

Energy And Civilization A History

When people should go to the ebook stores, search foundation by shop, shelf by shelf, it is in point of fact problematic. This is why we offer the book compilations in this website. It will no question ease you to see guide **Energy And Civilization A History** as you such as.

By searching the title, publisher, or authors of guide you truly want, you can discover them rapidly. In the house, workplace, or perhaps in your method can be all best place within net connections. If you set sights on to download and install the Energy And Civilization A History , it is entirely simple then, in the past currently we extend the partner to purchase and make bargains to download and install Energy And Civilization A History so simple!

Energy - Vaclav Smil 2017-01-05
With one famous equation, $E=mc^2$, Einstein proved all matter can be described as energy. It is everywhere and it is everything. In this newly updated and

engaging introduction, renowned scientist Vaclav Smil explores energy in all its facets - from the inner workings of the human body to what we eat, the car we drive and the race for more efficient and eco-friendly

fuels. *Energy: A Beginner's Guide* highlights the importance of energy in both past and present societies, by shedding light on the science behind global warming and efforts to prevent it, and by revealing how our daily decisions affect energy consumption. Whether you're looking for dinner table conversation or to further your own understanding, this book will amaze and inform, uncovering the truths and exposing the myths behind one of the most important concepts in our universe.

Energy in Nature and Society - Vaclav Smil
2008

A comprehensive, systematic, analytically unified, and interdisciplinary treatment of energy in nature and society, from solar radiation and photosynthesis to our fossil fueled civilization and its environmental consequences.

Coal - Barbara Freese 2016-02-09

"Engrossing . . . Coal, to borrow a phrase, is

king." -- New York Times Book Review In this remarkable book, Barbara Freese takes us on a rich historical journey that begins hundreds of millions of years ago and spans the globe. Prized as "the best stone in Britain" by Roman invaders who carved jewelry out of it, coal has transformed societies, launched empires, and expanded frontiers. It made China an eleventh-century superpower, inspired the Communist Manifesto, and helped the North win the American Civil War. Yet coal's transformative power has come at tremendous cost, from the blackening of our lungs and skies, to the perils of mining, to global warming. Now updated with a new chapter describing the high-stakes conflict between coal's defenders and those working to preserve a livable climate, *Coal* offers a captivating history of the mineral that helped build the modern world but now endangers our future.

Physics of the Future - Michio Kaku

2011-03-15

Imagine, if you can, the world in the year 2100. In *Physics of the Future*, Michio Kaku—the New York Times bestselling author of *Physics of the Impossible*—gives us a stunning, provocative, and exhilarating vision of the coming century based on interviews with over three hundred of the world’s top scientists who are already inventing the future in their labs. The result is the most authoritative and scientifically accurate description of the revolutionary developments taking place in medicine, computers, artificial intelligence, nanotechnology, energy production, and astronautics. In all likelihood, by 2100 we will control computers via tiny brain sensors and, like magicians, move objects around with the power of our minds. Artificial intelligence will be dispersed throughout the environment, and Internet-

enabled contact lenses will allow us to access the world's information base or conjure up any image we desire in the blink of an eye. Meanwhile, cars will drive themselves using GPS, and if room-temperature superconductors are discovered, vehicles will effortlessly fly on a cushion of air, coasting on powerful magnetic fields and ushering in the age of magnetism. Using molecular medicine, scientists will be able to grow almost every organ of the body and cure genetic diseases. Millions of tiny DNA sensors and nanoparticles patrolling our blood cells will silently scan our bodies for the first sign of illness, while rapid advances in genetic research will enable us to slow down or maybe even reverse the aging process, allowing human life spans to increase dramatically. In space, radically new ships—needle-sized vessels using laser propulsion—could replace the expensive

chemical rockets of today and perhaps visit nearby stars. Advances in nanotechnology may lead to the fabled space elevator, which would propel humans hundreds of miles above the earth's atmosphere at the push of a button. But these astonishing revelations are only the tip of the iceberg. Kaku also discusses emotional robots, antimatter rockets, X-ray vision, and the ability to create new life-forms, and he considers the development of the world economy. He addresses the key questions: Who are the winner and losers of the future? Who will have jobs, and which nations will prosper? All the while, Kaku illuminates the rigorous scientific principles, examining the rate at which certain technologies are likely to mature, how far they can advance, and what their ultimate limitations and hazards are. Synthesizing a vast amount of information to construct an exciting look at the years

leading up to 2100, *Physics of the Future* is a thrilling, wondrous ride through the next 100 years of breathtaking scientific revolution.

Energy and Civilization - Vaclav Smil

2017-05-12

A comprehensive account of how energy has shaped society throughout history, from pre-agricultural foraging societies through today's fossil fuel-driven civilization. "I wait for new Smil books the way some people wait for the next 'Star Wars' movie. In his latest book, *Energy and Civilization: A History*, he goes deep and broad to explain how innovations in humans' ability to turn energy into heat, light, and motion have been a driving force behind our cultural and economic progress over the past 10,000 years. —Bill Gates, *Gates Notes, Best Books of the Year* Energy is the only universal currency; it is necessary for getting anything done. The conversion of energy on

Earth ranges from terra-forming forces of plate tectonics to cumulative erosive effects of raindrops. Life on Earth depends on the photosynthetic conversion of solar energy into plant biomass. Humans have come to rely on many more energy flows—ranging from fossil fuels to photovoltaic generation of electricity—for their civilized existence. In this monumental history, Vaclav Smil provides a comprehensive account of how energy has shaped society, from pre-agricultural foraging societies through today's fossil fuel-driven civilization. Humans are the only species that can systematically harness energies outside their bodies, using the power of their intellect and an enormous variety of artifacts—from the simplest tools to internal combustion engines and nuclear reactors. The epochal transition to fossil fuels affected everything: agriculture, industry, transportation, weapons,

communication, economics, urbanization, quality of life, politics, and the environment. Smil describes humanity's energy eras in panoramic and interdisciplinary fashion, offering readers a magisterial overview. This book is an extensively updated and expanded version of Smil's *Energy in World History* (1994). Smil has incorporated an enormous amount of new material, reflecting the dramatic developments in energy studies over the last two decades and his own research over that time.

