

Book review: Bad science and bad arguments abound in ‘Apocalypse Never’ by Michael Shellenberger

A new book that critiques environmentalism is ‘deeply and fatally flawed.’

By Dr. Peter H. Gleick, 15 July 2020

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Think, if you will, of the feud between the Montagues and the Capulets in “Romeo and Juliet.” Or of the 1863-1891 classic American feud between the Hatfields and the McCoys, warring families in West Virginia and Kentucky.

In the decades-old tensions involving environmental science, population, resource dynamics, and ecology, it’s the Malthusians and the Cornucopians. Subscribing to the wisdom of English economist Thomas Malthus, Malthusians express concerns that exponential human population growth and economic demands will outrun global resources needed to support people, undermining long-term sustainability. Cornucopians, in contrast – with their nod to the cornucopia or “horn of plenty” of Greek mythology – hold that technological advances can sustain societal needs and that unbounded economic growth and increased population are positive, giving rise to more good ideas.

Review

The historical tensions and intellectual debates between Malthusians and Cornucopians are now more than two centuries old and have evolved. In recent years, the public conversation around critical global crises like human-caused climate change, deforestation and species extinction, population pressures, and new and worsening public health threats has grown louder, harsher, and increasingly ideological. As the sciences have improved, the deep complexity and connections among these problems have also become more apparent, as have urgent calls to address them through local, national, and global actions.

A recent entry in this debate is Michael Shellenberger’s “Apocalypse Never: Why Environmental Alarmism Hurts Us All” (HarperCollins Publishers, 2020). Shellenberger explains in his introduction that he seeks to counter and dismiss what he considers irrational, overwrought arguments of pending Malthusian catastrophes; instead, he seeks to promote the Cornucopian view that environmental problems can be eliminated if we’d just pursue aggressive economic growth, simple technological advances, and increased tapping of abundant natural resources. In doing so, he echoes previous efforts of authors like Herman Kahn, Julian Simon, and Bjørn Lomborg.

Climate dialogue seen as ‘out of control’

Shellenberger self-describes as an environmentalist activist and a bringer of facts and science to counter “exaggeration, alarmism, and extremism that are the enemy of a positive, humanistic, and rational environmentalism.” He decided to write this book because he believes “the conversation about climate change and the environment has, in the last few years, spiraled out of control.”

Voices of reason and clear analyses in the contentious debates about how to tackle our global problems are welcome. Unfortunately, the book is deeply and fatally flawed. At the simplest level, it is a polemic based on a strawman argument: To Shellenberger, scientists, “educated elite,” “activist journalists,” and high-profile environmental activists believe incorrectly that the end of the world is coming and yet refuse to support the only solutions that he thinks will work – nuclear energy and uninhibited economic growth.

‘What is new in here isn’t right, and what is right isn’t new.’

But even if the author properly understood the complexity and nature of global challenges, which he does not, and got the science right, which he did not, a fatal flaw in his argument is the traditional Cornucopian oversimplification of his solutions – reliance on economic growth and silver-bullet technology. As the great American journalist and humorist H. L. Mencken said, “there is always a well-known solution to every human problem – neat, plausible, and wrong.” Mencken also warned against those who know precisely what is right and what is wrong, a warning especially worth hearing in the highly complex and uncertain worlds of global climate, pandemics, and environmental change.

But the problems in the book go much deeper. The author wanders from topic to topic, jumping from personal anecdote to polemical arguments to data and numbers carefully chosen to support his views, making it difficult for the reader to follow his threads. The most serious flaw, however, is that he assumes a position and seeks data and facts to fit that position rather than, as science demands, using data and facts to develop, test, and refine a theory. As a result, the book suffers from logical fallacies, arguments based on emotion and ideology, the setting up and knocking down of strawman arguments, and the selective cherry-picking and misuse of facts, all interspersed with simple mistakes and misrepresentations of science. Distressingly, this is also an angry book, riddled with ugly ad hominem attacks on scientists, environmental advocates, and the media.

I provide just a few examples of these flaws here – a comprehensive catalog would require its own book. In short, what is new in here isn't right, and what is right isn't new.

