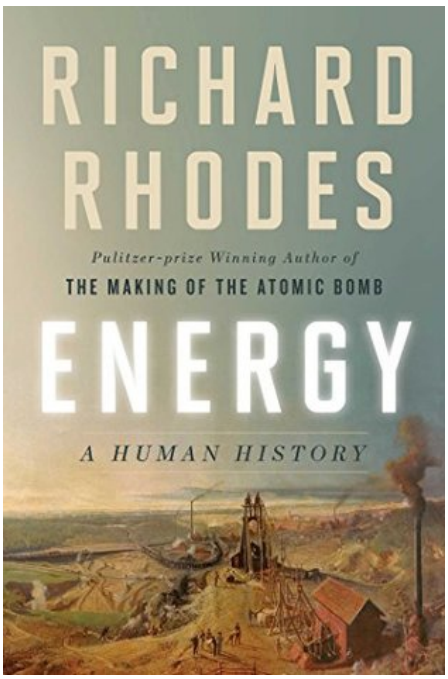

Energy: A Human History

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Pulitzer Prize- and National Book Award-winning author Richard Rhodes reveals the fascinating history behind energy transitions over time—wood to coal to oil to electricity and beyond.

People have lived and died, businesses have prospered and failed, and nations have risen to world power and declined, all over energy challenges. Ultimately, the history of these challenges tells the story of humanity itself.

Through an unforgettable cast of characters, Pulitzer Prize-winning author Richard Rhodes explains how wood gave way to coal and coal made room for oil, as we now turn to natural gas, nuclear power, and renewable energy. Rhodes looks back on five centuries of progress, through such influential figures as Queen Elizabeth I, King James I, Benjamin Franklin, Herman Melville, John D. Rockefeller, and Henry Ford.

In *Energy*, Rhodes highlights the successes and failures that led to each breakthrough in energy production; from animal and waterpower to the steam engine, from internal-combustion to the electric motor. He addresses how we learned from such challenges, mastered their transitions, and capitalized on their opportunities. Rhodes also looks at the current energy landscape, with a focus on how wind energy is competing for dominance with cast supplies of coal and natural gas. He also addresses the specter of global warming, and a population hurtling towards ten billion by 2100.

Human beings have confronted the problem of how to draw life from raw material since the beginning of time. Each invention, each discovery, each adaptation brought further challenges, and through such transformations, we arrived at where we are today. In Rhodes's singular style, *Energy* details how this knowledge of our history can inform our way tomorrow.

Energy: A Human History Details

Date	:	Published May 29th 2018 by Simon & Schuster
ISBN	:	
Author	:	Richard Rhodes
Format	:	Kindle Edition 481 pages
Genre	:	History, Science, Nonfiction, Economics, Technology, Politics

From Reader Review Energy: A Human History for online ebook

Kyle Bunkers says

This was an interesting book that really helps you get a sense of how we have have used various energy sources over the last 40 years. My only complaint is that it sort of ends suddenly, with just the briefest description of renewable energy. To some degree this is understandable, but compared to the detail and storytelling in the rest of the book, it is a bit of a letdown.

The book is basically exactly what its title suggests, a history of human energy use. This may not sound exciting to most, but Rhodes gives a human tale to each energy source, and provides interesting historical context to each resource he covers. He brings up stories that are not well known to the public (probably not well known to many but historians of the era), and shows his keen ability to explain science in regular English without losing much of the nuance. I would not say this book is as much a masterpiece as Rhodes's The Making of the Atomic Bomb, but I thoroughly enjoyed it and would not say it is very far behind in quality from it.

I think this would be a great read for just about anyone with even a passing interest in how we have used energy and may in the future. Rhodes has a pro-nuclear viewpoint which he justifies very well in my opinion. He also does not push any strong view onto the reader and lets the stories he tells, and how he tells them guide you towards thinking anew on how we should meet our energy needs.

Travis Tucker says

A good history of the progression of the history of the development of energy sources and machines to use them. My only issues were: 1) that is was bit America/Western Europe-centric. I understand that this is where the invention took place, but it would have been interesting to know how quickly ideas / adoption spread to other parts of the world. 2) the discussion on wind / solar renewables was a bit brief.

Gabbi Levy says

My interview with Richard Rhodes:

ENERGY IS ALL AROUND us. It lights homes, fuels cars, cooks food and connects people to their world, yet most spend little time thinking about where it comes from and how it gets to their lamps, televisions and cellphones.

