- Features
  High-Powered Plasma Turns Garbage Into Gas
- Start
  Proper Spelling? Its Tyme to Let Luce!
- Play
  Win at First-Person Shooters, the Coward's Way

FEATURES 20.02

Previous post
Next post

Why the Clean Tech Boom Went Bust

- By Juliet Eilperin
- Email Author
- January 20, 2012 |
- 3:21 pm |
- Wired February 2012

Wind Power: Plummeting natural gas prices now make this option comparatively expensive. Photo: Dan Forbes

John Doerr was crying. The billionaire venture capitalist had come to the end of his now-famous March 8, 2007, TED talk on climate change and renewable energy, and his emotions were getting the better of him. Doerr had begun by describing how his teenage daughter told him that it was up to his generation to fix global warming, since they had caused it. After detailing how the public and private sectors had so far failed at this, Doerr, who made his fortune investing early in companies that became some of Silicon Valley's biggest names—Netscape, Amazon.com, and Google, among others—exhorted the audience and his peers (largely one and the same) to band together and transform the nation's energy supply. "I really, really hope we multiply all of our energy, all of our talent, and all of our influence to solve this problem," he said, falling silent as he fought back tears. "Because if we do, I can look forward to the conversation I'm going to have with my daughter in 20 years."

As usual, Doerr's timing was perfect. Just weeks earlier, Al Gore's *An Inconvenient Truth* had won an Oscar for best documentary. (Gore is now a partner in Doerr's green tech team at the VC firm Kleiner Perkins Caufield & Byers.) Interest in climate change had never been higher. And as the economy recovered from the dual shocks of the Internet bubble and 9/11, Doerr's fellow Silicon Valley VCs were already looking to clean technology as the next big thing. What followed was yet another Silicon Valley gold rush, as the firms on Sand Hill Road were pulled along by the promise of new fortunes and the hope that they would be the ones to wean

America off of fossil fuels. The entrepreneurs and tech investors who had transformed media and communications were ready to make Silicon Valley the Saudi Arabia of clean energy. Never mind the fact that green technology had been struggling to achieve critical mass for decades. “You had folks who came in with the hubris to say, ‘I know these guys have been working on this for 50 years,’” says Andrew Beebe, chief commercial officer for Suntech, the Chinese solar manufacturer. “‘But I’ve got $50 million and I can blow the doors off this thing.’”

In 2005, VC investment in clean tech measured in the hundreds of millions of dollars. The following year, it ballooned to $1.75 billion, according to the National Venture Capital Association. By 2008, the year after Doerr’s speech, it had leaped to $4.1 billion. And the federal government followed. Through a mix of loans, subsidies, and tax breaks, it directed roughly $44.5 billion into the sector between late 2009 and late 2011. Avarice, altruism, and policy had aligned to fuel a spectacular boom.

Anyone who has heard the name Solyndra knows how this all panned out. Due to a confluence of factors—including fluctuating silicon prices, newly cheap natural gas, the 2008 financial crisis, China’s ascendant solar industry, and certain technological realities—the clean-tech bubble has burst, leaving us with a traditional energy infrastructure still overwhelmingly reliant on fossil fuels. The fallout has hit almost every niche in the clean-tech sector—wind, biofuels, electric cars, and fuel cells—but none more dramatically than solar.

