

Energy And Civilization A History

From the bestselling author of *The Ascent of Money* and *The Square and the Tower* “A dazzling history of Western ideas.” —*The Economist* “Mr. Ferguson tells his story with characteristic verve and an eye for the felicitous phrase.” —*Wall Street Journal* “[W]ritten with vitality and verve . . . a tour de force.” —*Boston Globe* Western civilization’s rise to global dominance is the single most important historical phenomenon of the past five centuries. How did the West overtake its Eastern rivals? And has the zenith of Western power now passed? Acclaimed historian Niall Ferguson argues that beginning in the fifteenth century, the West developed six powerful new concepts, or “killer applications”—competition, science, the rule of law, modern medicine, consumerism, and the work ethic—that the Rest lacked, allowing it to surge past all other competitors. Yet now, Ferguson shows how the Rest have downloaded the killer apps the West once monopolized, while the West has literally lost faith in itself. Chronicling the rise and fall of empires alongside clashes (and fusions) of civilizations, *Civilization: The West and the Rest* recasts world history with force and wit. Boldly argued and teeming with memorable characters, this is Ferguson at his very best.

The late German historian considers all forms and movements of human affairs as he predicts the inevitable eclipse of Western civilization, in an abridged edition of the classic study, first published more than eighty years ago. Reprint.

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.

This book examines the social, economic and political issues of public health provision in historical perspective. It outlines the development of public health in Britain, Continental Europe and the United States from the ancient world through to the modern state. It includes discussion of: * pestilence, public order and morality in pre-modern times * the Enlightenment and its effects * centralization in Victorian Britain * localization of health care in the United States * population issues and family welfare * the rise of the classic welfare state * attitudes towards public health into the twenty-first century.

The tragedy of European civilization is a protracted historical event spanning the twentieth century and in many ways is ongoing. During this time some of the greatest modern thinkers were active, producing works that both reflected what was happening in history and contributed towards shaping it. This work is a critique of their ideas. Harry Redner establishes where and how they went wrong, in some cases with apocalyptic consequences for Europe and the world. The great intellectuals of the age, at once philosophers, sociologists, political theorists, historians and much else besides, include Marx, Weber, Freud, Elias, Spengler, Wittgenstein, Heidegger, Arendt, Nietzsche, and Foucault. All of them had a historical impact, even if only in molding academic disciplines and shaping of public opinion, as was the case with the philosophers Wittgenstein and Arendt. This book explores the close links between anti-Semitism and cultural pessimism and the relation between psychology and sociology. Other themes range from the history and theory of the state, to the misconception of language and power. Suitable for students of sociology, philosophy, political theory, history, and cultural studies, this brilliant exploration of our civilization and its tragedies will also be of interest to intellectual general readers.

The author looks at the specifics of oil reserves and the petroleum industry and speculates on what will happen when the well runs dry. 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.

Vaclav Smil describes the concept of energy, while exploring a range of topics including everything from the inner workings of the human body to the race for more efficient and environmentally friendly fossil fuels.

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.

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).

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.

Past studies of China have concentrated on specific events or have related a chronological history of the dynastic periods. These works have included aspects of cultural history but have underemphasized the country's great social, political, and intellectual movements and their ultimate expression in the art and literature of the time. By focusing on such themes, Professor Michael provides a new framework for understanding the Chinese cultural tradition. The author describes the evolving history of ideas in China, from ancient faith in powerful magic to more modern concepts of a logical moral order of the universe and mankind's place in it. He also explores the intellectual ferment following the dawn of the age of reason, the integration of Buddhism into the Confucian social order, and the social transformations accompanying the rise and fall of the centralized state. Throughout, he illustrates how the changing society's beliefs, values, and aesthetic sense were embodied in its art and literature. This portrayal of the Chinese cultural tradition not only puts Chinese history in a new perspective, it also illuminates the process through which China constructed a modern society from a non-Western foundation and serves as an essential tool for understanding modern-day China and its prospects for the future.

An interdisciplinary and quantitative account of human claims on the biosphere's stores of living matter, from prehistoric hunting to modern energy production. The biosphere—the Earth's thin layer of life—dates from nearly four billion years ago, when the first simple organisms appeared. Many species have exerted enormous influence on the biosphere's character and productivity, but none has transformed the Earth in so many ways and on such a scale as *Homo sapiens*. In *Harvesting the Biosphere*, Vaclav Smil offers an interdisciplinary and quantitative account of human claims on the biosphere's stores of living matter, from prehistory to the present day. Smil examines all harvests—from prehistoric man's hunting of megafauna to modern crop production—and all uses of harvested biomass, including energy, food, and raw materials. Without harvesting of the biomass, Smil points out, there would be no story of human evolution and advancing civilization; but at the same time, the increasing extent and intensity of present-day biomass harvests are changing the very foundations of civilization's well-being. In his detailed and comprehensive account, Smil presents the best possible quantifications of past and current global losses in order to assess the evolution and extent of biomass harvests. Drawing on the latest work in disciplines ranging from anthropology to environmental science, Smil offers a valuable long-term, planet-wide perspective on human-caused environmental change.

