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Fossil Future: Why Global Human Flourishing Requires More Oil, Coal and Natural Gas --Not Less" by Alex Epstein

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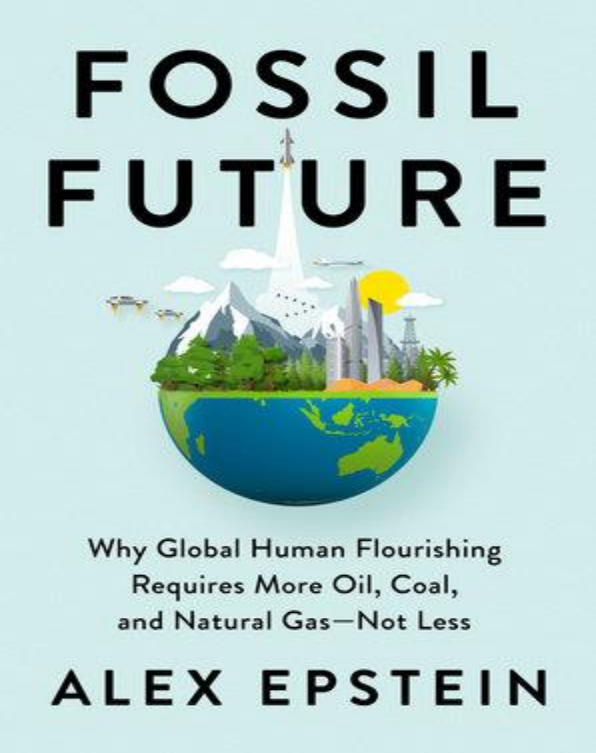

Abstract

Alex Epstein's "Fossil Future: Why Global Human Flourishing Requires More Oil, Coal, and Natural Gas--Not Less", rich in empirical data and common sense, is a timely masterpiece. It makes a compelling case for more Fossil Fuels (Oil, Coal, and Natural Gas) for the survival of the human race amid the Net–Zero ultimatum on CO_2 emission by 2050. In practice, Fossil Fuels are cheap, reliable, and necessary, whereas Renewable Energy (Wind and Solar) is expensive, unreliable, and a luxury. Petrochemicals are the building blocks of wind turbines and solar panels. At present, humans cannot collect renewable energy without petrochemical–based wind turbines and solar panels (i.e. without emitting CO_2). It is worth noting that there are 772 Pounds of petrochemical Plastics in each electric car. Therefore, the whole renewable-energy (Wind and Solar) movement is the height hypocrisy!

Introduction

The "Fossil Future" by Alex Epstein is a timely masterpiece amid the 2022–Energy Crisis in Europe. It is a well written, well researched, well reasoned, and well illustrated book. The author makes a compelling case for his argument "Why Global Human Flourishing Requires More Oil, Coal, and Natural Gas--Not Less" based on sound logic, common sense, and more importantly, empirical data.

Alex Epstein is an energy expert and founder of the Center for Industrial Progress, which offers a positive, pro–human alternative to the green movement. His New York Times best selling book, "The Moral Case for Fossil Fuels" (Epstein, 2014), has been widely praised as the most persuasive argument ever made for our continuing use of fossil fuels, winning Epstein the "Most Original Thinker of 2014" award from The McLaughlin Group. He earned a B.A. degree in Philosophy from the Duke University. The fact that Epstein is a philosopher, not a scientist, is an asset in this debate on "Fossil fuels vs. Renewable energy" that has been severely muddled by climate scientists. I, as a petroleum geologist (Shanmugam, 2006, 2012, 2021), find his book on Fossil Fuels, written by a philosopher, not only refreshing but intellectually rewarding! Therefore, I whole heartedly recommend this book to anyone who wishes to understand the problem with an open mind. I also take this opportunity to cite additional references in strengthening the case for Fossil Fuels.

Book title

My one criticism of the book is its title. As a geologist, I have difficulties with the title. In my view, "Fossil Future" should be titled "Fossil–Fuel Future". The reason is that the terms "Fossil" and "Fossil Fuel" are not one and the same. Each one conveys a totally different meaning in geology. According to the Cambridge Dictionary (2022a), the term "fossil" means "part of a plant or animal, or its shape, that has been preserved in rock or earth for a very long period". On the other hand, according to the Cambridge Dictionary (2022b), the term "fossil fuel" means "a fuel such as coal, oil, or natural gas that is produced by the gradual decaying of prehistoric plants and animals." In short, one represents a rock and the other represents a fuel.

Biased Climate Scientists

On page 63, under section "An Uncorrected Failure", Epstein points out the inherent problems and biases with climate scientists like James Hansen, Michael Mann, and Bill McKibben (see other examples by Van deer Linen, 2018; McKitrick and Christy, 2020; Koonin, S. E. (2021); Shanmugam, 2022). Climate scientists are biases and they accentuate the negative attributes of fossil fuels, such as 'CO2 emission, and totally ignore the positive attributes (See examples below).