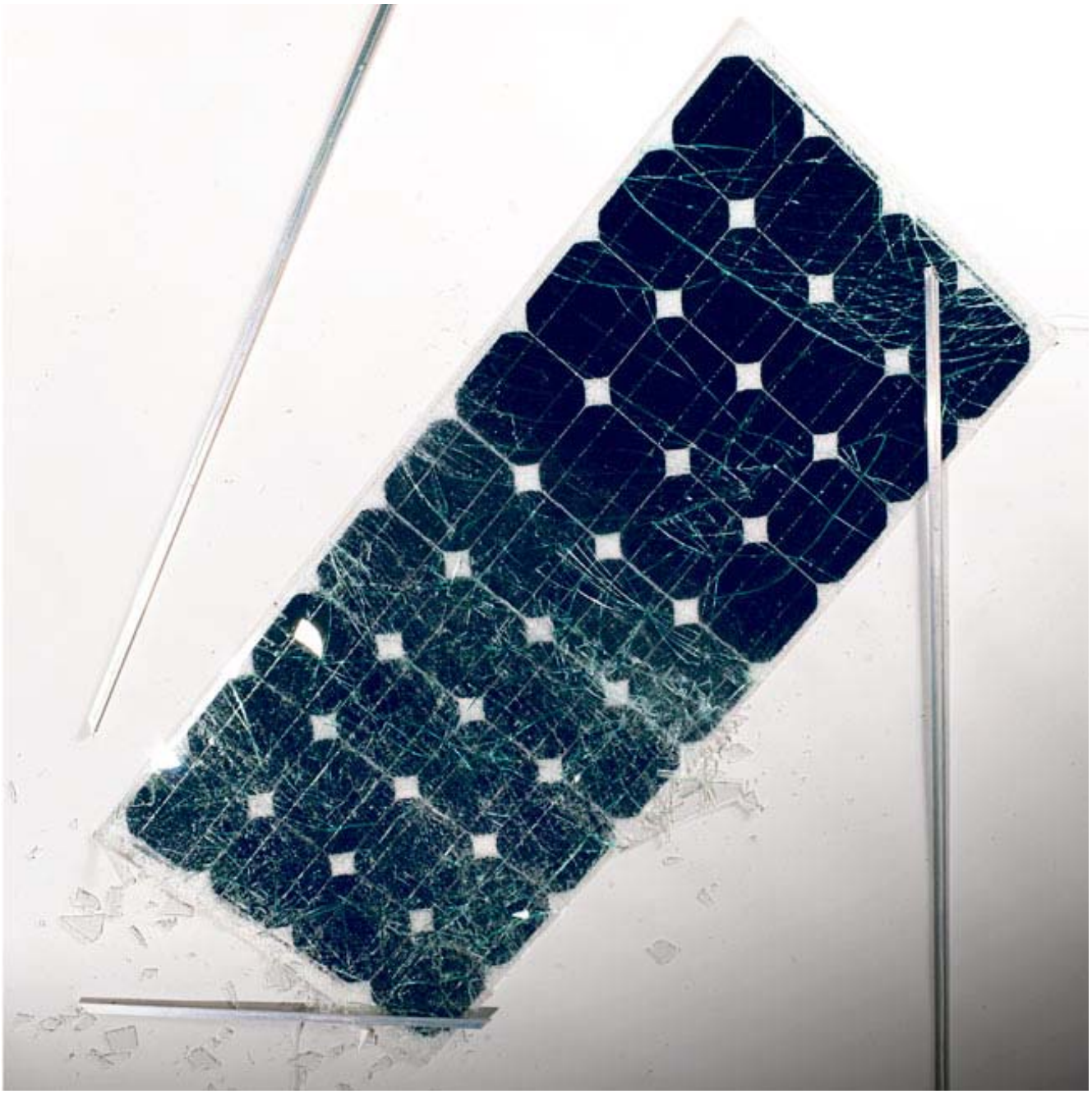
Next-gen biofuels: The technology to efficiently extract the energy from cellulose just isn't there yet.
Photo: Dan Forbes

Doerr's TED talk wasn't the start of this VC-fueled drive for a new-energy economy. Rather, it was a product of a transformation that was sweeping Silicon Valley. Many of the investors and entrepreneurs who had ridden the Internet bubble to various levels of success had already started pouring money and ideas into clean tech.

