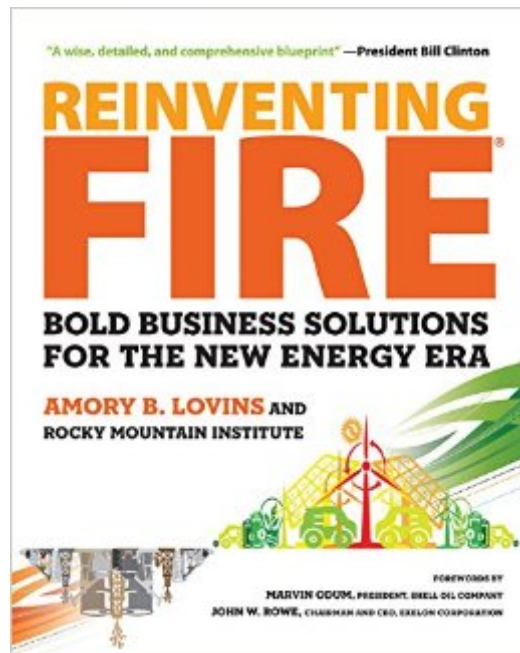


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# Reinventing Fire: Bold Business Solutions For The New Energy Era



## Synopsis

Oil and coal have built our civilization, created our wealth, and enriched the lives of billions. Yet, their rising costs to our security, economy, health, and environment now outweigh their benefits. Moreover, that long-awaited energy tipping point—where alternatives work better than oil and coal and compete purely on cost—is no longer decades in the future. It is here and now. And it is the fulcrum of economic transformation. A global clean-energy race has emerged with astounding speed. The ability to operate without fossil fuels will define winners and losers in business—and among nations. In *Reinventing Fire*, Amory Lovins and Rocky Mountain Institute offer a new vision to revitalize business models, end-run Washington gridlock, and win the clean-energy race—not forced by public policy but led by business for enduring profit. This groundbreaking roadmap reveals market-based solutions across the transportation, building, industry, and electricity sectors. It highlights pathways and competitive strategies for a 158%-bigger 2050 U.S. economy that needs no oil, no coal, no nuclear energy, one-third less natural gas, and no new inventions. This transition would cost \$5 trillion less than business-as-usual—without counting fossil fuels' huge hidden costs. It requires no new federal taxes, subsidies, mandates, or laws. The policy innovations needed to unlock and speed it need no Act of Congress. Whether you care most about profits and jobs, national security, health, or environmental stewardship, *Reinventing Fire* charts a pragmatic course that makes sense and makes money. With clarity and mastery, Lovins and RMI point out the astounding opportunities for enterprise to create the new energy era. Drawing praise President Bill Clinton, former National Security Advisor Robert McFarlane, and a host of others, *Reinventing Fire* has piqued the interest of world leaders, business leaders, and political strategists. The paperback will carry a new preface detailing the response from China and beyond.

## Book Information

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## Customer Reviews

Lovins opens with a hopeful note - that the 'tipping point,' where alternatives work better than oil and coal-fired energy, is here. Unfortunately, since he wrote that the price of natural gas has fallen greatly, and that is not the case. Transition, per Lovins, will cost \$5 trillion LESS than business-as-usual, and will require no new federal taxes or subsidies. Improved efficiency is the primary driver, with new renewable sources the secondary, contrary to former V.P. Cheney's stating that conservation is simply a "sign of personal virtue" and that relying on renewables would threaten "our way of life." Origins of Major Energy Problems: Burning oil and fueling power plants each release over 40% of America's and the world's CO<sub>2</sub>; nearly 75% of the former fuels mobility, and the same proportion runs buildings - the rest powers industry. In 2000, if Gulf oil imports had been charged the cost of forces poised to intervene in that area, they would have been priced \$77/bbl higher; subsidizing the costs of oil consumption in the U.S. puts American automakers at a disadvantage and complicates efforts to reduce consumption. (Eg. Ford's truck plant in Wayne, MI. earned \$3.7 billion in 1998 making 12 mpg Ford Expeditions and other SUVs. The U.S. 54.5 mpg standard for 2025 is still about 17% less than Europe's for 2020.) Two-thirds of Saudi oil flows through one processing plant and two terminals; a Pentagon study found that a handful of people in one evening could cut off 75% of the oil/gas to the eastern U.S. without leaving Louisiana. Transportation of coal and the distribution of electricity within the U.S. is not secure either. Half our fossil-fuel withdrawals have occurred since 1985. Reducing weight is the simplest route to improved auto fuel efficiency. Manufacturers have learned how to make thermoplastic body parts in less than a minute, vs. hours for their predecessor carbon-fiber parts. Composites also all about a 10X reduction in the 100 - 200 parts needed for a typical auto body, and the molding/welding processes are also simpler. Vehicle size, not weight is a key safety factor - thus, safety can be improved by building lighter cars, or reducing the weight of all cars/pickups. Carbon-fiber composites are about 6X better at absorbing crash energy as aluminum, which is about 2X better than steel. New engine technology (eg. electrically-actuated valves - Sturman; opposed piston-opposed cylinders instead of mechanically-operated via camshafts - OPOC) offer possible 50% improvement in efficiency. A study from a consortium of 35 steel producers showed auto structures could be made 25% lighter using advanced steels and manufacturing, at no extra cost - eg. varying the thickness according to need.

