

Seven Myths about Alternative Energy

As the world looks around anxiously for an alternative to oil, energy sources such as biofuels, solar, and nuclear seem like they could be the magic ticket. They're not."

MICHAEL GRUNWALD

What Comes Next?

Imagining the Post-Oil World

Nothing is as fraught with myths, misperceptions, and outright flights of fancy as the conversation about oil's successors. We asked two authors—award-winning environmental journalist Michael Grunwald and energy consultant David J. Rothkopf—to take aim at some of these myths, and look over the horizon to see which technologies might win the day and which ones could cause unexpected new problems. If fossil fuels are indeed saying their very long goodbye, then their would-be replacements still have a lot to prove.

1. "We Need to Do Everything Possible to Promote Alternative Energy"

Not exactly. It's certainly clear that fossil fuels are mangling the climate and that the status quo is unsustainable. There is now a broad scientific consensus that the world needs to reduce greenhouse gas emissions more than 25 percent by 2020—and more than 80 percent by 2050. Even if the planet didn't depend on it, breaking our addictions to oil and coal would also reduce global reliance on petrothugs and vulnerability to energy-price spikes.

But though the world should do everything sensible to promote alternative energy, there's no point trying to do everything possible. There are financial, political, and technical pressures as well as time constraints that will force tough choices; solutions will need to achieve the biggest emissions reductions for the least money in the shortest time. Hydrogen cars, cold fusion, and other speculative technologies might sound cool, but they could divert valuable resources from ideas that are already achievable and cost-effective. It's nice that someone managed to run his car on liposuction leftovers, but that doesn't mean he needs to be subsidized.

Reasonable people can disagree whether governments should try to pick energy winners and losers. But why not at least agree that governments shouldn't pick losers to be winners? Unfortunately,

that's exactly what is happening. The world is rushing to promote alternative fuel sources that will actually accelerate global warming, not to mention an alternative power source that could cripple efforts to stop global warming.

We can still choose a truly alternative path. But we'd better hurry.

2. "Renewable Fuels Are the Cure for Our Addiction to Oil"

Unfortunately not. "Renewable fuels" sound great in theory, and agricultural lobbyists have persuaded European countries and the United States to enact remarkably ambitious biofuels mandates to promote farm-grown alternatives to gasoline. But so far in the real world, the cures—mostly ethanol derived from corn in the United States or biodiesel derived from palm oil, soybeans, and rapeseed in Europe—have been significantly worse than the disease.

Researchers used to agree that farm-grown fuels would cut emissions because they all made a shockingly basic error. They gave fuel crops credit for soaking up carbon while growing, but it never occurred to them that fuel crops might displace vegetation that soaked up even more carbon. It was as if they assumed that biofuels would only be grown in parking lots. Needless to say, that hasn't been the case; Indonesia, for example, destroyed so many of its lush forests and peat lands to grow palm oil for the European biodiesel market that it ranks third rather than 21st among the world's top carbon emitters.

In 2007, researchers finally began accounting for deforestation and other land-use changes created by biofuels. One study found that it would take more than 400 years of biodiesel use to "pay back" the carbon emitted by directly clearing peat for palm oil. Indirect damage can be equally devastating because on a hungry planet, food crops that get diverted to fuel usually end up getting replaced somewhere. For example, ethanol profits are prompting U.S. soybean farmers to switch to corn, so Brazilian soybean farmers are expanding into cattle pasture; to pick up the slack and Brazilian ranchers are invading the Amazon rain forest, which is why another study pegged corn

ethanol's payback period at 167 years. It's simple economics: The mandates increase demand for grain, which boosts prices, which makes it lucrative to ravage the wilderness.

Deforestation accounts for 20 percent of global emissions, so unless the world can eliminate emissions from all other sources—cars, coal, factories, cows—it needs to back off forests. That means limiting agriculture's footprint, a daunting task as the world's population grows—and an impossible task if vast expanses of cropland are converted to grow middling amounts of fuel. Even if the United States switched its entire grain crop to ethanol, it would only replace one fifth of U.S. gasoline consumption.