Making the Modern World: Materials and Dematerialization - Vaclav Smil

2016-12-04

How much further should the affluent world push its material consumption? Does relative dematerialization lead to absolute decline in demand for materials? These and many other questions are discussed and answered in *Making the Modern World:*

Materials and Dematerialization. Over the course of time, the modern world has become dependent on unprecedented flows of materials. Now even the most efficient production processes and the highest practical rates of recycling may not be enough to result in dematerialization rates that would be high enough to negate the rising demand for materials generated by continuing population growth and rising standards of living. This book explores the costs of this dependence and the potential for substantial dematerialization of modern economies. Making the Modern World: Materials and Dematerialization considers the principal materials used throughout history, from wood and stone, through to metals, alloys, plastics and silicon, describing their extraction and production. *Power Density* - Vaclav Smil 2015-06-05 The first systematic, quantitative appraisal of power density, offering detailed reviews

of power densities of renewable energy flows, fossil fuels, and all common energy uses. “There's no author whose books I look forward to more than Vaclav Smil.” —Bill Gates In this book, Vaclav Smil argues that power density is a key determinant of the nature and dynamics of energy systems. Any understanding of complex energy systems must rely on quantitative measures of many fundamental variables. Power density—the rate of energy flux per unit of area—is an important but largely overlooked measure. Smil provides the first systematic, quantitative appraisal of power density, offering detailed reviews of the power densities of renewable energy flows, fossil fuels, thermal electricity generation, and all common energy uses. Smil shows that careful quantification, critical appraisals, and revealing comparisons of power densities make possible a deeper understanding of the ways we harness,

convert, and use energies. Conscientious assessment of power densities, he argues, proves particularly revealing when contrasting the fossil fuel-based energy system with renewable energy conversions. Smil explains that modern civilization has evolved as a direct expression of the high power densities of fossil fuel extraction. He argues that our inevitable (and desirable) move to new energy arrangements involving conversions of lower-density renewable energy sources will require our society—currently dominated by megacities and concentrated industrial production—to undergo a profound spatial restructuring of its energy system.

The Birth of Energy - Cara New Daggett
2019-09-13

In *The Birth of Energy* Cara New Daggett traces the genealogy of contemporary notions of energy back to the nineteenth-century science of thermodynamics to

challenge the underlying logic that informs today's uses of energy. These early resource-based concepts of power first emerged during the Industrial Revolution and were tightly bound to Western capitalist domination and the politics of industrialized work. As Daggett shows, thermodynamics was deployed as an imperial science to govern fossil fuel use, labor, and colonial expansion, in part through a hierarchical ordering of humans and nonhumans. By systematically excavating the historical connection between energy and work, Daggett argues that only by transforming the politics of work—most notably, the veneration of waged work—will we be able to confront the Anthropocene's energy problem. Substituting one source of energy for another will not ensure a habitable planet; rather, the concepts of energy and work themselves must be decoupled.

Civilization Critical - Darrin Qualman

2019-05-14T00:00:00Z

The modern world is wondrous. Its factories produce ten thousand cars every hour and ten trillion transistors every second. We carry supercomputers in our pockets, and nearly a million people are in the air at any time. In *Civilization Critical*, Darrin Qualman takes readers on a tour of the wonders of the 21st century. But the great strength of our modern world is also its great weakness. Our immense powers to turn resources and nature into products and waste imperil our future. And plans to double and redouble the size of the global economy veto sustainability. So, is our civilization doomed? No. Doom is a choice. We can make different choices. Qualman demonstrates that a 19th- and 20th-century transition to linear systems and away from the circular patterns of nature (and of all previous civilizations) is the foundational

error—the underlying problem, the root cause of climate change, resource depletion, ocean’s full of plastics, and a host of mega-problems now intensifying and merging, with potentially civilization-cracking results. In this sweeping work, Qualman reinterprets and re-explains the problems we face today, and charts a clear, hopeful path into the future.

