



## Book Power Hungry

### The Myths of "Green" Energy and the Real Fuels of the Future

Robert Bryce  
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## Recommendation

Few subjects carry as much doomsday weight as the battle over the future of global energy. Climate-change Cassandras and deniers, offshore-oil advocates and their opponents, all jostle for position amid a general consensus that the nations of the world need to move sooner rather than later to renewable sources of energy. But energy expert Robert Bryce, in more than 400 heavily footnoted, graphics-packed pages, simply whips out his calculator and does the math, with devastating results for that basic assumption. The modern industrialized world is utterly reliant on abundant supplies of affordable energy, he writes, and hydrocarbons – oil, coal and natural gas – are far and away the best sources for the cheap juice people want for their Macbooks and Maseratis. Forget wind and solar energy; they are simply too diffuse under current technology to make much of a dent in the world’s thirst for power. So what’s a worrier about melting ice caps to do? Bryce makes a very good case that a two-step plan is the only way out for the U.S.: America has enormous reserves of natural gas, so the nation should start with that, and use it until it can build an adequate number of nuclear reactors. Bryce tries a little too hard to make his point, including cracking lame jokes, but you’ll never think about this issue with anything less than clarity again. *BooksInShort* recommends this book to IT managers, heavy-industry executives, politicians and other big-picture planners seeking a real understanding of how to keep the lights on, long term.

## Take-Aways

- The world needs lots of cheap power, and “green” energy can’t supply it.
- Oil, coal and natural gas will be the fuels of choice for many years to come.
- The politicization of the energy debate has blinded the public to the hard realities of how much power society needs and how to obtain it.
- Wind and solar energies aren’t green when you consider the huge amount of land they need to be viable, and they are inherently inadequate to meet contemporary power demands.
- Making the transition from fossil fuels to other sources of energy will take almost the entire 21st century.
- Electric cars are no closer to practicability now than they were more than 100 years ago.
- Cheap, plentiful power is pivotal to the economic success of the U.S., and it is the single most important way developing nations can lift themselves into prosperity.
- The U.S. should pursue an “N2N” policy: focusing on natural gas while building nuclear reactors.
- It has enormous natural gas reserves, and technological advances keep improving access to the supply.
- Nuclear power is the best, greenest, no-carbon answer for meeting future electricity needs.

## Summary

# Fossil Fuels Versus Green Energy

The United States has built its economy on fossil fuels, the only energy source that can supply the gigantic amounts of power the country needs at a price it can afford. Four unavoidable business factors – cost, scale, power density and energy density – dictate America’s energy choices. Proponents of green energy are generally unaware of how much power the nation consumes and of how impractical wind, solar and biomass energies are from a business perspective. Moving away from hydrocarbons will take almost the entire 21st century and will require staggering amounts of new investment, which needs to be in “N2N” energy sources, that is, natural gas over the short haul and nuclear power over the long term. Both sources can provide all the power needed without all the carbon-dioxide emissions of oil and coal.

## Part I: The Quest for Power

Electric power makes modern society possible, but 90% of that power now comes from hydrocarbons because they are cheap, plentiful and effective. Ever since the terrorist attacks of September 11, 2001, a growing consensus has emerged that the world needs to move away from fossil fuels and replace them with renewable energy sources. One reason for this shift is fear about climate change. Yet, even if global warming is a fact, the U.S. won’t be able to stop the growth of hydrocarbon use elsewhere in the world. As developing economies such as India and China become more prosperous, they employ more fossil fuels. Turning away from such a strong resource won’t be easy or quick – another reason why the world’s energy diet will remain much the same in the near future.

“The renewable energy push...is based on the bogus notion that those sources are ‘greener’ than hydrocarbons such as oil and natural gas. That’s simply not true.”

However, you can’t tell that to the alarmist pundits, who play on the average person’s guilt and fear as they push their alternative-energy agenda. They succeed, in part, because most Americans aren’t scientifically or mathematically literate, so they don’t actually understand fundamental facts about energy and power, which must be evaluated on the “Four Imperatives: energy density, power density, cost and scale.” Energy is not power or a synonym for power. Energy is a fuel’s potential (a pail of gas has more energy potential than a pail of leaves) and power is the use of that potential. The higher a fuel’s “energy density and power density” the more efficient the fuel is.

