

Second Life

A manifesto for a new environmentalism.

TED NORDHAUS and MICHAEL SHELLENBERGER

RACHEL CARSON opened *Silent Spring*, her 1962 polemic against chemical pesticides, with a terrible prophecy: “Man has lost the capacity to foresee and to forestall. He will end by destroying the earth.” She proceeded to narrate a “Fable for Tomorrow,” describing a bucolic American town “where all life seemed to live in harmony with its surroundings.” The nearby farms flourished, the foxes barked, and the birds sang in a kind of pastoral Eden. “Then a strange blight crept over the area and everything began to change. Some evil spell had settled on the community.” Cattle died. Children died. And the birds stopped singing. It was a silent spring.

The moral of the story was obvious: Apocalypse was imminent unless humankind stopped violating nature. And so it came to pass that the environmental movement’s highest priority would be to limit our contamination of the world around us. This “pollution paradigm” worked well enough—for a time. Regulatory legislation of the 1960s and ’70s cleaned up our lakes and rivers and greatly reduced smog in our cities. In the 1990s, it dealt with acid rain and phased out ozone-depleting chemicals. Given these successes, it’s not surprising that environmental leaders have seen global warming, which is caused by human greenhouse gas emissions, as, essentially, a very big pollution problem.

In the summer of 2006, Carson was resurrected in the form of Al Gore, whose documentary, *An Inconvenient Truth*, began with images of power plants belching pollution and ended with scenes from the apocalypse: hurricanes, floods, and droughts. In case viewers missed the point, Gore observed, “It was almost like a nature hike through the Book of Revelation.” And he warned, “It’s human nature to take time. But there will also be a day of reckoning.” This narrative had dominated environmental thought for so long that few of us who grew up hearing it ever thought much about it. Nor have many of us questioned what appears to be the obvious solution to global warming: limits on pollution, especially carbon emissions.

The problem is that global warming is as different from smog in Los Angeles as nuclear war is from gang violence. The quantitative accumulation of carbon dioxide in the atmosphere has created something qualitatively different from the pollution problems of old: changing temperatures, which may lead to acute droughts, new disease epidemics, and even wars over resources like water. While dealing with smog and acid rain required relatively simple and inexpensive technical fixes—such as catalytic converters on cars and scrubbers on power plants—oil and coal are central to the functioning of the economy, and their replacements remain far more expensive.

Nor should we want to dramatically curtail energy consumption. Increasing energy use is the primary cause of global warming, but it is also a primary cause of rising prosperity, longer life spans, better medical treatment, and greater personal and political freedom. Environmentalists can rail against consumption and counsel sacrifice all they want, but neither poor countries like China nor rich countries like the United States are going to dramatically reduce their emissions if doing so slows eco-

nomics growth. Given this, the challenge we face as a species is to roughly double global energy production by mid-century while simultaneously cutting greenhouse gas emissions in half worldwide (and about 80 percent in the United States), so that we can avoid the worst consequences of climate change.

How could such a massive undertaking be achieved? Not, as environmental leaders insist, by *limiting* human power but rather by *unleashing* it. In terms of birthing a new energy economy, regulation is important—it’s just not the most important thing. The highest objective of anyone concerned about global warming must be to bring down the real price of clean energy below the price of dirty energy as quickly as possible—most importantly, in places like China. And, for that to happen, we’ll need a new paradigm centered on technological innovation and economic opportunity, not on nature preservation and ecological limits.

OVER THE LAST ten years, a consensus has emerged among energy policy experts—one no less important than the consensus among climate scientists that carbon emissions are warming the earth. What’s needed, they say, are disruptive clean-energy technologies that achieve non-incremental breakthroughs in both price and performance. Reflecting the consensus, New York University physicist Martin Hoffert and 16 other leading energy experts concluded a landmark 2002 analysis in the journal *Science* by observing that, “although regulation can play a role, the fossil fuel greenhouse effect is an energy problem that cannot be simply regulated away.”