Energy Myths and Realities - Vaclav Smil 2010

Reality: Comprehensive energy transitions take several generations. --

The Moral Case for Fossil Fuels - Alex Epstein
2014-11-13

Could everything we know about fossil fuels be wrong? For decades, environmentalists have told us that using fossil fuels is a self-destructive addiction that will destroy our planet. Yet at the same time, by every measure of human well-being, from life expectancy to clean water to climate safety,

life has been getting better and better. How can this be? The explanation, energy expert Alex Epstein argues in *The Moral Case for Fossil Fuels*, is that we usually hear only one side of the story. We're taught to think only of the negatives of fossil fuels, their risks and side effects, but not their positives—their unique ability to provide cheap, reliable energy for a world of seven billion people. And the moral significance of cheap, reliable energy, Epstein argues, is woefully underrated. Energy is our ability to improve every single aspect of life, whether economic or environmental. If we look at the big picture of fossil fuels compared with the alternatives, the overall impact of using fossil fuels is to make the world a far better place. We are morally obligated to use more fossil fuels for the sake of our economy and our environment. Drawing on original insights and cutting-edge research, Epstein argues that most of

what we hear about fossil fuels is a myth. For instance . . . Myth: Fossil fuels are dirty. Truth: The environmental benefits of using fossil fuels far outweigh the risks. Fossil fuels don't take a naturally clean environment and make it dirty; they take a naturally dirty environment and make it clean. They don't take a naturally safe climate and make it dangerous; they take a naturally dangerous climate and make it ever safer. Myth: Fossil fuels are unsustainable, so we should strive to use "renewable" solar and wind. Truth: The sun and wind are intermittent, unreliable fuels that always need backup from a reliable source of energy—usually fossil fuels. There are huge amounts of fossil fuels left, and we have plenty of time to find something cheaper. Myth: Fossil fuels are hurting the developing world. Truth: Fossil fuels are the key to improving the quality of life for billions of people in the developing world. If

we withhold them, access to clean water plummets, critical medical machines like incubators become impossible to operate, and life expectancy drops significantly. Calls to “get off fossil fuels” are calls to degrade the lives of innocent people who merely want the same opportunities we enjoy in the West. Taking everything into account, including the facts about climate change, Epstein argues that “fossil fuels are easy to misunderstand and demonize, but they are absolutely good to use. And they absolutely need to be championed. . . . Mankind’s use of fossil fuels is supremely virtuous—because human life is the standard of value and because using fossil fuels transforms our environment to make it wonderful for human life.”

How the World Really Works - Vaclav Smil

2022-05-10

INSTANT NEW YORK TIMES BESTSELLER

“A new masterpiece from one of my favorite

authors... [How The World Really Works] is a compelling and highly readable book that leaves readers with the fundamental grounding needed to help solve the world’s toughest challenges.”—Bill Gates

“Provocative but perceptive . . . You can agree or disagree with Smil—accept or doubt his ‘just the facts’ posture—but you probably shouldn’t ignore him.”—The Washington Post An essential analysis of the modern science and technology that makes our twenty-first century lives possible—a scientist's investigation into what science really does, and does not, accomplish. We have never had so much information at our fingertips and yet most of us don’t know how the world really works. This book explains seven of the most fundamental realities governing our survival and prosperity. From energy and food production, through our material world and its globalization, to risks, our

environment and its future, *How the World Really Works* offers a much-needed reality check—because before we can tackle problems effectively, we must understand the facts. In this ambitious and thought-provoking book we see, for example, that globalization isn't inevitable—the foolishness of allowing 70 per cent of the world's rubber gloves to be made in just one factory became glaringly obvious in 2020—and that our societies have been steadily increasing their dependence on fossil fuels, such that any promises of decarbonization by 2050 are a fairy tale. For example, each greenhouse-grown supermarket-bought tomato has the equivalent of five tablespoons of diesel embedded in its production, and we have no way of producing steel, cement or plastics at required scales without huge carbon emissions. Ultimately, Smil answers the most profound question of our age: are we

irrevocably doomed or is a brighter utopia ahead? Compelling, data-rich and revisionist, this wonderfully broad, interdisciplinary guide finds faults with both extremes. Looking at the world through this quantitative lens reveals hidden truths that change the way we see our past, present and uncertain future.

When the Lights Went Out - David E. Nye
2010-01-29

Blackouts—whether they result from military planning, network failure, human error, or terrorism—offer snapshots of electricity's increasingly central role in American society. Where were you when the lights went out? At home during a thunderstorm? During the Great Northeastern Blackout of 1965? In California when rolling blackouts hit in 2000? In 2003, when a cascading power failure left fifty million people without electricity? We often remember vividly our

time in the dark. In *When the Lights Went Out*, David Nye views power outages in America from 1935 to the present not simply as technical failures but variously as military tactic, social disruption, crisis in the networked city, outcome of political and economic decisions, sudden encounter with sublimity, and memories enshrined in photographs. Our electrically lit-up life is so natural to us that when the lights go off, the darkness seems abnormal. Nye looks at America's development of its electrical grid, which made large-scale power failures possible and a series of blackouts from military blackouts to the “greenout” (exemplified by the new tradition of “Earth Hour”), a voluntary reduction organized by environmental organizations. Blackouts, writes Nye, are breaks in the flow of social time that reveal much about the trajectory of American history. Each time one occurs, Americans confront their essential

condition—not as isolated individuals, but as a community that increasingly binds itself together with electrical wires and signals.