One of the first to bet big was Martin Roscheisen. He sold his email-management firm eGroups to Yahoo for $450 million, and in 2002 he cofounded Nanosolar, a panel manufacturer. But that was just the beginning. Vinod Khosla, cofounder and former CEO of Sun Microsystems, moved his VC firm, Khosla Ventures, heavily into biofuels and other renewables. Beebe, cofounder of the dotcom-era darling Bigstep.com, a web-hosting company, helped start the solar panel maker Energy Innovations in 2003. Arno Harris, who had helped steer what he now calls "an Amazon-Kleiner Perkins online wine store that left a big hole in the ground," worked with Beebe at a subsidiary of Energy Innovations before founding Recurrent Energy, a company that develops utility-scale solar projects, in 2006.

And PayPal cofounder Elon Musk has put $96 million of his own money into the electric-car startup Tesla Motors and was joined by well-known VCs Steve Jurvetson and Nancy Pfund. In 2008, by which time Kleiner Perkins had allocated more than $300 million to clean tech, the firm launched a $500 million growth fund that it said was "intended to help speed mass-market adoption of solutions to the world's climate crisis." Doerr, who told Forbes that curbing climate change was "the largest economic opportunity of the 21st century, and a moral imperative," helped direct money to everything from solar to smart meters.

These investors were drawn to clean tech by the same factors that had led them to the web, says Ricardo Reyes, vice president of communications at Tesla Motors. "You look at all disruptive technology in general, and there are some things that are common across the board," Reyes says. "A new technology is introduced in a staid industry where things are being done in a sort of cookie- cutter way." Just as the Internet transformed the media landscape and iTunes killed the record store, Silicon Valley electric car factories and solar companies were going to remake the energy sector. That was the theory, anyway.



Solar: Cheap panels from China have viscerated the US industry.
Photo: Dan Forbes

The major energy bills that passed in 2005 and 2007—which provided tax credits and loan guarantees for clean tech—gave investors further confidence. Venture capital in solar alone rose from $32 million in 2004 to nearly $1.85 billion in 2008. Investment in battery tech rose more than 30-fold during the same period.

Other clean-energy sectors were thriving as well, buoyed not only by VC money but by the fact that the average price of electricity, which had been stable for years, shot up 35 percent between 2002 and 2008. At the end of 2006, the total capacity of all the wind turbines installed in the US was 11,468 megawatts, enough to power 3.2 million homes. By 2010, it was nearly four times that much. “As more entrepreneurs and innovators saw there was capital available in the clean-energy sector, you saw more folks looking into developing solutions and business around that,” says Joshua Freed, vice president for clean energy at the

think tank Third Way. “There was a virtuous circle of capital moving to clean energy, and entrepreneurs moving to clean energy because there was a capital.”

One of these was Chris Gronet, a Stanford PhD in semiconductor processing who had been general manager of the thermal processing group at Applied Materials, a firm that provides equipment and software to semiconductor and solar companies. He had come up with a design for a revolutionary new solar module (a module is a light-gathering photovoltaic cell with all the attendant structural hardware and circuitry) that he believed would be vastly more efficient than the flat-panel modules that had dominated the market for more than three decades.

Conventional photovoltaics are tricky things to install. Under the best conditions—when their surfaces are clean and aimed directly into the sun—they generally operate at no better than 20 percent efficiency, meaning that they convert just a fifth of the energy striking them into electricity. But an immobile flat surface faces the sun head-on for only a brief period each day, at best. And simple dust can reduce the efficiency by 5 to 10 percent. Furthermore, flat panels’ vulnerability to wind poses numerous structural challenges—from mounting hardware to rooftop integrity. Solar firms routinely employ aeronautical engineers to deal with this issue, and VCs looking to get into the sector sometimes brought these experts on board to help judge whether a startup’s product could withstand intense wind patterns.

Gronet’s design called for a grate made of rows of cylindrical cells rather than a single panel of flat cells. The sun tracking across a cylinder will always be shining directly on part of it. That meant Gronet’s modules could be mounted parallel to a roof and out of the wind, rather than angled up into it. As an added bonus, the tubular cells would gather not just direct sunlight but also ambient light reflected off of the rooftops on which they were mounted.