This is not just a climate disaster. The grain it takes to fill an SUV tank with ethanol could feed a hungry person for a year; biofuel mandates are exerting constant upward pressure on global food prices and have contributed to food riots in dozens of poorer countries. Still, the United States has quintupled its ethanol production in a decade and plans to quintuple its biofuel production again in the next decade. This will mean more money for well-subsidized grain farmers, but also more malnutrition, more deforestation, and more emissions: European leaders have paid a bit more attention to the alarming critiques of biofuels—including one by a British agency that was originally established to promote biofuels—but they have shown no more inclination to throw cold water on this \$100 billion global industry.

3. "If Today's Biofuels Aren't the Answer, Tomorrow's Biofuels Will Be"

Doubtful. The latest U.S. rules, while continuing lavish support for corn ethanol, include enormous new mandates to jump-start "second-generation" biofuels such as cellulosic ethanol derived from switchgrass. In theory, they would be less destructive than corn ethanol, which relies on tractors, petroleum-based fertilizers, and distilleries that emit way too much carbon. Even first-generation ethanol derived from sugar cane—which already provides half of Brazil's transportation fuel—is considerably greener than corn ethanol. But recent studies suggest that any biofuels requiring good agricultural land would still be worse than gasoline for global warming. Less of a disaster than corn ethanol is still a disaster.

Back in the theoretical world, biofuels derived from algae, trash, agricultural waste, or other sources could help because they require no land or at least unspecific "degraded lands," but they always seem to be "several" years away from large-scale commercial development. And some scientists remain hopeful that fast-growing perennial grasses such as miscanthus can convert sunlight into energy efficiently enough to overcome the land-use dilemmas—someday. But for today, farmland happens to be very good at producing the food we need to feed us and storing the carbon we need to save us, and not so good at generating fuel. In fact, new studies suggest that if we really want to convert biomass into energy, we're better off turning it into electricity.

Then what should we use in our cars and trucks? In the short term . . . gasoline. We just need to use less of it.

Instead of counterproductive biofuel mandates and ethanol subsidies, governments need fuel-efficiency mandates to help the world's 1 billion drivers guzzle less gas, plus subsidies for mass transit, bike paths, rail lines, telecommuting, carpooling, and other activities to get those drivers out of their cars. Policy-makers also need to eliminate subsidies for roads to nowhere, mandates that require excess parking and limit dense development in urban areas, and other sprawl-inducing policies. None of this is as enticing as inventing a magical new fuel, but it's doable, and it would cut emissions.

In the medium term, the world needs plug-in electric cars, the only plausible answer to humanity's oil addiction that isn't decades away. But electricity is already the source of even more emissions than oil. So we'll need an answer to humanity's coal addiction, too.

4. "Nuclear Power Is the Cure for Our Addiction to Coal"

Nope. Atomic energy is emissions free, so a slew of politicians and even some environmentalists have embraced it as a clean alternative to coal and natural gas that can generate power when there's no sun or wind. In the United States, which already gets nearly 20 percent of its electricity from nuclear plants, utilities are thinking about new reactors for the first time since the Three Mile Island meltdown three decades ago—despite global concerns about nuclear proliferation, local concerns about accidents or terrorist attacks, and the lack of a disposal site for the radioactive waste. France gets nearly 80 percent of its electricity from nukes, and Russia, China, and India are now gearing up for nuclear renaissances of their own.

But nuclear power cannot fix the climate crisis. The first reason is timing: The West needs major cuts in emissions within a decade, and the first new U.S. reactor is only scheduled for 2017—unless it gets delayed, like every U.S. reactor before it. Elsewhere in the developed world, most of the talk about a nuclear revival has remained just talk; there is no Western country with more than one nuclear plant under construction, and scores of existing plants will be scheduled for decommissioning in the coming decades, so there's no way nuclear could make even a tiny dent in electricity emissions before 2020.