“Natural gas and nuclear power plants require far less land than wind and solar installations; both have lower carbon emissions than oil or coal.”

Urbanites won’t quickly abandon the energy supply that makes their improved lifestyles possible, and this stubborn attitude is in keeping with the deliberate pace of history. Wood was the predominant power source in the U.S. until 1885, when coal took over, and oil didn’t usurp coal until World War II. Even today, coal, which ran the first power station that Thomas Edison opened in New York in 1882, remains the fuel of choice for developing nations despite its environmental negatives: pollution, neurotoxin emissions and solid waste. Oil, on the other hand, is one of the most versatile fuels. It has changed human life irrevocably and has even brought people closer together. The diesel engine, which transports most goods, and the jet engine, which flies travelers to faraway places so efficiently, are creatures of oil.

## Part II: The Myths of Green Energy

In spite of the central role that abundant power plays in the U.S.’s economic success, misinformation abounds about the nation’s energy situation and the function of alternative sources. Energy myths include:

- **“Wind and solar are ‘green’”** – Both of these energy sources (as well as corn ethanol) require much more land than nuclear energy needs in order to deliver the same amount of power. Wind turbines generate low-level noise that many people find disturbing. Building new solar and wind facilities calls for the construction of many more high-voltage transmission lines.
- **“Wind power reduces CO2 emissions”** – Because of wind’s variability, turbines rarely can provide enough power to meet peak demands. Thus, power companies must build additional conventional gas- or coal-fired plants to provide supplemental electricity for peak periods.
- **“Denmark provides an energy model for the U.S.”** – Denmark leads the world in wind-power installation and use. But its turbines haven’t changed its need for oil and coal. Coal consumption was the same in 1981, 1999 and 2007. Danes also pay very high electricity and gas rates.
- **“T. Boone Pickens has a plan (or a clue)”** – The billionaire oilman gets great press, but his plan (building a giant wind farm and using the natural gas it saves to run cars) is poorly conceived. The U.S. has far too few natural-gas cars for this to work, and building them would take years.
- **“Going green will reduce imports of strategic commodities and create ‘green’ jobs”** – The construction of wind turbines and the Toyota Prius depend on rare earths such as neodymium; solar panels require tellurium. China controls most of these materials, so imports are unavoidable. Many of the jobs building turbines and solar panels will be created in China.
- **“The United States lags in energy efficiency”** – Actually, the U.S. is becoming more energy efficient, decreasing its carbon intensity by 43.6% and its overall energy intensity by 42% from 1980 to 2006. Per capita energy consumption fell 2.5% in the same span, due to shipping some manufacturing overseas and improving the energy efficiency of consumer goods.
- **“The United States can cut CO2 emissions by 80% by 2050, and carbon capture and sequestration can help achieve that goal”** – Such a sizeable reduction would bring the U.S. back to 1910 levels of CO2 emissions, about a seventh of today’s load, but with a population more than four times as large as it was in 1910. That’s extremely unlikely. Further, no economically viable technology exists for capturing and storing the huge amount of CO2 the U.S. emits yearly.
- **“Taxing carbon dioxide will work”** – No developing nation is going to agree to tax its economic progress, and that progress is based on burning hydrocarbons. Governments instead should focus on taxing and capping neurotoxin emissions, especially from coal.
- **“Oil is dirty”** – The world’s poorest people use biomass such as twigs and charcoal to cook food, a process that results in felling forests, threatening endangered species, contributing to climate change and killing people outright with smoke exposure. By contrast, oil is cleaner to burn and much more energy efficient.
- **“Cellulosic ethanol can scale up and cut U.S. oil imports”** – Despite almost a century of hype, no biofuel plant is currently producing cellulosic ethanol, chiefly because the power density of biomass is so low that viable ethanol production would require enormous amounts of plants like switchgrass.
- **“Electric cars are the next big thing”** – Here, too, the hype goes back to the auto’s earliest days. Electric cars are not going to be significant any time soon,

because even the most advanced batteries can't provide anywhere near the power of gas.

- **“We can replace coal with wood”** – Wood has far less power density and energy density than coal, so it takes much more wood than coal to produce power. Even a 10% replacement of coal with timber in power plants would require more than doubling annual U.S. wood consumption.