Two Cornucopian ideas lie at the heart of this book: The first idea is that there are no real “limits to growth” and environmental problems are the result of poverty and will be solved by having everyone get richer. This idea isn't original and has long been debunked by others (for a few examples see [here](#), [here](#), [here](#), and [here](#)).

View that nuclear alone can address needs

The second idea – and the focus of much of Shellenberger's past writings – is that climate and energy problems can and should be solved solely by nuclear power. He writes, “Only nuclear, not solar and wind, can provide abundant, reliable, and inexpensive heat,” and, “Only nuclear energy can power our high-energy human civilization while reducing humankind's environmental footprint.” (“Apocalypse Never” – hereafter “AN” – pp. 153 and 278) The many economic, environmental, political, and social arguments levied against nuclear are simply dismissed as having no merit, for example: “As for nuclear waste, it is the best and safest kind of waste produced from electricity production. It has never hurt anyone and there is no reason to think it ever will.” (AN, p. 152) His passionate belief that nuclear is the only answer to our energy and climate problems (maybe along with a mega-dam on the Congo River in Africa) is matched by the corollary that renewable energy alternatives – he calls them “unreliables” (AN, p. 176) – are bad because he asserts they are small scale, intermittent, and their economic, environmental, political, and social problems disqualifying.

The argument that poverty and environmental threats are intertwined is both correct and not new. It lies at the heart of international development efforts, including the early United Nations Millennium Development Goals and the current Sustainable Development Goals, [which state](#):

*“The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate change, environmental degradation, peace and justice. **The 17 Goals are all interconnected.**” (emphasis added)*

Similarly, mainstream experts in environmental science and environmental economics have long acknowledged that all energy options have complex sets of environmental advantages and disadvantages. The fields of energy risk assessment, integrated environmental systems analysis, and ecological economics have addressed them for decades.

Using the facade of ‘strawman arguments’

Shellenberger regularly sets up other strawman arguments and then knocks them down. [A strawman argument is an effort to refute an argument that hasn't been made by replacing your opponent's actual argument with a different one.] One of the most prevalent strawman arguments in the climate debate is that scientists claim climate change "causes" extreme events, when in fact, climate scientists make careful distinctions between "causality" and "influence" – two very different things. This area, called "attribution science," is one of the most exciting aspects of climate research today.

Shellenberger sets up the strawman argument that people are incorrectly claiming recent extreme events (like forest fires, floods, heat waves, and droughts) were caused by climate change, and then he debunks this strawman. "Many blamed climate change for wildfires that ravaged California" (AN, p.2) and "the fires would have occurred even had Australia's climate not warmed." (AN p. 21) He misrepresents how the media reported on the fires, describing a New York Times story on the 2019 Amazon fires: "As for the Amazon, The New York Times reported, correctly, that the 'fires were not caused by climate change.'" But here Shellenberger is cherry-picking a quote: If you look at the actual article [he cites](#), the journalist makes clear the "influence" of climate change just two sentences later:

*"These fires were not caused by climate change. They were, by and large, set by humans. **However, climate change can make fires worse. Fires can burn hotter and spread more quickly under warmer and drier conditions.**" (emphasis added)*

He also misunderstands or misrepresents the extensive and growing literature on the links between climate change and extreme events, saying "But climate change so far has not resulted in increases in the frequency or intensity of many types of extreme weather" (AN, p. 15) citing out-of-date research, including a workshop from 15 years ago. In fact, a large and growing body of literature already shows strong links between climate change and extreme events, including hurricanes, heat deaths, flooding, decreasing ice, and more (see, for a few examples, [here](#), [here](#), and [here](#)), and this literature has been expanding rapidly. For instance, in 2019, the American Meteorological Society, or AMS, published [a summary – produced annually – with 21 peer-reviewed analyses of extreme weather in 2018](#) including the research of 121 scientists from 13 countries. The severe Four Corners drought in the U.S., intense heat waves on the Iberian peninsula and in northeast Asia, exceptional precipitation in the mid-Atlantic states, and record-low sea ice in the Bering Sea were all examples of extreme weather events "made more likely by human-caused climate change." As [Jeff Rosenfeld, the editor-in-chief of the AMS series, noted](#), "We've now published more than 100 of these attribution studies in this AMS series and can see how powerful this science is getting. Attribution studies increasingly yield useful, nuanced conclusions that embrace real-world complexity," Rosenfeld wrote. "They collectively make an ever starker statement about the human influence on extreme weather."