At around this time, investors were searching for an alternative to the crystalline silicon used in photovoltaics, which was skyrocketing in price. As more and more manufacturers had been getting into making solar panels, increased demand had driven the price of processed silicon from around $50 per kilogram in 2004 to well above $300 by 2008. When the higher production costs were factored in, the price of electricity from solar firms was 17 to 23 cents per kilowatt-hour, even after subsidies. That was about twice the average price of conventionally produced electricity at the time.

Gronet’s design called for a mix of copper, indium, gallium, and selenium, or CIGS, instead of crystalline silicon. Though slightly less efficient than silicon in direct sunlight, CIGS performs better under cloud cover and in variable light. The technology had been around for several years but was too expensive to be practical. That changed as soon as silicon climbed above $200 per kilogram. Suddenly CIGS could compete. With his cylindrical module and exotic coating, Gronet had a model for transforming the solar industry. He incorporated his company in 2005, first calling it Gronet Technologies but quickly changing the name to Solyndra.

Gronet and his chief financial officer, Jonathan Michael, set out to raise capital for a factory. By 2007, they had $99 million from sources including RockPort Capital Partners and Argonaut Private Equity and were busy renovating an old Hitachi building in Fremont, California. In 2008, Virgin Green Fund, an investment arm of British business icon Richard Branson, chose Solyndra as the only solar company that it would put money into, out of more than 100 that applied for funding. By the end of that year, Solyndra had raised $600 million, boasted more than 500 employees, and had two major orders—$325 million from Sacramento-based Solar Power and $681 million from a German company called Phoenix Solar. “Everyone was pretty optimistic,” recalls Lindsey Eastburn, who was designing factory-automation software for Solyndra. “We were making product, and we were selling it.”

Just as Solyndra was starting to take off and needed more money for expansion, the venture capital climate began to cool. The 2008 financial collapse erased a quarter of the

gains VC firms had made between 2003 and 2007, and the sudden paucity of capital—combined with the difficulty of taking smaller companies public—hit renewable startups particularly hard. Venture investments in clean tech fell from $4.1 billion in 2008 to $2.5 billion in 2009.

There was an additional factor at work: impatience. Venture capitalists tend to work on three- to five-year horizons. As they were quickly finding out, energy companies don't operate on those timelines. Consider a recent analysis by Matthew Nordan, a venture capitalist who specializes in energy and environmental technology. Of all the energy startups that received their first VC funds between 1995 and 2007, only 1.8 percent achieved what he calls "unambiguous success," meaning an initial public offering on a major exchange. The average time from founding to IPO was 8.3 years. "If you're signing up to build a clean-tech winner," Nordan wrote in a blog post, "reserve a decade of your life."

The truth is that starting a company on the supply side of the energy business requires an investment in heavy industry that the VC firms didn't fully reckon with. The only way to find out if a new idea in this sector will work at scale is to build a factory and see what happens. Ethan Zindler, head of policy analysis for Bloomberg New Energy Finance, says the VC community simply assumed that the formula for success in the Internet world would translate to the clean-tech arena. "What a lot of them didn't bargain for, and, frankly, didn't really understand," he says, "is that it's almost never going to be five guys in a garage. You need a heck of a lot of money to prove that you can do your technology at scale."

Luckily for the clean-tech industry, a much larger investor stepped in to replace the retreating VCs—the federal government.

Power Struggles

For each unique green-tech sector, a unique set of challenges.—Rachel Swaby

Solar

Promise: Enough sunlight hits Earth in one hour to power the world for a year. In 2010, the solar industry predicted that as many as 500,000 people would be directly or indirectly employed in the US solar sector by 2016.

Reality: As we head into 2012, the number is more like 100,000. Prices for conventional solar cells have fallen 40 percent in the past year, due largely to a flood of panels from Chinese manufacturers, which have benefited from plunging silicon prices and government support. The price drop has eviscerated the US solar manufacturing industry.