### Part III: The Power of N2N

The future of the U.S. energy supply belongs to natural gas and nuclear power, the only sources that can provide the level of continuous electricity the nation needs without environmental damage. Some countries already have focused on these fuels as part of a macrotrend in which the world is decarbonizing and choosing gaseous sources over solids and liquids. The time when oil and coal production will peak – and then decline – is looming. This fact is helping spur the move to gas and nuclear alternatives.

“The always-on, super-clean, super-abundant horsepower that electricity provides has so much value that citizens around the world are willing to ignore the heavy costs extracted by mining and burning coal.”

Engineers have figured out how to get more natural gas out of the ground. Out in the gas fields, technological innovation is revealing how much natural gas the U.S. actually has. The use of hydraulic fracturing to recover huge amounts of the fuel from shale has transformed the industry. This advance wouldn't have been likely without the private ownership of mineral rights, which in practice means that no other country drills in the same way as the U.S. But even though natural gas provides wealth to ordinary people who happen to own mineral rights – and it creates plenty of good jobs – it also provokes environmental concerns, including possible groundwater contamination caused by the fracturing process and excessive water consumption. Natural gas remains the most environmentally friendly hydrocarbon in use, but the pre-eminent green choice is nuclear power – the only way the U.S. can get all the electricity it needs without carbon emissions. Opposition to nukes comes largely from environmentalists, though other critics and some power companies point out how expensive it is. Nuclear power's high cost stems from the initial expense of building a large reactor. Long term, operating a nuclear plant costs less than running a coal or natural gas plant. The cost per kilowatt of building big wind farms and solar arrays matches that of nuclear plants, but they provide nowhere near the same amount of power.

“The U.S. public has been primed to believe that an overhaul of our energy system is...patriotic and spiritually righteous, it's good business, and it will...cure the problems of halitosis and premature baldness.”

The biggest problem with nukes is nuclear waste – a target of the political posturing that led to the abandonment of the Yucca Mountain storage site and to the end of reprocessing spent fuel due to the premise that it could be weaponized. Yet reprocessing saves fuel and reduces the amount of high-level nuclear waste. One solution: Send the waste to the national nuclear labs, where it could be stored and reprocessed, and where new nuclear plants could be built. Another possible solution is transmutation, a neutron-bombardment technique that forces waste to decay faster. Implementing such steps would require political will that is now absent. Yet progress is possible. Small reactors (125 megawatts or less) offer real promise. They could be shipped to the site where they are needed, rather than being in place, and could be buried underground. Several firms are designing such modular reactors, though regulators haven't yet approved them. Nuclear plants could use thorium instead of uranium for their reactor fuel. Thorium is cheaper, generates less radioactive waste and doesn't produce plutonium as a fission byproduct.

### Part IV: Moving Forward

Much of what the public views as green power really isn't that at all, but since voters support wind and solar energy, their use will continue to grow. Meanwhile, policy makers could outline a four-principle “N2N Plan”: 1) support natural gas and nuclear with tax breaks, 2) produce more gas and oil domestically, 3) work for greater energy efficiency, and 4) keep working on energy-storage technology and renewable fuels. All this leads to some additional recommendations. First, the U.S. needs to support the International Atomic Energy Association to obtain a better handle on nuclear materials worldwide. The country should dislodge Iowa from its critical, early primary role in presidential elections, because it forces candidates to support the boondoggle of corn ethanol. Such politics lead to U.S. energy policies that make no sense. The country elects too many lawyers to public office when it needs more engineers and an educational system that trains children in science and math.

“We would gladly fill our fuel tanks with jelly beans, marbles or Hostess Twinkies if they could deliver the power needed to propel our Camrys and Suburbans to places like Wasilla or Waxahachie.”

The idea might be heretical to some, but America can look to Iran and France for guidance. Iran has a growing fleet of natural-gas vehicles, and France gets almost 80% of its electricity from nukes while managing the waste expertly. The U.S. should halt its wasteful hydrocarbon habits: Ban cutting away mountaintops for coal mining, and stop burning off natural gas, which should be saved and used for energy. Finally, the U.S. has too many – almost 50 – federal agencies and congressional panels with some say in crafting national energy policy. This renders decision making very difficult. Ultimately, the country needs to make the pursuit of cheap energy at home and abroad a central national goal. Once humankind understands that abundant, cheap electricity is central to its prosperity, worldwide, perhaps people can depoliticize this issue and make real progress.

### About the Author

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