But the world is at a turning point. Scientific consensus has concluded that humans – especially through a reliance on the fossil fuels used to produce energy – have contributed to the warming of the planet and that time is running out to avoid catastrophic effects. In his new book, "Energy: A Human History," Pulitzer Prize-winning historian Richard Rhodes explores the technological developments that drove the Industrial Revolution and created modern society – and that now may put it at risk.

In a recent interview with U.S. News, Rhodes discussed the choices ahead and the lessons from the past in

order to power the future. Excerpts:

Why are we having so much trouble letting go of carbon-based energy sources?

The most striking thing of all is how much more total, world-scale our situation is today than it ever has been in the past. All of the major transitions that I write about from wood coal and the development of various kinds of power sources were all regional or even local within a country at first. The other is how long it has taken to move from one major source of energy to another major source of energy. We tend to think that once we know how to build a solar panel or put up a wind turbine, that's it. We'll just do that and then things will change. But the lesson of the last 400 years, to the contrary, is that it's a much more complicated business than that because it involves social learning, and that tends to proceed very slowly with all of the various kinds of commitments and resistances and all of the technological development issues.

Existing producers of materials don't want to see the change that's taking place because they're invested in it. It's where their money is. I think we see that today with the resistance of the petroleum industries, hydrocarbon industries, to the idea that we need to decarbonize the energy supply. What are they going to do with all the investments they've made? They don't see that as a happy outcome and have been resisting it fiercely, even to the point of denying that global warming is actually taking place.

Natural gas is the largest single source of energy in the United States and is touted as better for the environment. But does it improve enough on other fossil fuels?

It has one great advantage, which is that it doesn't seriously pollute the air. By switching to natural gas to power our power stations, you reduce the amount of air pollution – and that's good. But on the other hand, it's about 50 percent as productive of carbon dioxide as coal. So in terms of global warming, it's not a happy solution to the problem. That's why I emphasize the development of nuclear power, because once nuclear plants are built, they basically produce no carbon at all. The only carbon that gets into the air from the development of nuclear power is the cement and steel and so forth that goes into the physical structure, so it ends up having about the same carbon footprint as solar, which is pretty small.

In the United States, the nuclear power systems operate better than 90 percent of the time. Compare around 30 percent for the renewables and you realize that it is obviously a great solution for generating the basic energy we need to make electricity to power the country.

Renewables are intermittent. Because they turn on and off with the wind and the sun, they need backup. They need a load-following system, and nuclear's not very good at turning it up and turning it down rapidly. With natural gas, you can do that in a matter of almost seconds. Since electricity is something that at present times we aren't able to store when it's made – it goes straight to the electric outlets to our homes – you need something you can almost instantaneously plug in when the cloud covers the sun. And natural gas is good for that.

The truth is, given the time span that's available before global warming really does cause some disastrous changes to the environment, and the long, long timespan involved in developing a new major energy source, we really are going to need everything we can get. We're going to need all the renewables – where they fit, where they're appropriate, where there's plenty of sunlight and plenty of wind, and we're going to need natural gas at least for load following. And I think we're going to need nuclear power to supply the immense amount of energy that is going to be demanded, particularly in India and China. Those countries are just beginning to move their immense populations into the middle-class life, and the middle-class life can almost be defined by how much electricity is available.

Why has nuclear taken off in other parts of the world, but remained basically flat in the U.S.?

I think it's largely prejudicial. Many people who are concerned about global warming are hostile to nuclear power, going back to a time when there was a very strong belief about and a lot of talking and writing about the idea that we were rapidly overpopulating the Earth. That was all shown to be nonsense – the peaking of the increased growth rate as more people in India and China and other places moved into better conditions and stopped having so many children.

The counterargument came from the early enthusiasts for nuclear power, who said nuclear is the way we can get past this problem – even if there are 40 billion people on Earth. With clean, safe, wonderful nuclear power, we can produce the energy they all need. The people who were opposed to the increasing population said, "We don't want nuclear to come along because it will encourage greater population growth. It will just make the world worse." And from that it got shifted over to a concern for the environment, and thus the emphasis by anti-nuclear people about things like nuclear accidents, what are you going to do with the waste and so on. It had a strange origin and it drifted over to concern for the environment, and it became an automatic response for many people that somehow there's something wrong with nuclear if you're thinking in environmental terms.

Read the rest of the interview here.

Nooilforpacifists says

It’s hard to imagine a more light-weight read. From the same author who who wrote the awe-inspiring “Making of the Atomic Bomb”. If you want to understand the industry and ideas, stick with Daniel Yeargin.

Most of the book is nothing new. Only at the end does Rhodes provide some useful stats. Such as nuclear power has caused the least number of deaths of any energy production technology. And in 1996, half of Americans were alive only because of technological improvements.