Outlook: China's 54 percent share of the global panel-making market will grow, and we'll remain locked into older technology. But cheap panels mean more of them on rooftops, which is good.

Wind

Promise: The US has the potential to generate enough wind energy to meet the nation's total consumption 12 times over.

Reality: At $35 a megawatt-hour, wind looked like a good deal back in 2007, when wholesale electric prices ranged between $45 and $85 per megawatt-hour. But the natural gas boom, plus the 2008 recession, drove prices under $30 by 2009, eliminating wind's financial edge. Also, NIMBY protests have made getting approval for a wind farm in the US as difficult as getting it for a coal-fired plant.

Outlook: Cheaper prices for turbines should result in lower costs for wind power by 2014. Though growth has slowed since 2008, this sector is still expected to cover about a third of any increased energy consumption in the US between now and 2035.

Algae

Promise: Algae is, by some measures, up to 30 times more energy-dense than other biofuel crops. It ought to yield cheaper fuel, saving huge swaths of arable land.

Reality: A recent Department of Energy road map includes a 33-item list of R&D challenges—from assessing environmental risks to creating efficient conversion methods—that must be overcome for algae to be viable. In fact, researchers still aren't able to cultivate the stuff on a large scale.

Outlook: In 2010, the DOE cautioned that "many years of both basic and applied science and engineering will likely be needed to achieve affordable, scalable, and sustainable algae-based fuels."

Fuel Cells

Promise: Zero-emission energy for everything from laptops to cars to power stations, all fueled by the most abundant element in the universe, hydrogen.

Reality: To compete with fossil fuels, the electricity from fuel cells needs to sell for around $30 per kilowatt. Right now, that figure is about $49. Also, there are only about 60 hydrogen refueling stations in the country, serving around 200 small vehicles and 15 buses. Industry leader FuelCell Energy lost $56.3 million in 2010 and has never turned a profit.

Outlook: Even if fuel cells become cheaper and more reliable, a workable hydrogen infrastructure is still decades away.

Batteries

Promise: Zero-emission vehicles (assuming that the power for recharging the batteries comes from zero-emission sources).

Reality: The federal government injected $2.4 billion into the battery industry in 2009, under the American Recovery and Reinvestment Act, with the stated goal of getting more electric cars on the road. But expensive materials means that advanced lithium-ion batteries still cost about $650 per kilowatt-hour of usable energy. At that level, the 24-kWh battery pack for a Nissan Leaf costs more than some cars.

Outlook: Despite a White House call to get battery prices down to $100 per kWh by 2020, the rosiest predictions foresee nothing cheaper than $300 per kWh over the next decade.

Cellulosic Biofuel

Promise: Biodiesel derived from stalks, trunks, stems, and leaves—rather than plant oils or the edible parts of crops—would supply cheap renewable energy without hitting the food supply.

Reality: In 2010, the US produced 88 million gallons of cellulosic biofuel—less than a year's output from a single corn ethanol plant. Large-scale commercialization is still not viable, because the sugars in biomass are harder to tease out than those in corn. Building a cellulosic ethanol plant costs up to four times as much as building a first-gen biofuel plant.

Outlook: In 2007, the government set a target of 100 million gallons of cellulosic biofuel reaching pumps annually. In 2010, that target was revised down to just 6.6 million gallons.

Smart Meters

Promise: Replace analog meters with digital devices that provide real-time feedback to both customers and utilities, which would help build more efficiency and stability into the grid.

Reality: Smart meters are being widely deployed. But fringe groups have voiced concerns about privacy and health that have slowed or canceled rollouts in several communities. And faulty meters that led to higher bills have caused several local governments to require independent reviews of the systems.

Outlook: Smart meters are the linchpin of the smart grid—computer-based automation of electricity delivery. None of these early glitches are likely to get in the way for long. Analysts predict 250 million smart meters will be installed worldwide by 2015.