Another example of a serious conceptual confusion is his chapter dismissing the threat of species extinctions. The chapter is full of misunderstandings of extinction rates, ecosystem and biological functions, confusions about timescales, and misuses of data. For example, Shellenberger confuses the concept of species "richness" with "biodiversity" and makes the astounding claim that

"Around the world, the biodiversity of islands has actually doubled on average, thanks to the migration of 'invasive species.' The introduction of new plant species has outnumbered plant extinctions one hundred fold." (AN, p. 66)

By this odd logic, if an island had 10 species of native birds found only there and they went extinct, but 20 other invasive bird species established themselves, the island's "biodiversity" would double. This error results from a misunderstanding of the study [he cites](#), which properly notes that simply assessing species numbers (richness not biodiversity) on islands ignores the critical issues of biodiversity raised by invasive species, including the disruption of endemic species interactions, weakening of ecosystem stability, alteration of ecosystem functions, and increasing homogenization of flora and fauna.

Another set of classic logical fallacies is the misuse, misrepresentation, and selective use of evidence. Shellenberger sees himself as the white knight bringing science and facts to emotional arguments. "Every fact, claim, and argument in this book is based on the best-available science ... Apocalypse Never defends mainstream science from those who deny it on the political Right and Left." (AN, p. xiii) But often, his

arguments are based on inappropriate use of evidence, outdated or cherry-picked science, misunderstandings or misrepresentation, or just outright errors.

One of the most common flaws is his confusing use of the terms “can,” “could,” “will,” “will likely,” and so on. These grammatical choices usually reflect classic Cornucopian optimism and the advantage of telling the audience a positive story, rather than one based on the actual evidence. For example, he claims:

*“When it comes to food production, the Food and Agriculture Organization of the United Nations (FAO) concludes that crop yields **will** increase significantly, under a wide range of climate scenarios.” (AN, p. 6, emphasis added)*

What great news, if only we knew for sure it were true and under all plausible climate scenarios. But in fact, this is a misrepresentation of the [2018 FAO report cited](#), which looks at possible futures and actually says:

*“Climate change already has negative effects on crop yields, livestock production and fisheries, particularly in low- and middle- income countries. **Such impacts are likely to become even stronger later in this century.** (emphasis added)*

“Unaddressed climate change, which is associated, inter alia, with unsustainable agricultural practices, is likely to lead to more land and water use, disproportionately affecting poor people and exacerbating inequalities within and between countries. This carries negative implications for both food availability and food access.

There are many other examples where his optimism (things “will” happen) overrides the scientific evidence and uncertainties about the future.

Misrepresenting what scientists actually say or said

Shellenberger’s discussion of nuclear energy and risk also misrepresents what scientists say. He states “mixing up reactors and bombs was, as we say, the go-to strategy for Malthusian environmentalists” (AN, p. 242), but to support this claim he offers the work of Drs. Paul and Anne Ehrlich and John Holdren in their 1977 book *Ecoscience*. Shellenberger quotes their factual statement that “A large reactor’s inventory of long-lived radioactivity is more than one thousand times that of the bomb dropped on Hiroshima.” ([Ecoscience](#), p. 445) But he then falsely says they are implying reactors can explode like bombs: “The implication was wrong. Nuclear reactors cannot detonate like bombs.” (AN, p. 242) Shellenberger was eager to set up the strawman that “Malthusian environmentalists” don’t know the difference between nuclear reactors and nuclear bombs, but in the paragraph right before the statement he quoted, Ehrlich, Ehrlich, and Holdren (the latter trained in part as a nuclear physicist, by the way) literally write: “It is physically impossible for an LWR [light-water reactor] or any thermal-neutron reactor to blow up like a nuclear bomb.” ([Ecoscience](#), p. 444)