The bigger problem is cost. Nuke plants are supposed to be expensive to build but cheap to operate. Unfortunately, they're turning out to be really, really expensive to build; their cost estimates have quadrupled in less than a decade. Energy guru Amory Lovins has calculated that new nukes will cost nearly three times as much as wind—and that was before their construction costs exploded for a variety of reasons, including the global credit crunch, the atrophying of the nuclear labor force, and a supplier squeeze symbolized by a Japanese company's worldwide monopoly on steel-forging for reactors. A new reactor in Finland that was supposed to showcase the global renaissance is already way behind schedule and way, way over budget. This is why plans for new plants were recently shelved in Canada and several U.S. states, why Moody's just warned utilities they'll risk ratings downgrades if they seek new reactors, and why

renewables attracted \$71 billion in worldwide private capital in 2007—while nukes attracted zero.

It's also why U.S. nuclear utilities are turning to politicians to supplement their existing loan guarantees, tax breaks, direct subsidies, and other cradle-to-grave government goodies with new public largesse. Reactors don't make much sense to build unless someone else is paying; that's why the strongest push for nukes is coming from countries where power is publicly funded. For all the talk of sanctions, if the world really wants to cripple the Iranian economy, maybe the mullahs should just be allowed to pursue nuclear energy.

Unlike biofuels, nukes don't worsen warming. But a nuclear expansion—like the recent plan by U.S. Republicans who want 100 new plants by 2030—would cost trillions of dollars for relatively modest gains in the relatively distant future.

Nuclear lobbyists do have one powerful argument: If coal is too dirty and nukes are too costly, how are we going to produce our juice? Wind is terrific, and it's on the rise, adding nearly half of new U.S. power last year and expanding its global capacity by a third in 2007. But after increasing its worldwide wattage tenfold in a decade—China is now the leading producer, and Europe is embracing wind as well—it still produces less than 2 percent of the world's electricity. Solar and geothermal are similarly wonderful and inexhaustible technologies, but they're still global rounding errors. The average U.S. household now has 26 plug-in devices, and the rest of the world is racing to catch up; the U.S. Department of Energy expects global electricity consumption to rise 77 percent by 2030. How can we meet that demand without a massive nuclear revival?

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We can't. So we're going to have to prove the Department of Energy wrong.

5. "There Is No Silver Bullet to the Energy Crisis"

Probably not. But some bullets are a lot better than others; we ought to give them our best shot before we commit to evidently inferior bullets. And one renewable energy resource is the cleanest, cheapest, and most abundant of them all. It doesn't induce deforestation or require elaborate security. It doesn't depend on the weather. And it won't take years to build or bring to market; it's already universally available.

It's called "efficiency." It means wasting less energy—or more precisely, using less energy to get your beer just as cold, your shower just as hot, and your factory just as productive. It's not about some austerity scold harassing you to take cooler showers, turn off lights, turn down thermostats, drive less, fly less, buy less stuff, eat less meat, ditch your McMansion, and otherwise change your behavior to save energy. Doing less with less is called conservation. Efficiency is about doing more or

the same with less; it doesn't require much effort or sacrifice. Yet more efficient appliances, lighting, factories, and buildings, as well as vehicles, could wipe out one fifth to one third of the world's energy consumption without any real deprivation.

Efficiency isn't sexy, and the idea that we could use less energy without much trouble hangs uneasily with today's more-is-better culture. But the best way to ensure new power plants don't bankrupt us, empower petrodictators, or imperil the planet is not to build them in the first place. "Negawatts" saved by efficiency initiatives generally cost 1 to 5 cents per kilowatt-hour versus projections ranging from 12 to 30 cents per kilowatt-hour from new nukes. That's because Americans in particular and human beings in general waste amazing amounts of energy. U.S. electricity plants fritter away enough to power Japan, and American water heaters, industrial motors, and buildings are as ridiculously inefficient as American cars. Only 4 percent of the energy used to power a typical incandescent bulb produces light; the rest is wasted. China is expected to build more square feet of real estate in the next 15 years than the United States has built in its entire history, and it has no green building codes or green building experience.