Charging Stations

Promise: A network of 240- and 480-volt charging-station kiosks could dot roadsides and parking lots, like ATMs for electric cars.

Reality: The fastest charge for a Nissan Leaf takes about 30 minutes at 480 volts. Unless we could suddenly install enough stations to guarantee no waiting (there are currently only 1,800 nationwide), the time commitment means that recharging on the go just isn't feasible. For the most part, electric-car owners are limited to as much driving as they can get from a single at-home charge.

Outlook: The cost of kiosks (up to $35,000 each) plus relatively low demand means they'll be limited to metropolitan areas for years to come.

In 2005, Congress created a federal loan guarantee program as part of the Energy Policy Act, which initially was authorized at $4 billion. Though ostensibly set up to promote nonpolluting energy sources, it was, like most federal slush funds, created by a politician (in this case, former Republican New Mexico senator Pete Domenici) to help a specific industry (in this case, nuclear energy). But the expected nuclear renaissance never happened; the private market was unwilling to finance plants that cost billions to build, created toxic waste, and ran into all the NIMBY hurdles that come with nuclear energy. So the door was open for applications from other clean-energy sectors.

While solar projects would ultimately receive more than three-quarters of the program's financial support, the list of recipients included everything from a wind farm in Oregon to a cellulosic ethanol plant in Kansas. But by the time Bush left office, not a penny had been distributed. Most of the applications, including one from Solyndra, were still wending their way through the approval rounds at the Department of Energy. There were only 16 employees tasked with sorting through the applications and relevant data, and the loan program was more of a theoretical construct than an engine of economic activity.

Then Obama took office, and the loan program suddenly had an administration committed to using federal dollars to stimulate what it referred to repeatedly as "the clean-energy economy." For Democrats, the concept of clean energy hit every button there was to push: It addressed the looming problem of climate change, offered a domestic source of electricity and fuel, and promised new jobs in a shaky economy.

The Department of Energy, which for decades had focused on managing nuclear waste and weapons and doling out subsidies to the fossil fuel industry, had a new leader—Steven Chu, a renowned physicist and Nobel laureate—and a fresh mandate.

The money the federal government delivered dwarfed what VCs had put into clean energy. The loan guarantee program alone provided a little more than $16 billion for 28 projects. The government pumped an additional $12.1 billion into the sector through tax credits. All told,

federal subsidies for renewable energy nearly tripled between 2007 and 2010, rising from $5.1 billion to $14.7 billion. The federal largesse also made clean tech look like a safer bet to the VC world, whose investments rebounded after the 2009 dip.

Solyndra's $535 million loan guarantee closed in September 2009. The firm had no problem putting the funds to use, starting construction on a second factory, expanding its workforce to 1,100 employees, and paying millions for a custom machine designed to put the finishing touches on the cells at a rate of 60 per minute. As part of an ongoing "Main Street tour" highlighting the nation's manufacturing prowess, Obama scheduled an appearance at the Solyndra factory in May 2010. After a tour of the facilities, the president gave a speech on the factory floor in which he called Solyndra "an engine of economic growth." "The future is here," he added.

By fall of 2010, Solyndra had scuttled plans for a $300 million IPO and was still waiting to hear back on an additional $469 million loan application, filed just days after the first loan was approved, to help finance its second factory. While the company's solar modules were working as planned, Solyndra needed to increase its production capacity to get per-unit costs down. The custom machine had turned out to be a dud. Despite months of work by a team of engineers sent over from the Dutch company that had built the two-story-tall behemoth, it was struggling to reach its expected output. When all the costs were factored in, a Solyndra module cost at least 30 percent more per watt than a traditional photovoltaic, and the gap was growing. Unless Solyndra got faster and cheaper, there was no way it would be able to compete.

Given the concerns about Solyndra's financial viability, the company agreed with DOE officials to drop the request for a second loan. Yet in early 2011, despite further warnings about Solyndra's cash-flow issues, the DOE agreed to restructure the original loan, with a provision guaranteeing that private investors, not the federal government, would be repaid first in the case of a default. It was a decision that the Obama administration's critics would make much of within a matter of months.