This is just one of a series of misrepresentations of the works of the Ehrlichs and Holdren. Just a few paragraphs later, for instance, he says “Holdren and the Ehrlichs had to claim fossil fuels were scarce to oppose the extension of fertilizers and industrial agriculture to poor nations and to raise the alarm over famine.” (AN, p. 242) This is the exact **opposite** of what they have long argued. [To quote Dr. Holdren](#): “What environmentalists mainly say on this topic is **not that we are running out of energy, but that we are running out of environment** – that is, running out of the capacity of air, water, soil, and biota to absorb” the environmental, social, and health impacts of burning fossil fuels. (emphasis added)

Another example of the confusions running through Shellenberger’s narratives is the section “Greed Saved the Whales, Not Greenpeace.” His argument is that cheap oil, epitomized by the discovery of oil in Pennsylvania, saved the whales: “The discovery of the Drake Well led to widespread production of petroleum-based kerosene... thus saving the whales.” (AN, p. 111) Just a page later, however, he acknowledges “But then, whaling came back, and in a big way. Between 1904 and 1978, whalers killed one million whales, nearly three times more than had been harvested before.” He then claims that cheap

vegetable oils (ironically in the form of palm oil from deforestation in the Congo) saved the whales, but then again has to acknowledge that massive whale kills continued.

What finally led to today's almost near moratorium on whale hunts? Not just changes in market forces, not changes in energy sources, not "greed" and the growth in wealth and prosperity as he argues, but the change in public opinion pushed by environmental groups and the public. And oddly, his last sentence in this chapter acknowledges this: "When it comes to protecting the environment by moving to superior alternatives, public attitudes and political action matter" (AN, p. 125) – exactly the point of environmental advocacy groups like Greenpeace that worked to change public opinion.

Scientific uncertainty is not the same as 'We don't know'

Shellenberger misunderstands the concept of "uncertainty" in science, making the classic mistake of thinking about uncertainty in the colloquial sense of "We don't know" rather than the way scientists use it to present "a range of possibilities." In his discussion about catastrophic tipping points like loss of ice sheets, forest and species die back in the Amazon, and changes in ocean circulation, he says (AN, p. 25):

"The high level of uncertainty on each, and a complexity that is greater than the sum of its parts, make many tipping point scenarios unscientific ... there is no scientific evidence that one would be more probable or catastrophic than other potentially catastrophic scenarios, including an asteroid impact, super-volcanoes, or an unusually deadly influenza pandemic."

This is both wrong and hardly comforting. First, high levels of uncertainty are not "unscientific" and second, while most of the climate assessments of the IPCC and others generally do not assess the risk of global catastrophes like these, they do not rule them out, especially if we are too slow to act. The late climate scientist Dr. Stephen Schneider, in [a critique of this same argument](#) made by another Cornucopian, addressed the critical importance of looking at extreme risk probabilities at the "fat tail" of probability distributions and said:

"It is precisely because the responsible scientific community cannot rule out such catastrophic outcomes at a high level of confidence that climate mitigation policies are seriously proposed."

Thus, when scientists discuss possible catastrophic climate risks, they are not being "apocalyptic" – they are responsibly identifying risks that must be evaluated and discussed in the context of science, economics, public policy, and public health.

Another classic logical fallacy is to try to discredit an opponent's argument by attacking the person and her or his motives, rather than the argument – hence the Latin "ad hominem" ("against the man"). Ad hominem attacks are pervasive in this book and detract from its tone and the content. Shellenberger attacks "apocalyptic environmentalists" as "oblivious, or worse, unconcerned" about poverty (AN, p. 35) or for opposing a massive dam on the Congo river. (AN, p. 276) He attacks the finances of leading environmental groups and leaders like the late David Brower, arguing they have taken donations from fossil fuel companies to "greenwash the closure of nuclear plants." (AN, p. 205) And he attacks the motives, reputations, and science of many individual environmental and geophysical scientists whose work contradicts his arguments.