But, there’s no energy in “Energy”.

Charlene says

I read this book at the same time as Smil's Energy and Civilization. It proved to be a good compliment to Smil's book but left me feeling pretty disappointed at the same time. I wanted more from this book than it had to offer. Maybe I would have favored it more if I had not read at the same time as Smil's masterpiece.

This book started out more interesting than it ended. Rhodes asked thought provoking questions, such as how did humans figure out how to best harvest energy from nature. For example, should they use a plot of land as a crop for food? Should they use their horsepower to cultivate the land to grow oak trees? Planting oak trees was extremely important for the building of civilization. Great warships relied on the old, tall trees to construct the many masts required for these ships to defend their own land and conquer other lands. Warships were extremely valuable to national security back then, like aircraft are now. It took 2500 large oak trees to build a warship. However, it took 80-120 years for these oak trees to grow, a very long term investment. A farmer could make more money immediately growing food. So how many farmers would make the choice to grow the trees that paved the way not only for their country's victory in war but that built the railroads that allowed for easier trade, when they could make more money in a shorter time period for growing crops? It was a really great problem to think about.

When Rhodes asked, and attempted to answer, questions such as the one above, the book felt exciting. I wanted to think about the complexities of harvesting energy from wood, mining iron, and the other ways humans found to extract energy to build their civilizations. As the book traveled through time, to the industrial revolution, I felt bored and was not too disappointed when the book was done.

Peter Mcloughlin says

Richard Rhodes has been writing since the early 1980s and I have read most of his books. He always has a good sense of historical narrative and he is a good science popularizer. He combines both these talents in many of his works and this book is no exception. He covers what many including myself consider the key to modernity our energy systems. He starts in Elizabethan England which was highly dependent on a dwindling supply of lumber for nearly everything from ships to baking bread. He covers the introduction of coal and energy revolution that centered around it with the rise of steam-powered machinery that powered the first industrial revolution. he then talks about illumination for homes and shops with candles, reeds the switch over to whale oil, then to kerosene and finally electric light of the second industrial revolution centered on electricity and industrial chemistry. We go to the automobile as the world we know comes into focus. Finally, we come to sources that our current transition is starting, nuclear, gas and renewables. These transitions take about 100 years or at least they did in the past and we are in need of a change with the climate crisis breathing down our necks. Good and realistic picture of our changing energy economy over time.

Tdr85 says

This is an exceedingly well-written book. It covers the last 4 centuries of innovation, and the effects of said innovation, in energy from wood to renewable power. Mostly it deals with the emergence of new types of energy in Great Britain and the U.S. but of course the impact was worldwide. Rhodes spends a great deal of time on the synergy of infrastructure and innovation. Eg., why did gasoline become the fuel of cars instead of the possible alternatives? Mostly because of the existing infrastructure or the ease at which it could be created ('ease' being a relative term as many problems arose and were sufficiently solved). His close look at nuclear power in the U.S. should give pause to those concerned about climate change. I especially enjoyed his takedown of Paul Ehrlich's The Population Bomb casting it into the cesspool of eugenics where it belongs.

Whether we can solve the looming issue of decarbonization in the coming century or so is very much up in the air but Rhodes make clear, in the final chapter, that we are all in this together.

Margaret Sankey says

Rhodes applies his talent for explaining science and technology to a popular audience to the modern history of energy--the deforestation of Europe and the coming of coal of increasing efficiency and quality, rushlight, steam engines, whale oil, kerosene and turpentine, oil, nuclear and wind. Along the way, there are vivid portraits of the people who made the technological leaps, often at high cost to themselves and their families, and the political and cultural oddities (the attempt to lure Nantucket's whaling families to live in the UK, for one) which shape the implementation. I was also surprised to learn the connection between the brewing

industry, which needed kilns to dry the malt, and blast furnaces.

Peter Tillman says

https://www.wsj.com/articles/energy-r...
WSJ featured review, which calls it "Splendid .... A riveting account":
"Humanity’s bottomless ingenuity is on full display in a fine history of the harnessing of the natural world’s potential, from charcoal to ‘rock oil’ to nuclear, wind and solar sources."

Brendan Holly says

Energy is incredibly informative, although it didn't necessarily grab my attention as much as I had hoped. Still I learned an incredibly amount, but I was, perhaps naively, surprised by the end of the book. The final section quickly became almost exclusively devoted to nuclear energy apologetics. While I am not particularly committed to an anti-nuclear position like some of my fellow environmentalists, the book ended with a rhetorical flourish propping up the Promethean spirit of human innovation as we attenuate our suffering. Little consideration is given to the impacts of energy besides 1. Human health (a thing of the past) and 2. Climate change (don't worry its effects will be limited due to human innovation). Of course, I also don't want to read an anti-energy, damn those humans of the past screed. I just don't think Rhodes gives environmentalists and those concerned about limits, environmental impact, etc a fair shake.