Understanding the Global Energy Crisis

- Richard A. Simmons 2014-03-15

We are facing a global energy crisis caused by world population growth, an escalating increase in demand, and continued dependence on fossil-based fuels for generation. It is widely accepted that increases in greenhouse gas concentration levels, if not reversed, will result in major changes to world climate with consequential effects on our society and economy. This is just the kind of intractable problem that Purdue University's Global Policy Research Institute seeks to address in the Purdue Studies in Public Policy series by promoting the engagement between policy makers and experts in fields such as engineering and technology. Major steps

forward in the development and use of technology are required. In order to achieve solutions of the required scale and magnitude within a limited timeline, it is essential that engineers be not only technologically-adept but also aware of the wider social and political issues that policy-makers face. Likewise, it is also imperative that policy makers liaise closely with the academic community in order to realize advances. This book is designed to bridge the gap between these two groups, with a particular emphasis on educating the socially-conscious engineers and technologists of the future. In this accessibly-written volume, central issues in global energy are discussed through interdisciplinary dialogue between experts from both North America and Europe. The first section provides an overview of the nature of the global energy crisis approached from historical, political, and

sociocultural perspectives. In the second section, expert contributors outline the technology and policy issues facing the development of major conventional and renewable energy sources. The third and final section explores policy and technology challenges and opportunities in the distribution and consumption of energy, in sectors such as transportation and the built environment. The book's epilogue suggests some future scenarios in energy distribution and use.

Energy Storage and Civilization -

Graham Palmer 2020-01-17

Fossil fuels comprise the accumulation of prehistoric biomass that was energised by sunlight, and formed by earth system dynamics. Fossil fuels can be conceptualized as stored energy stocks that can be readily converted to power flows, on demand. A transition from a reliance on stored energy stocks, to renewable energy

flows, will require a replication of energy storage by technological devices and energy conversion methods. Most analyses of energy storage focus solely on the economic-technical properties of storage within incumbent energy systems. This book broadens the scope of the study of storage by placing it within a broader, historical, biophysical framework. The role and value of storage is examined from first principles, and framed within the contemporary context of electrical grids and markets. The energy-economic cost of electrical storage may be critical to the efficacy of high penetration renewable scenarios, and understanding the costs and benefits of storage is needed for a proper assessment of storage in energy transition studies. This book provides a starting point for engineers, scientists and energy analysts for exploring the role of storage in energy transition studies, and for gaining

an appreciation of the biophysical constraints of storage.

Energy and Civilization - Vaclav Smil
2018-11-13

A comprehensive account of how energy has shaped society throughout history, from pre-agricultural foraging societies through today's fossil fuel-driven civilization. "I wait for new Smil books the way some people wait for the next 'Star Wars' movie. In his latest book, *Energy and Civilization: A History*, he goes deep and broad to explain how innovations in humans' ability to turn energy into heat, light, and motion have been a driving force behind our cultural and economic progress over the past 10,000 years. —Bill Gates, *Gates Notes*, Best Books of the Year Energy is the only universal currency; it is necessary for getting anything done. The conversion of energy on Earth ranges from terra-forming forces of plate tectonics to cumulative erosive effects

of raindrops. Life on Earth depends on the photosynthetic conversion of solar energy into plant biomass. Humans have come to rely on many more energy flows—ranging from fossil fuels to photovoltaic generation of electricity—for their civilized existence. In this monumental history, Vaclav Smil provides a comprehensive account of how energy has shaped society, from pre-agricultural foraging societies through today's fossil fuel-driven civilization. Humans are the only species that can systematically harness energies outside their bodies, using the power of their intellect and an enormous variety of artifacts—from the simplest tools to internal combustion engines and nuclear reactors. The epochal transition to fossil fuels affected everything: agriculture, industry, transportation, weapons, communication, economics, urbanization, quality of life, politics, and the

environment. Smil describes humanity's energy eras in panoramic and interdisciplinary fashion, offering readers a magisterial overview. This book is an extensively updated and expanded version of Smil's *Energy in World History* (1994). Smil has incorporated an enormous amount of new material, reflecting the dramatic developments in energy studies over the last two decades and his own research over that time.

Energy Transitions: Global and National Perspectives, 2nd Edition -

Vaclav Smil 2016-12-05

This book provides a detailed, global examination of energy transitions, supplying a long-term historical perspective, an up-to-date assessment of recent and near-term advances in energy production technology and implementation, and an explanation of why efforts to limit global warming and to shift away from

fossil fuels have been gradual. • Presents historical coverage of energy production, energy use, and key technical and economic factors that affect the currently unfolding transitions • Offers insightful analysis of energy transitions on both the national and global scale to explain the possibilities and limitations of the process • Supplies a critical appraisal of new renewable conversions that makes clear their advantages and potential benefits as well as their inherent unavoidable limitations • Enables general readers to gain an in-depth understanding of energy transitions from the perspective of an acclaimed scientist with expertise in the fields of energy, environmental and population change, technical innovation, and public policy
Crisis in the Red Zone - Richard Preston
2020-04-03
NEW YORK TIMES BESTSELLER • An urgent wake-up call about the future of

emerging viruses and a gripping account of the doctors and scientists fighting to protect us, told through the story of the deadly 2013–2014 Ebola epidemic “Crisis in the Red Zone reads like a thriller. That the story it tells is all true makes it all more terrifying.”—Elizabeth Kolbert, Pulitzer Prize-winning author of *The Sixth Extinction* From the #1 bestselling author of *The Hot Zone*, now a National Geographic original miniseries . . . This time, Ebola started with a two-year-old child who likely had contact with a wild creature and whose entire family quickly fell ill and died. The ensuing global drama activated health professionals in North America, Europe, and Africa in a desperate race against time to contain the viral wildfire. By the end—as the virus mutated into its deadliest form, and spread farther and faster than ever before—30,000 people would be infected, and the dead would be