Despite this consensus, environmental lobbyists in Washington today are overwhelmingly focused on addressing global warming through two overlapping strategies. First, they want to establish a cap on greenhouse gases that decreases over time. Second, they want to make clean-energy sources cost-competitive by increasing the cost of dirty energy. While there is great debate about how to best implement these strategies—whether through traditional command-and-control regulatory mechanisms, market-based cap-and-trade approaches, or an outright tax on carbon emissions—there is little question that the solution is pollution regulation.

It is not. The challenge is simply too large. In 2007, human beings will consume roughly 15 terawatts of energy worldwide. That level of energy use will rise rapidly over the next 100 years due to population growth and increasing living standards, especially among the global poor. By the year 2100, humankind will need to produce and consume roughly 60 terawatts of energy if every human on earth is to reach the level of prosperity enjoyed today by the world’s wealthiest one billion people. Even if economies were to become much more efficient, the total terawatts needed to bring all of humankind out of poverty would still need

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to roughly double by 2050 and triple by century's end.

Consider China. Today, the country is rumbling with rising prosperity, rising expectations, rising demands for freedom—all fueled by cheap, dirty coal energy. This year or next, China will surpass the United States as the world's largest producer of greenhouse gas emissions. And yet, the average Chinese still consumes less than 20 percent of the energy consumed by the average American, meaning that the Chinese contribution to global warming is going to grow tremendously. After all, neither the Chinese people nor the Chinese government will accept any solution that does not allow energy consumption comparable to our own.

The only way to double global energy consumption while cutting global warming emissions in half is by developing new sources of clean energy. Thus, the problem with the proposals currently being discussed in Congress: They will, for the foreseeable future, direct private investment toward the least expensive emissions reductions (such as burning methane from landfills, purchasing forest land for carbon sequestration, or retrofitting power plants and buildings so they operate more efficiently) rather than toward breakthrough technologies (like low-cost solar energy and carbon capture and storage), which are too expensive to become widely adopted today but which are vital for creating a new energy economy and thus drastically reducing emissions. Cap-and-trade schemes, for example, would achieve some inexpensive reductions but wouldn't drive investment into long-term R&D because those investments would not immediately reduce emissions. Nor can private firms invest in the public infrastructure, such as new transmission lines, both because they are public and also because they are so capital intensive.

Even if such regulations were to provide the right economic incentives, they provide the wrong political ones. The regulation-centered approach to global warming fails because it depends on doing something highly unpopular: raising the price of energy. Fears of political backlash will prevent lawmakers from raising the price of carbon (and thus the price of electricity and gasoline) high enough for clean energy to become cost-competitive. It is for this reason that virtually every congressional proposal to regulate carbon emissions gives industry an "out" if compliance with the law becomes too expensive. The regulation-centered approach is thus doomed to fail in one way or another: Price carbon too high and risk economic consequences and political backlash;

price it too low, and dirty-energy sources will not cost enough to make clean energy cost-competitive.

The concern over higher energy prices has plagued European efforts to comply with the Kyoto treaty on global warming. EU nations issued too many emissions credits. Thus, neither the regulations themselves nor the resulting low market price for carbon has lowered emissions or raised much money for clean-energy technologies. Little surprise then that, late last year, the United Nations quietly announced that, since 2000, the emissions of the 41 wealthy, industrialized members of Kyoto had gone up, not down, by more than 4 percent.

WHILE PUSHING for a bold clean-energy agenda might seem like an obvious job for the environmental lobby, the truth is that environmental groups have never prioritized those investments because they have been focused on limiting pollution. The absence of an effective lobby for clean energy explains, in part, why public investment in energy research and development in the United States dropped from an already modest \$8 billion in 1980 to \$3 billion in 2005. Given this, it's understandable that energy is the least innovative sector of the economy. Coal has been in widespread use for 150 years, and oil for 80. Our houses, cars, medicines, manufacturing, communications, and consumer technologies have all improved dramatically over the last century, but our energy sources have not. Today, clean-energy sources, such as biomass, wind, geothermal, and solar, represent just 2 percent of the world's electricity.