A major automaker found it could cut aerodynamic drag about 30%, and boost fuel economy 14%. Changing from the least to the most efficient tires would improve mileage 8 - 12%, without added cost. VW's XL1 carbon-fiber two-seater plug-in hybrid with a .8L 48 hp. diesel and 27 hp electric motors weighs 1,752 lbs, had a 0.186 coefficient of drag, and offers 230 mpg gasoline-equivalent performance - it is scheduled for limited 2013 production. Placing an electric motor in each wheel eliminates the need for a transmission, clutch, drive shaft, axles, U-joints, and differentials. Other opportunities include less driving (eg. insurance based on miles driven cuts mileage 8% - 'PAYD'; car-pooling - spontaneous and standardized), lower speed limits. Mesilla Valley Transportation averages 8.5 miles/gallon, and limits its trucks to 63 mph. Turnpike doubles, APUs, 50' trailers, raising the truck limit (England allows 110,000 lbs), consolidating shipments via 3rd parties, making products closer to customers, removing water from eg. detergents, and shifting from truck to rail (49% of U.S. freight, with 9% of the freight-sector fuel) are trucking opportunities. Fuel/airline seat-mile has fallen 82% from 1958 to 2010. Lovins contends that strut-braced wings (longer, lighter, thinner) would offer another 70% fuel-use reduction. Other options include teleconferencing, and more direct routes (SWA) instead of the hub-spoke system. Lovins sees the potential to save \$1.9 trillion in U.S. building energy costs by 2050, at a cost of \$0.5 trillion. The Empire State Building is cutting 38% off its energy bills and peak electrical demand by 35% via \$106 million in improved windows and insulation, plus equipment retrofits. Options for commercial and residential energy savings include windows that darken in response to a small electric current or heat (Pleotint, Ravenbrick), windows using a printable liquid-crystal coating to vary the amount of incoming heat energy (Serious Energy's 'AdaptiveE'), enhanced evaporative cooling that dries incoming air (DEVap) - shaves 50 - 90% off the energy used by traditional AC in even humid areas (Advantix Systems, Trane), silica-based insulating gels (R-40 with only an inch of covering) that have recently become more affordable (Proctor Group, Aspen Aerogels), LEDs, OLED screens, efficient rotors (eg. PAX Scientific), pots that stay flat when heated on a stove. Joe Romm and Paul Krugman add some interesting points regarding solar power. In most applications, it competes with retail prices, not the far lower wholesale prices because it is hooked up on a roof and plugged directly into the grid - avoiding expensive transmission. Costs are declining at 7%/year. They too believe we are, or at least should be, on the cusp of an energy transformation - and that's not even taking into account estimates of the rapidly rising estimates of the external costs of carbon-fueled power.

Amory Lovins is a genius, and RMI is a really great outfit. This is a good and extremely important book, but the Kindle edition is unreadable. RMI's insistence on using sidebars on practically every

page, and the Kindle format's attempt to integrate the sidebars into the text render the Kindle edition disjointed to the point of unintelligibility. Get it on paper. Don't bother with the Kindle edition.

Finally, an objective look at critical issues that have become too political. Whether you are a global-warming zealot or skeptic, this book is an important contribution to what we might do and what we should do for a better future. Clearly laid out, easy to read, great graphics, and most persuasive arguments. Lovins and the staff at RMI have made a huge contribution to an important topic. The subtitle says it all: **Bold Business Solutions for the New Energy Era**. Not a doom-and-gloom or here-is-how-we-must-all-sacrifice tome, this book lays out how global business and the unbounded creativity of people can address a critical issue with a win-win for everyone. Now all we need is the leadership from business, government, and all of us to get it done. Nice work, RMI. I will recommend this book to many friends. (BTW, I have no affiliation with RMI.)

Amory Lovins is the most rigorous and accomplished energy economist in the world. His original work, ridiculed at the time by the energy industry, has since been embraced and implemented by that very same industry, worldwide. His new book, *Reinventing Fire*, covers energy systems: fuels and electricity and energy uses: vehicles, buildings and industry. Each section presents the considerable data as a series of well designed charts, explanations and up to date anecdotal success stories of improved energy efficiency, real world examples proving the possible. His forecasts show how adoption of those improvements can impact energy use until 2050. The text is readable by the non-specialists and would even make an excellent textbook for older high school students through graduate school. For energy professionals, the anecdotes are backed by over 750 footnotes and 37 pages of references. It's a distillation of many years of research at the Rocky Mountain Institute, the consulting practice of Lovins and his team. The references extend to 2011. For specialists, Lovins graphs will become industry standard references. The anecdotes can form a powerful narrative to work into presentations. For the public, the book provides a fact-based explanation of our current and potential future utilization of energy, backed by original sources. It would be well to be read by the press, and can provide a fact checking reference - a critical need today. This book is a critical reference, and a clear, readable roadmap to one energy future, by the foremost expert in the field and his research team.

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