spread across eight countries on three continents. In this taut and suspenseful medical drama, Richard Preston deeply chronicles the pandemic, in which we saw for the first time the specter of Ebola jumping continents, crossing the Atlantic, and infecting people in America. Rich in characters and conflict—physical, emotional, and ethical—Crisis in the Red Zone is an immersion in one of the great public health calamities of our time. Preston writes of doctors and nurses in the field putting their own lives on the line, of government bureaucrats and NGO administrators moving, often fitfully, to try to contain the outbreak, and of pharmaceutical companies racing to develop drugs to combat the virus. He also explores the charged ethical dilemma over who should and did receive the rare doses of an experimental treatment when they became available at the peak of the

disaster. Crisis in the Red Zone makes clear that the outbreak of 2013–2014 is a harbinger of further, more severe outbreaks, and of emerging viruses heretofore unimagined—in any country, on any continent. In our ever more interconnected world, with roads and towns cut deep into the jungles of equatorial Africa, viruses both familiar and undiscovered are being unleashed into more densely populated areas than ever before. The more we discover about the virosphere, the more we realize its deadly potential. Crisis in the Red Zone is an exquisitely timely book, a stark warning of viral outbreaks to come.

Energy In World History - Vaclav Smil
2019-04-15

Every human activity entails the conversion of energy. Changes in the fundamental sources of energy, and in the use of energy sources, are a basic dimension of the

evolution of society. Our appreciation of the significance of these processes is essential to a fuller understanding of world history. Vaclav Smil offers a comprehensive look at the role

Why the West Rules - For Now - Ian Morris
2011-01-14

Why does the West rule? In this magnum opus, eminent Stanford polymath Ian Morris answers this provocative question, drawing on 50,000 years of history, archeology, and the methods of social science, to make sense of when, how, and why the paths of development differed in the East and West — and what this portends for the 21st century. There are two broad schools of thought on why the West rules. Proponents of "Long-Term Lock-In" theories such as Jared Diamond suggest that from time immemorial, some critical factor — geography, climate, or culture perhaps — made East and West

unalterably different, and determined that the industrial revolution would happen in the West and push it further ahead of the East. But the East led the West between 500 and 1600, so this development can't have been inevitable; and so proponents of "Short-Term Accident" theories argue that Western rule was a temporary aberration that is now coming to an end, with Japan, China, and India resuming their rightful places on the world stage. However, as the West led for 9,000 of the previous 10,000 years, it wasn't just a temporary aberration. So, if we want to know why the West rules, we need a whole new theory. Ian Morris, boldly entering the turf of Jared Diamond and Niall Ferguson, provides the broader approach that is necessary, combining the textual historian's focus on context, the anthropological archaeologist's awareness of the deep past, and the social scientist's comparative methods to make sense of the

past, present, and future — in a way no one has ever done before.

Carbon Democracy - Timothy Mitchell
2013-06-25

“A brilliant, revisionist argument that places oil companies at the heart of 20th century history—and of the political and environmental crises we now face.”

—Guardian Oil is a curse, it is often said, that condemns the countries producing it to an existence defined by war, corruption and enormous inequality. Carbon Democracy tells a more complex story, arguing that no nation escapes the political consequences of our collective dependence on oil. It shapes the body politic both in regions such as the Middle East, which rely upon revenues from oil production, and in the places that have the greatest demand for energy. Timothy Mitchell begins with the history of coal power to tell a radical new story about the rise of democracy. Coal was

a source of energy so open to disruption that oligarchies in the West became vulnerable for the first time to mass demands for democracy. In the mid-twentieth century, however, the development of cheap and abundant energy from oil, most notably from the Middle East, offered a means to reduce this vulnerability to democratic pressures. The abundance of oil made it possible for the first time in history to reorganize political life around the management of something now called “the economy” and the promise of its infinite growth. The politics of the West became dependent on an undemocratic Middle East. In the twenty-first century, the oil-based forms of modern democratic politics have become unsustainable. Foreign intervention and military rule are faltering in the Middle East, while governments everywhere appear incapable of addressing the crises

that threaten to end the age of carbon democracy—the disappearance of cheap energy and the carbon-fuelled collapse of the ecological order. In making the production of energy the central force shaping the democratic age, Carbon Democracy rethinks the history of energy, the politics of nature, the theory of democracy, and the place of the Middle East in our common world.

Uranium - Tom Zoellner 2009-03-05

The fascinating story of the most powerful source of energy the earth can yield Uranium is a common element in the earth's crust and the only naturally occurring mineral with the power to end all life on the planet. After World War II, it reshaped the global order—whoever could master uranium could master the world. Marie Curie gave us hope that uranium would be a miracle panacea, but the Manhattan Project gave us reason to

believe that civilization would end with apocalypse. Slave labor camps in Africa and Eastern Europe were built around mine shafts and America would knowingly send more than six hundred uranium miners to their graves in the name of national security. Fortunes have been made from this yellow dirt; massive energy grids have been run from it. Fear of it panicked the American people into supporting a questionable war with Iraq and its specter threatens to create another conflict in Iran. Now, some are hoping it can help avoid a global warming catastrophe. In Uranium, Tom Zoellner takes readers around the globe in this intriguing look at the mineral that can sustain life or destroy it.

