentration but shows a logarithmic dependence.").

20. See Bob Tisdale, *Climate Observations*, WORDPRESS (May 23, 2016), <https://bobtisdale.wordpress.com/2013/09/24/new-book-climate-models-fail/>; Patrick J. Michaels & Paul C. Knappenberger, *Climate Models and Climate Reality: A Closer Look at a Lukewarming World*, CATO INST. (Dec. 15, 2015), https://object.cato.org/sites/cato.org/files/pubs/pdf/working-paper-35_2.pdf.

21. See generally Robert A. Berner & Zavareth Kothavala, *Geocarb III: A Revised Model of Atmospheric CO₂ Over Phanerozoic Time*, 301 AM. J. SCI. 182 (2001).

deaths.²² In general, life thrives under warmer conditions—as demonstrated by the dramatic decline in biomass and biodiversity from the equator to the poles.

The widely-ignored fertilizing effect of CO₂ is significant and positive, yet ignored; a proper energy and environmental discussion must take it into account. Increasing CO₂ levels is a proven driver of plant growth, which is why greenhouses contain three times as much CO₂ as our atmosphere. Satellite data show dramatic increases in plant growth in uninhabited locations as CO₂ levels have increased over the past several decades.²³ Increased CO₂ has also contributed significantly to crop yields and helped millions avoid malnutrition or starvation.²⁴

The widely-ignored energy effect of fossil fuels is spectacularly positive; it has helped us take the inherently dangerous climate and make it far safer than it has ever been. While the climate debate treats the global climate system as naturally stable and safe, it is in fact naturally volatile and vicious. Climate safety requires climate protection through development and technology, both of which are fueled by affordable energy. The international disaster database, which tracks climate-related deaths—including deaths from flood, droughts, extreme heat, extreme cold, storms, and wildfires—shows a 98% *decrease* in the rate of climate-related deaths since significant CO₂ emissions began eighty years ago.²⁵ Fossil fuel use doesn't take a safe climate and make it dangerous; it takes a dangerous climate and makes it safe.

Freeman ignores the fertilizer effect and the energy effect. Instead, she repeatedly asserts that I deny the existence of any warming, and she justifies claims of catastrophic warming by appealing to “evidence” I explicitly deal with in the book.

Freeman writes:

Since there is no persuasive evidence that any warming effect is associated with greenhouse gas concentrations in the atmosphere, Epstein claims there is no basis to believe predictions about likely warming in the future.²⁶

Moreover, Epstein's claim that the climate is *not* sensitive to CO₂ concentrations is contradicted by both the climate models and physical data about past climates, which scientists have collected from a variety of sources, including CO₂ concentrations found in ice cores and sedimentary data on the ocean floor.²⁷

Yet MCFE repeatedly states that there is a warming effect associated with greenhouse gas concentrations in the atmosphere.

A huge source of confusion in our public discussion is the separation of people (including scientists) into ‘climate change believers’ and ‘climate change deniers’—the latter a not-so-subtle comparison to Holocaust deniers. ‘Deniers’ are ridiculed for

22. See *Cold Weather Kills Far More People than Hot Weather*, SCIENCE DAILY (May 20, 2015), <https://www.sciencedaily.com/releases/2015/05/150520193831.htm>.

23. Zaichun Zhu et al., *Greening of the Earth and Its Drivers*, 6 NATURE CLIMATE CHANGE 791 (2016), <http://www.nature.com/nclimate/journal/v6/n8/full/nclimate3004.html>.

24. See *generally* CO₂ SCIENCE, PLANT GROWTH DATABASE (2017), http://www.co2science.org/data/plant_growth/plantgrowth.php.

25. INDUR M. GOKLANY, REASON FOUNDATION, WEALTH AND SAFETY: THE AMAZING DECLINE IN DEATHS FROM EXTREME WEATHER IN AN ERA OF GLOBAL WARMING, 1900-2010 at 15 (2011).