Fossil fuels vs. Renewable energy

The central theme of the book is to emphasize the benefits of fossil fuels to humanity when compared with renewable energy types (Table 1).

Table 1. Fossil fuels vs. Renewable energy

Serial Number	Property	Fossil Fuels	Renewable Energy
1	Types	Oil Natural gas Coal	Solar Wind Hydro* Geothermal* Biomass*
2	Percentage of world's energy	80%	3%
3	Usage in critical areas, such as agriculture, production of fertilizers, heavy machinery, aviation, shipping, trucking and other ground transportation, sanitation, road construction, pipeline construction, military complexes, war machines, space industry, healthcare industry, among many others.	Yes	No
4	Petroleum products critical to modern living	>6,000 syringes, medical equipment, gloves, N─95 masks, Aspirin, antibacterial, cough syrups, lubricants, ointments (see Table 2)	0 (Zero) Petrochemicals are the building blocks of wind turbines and solar panels (Hockstad, 2016)
5	Energy density	Very high (Concentrated)	Low (Dilute)
6	Occurrence	Subsurface	Subaerial
7	Reliability	Very high	Low Sun and the wind are intermittent, uncontrollable, unreliable, sources of energy (Lawson, 2022; Schreiber, 2022)
8	Cost	Cheap	Expensive
9	Emission of CO_2	Low (Happer, 2022)	Zero
10	Damage to environment	Minimum (e.g. Emission of CO_2) (Lindzen, 2012; Happer, 2022)	Yes (e.g. killing of birds by wind turbines)
11	Group think	Low	Very high

12	Influence by International Organizations and Social Media	Accentuate the negative and ignore the positive attributes	Accentuate the positive and ignore the negative attributes
13	Research funding	Low	Very high. **German funding for renewable energy research reaches 1.31 billion Euros (Meza, 2022)**
14	Availability	Unlimited reserve with potential for new discoveries (CNOOC, 2002). Fracking of shale gas.	Unlimited
15	The ultimate effect of the Net-Zero policy	Planet Earth without humans, but with real-world earthquakes, volcanic activities, meteorite impacts, tropical cyclones, and tsunamis	Planet Earth without humans, but with real-world earthquakes, volcanic activities, meteorite impacts, tropical cyclones, and tsunamis
16	Operation	Ethical Methods of extraction of Fossil fuels do not employ renewable energy	Hypocritical Methods of extraction of renewable energy do utilize fossil fuels. 1. Wind turbines and Solar panels ─the means of collecting renewable energy─ are made with petrochemical products (Hockstad, 2016) 2. The green-energy elites, such as, Al Gore, Leonardo DiCaprio, and Bill Gates, fly to Davos in Switzerland to attend the World Economic Forum, where they promote renewable energy. However, their private jets consume enormous amounts of jet fuels emitting CO_2.

*Not the focus of this book review
Note: Epstein also emphasizes the importance of Nuclear Energy

In his books, Epstein documented that Fossil fuels (Oil, Coal, and Natural Gas) are still the dominant source of energy around the world, and growing fast—while much hyped renewable (Wind and Solar) are causing sky rocketing electricity prices and increased blackouts (Epstein, 2014). Fossil fueled development has brought global poverty to an all-time low (Epstein, 2014). While fossil fuels have contributed to the 1 degree of warming in the last 170 years, climate-related deaths are at all-time lows thanks to fossil-fueled development (Epstein, 2014). During the past 100 years, with an increasing atmospheric CO2 there has been a decreasing climate-related disaster deaths (Epstein, 2022) (Fig. 1).

Life─saving petroleum products

On page 152, Epstein reminds us that "Fossil fuel materials are also indispensable to modern medicine, with medications, syringes, medical equipment, gloves, and masks all made of oil and/ or natural gas. It's hard to find something in a hospital that isn't substantially made of oil and/or gas." The N─95 masks, which saved millions of lives during the COVID-19 Pandemic worldwide in 2020, are made mostly of petrochemicals derived from oil and natural gas (Quan, 2020). Aspirin, antibacterial, suppositories, cough syrups, lubricants, creams, ointments are some of the numerous medications that have their base in petrochemicals.