'My favourite author has done it again. Numbers Don't Lie is by far his most accessible book to date, and I highly recommend it to anyone who is curious about the world' Bill Gates Is flying dangerous? How much do the world's cows weigh? And what makes people happy? From Earth's nations and inhabitants, through the fuels and foods that energize them, to the transportation and inventions of our modern world - and how all of this affects the planet itself - in *Numbers Don't Lie*, Professor Vaclav Smil takes us on a fact-finding adventure, using surprising statistics and illuminating graphs to challenge lazy thinking. Smil is on a mission to make facts matter, because after all, numbers may not lie, but which truth do they convey? 'Smil's title says it all: to understand the world, you need to follow the trendlines, not the headlines.

This is a compelling, fascinating, and most important, realistic portrait of the world and where it's going' Steven Pinker 'The best book to read to better understand our world. It should be on every bookshelf!' Linda Yueh 'There is perhaps no other academic who paints pictures with numbers like Smil' Guardian

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.

World acclaimed scientist Vaclav Smil reveals everything there is to know about nature's most sought-after resource Oil is the lifeblood of the modern world. Without it, there would be no planes, no plastic, no exotic produce, and a global political landscape few would recognise. Humanity's dependence upon oil looks set to continue for decades to come, but what is it? Fully updated and packed with fascinating facts to fuel dinner party debate, Professor Vaclav Smil's *Oil: A Beginner's Guide* explains all matters related to the 'black stuff', from its discovery in the earth right through to the controversy that surrounds it today.

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. 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.

#1 NEW YORK TIMES BEST SELLER • In this urgent, authoritative book, Bill Gates sets out a wide-ranging, practical—and accessible—plan for how the world can get to zero greenhouse gas emissions in time to avoid a climate catastrophe. Bill Gates has spent a decade investigating the causes and effects of climate change. With the help of experts in the fields of physics, chemistry, biology, engineering, political science, and finance, he has focused on what must be done in order to stop the planet's slide to certain environmental disaster. In this book, he not only explains why we need to work toward net-zero emissions of greenhouse gases, but also details what we need to do to achieve this profoundly important goal. He gives us a clear-eyed description of the challenges we face. Drawing on his understanding of innovation and what it takes to get new ideas into the market, he describes the areas in which technology is already helping to reduce emissions, where and how the current technology can be made to function more effectively, where breakthrough technologies are needed, and who is working on these essential innovations. Finally, he lays out a concrete, practical plan for achieving the goal of zero emissions—suggesting not only policies that governments should adopt, but what we as individuals can do to keep our government, our employers, and ourselves accountable in this crucial enterprise. As Bill Gates makes clear, achieving zero emissions will not be simple or easy to do, but if we follow the plan he sets out here, it is a goal firmly within our reach.

From the author of the #1 bestselling and Governor General's Literary Award-winning *The Ingenuity Gap* – an essential addition to the bookshelf of every thinking person with a stake in our world and our civilization. This is a groundbreaking, essential book for our times. Thomas Homer-Dixon brings to bear his formidable understanding of the urgent problems that confront our world to clarify their scope and deep causes. *The Upside of Down* provides a vivid picture of the immense stresses that are simultaneously converging on our societies and threatening a breakdown that would profoundly shake civilization. It shows, too, how we can choose a better route into the future. With the immediacy that characterized his award-winning international bestseller, *The Ingenuity Gap*, Homer-Dixon takes us on a remarkable journey – from the fall of the Roman empire to the devastation of the 9/11 attacks in New York, from Toronto in the 2003 blackout to the ancient temples of Lebanon and the wildfires of California. Incorporating the newest findings from an astonishing array of disciplines, he argues that the great stresses our world is experiencing – global warming, energy scarcity, population imbalances, and widening gaps between rich and poor – can't be looked at independently. As these stresses combine and converge, the risk of breakdown rises. The first signs are appearing in the wastelands of the Arctic, the mud-clogged streets of Gonaïves, Haiti, and the volatile regions of the Middle East and Asia. But while the consequences of denial in our more perilous world are dire, Homer-Dixon makes clear that we can use our emerging understanding of the complex systems in which we live to avoid catastrophic collapse in a way the Roman empire could not. This vitally important new book shows how, in the face of breakdown, we can still provide for the renewal of our global civilization. We are creating the conditions for catastrophe, but by understanding the underlying principles that make human and natural systems

resilient – and by working together to put those principles into effect – we can still limit the severity of collapse and foster regeneration, innovation, and renewal.

This new book offers an engineer's perspective on the history of water technology and its impact on the development of civilisation. A Second Edition and translation into English of the French book "L'Hydraulique dans les Civilisations Anciennes". Water professionals, engineers, scientists, and students will find this book fascinating and invaluable

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.