26. Freeman, *supra* note 4, at 336.

27. *Id.* at 338.

denying the existence of the greenhouse effect, an effect by which certain molecules, including CO₂, take infrared light waves that the Earth reflects back toward space and then reflect them back toward the Earth, creating a warming effect. But this is a straw man. Every ‘climate change denier’ I know of recognizes the existence of the greenhouse effect, and many if not most think man has had some noticeable impact on climate. What they deny is that there is evidence of a *catastrophic* impact from CO₂’s warming effect. That is, they are expressing a different opinion about how fossil fuels affect climate—particularly about the nature and magnitude of their impact.²⁸

So why do we have the idea that the greenhouse effect means rapid global warming? Because the proven greenhouse effect is *falsely equated* with the *related but speculative* theory that the greenhouse effect of CO₂ is dramatically *amplified* by other effects in the atmosphere, leading to rapid warming instead of the otherwise expected decelerating warming. Some predictions of dramatic global warming (and ultimately catastrophic climate change) posit that the greenhouse effect of CO₂ in the atmosphere will greatly amplify water vapor creation in the atmosphere, which could cause much more warming than CO₂ acting alone would. This kind of reinforcing interaction is called a *positive feedback loop*.²⁹

Freeman writes:

Putting climate models aside, Epstein’s claim that the world has not experienced warming at all puts him in a very small group of outliers, and is demonstrably wrong on the facts.³⁰

Yet MCFE explicitly acknowledges the fact that there has been mild warming.

Here’s the summary of what has actually happened—a summary that nearly every climate scientist would have to agree with. Since the industrial revolution, we’ve increased CO₂ in the atmosphere from .03[%] to .04[%], and temperatures have gone up less than a degree Celsius, a rate of increase that has occurred at many points in history. Few deny that during the last fifteen-plus years, the time of record and accelerating emissions, there has been little to no warming—and the models failed to predict that. By contrast, if one assumed that CO₂ in the atmosphere had no major positive feedbacks, and just warmed the atmosphere in accordance with the greenhouse effect, this mild warming is pretty much what one would get.³¹

Freeman writes:

Clearly Epstein sees no need for such a shift because in his account, fossil energy has no significant downsides. He dismisses climate change as a reason to curtail fossil fuel use, for example, declaring every climate model to be a “complete failure.”³²

Moreover, the models Epstein dismisses as “failures,” have actually performed well. When scientists compare what the models show with what actually happened (a process they call hindcasting), the models match reality: global surface temperature rise tracks the rise in atmospheric greenhouse gas concentrations over the same period, both in the observed world and according to the models.³³

28. EPSTEIN, *supra* note 12, at 91-92.

29. *Id.* at 99.

30. Freeman, *supra* note 4, at 338.

31. EPSTEIN, *supra* note 12, at 104.

32. Freeman, *supra* note 4, at 336.

33. *Id.* at 338.

Yet MCFE gives extensive evidence for the failure of climate models to accurately predict climate—and explains why their ability to hindcast is not evidence that they are reliable.

How good are the models at predicting warming or the changes in climate that are supposed to follow from warming?

One pitfall in asking this question is that we have to make sure we have evidence of models *predicting climate in advance*. Why do I say ‘in advance?’ Because part of climate models involve ‘hindcasting’ or ‘postdicting’—that is, coming up with a computer program that ‘predicts,’ after the fact, what happened. There are reasons to do this—namely, it’s important to see if your model could have accounted for the past. *But a model is not valid until it makes real, forward predictions*. It’s a truism in any field of math that if you are allowed enough complexity, you can engage in ‘curve fitting’ for any pattern of data with an elaborate equation or program that will ‘postdict’ exactly what happened in the past—but in no way does that mean it will predict the future. (Many investors lose money doing this sort of thing.) The best way to test a model is to see whether it can make accurate and meaningful predictions about the future.³⁴

If a climate prediction model can’t predict climate, it is not a valid model—and predictions made on the basis of such a model are not scientific. Those whose models fail but still believe their core hypothesis right still need to acknowledge their failure. If they believe that their hypothesis is right and that complete lack of dramatic warming is just the calm before the storm, they should state all the evidence pro and con. Unfortunately, many of the scientists, scientific bodies, and especially public intellectuals and media members have not been honest with the public about the failure of their predictions. Like all too many who are attached to a theory that ends up contradicting reality, they have tried to pretend that reality is different from what it is, to the point of extreme and extremely dangerous dishonesty.³⁵

Freeman writes:

Epstein argues that technology and human ingenuity will enable us to continue using fossil fuels perpetually with virtually no serious adverse impacts. . . . But whatever the success of technologies like scrubbers and filters, which are capable of controlling *conventional* air pollution from coal and natural gas combustion, there is no equivalent equipment add-on currently widely and affordably available that can do the same for carbon emissions, a fact that Epstein fails to mention.³⁶

Freeman’s charge not only ignores the lengthy argument MCFE offers against climate catastrophism, but it also ignores a subchapter called “But What If . . . ?” devoted to a hypothetical scenario in which we faced a climate catastrophe from fossil fuels. That section explains what a proper response to this challenge of adverse climate impacts would look like, including the role of technology in helping us cope with climate challenges.