But we already know that efficiency mandates can work wonders because they've already reduced U.S. energy consumption levels from astronomical to merely high. For example, thanks to federal rules, modern American refrigerators use three times less energy than 1970s models, even though they're larger and more high-tech.

The biggest obstacles to efficiency are the perverse incentives that face most utilities; they make more money when they sell more power and have to build new generating plants. But in California and the Pacific Northwest, utility profits have been decoupled from electricity sales, so utilities can help customers save energy without harming shareholders. As a result, in that part of the country, per capita power use has been flat for three decades—while skyrocketing 50 percent in the rest of the United States. If utilities around the world could make money by helping their customers use less power, the U.S. Department of Energy wouldn't be releasing such scary numbers.

6. "We Need a Technological Revolution to Save the World"

Maybe. In the long term, it's hard to imagine how (without major advances) we can reduce emissions 80 percent by 2050 while the global population increases and the developing world develops. So a clean-tech Apollo program modeled on the Manhattan Project makes sense. And we do need carbon pricing to send a message to market makers and innovators to promote low-carbon activities; Europe's cap-and-trade scheme seems to be working well after a rocky start. The private capital already pouring into renewables might someday produce a cheap solar panel or a synthetic fuel or a superpowerful battery or a truly clean coal plant. At some point, after we've milked efficiency for all the negawatts and negabarrels we can, we might need something new.

But we already have all the technology we need to start reducing emissions by reducing consumption. Even if we only hold electricity demand flat, we can subtract a coal-fired megawatt every time we add a wind-powered megawatt. And with a smarter grid, green building codes, and strict efficiency standards for everything from light bulbs to plasma TVs to server farms, we can do better than flat. Al Gore has a reasonably plausible plan for zero-emissions power by 2020; he envisions an ambitious 28 percent decrease in demand through efficiency, plus some ambitious increases in supply from wind, solar, and geothermal energy. But we don't even have to reduce our fossil fuel use to zero to reach our 2020 targets. We just have to use less.

If somebody comes up with a better idea by 2020, great! For now, we should focus on the solutions that get the best emissions bang for the buck.

7. "Ultimately, We'll Need to Change Our Behaviors to Save the World"

Probably. These days, it's politically incorrect to suggest that going green will require even the slightest adjustment to our way of life, but let's face it: Jimmy Carter was right. It wouldn't kill you to turn down the heat and put on a sweater. Efficiency is a miracle drug, but conservation is even better; a Prius saves gas, but a Prius sitting in the driveway while you ride your bike

uses no gas. Even energy-efficient dryers use more power than clotheslines.

More with less will be a great start, but to get to 80 percent less emissions, the developed world might occasionally have to do less with less. We might have to unplug a few digital picture frames, substitute teleconferencing for some business travel, and take it easy on the air conditioner. If that's an inconvenient truth, well, it's less inconvenient than trillions of dollars' worth of new reactors, perpetual dependence on hostile petrostates, or a fricasseed planet.

After all, the developing world is entitled to develop. Its people are understandably eager to eat more meat, drive more cars, and live in nicer houses. It doesn't seem fair for the developed world to say: Do as we say, not as we did. But if the developing world follows the developed world's wasteful path to prosperity, the Earth we all share won't be able to accommodate us. So we're going to have to change our ways. Then we can at least say: Do as we're doing, not as we did.

Critical Thinking

1. What is Grunwald's point of view?
2. How does this article complement or contradict the point of views in Articles 3, 11, 12, 13, 26, 27, 28, and 30?

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