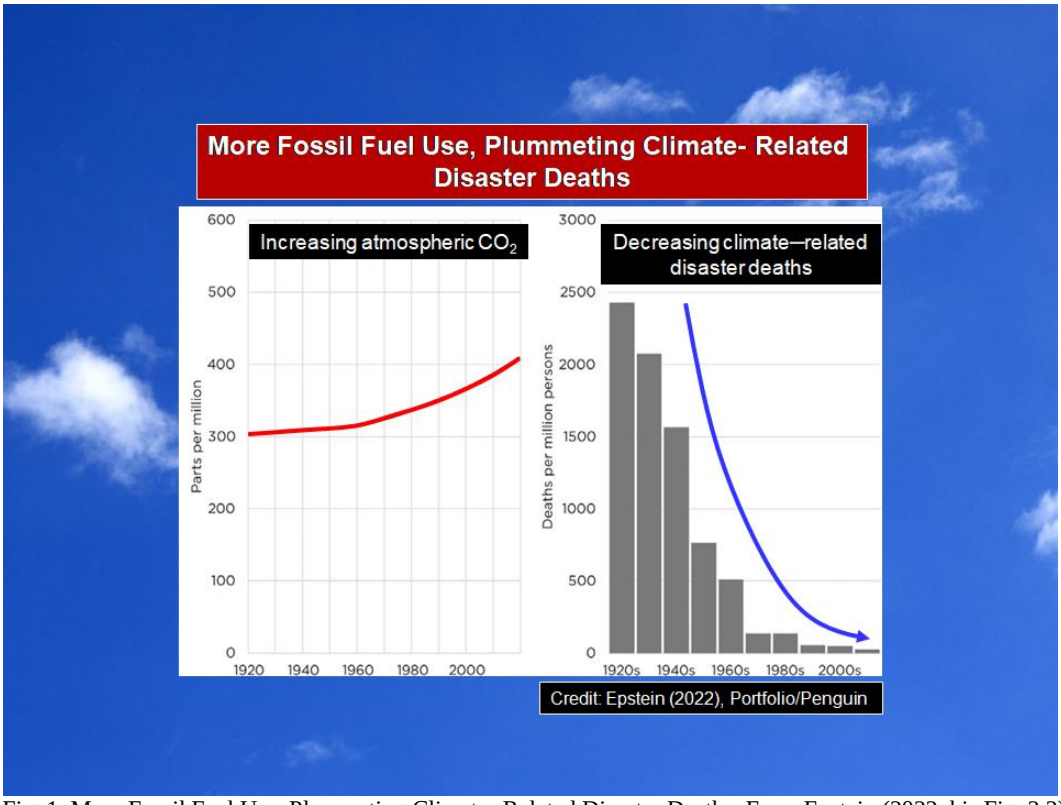

Fig. 1. More Fossil Fuel Use, Plummeting Climate- Related Disaster Deaths. From Epstein (2022, his Fig. 2.2). Additional labels by G. Shanmugam. *Sources: Scripps Institution of Oceanography; EM- DAT; World Bank Data; Maddison Project Database*

Rankin Energy Corporation (2022) stated that there are over 6,000 products. Petroleum products are an integral part of modern living, but we seldom acknowledge their importance (e.g., Floor Wax, Soap, Shoes, Toilet Seats, Shampoo, Anesthetics, Toothpaste, Gasoline, among others; see Table 2). Table 2. 144 petroleum products, among over 6,000 items, that are in use to facilitate modern living (Ranken Energy Corporation, 2022).

Infinite reserve of fossil fuels

The notion that the reserve of fossil fuels is finite is false. We continue to discover new oil and gas fields. In October 2022, CNOOC (2022) discovered a large deep─water gas field, containing 50 billion cubic meters of fuel in the South China Sea. According to the China National Offshore Oil Corp (CNOOC), the gas field called "Baodao 21─1" achieved the biggest drilling breakthrough in the Songnan─Baodao area in more than 50 years. Furthermore, innovative methods like fracking of shale gas provide endless opportunities for Infinite supply of fossil fuels. Epstein on page 55 correctly points out that "For example, using fossil─ fueled machines that "fracture" once─ useless shale rocks, today's oil and gas industry cost- effectively produces via fracking over a hundred billion gallons of oil a year that were in the past considered Unavailable."

Reliability and Research Funding

On page 115, Epstein writes that "A non─nourishing environment is one in which one toils for hours and hours a day to acquire barely enough food and water to make it to the next day." Personally, I could personally relate to this point some 70 years ago. I was born in 1944 in a small town called Sirkazhi, Madras Presidency, British India. In those days, my mother would start cooking very early in the morning using cow dung patties that would take 15─20 minutes just to heat a pot of water. Thanks to fossil─fuel generated electricity and microwave Ovens; one can accomplish the same task today in just 30 seconds. Disappointingly, one third of the world still uses wood and dung (See Epstein, 2022, his Fig. 1.5). Fossil fuels have done wonders to modern living. However, if fossil fuels were to be abolished tomorrow by the Net─Zero mandate, the modern living, as we know it in the West, will cease to exist. This is not a hollow threat, but a

real possibility. Sadly, we are already witnessing this tragedy in Europe today.