That said, I want to consider a hypothetical scenario in which CO₂ emissions *do* cause a significant climate danger around the world. I believe that even if that were true, the current conduct and policies of environmental leaders would be inappropriate. Given what we know about the value of energy and of fossil fuels’ superiority in most

34. EPSTEIN, *supra* note 12, at 101.

35. *Id.* at 104.

36. Freeman, *supra* note 4, at 339-40.

contexts, how should an honestly concerned person respond if there is a big problem?

First of all, by getting a straightforward understanding of the exact nature, magnitude, and certainty or uncertainty of the problem. It's actually hard to imagine a dilemma that might justify restricting fossil fuels, for our potential climate mastery is so great. But say there's a rapid rise in sea levels, enough to be truly concerned. What reaction would we want from our thought leaders? One would be an embrace of technological solutions, including those used in the Netherlands and every other place that deals well with sea level and flooding. Another would be investing a huge amount of energy and technology looking for still better solutions.

In terms of communicating with the public, we would want our leaders to offer precise, objective briefings about evidence, risks, and probabilities with a recognition of the need to balance the risks with other risks (e.g., the hardships of energy loss). We would definitely not want vague talk of 'catastrophe' with Hollywood hysteria scenarios. We would want scientists and other thought leaders to welcome debate and be understanding of opponents. We would not want them to bash the inquisitive or skeptical as 'deniers.'

Economically, we would want a commitment to liberate any and every technology that could help, from seawall technology to dike technology to durable building technology to CO₂-free energy technology. We would not oppose the only globally scalable form of CO₂-free energy ever invented: nuclear power. I believe the evidence is clear that nuclear is the safest energy technology (safer than fossil fuels, hydro, wind, solar). But even if it wasn't, if it would help avert a catastrophe, the doomsayers shouldn't be hostile to it. Ditto for large-scale hydroelectric power, which is also widely fought.

The one thing a human-focused response to a major climate danger would not do is try to save ourselves by pursuing solar, wind, and biofuels. These are the worst-performing sources of energy we have, and if we were truly in desperate straits, we would go with something that works; we wouldn't force everyone to use the worst and hope for the best.

Finally, on an emotional note, I think that a proper reaction to a major danger from fossil fuels would be *sorrow*. Think about it: If the energy that runs our civilization has a tragic flaw, that is a terribly sad thing. It would be even worse, say, than if wireless technology caused brain cancer. The appropriate attitude would be gratitude toward the fossil fuel companies for what they had done for us, combined with recognition that we would have to suffer a lot in the years ahead, combined with the commitment to the best technologies that I mentioned earlier.³⁷

In MCFE, I argue that there is no persuasive evidence for catastrophic global warming—and that, far more important, *whatever* climate challenges we face in the years ahead, fossil fuels can play an overwhelmingly positive role in helping us master a climate that is inherently dangerous to human life. Freeman does her readers a disservice by ignoring those arguments, denying the failure of climate models to make accurate climate forecasts, and pretending that MCFE denies the effects of CO₂.

37. EPSTEIN, *supra* note 12, at 134-35.

V. THE EFFECTS OF FOSSIL FUELS ON ENVIRONMENTAL QUALITY

Just as every region of the world, in its undeveloped state, is full of climate dangers, so every region of the world is full of other environmental dangers to our health, such as disease-carrying insects, lack of waste-disposal technology, disease-carrying mammals, disease-carrying crops, bacteria-filled water, earthquakes, and tsunamis.

In *MCFE*, I argue that to conquer these environmental hazards we need to develop a far more sanitary and durable environment. Development is the transformation of a non-human environment into a human-friendly environment using high-energy machines. Development means water-purification systems, irrigation, synthetic fertilizers and pesticides, genetically improved crops, dams, seawalls, heating, air-conditioning, sturdy homes, drained swamps, central power stations, vaccination, pharmaceuticals, and so on.

Of course, development and the fossil fuel energy that powers it carries risks and creates by-products, such as coal smog, that we need to understand and minimize, but these need to be viewed in the context of fossil fuels' overall benefits, including their environmental benefits. It turns out that those benefits far, far outweigh the negatives—and technology is getting ever better at minimizing and neutralizing those risks.

After examining the effect of fossil fuels on air, sanitation, water quality, and human health, I conclude the overall impact of fossil fuels on environmental quality and more broadly, human well-being, is tremendously positive. Fossil fuels don't only help us transform our environment for the better; they help us transform *ourselves* for the better through health technology.