The kind of technological revolution called for by energy experts typically does not occur via regulatory fiat. We did not invent the Internet by taxing telegraphs nor the personal computer by limiting typewriters. Nor did the transition to the petroleum economy occur because we taxed, regulated, or ran out of whale oil. Those revolutions happened because we invented alternatives that were vastly superior to what they replaced and, in remarkably short order, became a good deal cheaper.

And, contrary to conventional wisdom, private firms rarely initiate technological revolutions. Indeed, government has always been at the center of technological innovation, and most of America's largest industries have benefited from strategic government investments in their development. Farm land was granted to early American frontier farmers, and agriculture has been publicly subsidized since the early twentieth century. Before

the Civil War, Abraham Lincoln was best known for his aggressive advocacy of publicly funded transit infrastructure: canals, roads, and railroads. During the cold war, government investment was essential to the aerospace industry's development.

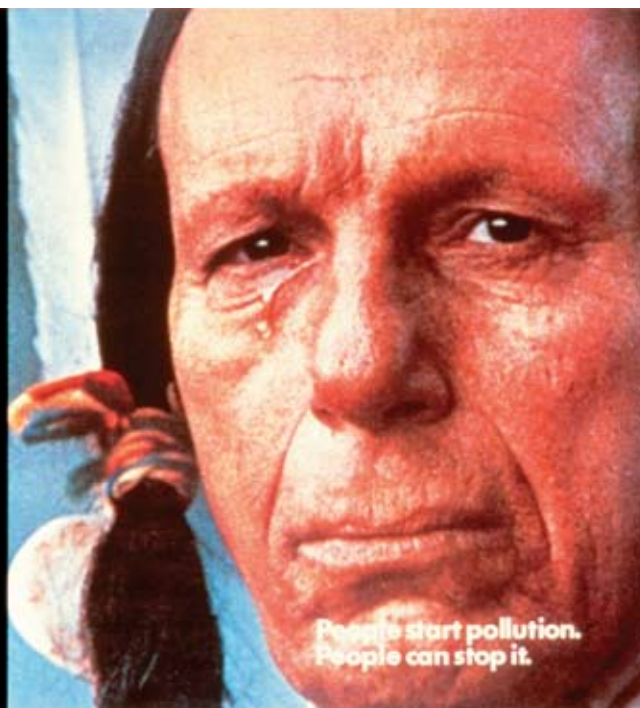
Big, long-term investments in new technologies are made only by governments and are almost always motivated by concerns about national security or economic competitiveness, from the threat of the Soviet Union in the 1950s to OPEC in the '70s. The Internet (originally Arpanet) was created by the Defense Advanced Research Projects Agency, which was itself established in response to the Soviet Union's launching of the first Sputnik satellite in 1957. The invention of today's giant wind turbines was stimulated by incentives in the United States and Denmark in the '70s and '80s. The first solar photovoltaic cells were created for the space program in the '50s. And today's highly mature energy markets are the result of decades of subsidies for coal mining and oil drilling.

Our priority, then, should be a five- or ten-fold increase in investment in clean energy—broadly defined to include R&D, deployment, procurement, education, and infrastructure—from less than \$3 billion per year to \$15 to \$30 billion. Indeed, what matters most about the global-warming legislation being considered in Congress is how much money it will raise to invest in clean energy. Auctioning emissions permits to polluting firms could generate \$15 billion or more per year. A tax on carbon could generate a similar amount. A \$300 billion investment over ten years would, according to one study, generate an additional \$200 billion in private capital.