Rhodes seems to willfully misrepresent the UN projection on population to fit his political purpose, repeatedly citing 10 billion people at 2100. The 2017 revision's median projection , which he claims to reference, projects 9.8 billion people by 2050 (hitting 10 around 2055) and 11.2 billion people by 2100. 10 billion people in 2100 is outside of the 80% two-tailed confidence interval (thus their prediction presents a less than 10% chance of 10 billion people, the number Rhodes bandies about ad nauseum. Of course, I'm not claiming we should approach population from a Malthusian perspective; indeed, the ecological concerns that I care deeply about are better dealt with by adjusting for environmental footprint rather than raw population data. But we cannot pretend that population is immaterial or that an increasingly developed world will not increase environmental degradation. Setting aside the climate impacts of energy use, energy drives our human prerogatives which are overwhelmingly not ecologically benign. Of course energy development and technological innovation will continue full steam ahead by charcoal, sea coal, gasoline, or fission, but I don't think we can come to terms with the history of energy ensconced in Rhodes' anthropocentric lens, bereft of an understanding of the non-human actors we have impressed into the service of progress over the centuries.

Lee Woodruff says

If you love books that cover epic transformations in history this is your next non fiction read about the evolution of energy from wood to nuclear - four centuries of change and all the implications - an in-depth good read.

Erik says

History of the development of different forms of energy, from the first uses of coal to nuclear power. The first half lacked insight, almost exclusively dealing with the people who discovered or invented key steps. The best parts deal with nuclear power and the ways people have lied and manipulated facts to make it seem unsafe. Most noxiously the LNT (linear no threshold) theory which is still taken as fact by many people who should know better.

Rhodes is equally forceful when dismantling anti-humanist environmentalists (he calls them Neo-malthusians) like Paul Ehrlich. There's definitely good reason to attack them, but it's not really expected in a book about energy.

In the end, Rhodes seems to lose interest near the end. There's a little bit about wind energy, but practically nothing about solar, thermal or wave energy. Fusion is given a very cursory treatment. There's not enough about climate change either.

I hope Rhodes chooses a subject he's more passionate about for his next book. A book about the excesses of the environmentalist movement would probably be a better fit.

Dax says

A little bit of a dry read at times, but very informative. Rhodes devotes a chapter or two to each of the major sources of energy humans have used over the last several hundred years. Wood, steam, coal, hydrocarbons, nuclear fission, renewables; all are covered in detail. Rhodes also discusses the history of several environmental movements which is much more interesting than it sounds.Part III, which covers hydrocarbons, nuclear power, renewables, and our path forward is the most noteworthy for our current situation.

Very good stuff, but I can't call it excellent. A high three stars.

David Montgomery says

A good overview of the changes in human energy use from the Elizabethan period through to the present. Rhodes surveys the rise and fall of muscle, water, steam and electricity, of wood, coal, oil, natural gas, nuclear, wind and solar in turn. Each gets capsule histories of varying lengths, summarizing the circumstances of their rise and the major figures and events involved in the major inventions.

I enjoyed the first half of the book, focused on pre-20th Century energy, more than the second half, which felt briefer and more polemic. At the end, Rhodes makes his aim clear: he is a champion of human ingenuity when it comes to energy, contra the neo-Malthusians who want to cut back. I'm sympathetic to this view, and get how the book's treatment of how humans invented new energy sources to overcome the drawbacks of the older sources (over and over again, but always ending up a little better off) supports this argument. But I feel the book would have been stronger if it had been less polemical, letting readers draw their own conclusion from Rhodes' presentation of the facts. Perhaps this freed-up space could have been used to go into more detail about more modern energy sources, of which only nuclear gets a full treatment, or to make it a true history of energy and cover the pre-modern energy sources (human and animal muscle, mechanical channeling of wind and water) with the same rigor. His anti-Malthusian conclusion only made me want to read Charles Mann's book-length take of that debate, *The Wizard and the Prophet: Two Remarkable Scientists and Their Dueling Visions to Shape Tomorrow's World* .

Still, *Energy* was an enjoyable and fairly brisk read. His histories of the rise of steam engines, oil drilling and electrical power were all thoroughly enlightening; his other chapters all had interesting nuggets. I just feel the book could have been more.

Lubinka Dimitrova says

Very informative, but too dry for my taste and my mind was wandering off. Still, plenty of interesting facts.