Serial Number	Petroleum Products			
1-4	Solvents	Diesel fuel	Motor Oil	Bearing Grease
5-8	Ink	Floor Wax	Ballpoint Pens	Football Cleats
9-12	Upholstery	Sweaters	Boats	Insecticides
13-16	Bicycle Tires	Sports Car Bodies	Nail Polish	Fishing lures
17-20	Dresses	Tires	Golf Bags	Perfumes
21-24	Cassettes	Dishwasher parts	Tool Boxes	Shoe Polish
25-28	Motorcycle Helmet	Caulking	Petroleum Jelly	Transparent Tape
29-32	CD Player	Faucet Washers	Antiseptics	Clothesline
33-36	Curtains	Food Preservatives	Basketballs	Soap
37-40	Vitamin Capsules	Antihistamines	Purses	Shoes
41-44	Dashboards	Cortisone	Deodorant	Shoelace Aglets
35-48	Putty	Dyes	Panty Hose	Refrigerant
49-52	Percolators	Life Jackets	Rubbing Alcohol	Linings
53-56	Skis	TV Cabinets	Shag Rugs	Electrician's Tape
57-60	Tool Racks	Car Battery Cases	Epoxy	Paint
61-64	Mops	Slacks	Insect Repellent	Oil Filters
65-68	Umbrellas	Yarn	Fertilizers	Hair Coloring
69-72	Roofing	Toilet Seats	Fishing Rods	Lipstick
73-76	Denture Adhesive	Linoleum	Ice Cube Trays	Synthetic Rubber
77-80	Speakers	Plastic Wood	Electric Blankets	Glycerin
81-84	Tennis Rackets	Rubber Cement	Fishing Boots	Dice
85-88	Nylon Rope	Candles	Trash Bags	House Paint
89-92	Water Pipes	Hand Lotion	Roller Skates	Surf Boards
93=96	Shampoo	Wheels	Paint Rollers	Shower Curtains
97-100	Guitar Strings	Luggage	Aspirin	Safety Glasses
101-104	Antifreeze	Football Helmets	Awnings	Eyeglasses
105-108	Clothes	Toothbrushes	Ice Chests	Footballs
109-112	Combs	CD's & DVD's	Paint Brushes	Detergents
113-116	Vaporizers	Balloons	Sun Glasses	Tents
117-120	Heart Valves	Crayons	Parachutes	Telephones
121-124	Enamel	Pillows	Dishes	Cameras
125-128	Anesthetics	Artificial Turf	Artificial limbs	Bandages
129-132	Dentures	Model Cars	Folding Doors	Hair Curlers
133-136	Cold cream	Movie film	Contact lenses	Drinking Cups
137-140	Fan Belts	Car Enamel	Shaving Cream	Ammonia
141-144	Refrigerators	Golf Balls	Toothpaste	Gasoline

Because of the ongoing Russia–Ukraine war that began in February 2022, sanctions were imposed on Russia. This led to shutting down of Nord Stream Pipelines 1 and 2 that were built to supply gas from Russia to Germany. According to Lawson (2022), "Nord Stream 1 is the single biggest pipeline for gas from Russia to Europe and has the capacity to deliver 55bn cubic metres (bcm) of gas a year. Continued supplies through the pipeline are seen as crucial to prevent a deepening of the energy crisis." In this context, the Germany's Deutsche Bank reported that if Russia makes deeper cuts in the supply of natural gas to Western Europe as a result of sanctions over the war in Ukraine, German households might have to turn to an alternative fuel to heat their homes, such as wood (Schreiber, 2022).

Germany is the leader in promoting renewable energy. The German government has approved 1.31 billion Euros in funding for research related to the country's energy transition, according to the federal environment ministry. In its aim to become climate-neutral and less dependent on energy imports, Germany is striving to convert its supply systems to renewable energy (Meza, 2022). However, under precarious war conditions, the only reliable energy sources are the Fossil Fuels (Oil, Coal, and Natural Gas), not renewable energy (Solar and Wind). Epstein illustrates this point in great detail on page 215 with his Fig. 6.3 using Germany as a case study.

Fossil Fuels are cheap, reliable, and necessary, whereas Renewable Energy (Wind and Solar) is expensive, unreliable and a luxury.

The role of CO_2 in generating cyclones

Epstein writes about weather extremes born of carbon usage. In the U.S., whenever a cyclone hits the Gulf of Mexico, the first you hear from the weather forecaster on TV is that tropical cyclones are the result of anthropogenic global warming and related carbon emission. Epstein tackles this fallacy head on page 277 by noting that "Long before significant CO_2 emissions, storms were taking tens and even hundreds of thousands of human lives in the unempowered world, such as the 300,000 lives lost in an 1839 India cyclone". Importantly, empirical data show that there is a decrease in storm─related deaths during the past six decades (Epstein, 2022, his Fig. 7.5) (Fig, 2).