Some of this money ought to be used to create a new military-industrial-academic complex around clean-energy sciences, similar to the one we created around computer science in the 1950s and '60s. The transformation of Silicon Valley from a sleepy collection of apple orchards and small towns to the information technology powerhouse that it is today was the result of massive investments by the federal government into a set of interlinked military, industrial, and academic institutions in the region—a fact that is largely ignored by many high-tech executives, who prefer to imagine that it all started in Bill Hewlett's garage. Concretely, this means creating undergraduate and graduate programs in new energy sciences; postgraduate fellowships for scientists, engineers, and technicians; and training for the electricians, construction workers, efficiency experts, and installers needed to make the clean-energy revolution real.

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And some of it ought to be used to buy down the price of clean-energy technologies like the Defense Department did with microchips. Today, microchips are cheap and seem to be inside of everything: our cell phones, our watches, and our cars. But it wasn't always this way. Microchips used to be big, slow, and expensive. Then, in the 1960s, the Pentagon made the strategic decision to effectively guarantee the market for microchips, allowing firms such as Intel to grow and eventually stand on their own. Some energy experts have calculated that an investment of roughly \$200 billion would bring the price of solar energy down to that of coal. Investments could also be made in carbon capture and storage, geothermal energy, and wind power, as well as toward the energy infrastructure needed so that clean-energy sources can compete on a level playing field. The goal would not be to subsidize clean energy in perpetuity but rather to make the kinds of investments that ultimately bring the real price of clean energy down to the price of dirty-energy sources like coal in places like China.

DOING ALL THIS will require a more optimistic narrative from the environmental community. Gore's *An Inconvenient Truth*, like *Silent Spring*, was considered powerful because it marshaled the facts into an effective (read: apocalyptic) story. But, ironically, for more than seven years, research that

environmentalists have privately conducted on attitudes toward global warming has found the opposite: Cautionary tales and narratives of eco-apocalypse tend to provoke fatalism, conservatism, and survivalism among voters—not the rational embrace of environmental policies. This research is consistent with extensive social-science research that strongly correlates fear, rising insecurity, and pessimism about the future with resistance to change.

In promoting the inconvenient truth that humans must limit their consumption and sacrifice their way of life to prevent the world from ending, environmentalists are not only promoting a solution that won't work, they've discouraged Americans from seeing the big solutions at all. For Americans to be future-oriented, generous, and expansive in their thinking, they must feel secure, wealthy, and strong.

How might history have been different had environmentalists and their political allies 20 years ago proposed that the nations of the world make a massive, shared investment in clean energy, better and more efficient housing development, and more comfortable and efficient transportation systems? The tables would have been turned. Global-warming skeptics would have had to take a position against the growth of new markets and industries. Proponents of this investment agenda could have tarred

their opponents as being anti-business, anti-growth, anti-investment, anti-jobs, and stuck in the past.

Thankfully, it's not too late. Today, there is quickly emerging a new political lobby and movement for clean-energy investment that is unburdened by the pollution paradigm. Increasingly, energy companies and investors are realizing that they cannot rely on the environmental lobby and must take political matters into their own hands. And, with young and grassroots environmentalists more inspired by the vision of creating a new energy economy than regulating the old one, there's new hope that we will soon see the emergence of a more expansive, relevant, and powerful ecological movement, one grounded in possibilities, not limits.

To be sure, the effort to reduce and stabilize global greenhouse gas emissions will require a major regulatory effort to make sure that everyone is playing by the same rules, provide a stable investment environment for nations and businesses, and increase the cost of fossil fuels relative to cleaner energy sources. But the conventional wisdom today about global warming is backwards. Environmentalism is not the solution to the crisis of global warming. Instead, global warming is driving environmentalism to evolve into something else. Reflecting on the birth of a politics capable of dealing with global warming, Bill McKibben, the author of the seminal 1989 book *The End of Nature*, wrote, "If it has success, it won't be environmentalism anymore. It will be something much more important." ♦