Like all forms of energy, they have risks and by-products, but they also give us the energy and resources to minimize, neutralize, or even reverse those harms. More broadly, if health is our concern, fossil fuels underlie the food and medical care systems that have created the longest life expectancy in history.³⁸

But Freeman doesn't address these arguments. She wrongly claims *MCFE* denies that fossil fuels have risks, and then attacks that straw man by asserting the existence of risks, like that posed by mercury, that I explicitly deal with in the book.

Freeman writes:

Epstein chastises his opponents for overstating the costs of fossil energy. He repeatedly belittles the notion that fossil fuels have any significant downsides. To make this case, he strongly implies that the overwhelming amount of public health data linking air pollution from fossil fuel combustion to increased morbidity and mortality is skewed, exaggerated or fake.³⁹

MCFE attempts to give a precise account of the downsides of fossil fuels, and provides extensive evidence for its claim that fossil fuel opponents have exaggerated the risks and ignored the benefits.

But at the same time, we *do* create risks and side effects that can be deadly, and we need to understand them in order to set policies that will maximize benefits while

38. THE WORLD BANK, LIFE EXPECTANCY AT BIRTH, TOTAL (YEARS), <http://data.worldbank.org/indicator/SP.DYN.LE00.IN> (last visited Feb. 25, 2017).

39. Freeman, *supra* note 4, at 344.

minimizing risks. Like all technologies, fossil fuels have risks and side effects. When we transform those ancient dead plants into energy, bad things can happen. Every time we use energy from fossil fuels (and from any other form of energy) we are engaging in a process that is filled with risk and that, if not managed properly, can become deadly. The process of producing energy can involve all manner of hazardous materials. For example, hydrofluoric acid, a vital material in certain kinds of oil drilling (and many kinds of mining) can literally travel through your skin and melt your bones. The process of producing energy, because it involves something that can generate enormous amounts of power, always carries the risk of the power going out of control: explosions, electrocutions, fires. And then the process of producing fossil fuels involves by-products that can be hazardous to our health.⁴⁰

As we'll see looking at modern fossil fuel technology, we have progressed incredibly in pollution-reduction technology, but it's worth remembering that to the people who experience the need for energy most directly, it's worth pretty much any price, in the same way that you'll put up with a lot of side effects to take a lifesaving drug. And lifesaving drugs, like everything else we value, depend on access to cheap, plentiful, reliable energy—to produce, to transport, to package, to refrigerate.⁴¹

The evidence is brought to us via 'studies,' cited by news media eager to run dramatic, 'if it bleeds it leads' headlines. The main thing to watch out for here is a statement like 'X causes Y'⁴²

Take the example of mercury.

Freeman writes:

Epstein also claims that mercury is not a threat to public health when understood "in context." But whatever context he has in mind, he is flatly wrong, because mercury emissions from coal-burning power plants are a proven neurotoxin, which is dangerous even at low levels, and especially risky to pregnant women and their fetuses.⁴³

But MCFE addresses this very claim by Freeman and others as sloppy and superficial.

Mercury, a metal element, exists naturally throughout the world, most notably in the oceans, which contain an estimated 40 million to 200 million tons of mercury, as well as in most forms of plant and animal life. Mercury is released into the air by volcanoes, wildfires, and in far lesser quantities, the burning of coal. Natural causes of mercury are why the region of the United States with the highest mercury levels is the Southwest, whereas there are much lower levels in coal-heavy West Virginia and Kentucky.

Mercury, like any substance, is toxic in certain forms and doses and harmless in others. The form of mercury that is of particular concern to human health is called methylmercury (or monomethylmercury), a combination of mercury, carbon, and hydrogen. Discussions of 'mercury poisoning' are misleading, because mercury becomes methylmercury only under certain conditions, and methylmercury can be absorbed by human beings in relevant quantities only under certain conditions (for example, the element selenium seems to prevent the absorption of methylmercury).

40. EPSTEIN, *supra* note 12, at 151-52.

41. *Id.* at 80.

42. *Id.* at 164.

43. Freeman, *supra* note 4, at 345.

To be sure, negative cause-and-effect relationships do exist between fossil fuel emissions and human health—in certain concentrations and in certain contexts—but this doesn't appear to be one of them.⁴⁴

By derogating MCFF for its focus on looking at things “in context”—and ignoring its in-context accounts of substances such as mercury—Freeman once again commits a fallacy that the book warns against.

VI. CAUSES OF OPPOSITION TO LIFE-PROMOTING FORMS OF ENERGY

As I noted earlier, MCFF argues that we cannot think clearly about energy unless we're clear on our standard of value: maximum human flourishing or minimum human impact. Freeman's response is to deny that environmentalists hold minimum impact as an ideal, and dismiss my claim that they do as “unfair” and “insulting” “assertions,” without giving the reader any of the evidence the book offers.