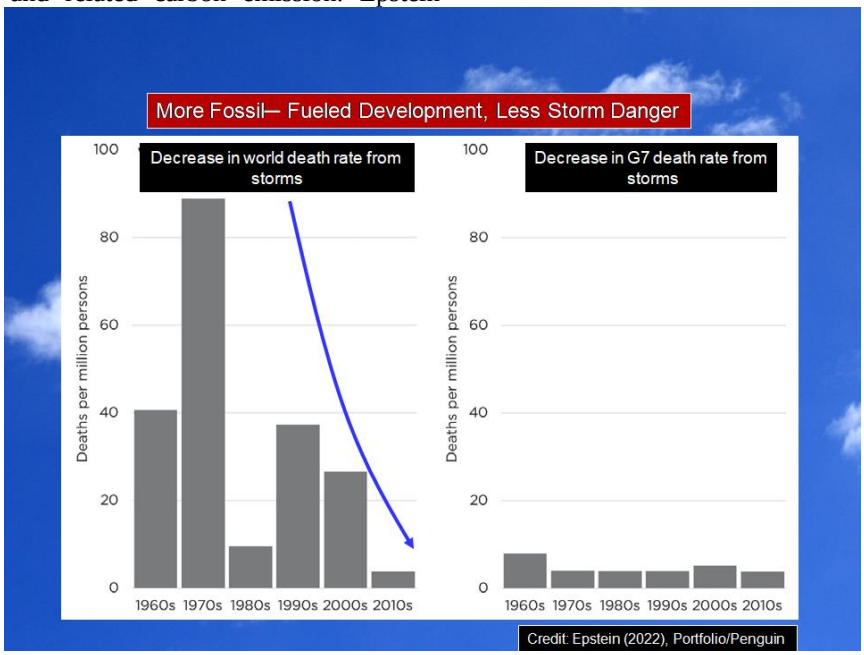

Fig. 2. More Fossil- Fueled Development, Less Storm Danger. From Epstein (2022, his Fig. 7.5). Additional labels by G. Shanmugam. *Sources: Scripps Institution of Oceanography; EM- DAT; World Bank Data; Maddison Project Database*

As a geologist, I have researched and published articles on cyclone and tsunamis in peer─reviewed international journals (Shanmugam, 2008). I find the connection between CO_2 and cyclones is unsustainable. Tropical cyclones are formed only when certain meteorological conditions are satisfied. Necessary conditions for the development of tropical cyclones are (Gray, 1979; AOML, 2007):

(1) A minimum distance of at least 500 km (311 mi) from the equator,
(2) Warm ocean waters of at least 26.5°C (80°F) to a depth of about 50 m (164 ft),
(3) An unstable atmosphere that cools fast with height,
(4) Relatively moist layers near the mid atmosphere (5 km; 3 mi),
(5) A pre─existing near─surface disturbance with sufficient vorticity and convergence,
(6) Low values (less than about 10 m s^{-1} [33 ft s^{-1}]) of vertical wind shear (i.e., the magnitude of wind change with height) between the surface and the upper troposphere, and
(7) The Coriolis force.

Clearly, CO_2 emission is not a primary factor in the genesis of cyclones.

Recent studies by Chand et al. (2022) show that the frequency of cyclones has been declining since 1850 (Fig. 3) despite global warming. Therefore, the link between Co_2 emissions and generation of tropical cyclones is not validated by empirical data.