Do media and environmental scientists have the opposite of a 'love for humanity'?

But Shellenberger has a special level of animosity for the press:

"News media, editors, and journalists might consider whether their constant sensationalizing of environmental problems is consistent with their professional commitment to fairness and accuracy, and their personal commitment to being a positive force in the world. While I am skeptical that stealth environmental activists working as journalists are likely to change how they do their reporting, I am hopeful that competition from outside traditional news media institutions, made possible by social media, will inject new competitiveness into environmental journalism and raise standards" (AN, p. 277-278)

In the most disturbing examples of vicious personal attacks, he paints broad categories of people who disagree with him as motivated by a hatred of humanity:

*“When we hear activists, journalists, IPCC scientists, and others claim climate change will be apocalyptic unless we make immediate, radical changes, including massive reductions in energy consumption, **we might consider whether they are motivated by love for humanity or something closer to its opposite** (AN, p. 275, emphasis added). **We must fight against Malthusian and apocalyptic environmentalists who condemn human civilization and humanity itself.**” (AN, p. 274) (emphasis added).*

He argues in his closing sections that people worried about environmental disasters are playing out “a kind of subconscious fantasy for people who dislike civilization” (AN, p. 270) and suggests that people who oppose the solutions he prefers do so because they long for the destruction of civilization – a nasty attack on the motives of all those working in this field.

Finally, the book is riddled with a variety of simple errors. Any book with as many numbers, citations, and claims is at risk of having some mistakes, of course. But the number and scope of them here is problematic. A comprehensive catalog is well beyond the scope of this review, but one example is a massive misstatement of the amount of water required to produce energy. He says “And burning gas rather than coal for electricity requires 25 to 50 times less water.” (AN, p. 118) As shown by the actual numbers from the reference he cites, however, the difference is a factor of around two or less, not 25 to 50. And in an important omission, he fails to note that key renewable energy sources such as wind and solar photovoltaics require far less water per unit of electricity produced than all fossil fuel and nuclear thermal plants. In his discussion about climate change and extreme events, he leaves out extensive peer-reviewed evidence (like [this 2015 paper](#), among many others) showing how fire seasons have gotten much longer as a result of rising temperatures and changing precipitation patterns. He claims, twice (AN pp. 211 and 241), that nuclear power plants produce “zero pollution” – an inaccurate and unnecessary exaggeration.

A common shared goal for ‘a better future’

Shellenberger no doubt believes in, and supports, the goal of a better future. So do environmental scientists, activists, and any decent human. The disagreements we hear lie in different perceptions of the root causes of our crises and the choice of solutions to move our current world to that better future. But ideological polemics, misunderstandings and misrepresentations of science, and angry ad hominem attacks on others working in the field do nothing to move us in the right direction.

There is uncertainty about the best path forward. Those who believe the evidence shows our current path crosses dangerous planetary limits and may lead to severe environmental and social disruption can’t prove an apocalyptic future will happen – they’re arguing we must do what we can to avoid it. But neither can Cornucopians prove that narrow technological solutions and unconstrained economic growth will avoid those catastrophic futures. The imbalance of these viewpoints is key however: if Malthusians are wrong, all they would have done is made the world a better place. If Cornucopians are wrong, apocalyptic outcomes are indeed a real possibility.

Where does that leave us? Identifying, publicizing, and working to avoid future environmental and social disasters is vitally important. I’ve worked at the intersection of science and policy on issues of climate change, freshwater resources, and environmental conflicts for more than 40 years, and the good news is that positive, effective solutions exist. We know how to provide safe water and sanitation to the billions who still lack it. We know we must now work to both cut greenhouse gas emissions to reduce the severity of climate change and at the same time work to adapt to the impacts we can no longer avoid. We know how to improve agricultural efficiency to both grow enough food for everyone and to get it to hungry mouths.

What we lack are adequate efforts to prioritize solutions, fix governmental and institutional failures, motivate policymakers, and, sadly, talk rationally to each other about moving forward quickly and effectively. This book fails to contribute to those much-needed efforts.