Solyndra's failure wasn't just the result of manufacturing problems. It was also a product of a broad shift that was happening in the US energy sector. The financial models that had justified the massive investments in clean-energy sources were built on assumptions that the price of fossil fuels, in particular natural gas, would continue to rise. But those models began to fall apart as a natural gas boom transformed the energy landscape.

As with the Internet bubble, and the more recent housing bubble, there were signs of trouble. In fact, in the weeks and days leading up to Obama's visit to the Solyndra plant, officials at the Office of Management and Budget were issuing warnings. "I am increasingly worried that this visit could prove embarrassing to the Administration in the not too distant future," wrote one OMB official.

In fact, though Solyndra CEO Brian Harrison painted a rosy picture for lawmakers in July 2011—boasting that revenue "grew from $6 million in 2008 to $100 million in 2009 to $140 million in 2010" and would nearly double in 2011—the truth was laid out in an internal White House memo obtained by *The Washington Post* after Solyndra filed for bankruptcy. The August 2011 memo, written days before Solyndra went bankrupt, stated simply that "the company has had 0 percent sales growth since [fall] 2009."

Perhaps the biggest force working against not just Solyndra but clean energy in general is this: Because natural gas has gotten so cheap, there is no longer a financial incentive to go with renewables. Technical advances in natural gas extraction from shale—including the controversial practice of hydraulic fracturing, or fracking—have opened up reserves so massive that the US has surpassed Russia as the world's largest natural gas supplier.

The price of natural gas peaked at nearly $13 per thousand cubic feet in 2008. It now stands at around $3. A decade ago, shale gas accounted for less than 2 percent of America's natural

gas supply; it is now approaching one-third, and industry officials predict that the total reserves will last a century. Because 24 percent of electricity comes from power plants that run on natural gas, that has helped keep costs down to just 10 cents per kilowatt-hour—and from a source that creates only half the CO_2 pollution of coal. Put all that together and you've undone some of the financial models that say it makes sense to shift to wind and solar. And in a time of economic uncertainty, the relatively modest carbon footprint of natural gas gets close enough on the environmental front for a lot of people to feel just fine turning up the air-conditioning.

Solyndra's Epic Missteps

From Chinese competition to the color of customers' roofs, the solar manufacturer made assumptions that proved disastrously wrong.—*R.S.*

The scene at Solyndra two days after the company's September 6, 2011, bankruptcy filing.
Photo: Bloomberg/Getty

Ramp-Up Costs

Gearing up to manufacture a new consumer product is notoriously expensive. In the energy sector, the costs can be crushing, as Solyndra found out: It spent at least $87 million to outfit its first factory and get to market, $290 million in research and development, and $733 million on just the first phase of its second

factory, which was necessary to manufacture at the required scale. Per watt, Solyndra's projected prices were up to double what consumers can now pay for conventional solar power.

Silicon Prices

Traditional solar panels are made from silicon. Solyndra's next-gen design used CIGS—a combination of copper, indium, gallium, and selenium. When Solyndra launched, processed silicon was selling at historic highs, which made CIGS a cheaper option. But silicon producers overreacted to the price run-up and flooded the market. Prices dropped by as much as 90 percent and stayed there. Solyndra's business model was based on a price advantage for CIGS that no longer existed.

Shale Gas Output

In 2001, shale gas accounted for less than 2 percent of US natural gas output. Today, thanks to advances in horizontal drilling and the effective though highly controversial technique of hydraulic fracturing, or fracking, it accounts for 30 percent. Meanwhile the price of natural gas has fallen by 77 percent since 2008, and the cost of producing electricity in gas plants is down 40 percent since then. Renewables simply can't compete.