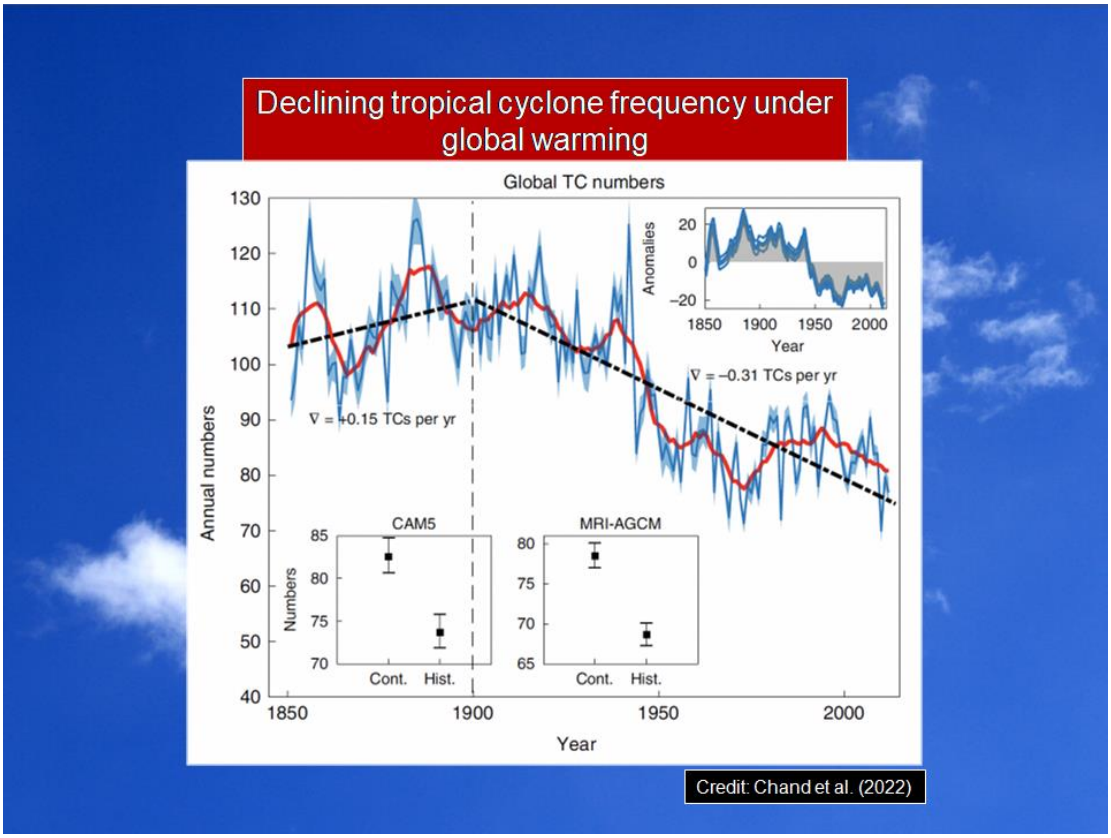

Fig. 3. Declining tropical cyclone frequency under global warming. From Chand et al. (2022). Nature Climate Change.

The Net─Zero Ultimatum

On page 394, Epstein notes that "…President Joe Biden has made it a goal for the U.S. to have "Net─Zero" CO_2 emissions from electricity by 2035 and from all forms of energy by 2050— with unreliable solar and wind as the primary means of getting there."

This mandate, if implemented, requires 100% elimination of fossil fuels by 2050.

It can realistically be achieved only by eliminating the entire human race because the human race is the only one who uses fossil fuels that emit CO_2.

Fossil fuels are the underpinning of modern civilization that relies on petroleum products.

Renewable energy sources (wind and solar) cannot produce petroleum products (Fig. 4) because wind and solar energy sources do not contain hydrogen and carbon molecules.

Therefore, modern civilization will cease to exist without fossil fuels.

Environmental, Social, and Governance (ESG) On page 396, Epstein alerts that "The aspect of the corporate anti─ fossil fuel movement that scares me the most is the "ESG" movement, which prods companies not only to advocate for fossil fuel elimination but also to commit to practicing it, independent of what the law says." He is proven correct in the case of Sri Lanka that adopted ESG policy and banned chemical fertilizer in 2021. Although Sri Lanka has an almost perfect ESG score at 98.1, Sri Lanka has drastically reduced crop yields. Furthermore, the ESG policy has damaged Sri Lanka's trade balance and has run out of fuel. The country is facing the worst economic crisis in decades (Daily Caller News Foundation, 2022), resulting in bankruptcy (Bostock, 2022). According to Follett and Cochran (2022), "Over 90 percent of Sri Lanka's farmers had used chemical fertilizers before they were banned. After they were banned, an astonishing 85 percent experienced crop losses. Rice production fell 20 percent and prices skyrocketed 50 percent in just six months."