Freeman writes:

Epstein adopts what he terms a ‘human standard of value’ and faults environmentalists for adopting instead a ‘non-impact’ standard, which he defines as prioritizing a pristine environment over human welfare. Environmentalists would deprive society, he says, of ‘the energy of life’ in order to preserve the natural world.

Now, even if one does not much care for environmentalists, such assertions are extremely unfair and perhaps even insulting. Many people of faith believe that we have an obligation to be good stewards of the natural world. And in any event, contrary to Epstein's assertions, the mainstream environmental movement is overwhelmingly concerned with human welfare, viewing climate change as a significant threat to people.⁴⁵

Indeed, the specific environmentalists Epstein derides for not caring about human welfare clearly do, as reflected in the very quotes he uses.⁴⁶

Yet Freeman ignores the vast amount of evidence marshaled to support the claim that environmentalists prioritize non-impact over human life, including quotes which unmistakably lack concern for human welfare:

Many leading environmental thinkers, including those who predict fossil fuel catastrophe, hold as their standard of value what they call ‘pristine’ nature or wilderness—nature unaltered by man.

For example, in a *Los Angeles Times* review of *The End of Nature*, [Bill] McKibben's influential book of twenty-five years ago predicting catastrophic climate change, David M. Graber, research biologist for the National Park Service, wrote this summary of McKibben's message:

McKibben is a biocentrist, and so am I. We are not interested in the utility of a particular species or free-flowing river, or ecosystem, to mankind. They have intrinsic value, more value—to me—than another human body, or a billion of them. Human happiness, and certainly human fecundity, are not as important as a wild and healthy planet. I know social scientists who remind me that people are part of nature, but it isn't true. Somewhere along the line—at about a billion [*sic*] years ago, maybe half

44. EPSTEIN, *supra* note 12, at 165-66.

45. Freeman, *supra* note 4, at 348.

46. *Id.*

that—we quit the contract and became a cancer. We have become a plague upon ourselves and upon the Earth. It is cosmically unlikely that the developed world will choose to end its orgy of fossil-energy consumption, and the Third World its suicidal consumption of landscape. Until such time as *Homo sapiens* should decide to rejoin nature, some of us can only hope for the right virus to come along.

In his book, McKibben wrote that our goal should be a ‘humbler world,’ one where we have less impact on our environment and ‘human happiness would be of secondary importance.’

What is of primary importance? *Minimizing our impact on our environment.* McKibben explains: ‘Though not in our time, and not in the time of our children, or their children, if we now, *today*, limited our numbers and our desires and our ambitions, perhaps nature could someday resume its independent working.’ This implies that there should be fewer people, with fewer desires, and fewer ambitions. This is the exact opposite of holding human life as one’s standard of value. It is holding *human nonimpact* as one’s standard of value, without regard for human life and happiness.⁴⁷

In the late 1980s, some reports that fusion was close to commercial reality got quite a bit of press. Reporters interviewed some of the world’s environmental thought leaders to ask them what they thought of fusion—testing how they felt, not about energy’s human-harming risks and wastes, but about its pure transformative power. What did they say?

These are some quotes from a story in the *Los Angeles Times* called ‘Fear of Fusion: What if It Works?’

Leading environmentalist Jeremy Rifkin: ‘It’s the worst thing that could happen to our planet.’

Paul Ehrlich: Developing fusion for human beings would be ‘like giving a machine gun to an idiot child.’

Amory Lovins was already on record as saying, “Complex technology of any sort is an assault on human dignity. It would be little short of disastrous for us to discover a source of clean, cheap, abundant energy, because of what we might do with it.”⁴⁸

This is the logical end of holding human nonimpact as your standard of value; the best way to achieve it is to do nothing at all, to not exist. Of course, few hold that standard of value consistently, and even these men do not depopulate the world of themselves. But to the extent that we hold human nonimpact as our standard of value, we are going against what our *survival requires*.⁴⁹

VII. CONCLUSION

As I have illustrated through direct quote after direct quote, Jody Freeman’s “A Critical Look at *The Moral Case for Fossil Fuels*” is not a look at *The Moral Case for Fossil Fuels*, at all. It is an attack on a straw man—or, more precisely, over a dozen straw men.

This is unfortunate because I believe the book has new and important arguments to make, above all about methodology—and I very much want to see how

47. EPSTEIN, *supra* note 12, at 30-31.

48. *Id.* at 196.

49. *Id.* at 197.

the top minds of the establishment position grapple with those arguments. I hope that this article inspires them to.