Power Trip - Michael E. Webber 2019-05-07

A global tour of energy--the builder of human civilization and also its greatest threat. Energy is humanity's single most important resource. In fact, as energy

expert Michael E. Webber argues in *Power Trip*, the story of how societies rise can be told largely as the story of how they manage energy sources through time. In 2019, as we face down growing demand for and accumulating environmental impacts from energy, we are at a crossroads and the stakes are high. But history shows us that energy's great value is that it allows societies to reinvent themselves. *Power Trip* explores how energy has transformed societies of the past and offers wisdom for today's looming energy crisis. There is no magic bullet; energy advances always come with costs. Scientific innovation needs public support. Energy initiatives need to be tailored to individual societies. We must look for long-term solutions. Our current energy crisis is real, but it is solvable. We have the power.

[How the World Really Works - Vaclav Smil](#)
2022-01-27

We have never had so much information at our fingertips and yet most of us don't know how the world really works. This book explains seven of the most fundamental realities governing our survival and prosperity. From energy and food production, through our material world and its globalization, to risks, our environment and its future, *How the World Really Works* offers a much-needed reality check - because before we can tackle problems effectively, we must understand the facts. In this ambitious and thought-provoking book we see, for example, that globalization isn't inevitable and that our societies have been steadily increasing their dependence on fossil fuels, making their complete and rapid elimination unlikely. Vaclav Smil is neither a pessimist nor an optimist, he is a scientist; he is the world-leading expert on energy and an astonishing polymath. This is his magnum opus and is a continuation of

his quest to make facts matter. Drawing on the latest science, including his own fascinating research, and tackling sources of misinformation head on - from Yuval Noah Harari to Noam Chomsky - ultimately Smil answers the most profound question of our age- are we irrevocably doomed or is a brighter utopia ahead?

Children of the Sun - Alfred W. Crosby
2006-01-01

A spirited survey of humanity's historical and modern efforts to harness sun-based energy reveals how the human race's successes have hinged directly on effective uses of sun energy, cites rates in pollution and global warming as warning signs of fossil fuel limits, and makes optimistic predictions about future innovations.

13,000 first printing.

Global Catastrophes and Trends - Vaclav Smil
2012-09-21

A wide-ranging, interdisciplinary look at

global changes that may occur over the next fifty years—whether sudden and cataclysmic world-changing events or gradually unfolding trends. Fundamental change occurs most often in one of two ways: as a “fatal discontinuity,” a sudden catastrophic event that is potentially world changing, or as a persistent, gradual trend. Global catastrophes include volcanic eruptions, viral pandemics, wars, and large-scale terrorist attacks; trends are demographic, environmental, economic, and political shifts that unfold over time. In this provocative book, scientist Vaclav Smil takes a wide-ranging, interdisciplinary look at the catastrophes and trends the next fifty years may bring. Smil first looks at rare but cataclysmic events, both natural and human-produced, then at trends of global importance, including the transition from fossil fuels to other energy sources and growing economic and social inequality. He

also considers environmental change—in some ways an amalgam of sudden discontinuities and gradual change—and assesses the often misunderstood complexities of global warming. *Global Catastrophes and Trends* does not come down on the side of either doom-and-gloom scenarios or techno-euphoria. Instead, Smil argues that understanding change will help us reverse negative trends and minimize the risk of catastrophe.

Energy - Richard Rhodes 2019-06-11

A “meticulously researched” (The New York Times Book Review) examination of energy transitions over time and an exploration of the current challenges presented by global warming, a surging world population, and renewable energy—from Pulitzer Prize- and National Book Award-winning author Richard Rhodes. People have lived and died, businesses have prospered and failed, and nations have risen to world power and

declined, all over energy challenges. 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. “Entertaining and informative...a powerful look at the importance of science” (NPR.org), 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 his “magisterial history...a tour de force of popular science” (Kirkus Reviews, starred review), Rhodes shows how breakthroughs in energy production occurred; from animal and waterpower to the steam engine, from internal-combustion to the electric motor. He 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 energy 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. "A beautifully written, often inspiring saga of ingenuity and progress...Energy brings facts, context, and clarity to a key, often contentious subject" (Booklist, starred review).

Transforming the Twentieth Century -
Vaclav Smil 2006-04-13

This inquiry into the technical advances that shaped the 20th century follows the evolutions of all the principal innovations introduced before 1913 (as detailed in the first volume) as well as the origins and

elaborations of all fundamental 20th century advances. The history of the 20th century is rooted in amazing technical advances of 1871-1913, but the century differs so remarkably from the preceding 100 years because of several unprecedented combinations. The 20th century had followed on the path defined during the half century preceding the beginning of World War I, but it has traveled along that path at a very different pace, with different ambitions and intents. The new century's developments elevated both the magnitudes of output and the spatial distribution of mass industrial production and to new and, in many ways, virtually incomparable levels. Twentieth century science and engineering conquered and perfected a number of fundamental challenges which remained unresolved before 1913, and which to many critics appeared insoluble. This book is organized

in topical chapters dealing with electricity, engines, materials and syntheses, and information techniques. It concludes with an extended examination of contradictory consequences of our admirable technical progress by confronting the accomplishments and perils of systems that brought liberating simplicity as well as overwhelming complexity, that created unprecedented affluence and equally unprecedented economic gaps, that greatly increased both our security and fears as well as our understanding and ignorance, and that provided the means for greater protection of the biosphere while concurrently undermining some of the key biophysical foundations of life on Earth. Transforming the Twentieth Century will offer a wide-ranging interdisciplinary appreciation of the undeniable technical foundations of the modern world as well as a multitude of welcome and worrisome

consequences of these developments. It will combine scientific rigor with accessible writing, thoroughly illustrated by a large number of appropriate images that will include historical photographs and revealing charts of long-term trends.