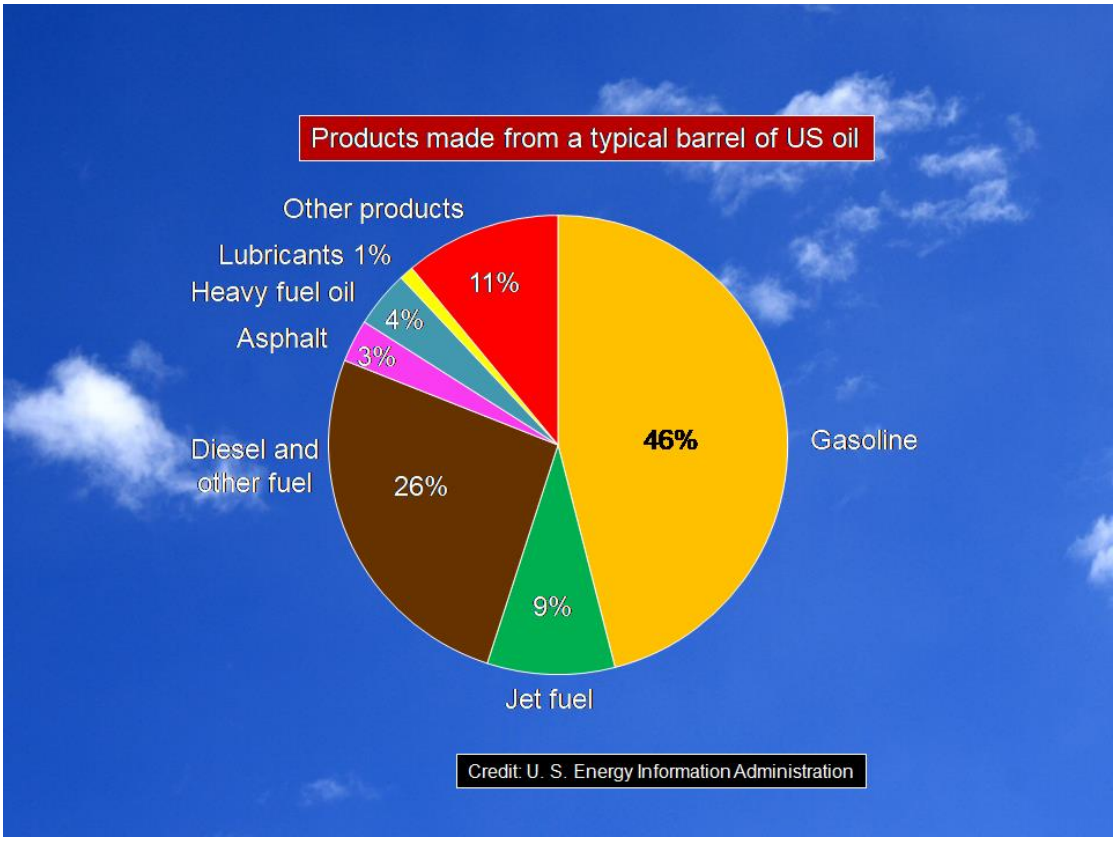

Fig. 4. A breakdown of the products made from a typical barrel of US oil. Solar and wind cannot produce these vital products necessary for human survival in the western countries.
Diagram credit: U.S. Energy Information Administration > Petroleum > Navigator > Refinery Yield

Wind turbines, Solar panels, and Electric cars: The Green Energy Myths

In chapter 6, Epstein explains why the more solar and wind grids we use, the more their electricity tends to cost. In addition to this economic problem, there is an ethical problem. Petrochemicals are the building blocks of wind turbines and solar panels (Epstein did, 2016). At present, humans cannot collect renewable energy without petrochemical─based turbines and panels (i.e. without emitting CO_2). It is worth noting that there are 772 pounds of Petro-Chemical Plastics In each electric car (Whipple, 2020). Therefore, the whole renewable─energy (Wind and Solar) movement is the height hypocrisy!

Earth in the Solar System

Epstein discusses the role of the Sun on climate change throughout the book. I would like to further emphasize that Climate Change that affects the Earth must be considered in the context of the Solar System (Fig. 5).

In the Solar System, Earth is a minor player (Fig. 5), despite its human habitants with an "inflated sense of self". For example, the global elites like Al Gore (a former U.S. Vice President) and Leonardo DiCaprio (an actor) set agenda in controlling CO_2 emissions during their annual meeting at the World Economic Forum in Davos, Switzerland, see also Table 1).

In their seminal book, Haigh and Cargill (2015) emphasize that "The Earth's climate system depends entirely on the Sun for its energy. Solar radiation warms the atmosphere and is fundamental to atmospheric composition, while the distribution of solar heating across the planet produces global wind patterns and contributes to the formation of clouds, storms, and rainfall."
We humans cannot regulate cosmic forces that control Earth's temperature and climate (Haigh and Cargill, 2015; see also Soon et al., 2015; Soon and Baliunas, 2017).

Furthermore, Venus and Jupiter may meddle with Earth's orbit and climate (Daley, 2018). In 405,000-year cycles, the tug of nearby planets causes hotter summers, colder winters and drier droughts on our Planet Earth. By comparison, the human factor in controlling Earth's climate is frivolous.

Earth's climate is controlled by CO_2 emissions by all countries (see Pie Chart in Fig. 5). Any mandate on control of emission of CO_2

must be adopted by all countries without any exceptions. However, this is not the case today.