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Book review: Michael Shellenberger's reheated critique of climate 'alarmism'

Jim Green, *RenewEconomy*, 7 Aug 2020

<https://reneweconomy.com.au/book-review-michael-shellenbergers-reheated-critique-of-climate-alarmism-54464/>

California-based Michael Shellenberger first courted controversy in 2004 with his 'death of environmentalism' [critique](#) of the environment movement and has continued to attract controversy by promoting nuclear power, demonising renewable energy ("renewables are [worse](#) for the environment than fossil fuels") and demonising the environment movement that he claims to be part of.

Shellenberger's is now into 'luke-warmism' — downplaying the risks associated with climate change and attacking environmentalists for climate and environmental 'alarmism'. That's the focus of his new [book](#), *Apocalypse Never: Why Environmental Alarmism Hurts Us All*. In fact, Shellenberger has been downplaying climate risks [since 2010 if not earlier](#) — his luke-warmism is reheated.

A number of factual rebuttals of Shellenberger's claims about environmental alarmism have been written, and more will follow ([1,2,3,4,5](#)). *Climate Feedback* asked six scientists to review Shellenberger's lengthy [opinion piece](#) which promotes his book. They [found](#) its overall scientific credibility to be 'low' and most found it indulged in cherry-picking and misleading statements.

Shellenberger's claim that "climate change is not making natural disasters worse" is inaccurate and contradicts numerous scientific studies linking climate change to temperature extremes, drought, precipitation patterns, and wildfires.

His claims about species extinction are wrong, his claims about fires and their connection to climate change are [misleading](#) and contradict scientific studies, his claim that 100% renewables would require increasing the land used for energy from today's 0.5% to 50% is [wildly inaccurate](#), and so on.

Daniel Swain from UCLA and the US National Center for Atmospheric Research [said](#) Shellenberger's article "presents a mix of out-of-context facts and outright falsehoods to reach conclusions that are, collectively, fundamentally misleading". Jennifer Francis from the Woods Hole Research Center [said](#) that "many statements are half-truths or based on cherry-picked information" and "some are outright false."

Shellenberger's luke-warmism reads like a PR campaign clumsily constructed by a fossil fuel company. In response to sea level rise 'alarmism', he [reassures](#) us that "Netherlands became rich, not poor while adapting to life below sea level".

Right-wing, anti-environment supporters

Predictably, the right-wing, anti-environment media are [amplifying](#) Shellenberger's [messages](#). The Murdoch News Corp. press has been especially [excited](#) — Shellenberger is "News Corps latest golden " environmentalist' ... pushing the Murdoch line against renewables" according to former Australian Prime Minister [Kevin Rudd](#).

Ketan Joshi [joined the dots](#):

"Shellenberger appeared three times on Sky News Australia, a News Corp outlet that relies heavily on major advertising dollars from several key fossil fuel companies and lobby groups; eg Hancock Prospecting and

the federal and NSW Minerals Council. He wrote or featured in ten articles in The Australian, which regularly places full page advertisements from the coal lobby.”

Climate science-denying organisations, including those with links to fossil fuel industries, are also falling over themselves to promote Shellenberger and his new book. His interview with the far-right, fossil fuel-funded Heartland Institute — one of many such interviews — is mutual admiration from start to finish.

“Climate needs to have its importance diminished”, Shellenberger [told](#) the Heartland Institute. “The main function of the IPCC [Intergovernmental Panel on Climate Change] appears to be to terrify people. I don’t know what else it does. ... I’m not sure the organisation needs to exist any more,” he said.

Pro-nuclear frenemies

Shellenberger’s latest claims have attracted criticism even from some nuclear power advocates. Climate scientist Kerry Emanuel [said](#) he was “very concerned” about Shellenberger’s [opinion piece](#) and is reconsidering his position as an adviser to Shellenberger’s lobby group Environmental Progress. Emanuel said Shellenberger is “embracing disinformation” and that there is “plenty of evidence” that climate change is making natural disasters worse despite Shellenberger’s claim to the contrary.