Growth - Vaclav Smil 2020-12-08

A systematic investigation of growth in nature and society, from tiny organisms to the trajectories of empires and civilizations. Growth has been both an unspoken and an explicit aim of our individual and collective striving. It governs the lives of microorganisms and galaxies; it shapes the capabilities of our extraordinarily large brains and the fortunes of our economies. Growth is manifested in annual increments of continental crust, a rising gross domestic product, a child's growth chart, the spread of cancerous cells. In this magisterial book, Vaclav Smil offers systematic investigation of growth in nature and society, from tiny

organisms to the trajectories of empires and civilizations. Smil takes readers from bacterial invasions through animal metabolisms to megacities and the global economy. He begins with organisms whose mature sizes range from microscopic to enormous, looking at disease-causing microbes, the cultivation of staple crops, and human growth from infancy to adulthood. He examines the growth of energy conversions and man-made objects that enable economic activities—developments that have been essential to civilization. Finally, he looks at growth in complex systems, beginning with the growth of human populations and proceeding to the growth of cities. He considers the challenges of tracing the growth of empires and civilizations, explaining that we can chart the growth of organisms across individual and evolutionary time, but that the progress of

societies and economies, not so linear, encompasses both decline and renewal. The trajectory of modern civilization, driven by competing imperatives of material growth and biospheric limits, Smil tells us, remains uncertain.

Energy and Civilization - Vaclav Smil
2017-05-12

A comprehensive account of how energy has shaped society throughout history, from pre-agricultural foraging societies through today's fossil fuel-driven civilization. "I wait for new Smil books the way some people wait for the next 'Star Wars' movie. In his latest book, *Energy and Civilization: A History*, he goes deep and broad to explain how innovations in humans' ability to turn energy into heat, light, and motion have been a driving force behind our cultural and economic progress over the past 10,000 years. —Bill Gates, *Gates Notes*, Best Books of the Year Energy is the only universal

currency; it is necessary for getting anything done. The conversion of energy on Earth ranges from terra-forming forces of plate tectonics to cumulative erosive effects of raindrops. Life on Earth depends on the photosynthetic conversion of solar energy into plant biomass. Humans have come to rely on many more energy flows—ranging from fossil fuels to photovoltaic generation of electricity—for their civilized existence. In this monumental history, Vaclav Smil provides a comprehensive account of how energy has shaped society, from pre-agricultural foraging societies through today's fossil fuel-driven civilization. Humans are the only species that can systematically harness energies outside their bodies, using the power of their intellect and an enormous variety of artifacts—from the simplest tools to internal combustion engines and nuclear reactors. The epochal transition to fossil

fuels affected everything: agriculture, industry, transportation, weapons, communication, economics, urbanization, quality of life, politics, and the environment. Smil describes humanity's energy eras in panoramic and interdisciplinary fashion, offering readers a magisterial overview. This book is an extensively updated and expanded version of Smil's *Energy in World History* (1994). Smil has incorporated an enormous amount of new material, reflecting the dramatic developments in energy studies over the last two decades and his own research over that time.

Energy at the Crossroads - Vaclav Smil
2005-02-11

An objective, comprehensive, and accessible examination of today's most crucial problem: preserving the environment in the face of society's insatiable demand for energy. In *Energy at*

the Crossroads, Vaclav Smil considers the twenty-first century's crucial question: how to reconcile the modern world's unceasing demand for energy with the absolute necessity to preserve the integrity of the biosphere. With this book he offers a comprehensive, accessible guide to today's complex energy issues—how to think clearly and logically about what is possible and what is desirable in our energy future. After a century of unprecedented production growth, technical innovation, and expanded consumption, the world faces a number of critical energy challenges arising from unequal resource distribution, changing demand patterns, and environmental limitations. The fundamental message of *Energy at the Crossroads* is that our dependence on fossil fuels must be reduced not because of any imminent resource shortages but because the widespread burning of oil, coal, and natural

gas damages the biosphere and presents increasing economic and security problems as the world relies on more expensive supplies and Middle Eastern crude oil. Smil begins with an overview of the twentieth century's long-term trends and achievements in energy production. He then discusses energy prices, the real cost of energy, and "energy linkages"—the effect energy issues have on the economy, on quality of life, on the environment, and in wartime. He discusses the pitfalls of forecasting, giving many examples of failed predictions and showing that unexpected events can disprove complex models. And he examines the pros and cons not only of fossil fuels but also of alternative fuels such as hydroenergy, biomass energy, wind power, and solar power. Finally, he considers the future, focusing on what really matters, what works, what is realistic, and which outcomes are most

desirable.

Energy and the English Industrial Revolution - E. A. Wrigley 2010-08-19

Retrospective: 9.

The Collapse of Complex Societies - Joseph Tainter 1988

Twenty-four examples of societal collapse help develop a new theory to account for their breakdown. Detailed studies of the Roman, Mayan and Cacaoan collapses clarify the processes of disintegration.