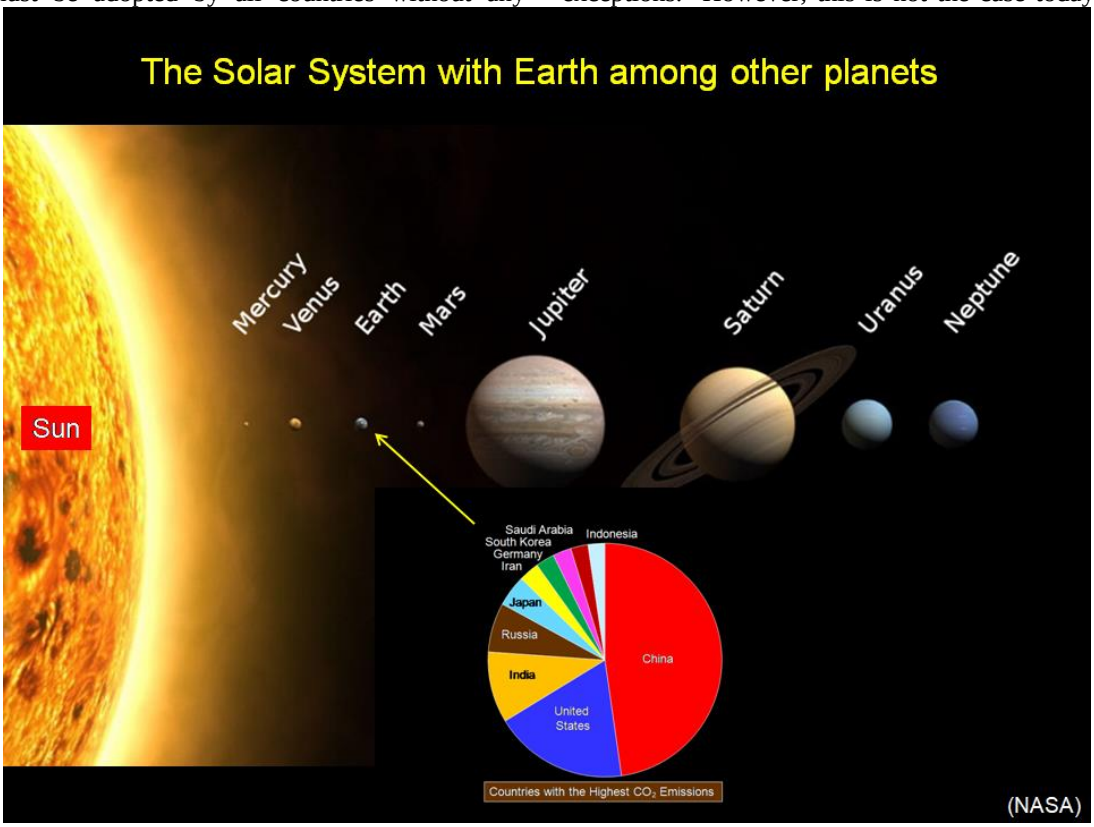

Fig. 5. Diagram showing the position of Earth among other planets in the Solar System (NASA). The pie chart at the bottom shows the top 10 countries with the Highest CO_2 emissions in the world (Unit: million tons CO_2) in 2020 (EDGAR, 2022).

China - 11,680.42 (Unit: million tons CO_2)
United States - 4,535.30
India - 2,411.73
Russia - 1,674.23
Japan - 1,061.77
Iran - 690.24
Germany - 636.8
South Korea - 621.47
Saudi Arabia - 588.81
Indonesia - 568.27

Figures, Notes, and Index

Figures are composed of histograms, pie charts, graphs and photographs. They are clearly labeled and sourced. There are 39 figures.

Notes are useful list of references and other explanations included at the end. There are 328 notes.

On pages 457─468, a comprehensive Index contains Subject and Author names.

The book ends on page 468, but the publisher erroneously claims that there are 480 pages.

I have examined both the print version and the digital (PDF) version. The Publisher: Portfolio/Penguin has done an excellent job of production.

Concluding remarks

Epstein, by applying his distinctive "human flourishing framework" (page 95) to the latest evidence, comes to the audacious conclusion that the benefits of fossil fuels will continue to far outweigh their side effects—including climate impacts—for generations to come. Epstein forcefully argues that the path to global human flourishing is a combination of using more fossil fuels, getting better at "climate mastery," (page 101) and establishing "energy freedom" (Chapter 10, page 357) policies that allow nuclear and other truly promising alternatives to reach their full long-term potential. In the final Chapter 11 (page 430), Epstein concludes the book with an optimistic note: "Sooner or later— and with your help, sooner—billions of people will see what I started seeing fourteen years ago: that for eight billion people to

live in a nourishing, safe, opportunity- filled world— a world in which, for the first time ever, global human flourishing is possible— we need more oil, coal, and natural gas, not less." Amen!

Acknowledgements

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