Climate scientist Tom Wigley [said](#) “some damage will be done” as Shellenberger’s words “may be misrepresented by people who don’t believe in human-caused global warming”.

Zeke Hausfather from the Breakthrough Institute (which Shellenberger co-founded in 2007) [said](#) that Shellenberger’s opinion piece includes a mix of “accurate, misleading, and patently false statements” and that “inaccurately downplaying real climate risks is deeply problematic and counterproductive”.

Hausfather [said](#) the Breakthrough Institute and Shellenberger are “not on friendly terms” and Shellenberger “in no way reflects our views”, partly because of [disagreements](#) “about the role of nuclear as a climate silver bullet vs. part of a broader portfolio of decarbonization technologies”.

Nuclear engineer Katie Mummah [said](#): “Michael Shellenberger is not the only pro-nuclear environmentalist and many of us do not share his views on 1. whether or not climate change is a crisis 2. the value of renewables 3. how to communicate about nuclear energy 4. nuclear weapons.”

Australian economist Prof. John Quiggin [writes](#):

“Michael Shellenberger’s [“apology essay”](#) is the last gasp of “ecomodernism”. Although ecomodernists make a lot of claims, the only one that is distinctive is that nuclear power is the zero-carbon “baseload” energy source needed to replace coal, and that mainstream environmentalists have wrongly opposed it.

“Historically, there is something to this. It would have been better to keep on building nuclear plants in the 1980s and 1990s than to switch from oil to coal, and it was silly for Germany to shut down nuclear power before coal.

“But none of that is relevant anymore, at least in the developed world. Solar PV and wind, backed up storage are far cheaper than either nuclear or coal. As a result, there have been very few new coal or nuclear plants constructed in developed countries in recent years. ...

“At this point, Shellenberger is faced with the choice between admitting that the mainstream environmentalists were right or explicitly going over to the other side. He has chosen the latter.”

Technically accurate nuclear snapshot

Strangely, Shellenberger provides a good snapshot of the current state of nuclear power in *Apocalypse Never*, followed by this caveat: “While all of the above is technically accurate, I carefully excluded key facts in order to be misleading ...”

Here's a sample of his [technically accurate snapshot](#):

“Every effort to make nuclear plants safer makes them more expensive, according to experts, and higher subsidies from governments are required to make them cost-effective. Those soaring subsidies, combined with the financial cost of accidents like Fukushima, estimated to be between 35 trillion yen and 81 trillion yen (\$315 billion to \$728 billion) by one private Japanese think tank, make nuclear one of the most expensive ways to generate electricity.

“Meanwhile, from Finland and France to Britain and the United States, nuclear plants are way behind schedule and far over budget. Two new nuclear reactors at Britain's Hinkley Point C were estimated to cost \$26 billion but will now cost as much as \$29 billion. Expansion of a nuclear plant near Augusta, Georgia, which was supposed to take four years and cost \$14 billion for two new reactors, is now expected to take ten years and cost as much as \$27.5 billion. All of this makes nuclear too slow and expensive to address climate change, many experts say.

“Nuclear has what energy experts call a “negative learning curve,” meaning we get worse at building it the more we do it. Most technologies have a positive learning curve. Take solar panels and wind turbines, for instance. Their costs declined 75 percent and 25 percent, respectively, since 2011. The more we make of them, the better we get at it and the cheaper they become. ...

“Today, the developed world is abandoning nuclear. Germany is almost done phasing it out. France has reduced nuclear from 80 percent to 71 percent of its electricity and is committed to reduce it to 50 percent. In the United States, nuclear could decline from 20 percent to 10 percent of its electricity by 2030. Belgium, Spain, South Korea, and Taiwan are all phasing out their nuclear plants.”

That's a good summary of the sickly state of nuclear power and it isn't much changed by the “key facts” that Shellenberger “carefully excluded” – fringe claims about radiation and health, wishful thinking about nuclear economics, promoting nuclear weapons proliferation and celebrating the [connections](#) between nuclear power and weapons, etc.

Dr. Jim Green is the national nuclear campaigner with [Friends of the Earth Australia](#) and editor of the [Nuclear Monitor newsletter](#).