Accurate, balanced AND imaginative. Jesse H. Anusubel, Director, Program for the Human Environment, The Rockefeller University

Civilization and Its Discontents is considered Freud's most brilliant work. In it he states his views on the broad question of man's place in the world. It has been praised, dissected, lambasted, interpreted, and reinterpreted. Originally published in 1930, it seeks to answer several questions fundamental to human society and its organization—What influences led to the creation of civilization? Why and how did it come to be? What determines civilization's trajectory? This process, argues Freud, is an inherent quality of civilization that instills perpetual feelings of discontent in its citizens. Freud's theme is that what works for civilization doesn't necessarily work for man. Man, by nature aggressive and egotistical, seeks self-satisfaction.

A "smart and surprising" (Booklist) "expansive history" (Publishers Weekly) detailing the role that wood and trees have played in our global ecosystem—including human evolution and the rise and fall of empires—in the bestselling tradition of Yuval Harari's *Sapiens* and Mark Kurlansky's *Salt*. As the dominant species on Earth, humans have made astonishing progress since our ancestors came down from the trees. But how did the descendants of small primates manage to walk upright, become top predators, and populate the world? How were humans able to develop civilizations and produce a globalized economy? Now, in *The Age of Wood*, Roland Ennos shows for the first time that the key to our success has been our relationship with wood. "A lively history of biology, mechanics, and culture that stretches back 60 million years" (Nature) *The Age of Wood* reinterprets human history and shows how our ability to exploit wood's unique properties has profoundly shaped our bodies and minds, societies, and lives. Ennos takes us on a sweeping journey from Southeast Asia and West Africa where great apes swing among the trees, build nests, and fashion tools; to East Africa where hunter gatherers collected their food; to the structural design of wooden temples in China and Japan; and to Northern England, where archaeologists trace how coal enabled humans to build an industrial world. Addressing the effects of industrialization—including the use of fossil fuels and other energy-intensive materials to replace timber—*The Age of Wood* not only shows the essential role that trees play in the history and evolution of human existence, but also argues that for the benefit of our planet we must return to more traditional ways of growing, using, and understanding trees. A brilliant blend of recent research and existing scientific knowledge, this is an "excellent, thorough history in an age of our increasingly fraught relationships with natural resources" (Kirkus Reviews, starred review).

This authoritative but highly accessible book presents the reader with a powerful framework for understanding the critical role of the energy return on investment (EROI) in the survival and well-being of individuals, ecosystems, businesses, economies and nations. Growth and development are fundamental and ubiquitous processes at all scales, from individuals to food crops to national economies. While we are all familiar with the concepts of economic growth and living standards as measured by gross domestic product (GDP), we often take for granted the energy use that underpins GDP and our expectations for year-on-year growth. In this book, you will learn how these measures of "progress" are completely dependent on the balance that can be achieved between energy costs (inputs) and gains. Nothing is made or moved without an energy surplus, and it is the EROI of available energy sources more than any other single factor that determines the shape of civilization. Nearly all politics and economics assume that policy and market forces are the levers upon which future outcomes will hinge. However, this book presents many examples of historical and current events that can be explained much more clearly from an energetic perspective. In addition, a future scenario is developed that gives a central place to EROI in assessing the potential of governmental and private initiatives to substitute so-called renewable energy sources for diminishing stocks of fossil fuels. When cheap fossil fuels are no longer available in the abundance needed to mask economic problems and power business as usual, it will be EROI more than the plethora of "green" technologies that creates the boundary conditions for a sustainable future.

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.

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.

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."

Uses four factors--energy capture per capita, organization, information technology and war-making capacity--to attempt to show which world regions were the most powerful throughout all of human history.

A monumental, wholly accessible work of scholarship that retells human history through the story of mankind's relationship with the sea. An accomplishment of both great sweep and illuminating detail, *The Sea and Civilization* is a stunning work of history that reveals in breathtaking depth how people first came into contact with one another by ocean and river, and how goods, languages, religions, and entire cultures spread across and along the world's waterways. Lincoln Paine takes us back to the origins of long-distance migration by sea with our ancestors' first forays from Africa and Eurasia to Australia and the Americas. He demonstrates the critical role of maritime trade to the civilizations of ancient Egypt and Mesopotamia, and the Indus Valley. He reacquaints us with the great seafaring cultures of antiquity like those of the Phoenicians and Greeks, as well as those of India, Southeast and East Asia who parlayed their navigational skills, shipbuilding techniques, and commercial acumen to establish vibrant overseas colonies and trade routes in the centuries leading up to the age of European overseas expansion. His narrative traces subsequent developments in commercial and naval shipping through the post-Cold War era. Above all, Paine makes clear how the rise and fall of civilizations can be traced to the sea.

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

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.

Reality: Comprehensive energy transitions take several generations. --

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

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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.

"A thoughtful and thoroughly documented analysis of the runaway train we are all aboard. Anyone worried about the track ahead should read it. Those not worried should read it more than once." --Ronald Wright, author of *A Short History of Progress*

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

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