The New Map - Daniel Yergin 2021-09-14
A Wall Street Journal bestseller and a USA Today Best Book of 2020 Named Energy Writer of the Year for *The New Map* by the American Energy Society “A master class on how the world works.” —NPR Pulitzer Prize-winning author and global energy expert, Daniel Yergin offers a revelatory new account of how energy revolutions, climate battles, and geopolitics are mapping our future The world is being

shaken by the collision of energy, climate change, and the clashing power of nations in a time of global crisis. Out of this tumult is emerging a new map of energy and geopolitics. The “shale revolution” in oil and gas has transformed the American economy, ending the “era of shortage” but introducing a turbulent new era. Almost overnight, the United States has become the world's number one energy powerhouse. Yet concern about energy's role in climate change is challenging the global economy and way of life, accelerating a second energy revolution in the search for a low-carbon future. All of this has been made starker and more urgent by the coronavirus pandemic and the economic dark age that it has wrought. World politics is being upended, as a new cold war develops between the United States and China, and the rivalry grows more dangerous with Russia, which is

pivoting east toward Beijing. Vladimir Putin and China's Xi Jinping are converging both on energy and on challenging American leadership, as China projects its power and influence in all directions. The South China Sea, claimed by China and the world's most critical trade route, could become the arena where the United States and China directly collide. The map of the Middle East, which was laid down after World War I, is being challenged by jihadists, revolutionary Iran, ethnic and religious clashes, and restive populations. But the region has also been shocked by the two recent oil price collapses--and by the very question of oil's future in the rest of this century. A master storyteller and global energy expert, Daniel Yergin takes the reader on an utterly riveting and timely journey across the world's new map. He illuminates the great energy and geopolitical questions in an era of rising political turbulence and points to

the profound challenges that lie ahead.
The Measure of Civilization - Ian Morris
2013-01-27

A groundbreaking look at Western and Eastern social development from the end of the ice age to today In the past thirty years, there have been fierce debates over how civilizations develop and why the West became so powerful. *The Measure of Civilization* presents a brand-new way of investigating these questions and provides new tools for assessing the long-term growth of societies. Using a groundbreaking numerical index of social development that compares societies in different times and places, award-winning author Ian Morris sets forth a sweeping examination of Eastern and Western development across 15,000 years since the end of the last ice age. He offers surprising conclusions about when and why the West came to dominate the world and fresh

perspectives for thinking about the twenty-first century. Adapting the United Nations' approach for measuring human development, Morris's index breaks social development into four traits—energy capture per capita, organization, information technology, and war-making capacity—and he uses archaeological, historical, and current government data to quantify patterns. Morris reveals that for 90 percent of the time since the last ice age, the world's most advanced region has been at the western end of Eurasia, but contrary to what many historians once believed, there were roughly 1,200 years—from about 550 to 1750 CE—when an East Asian region was more advanced. Only in the late eighteenth century CE, when northwest Europeans tapped into the energy trapped in fossil fuels, did the West leap ahead. Resolving some of the biggest debates in global history, *The Measure of Civilization*

puts forth innovative tools for determining past, present, and future economic and social trends.

Made in the USA - Vaclav Smil 2013-08-23

An argument that America's economy needs a strong and innovative manufacturing sector and the jobs it creates.

Carbon Technocracy - Victor Seow
2022-04-08

Carbon technocracy -- Vertical natures --
Technological enterprise -- Fueling
anxieties -- Imperial extraction -- Nationalist
reconstruction -- Socialist industrialization -
- Exhausted limits.

Energy Transitions - Vaclav Smil 2010

This bold and controversial argument shows why energy transitions are inherently complex and prolonged affairs, and how ignoring this fact raises unrealistic expectations that the United States and other global economies can be weaned quickly from a primary dependency on

fossil fuels. * Includes case studies of energy transitions in eight nations * Presents graphs of energy transitions on global and national scales, showing both common features and idiosyncratic patterns * Features photographs of the containment vessel of America's first nuclear reactor and of a stationary gas turbine * Provides a thorough bibliography

Grand Transitions - Vaclav Smil
2021-02-12

What makes the modern world work? The answer to this deceptively simple question lies in four "grand transitions" of civilization--in populations, agriculture, energy, and economics--which have transformed the way we live. Societies that have undergone all four transitions emerge into an era of radically different population dynamics, food surpluses (and waste), abundant energy use, and expanding economic opportunities. Simultaneously, in

other parts of the world, hundreds of millions remain largely untouched by these developments. Through erudite storytelling, Vaclav Smil investigates the fascinating and complex interactions of these transitions. He argues that the moral imperative to share modernity's benefits has become more acute with increasing economic inequality, but addressing this imbalance would make it exceedingly difficult to implement the changes necessary for the long-term preservation of the environment. Thus, managing the fifth transition--environmental changes from natural-resource depletion, biodiversity loss, and global warming--will determine the success or eventual failure of the grand transitions that have made the world we live in today.

Crude Reality - Brian C. Black 2020-09-30
This concise, accessible introduction to the history of oil tells the story of how petroleum has shaped human life since it

was first discovered oozing inconspicuously from the soil. For a century, human dependence on petroleum caused little discomfort as we enjoyed the heyday of cheap crude—a glorious episode of energy gluttony that was destined to end. Today, we see the disastrous results in environmental degradation, political instability, and world economic disparity in the waning years of a petroleum-powered civilization—lessons rooted in the finite nature of oil. Considering the nature of oil

itself as well as humans' remarkable relationship with it, Brian C. Black spotlights our modern conundrum and then explores the challenges of our future without oil. It is this essential context, he argues, that will prepare us for our energy transition. Bringing his global perspective and wide-ranging technical knowledge, Black has written an essential contribution to environmental history and the rapidly emerging field of energy history in this sweeping, forward-looking survey.