Chinese Supply

In 2010, China established a $30 billion line of credit for the nation's solar industry as part of a strategy to bolster domestic production. The result: Chinese firms went from making just 6 percent of the world's solar cells in 2005 to manufacturing more than half of them today. The US share has plummeted from 40 percent to 7 percent. Solyndra and other manufacturers were simply price out of the market.

Rooftop Colors

Solyndra's model assumed that its cylindrical cells would generate 15 percent more energy per square foot than flat crystalline-silicon cells. This math assumed that the cells would be installed on white roofs, where their sides and bottoms would absorb reflected light. The company hoped to forge partnerships with roofing companies to facilitate this—and to open new sales channels—but was unable to do so in sufficient numbers.

Another blow to the domestic clean-tech industry was a glut of processed silicon that sent prices back down below $30 a kilogram. That price, combined with the technological simplicity of manufacturing conventional solar panels, opened the door to relatively unsophisticated operators. For example, in 2007, a Chinese textile manufacturer approached Arno Harris, CEO of utility developer Recurrent Energy, to see if he'd be interested in buying solar panels that they hoped to begin making. When the bar to entry is so low that textile makers can churn out solar modules, Solyndra's expensive CIGS-coated cylinders and other next-gen renewable technologies simply can't compete.

There was another factor driving down the cost of conventional photovoltaics. In recent years, China has worked aggressively to develop its domestic solar production capacity. National banks have given credit lines that dwarf the federal loans US firms enjoyed; local and provincial governments have provided tax incentives as well as land at below-market rates; and the national government recently established a so-called feed-in tariff, which compels utilities to buy electricity from solar developers at above-market rates to offset their production costs.

Understandably, American firms have struggled to remain competitive. In 1995, more than 40 percent of all silicon-based solar modules worldwide were made in the US; now it's 6 percent. In less than two years, at least eight solar plants have closed or downsized, eliminating nearly 3,000 American manufacturing jobs, including the 1,100 employees who saw their jobs disappear with Solyndra's spectacular September 2011 bankruptcy. China now accounts for more than half of global photovoltaic output, and Chinese-made modules are up to 20 percent cheaper than American ones.

Wind has also taken a hit. Not only can the turbines not match the current costs of gas-fired plants, the flood of cheap Chinese solar panels can make them less attractive as a green option, too. The pace of new wind-turbine installations in the US has declined by more than half since 2008. This past October, Cliff Stearns, the Republican chair of the House Energy and Commerce Oversight and Investigations Subcommittee, admitted to NPR what had by then become obvious: "We can't compete with China to make solar panels and wind turbines."

The boom has gone bust.

And yet, clean tech is far from dead. Certain companies and technologies will emerge from the ruins not only to survive but to thrive, just like they did after the bursting of the Internet bubble.

Electric cars seem like a relatively safe bet, spurred by both rising oil prices and federal rules requiring greater fuel efficiency. Additionally, as it has with solar, China has aggressively pushed into the competitive battery industry. As a result, prices for the lithium-ion battery modules in electric cars—which can cost more than some gas-powered cars—are coming down. Tesla started out making 600 sports cars a year, priced at $109,000 each; in 2012 it will begin selling the Model S, a full-size sedan that goes from zero to 60 in six seconds and costs just under $50,000 (once you kick in a $7,500 federal tax credit). Within five years, the company says, it will be producing 100,000 cars annually and charging just $30,000 apiece. The company's stock took a hit in early December, after Morgan Stanley cut its price target—citing concerns about the broader EV market—but it was still up for the year, even after the drop.

Meanwhile, the low silicon prices and cheap Chinese photovoltaics that undermined next-gen clean tech have proven a boon to distributed-generation businesses—the firms that install solar systems to power individual homes and offices. These companies are thriving because they came up with a new financing model that makes installing standard flat-panel solar generators truly affordable.

A decade ago, a rooftop solar array for a 3,000-square-foot home would have cost the owner about $45,000. The price can now be less than $20,000. That's not cheap, but instead of having to pay it up front, homeowners can now work with companies like San Mateo, California-based SolarCity and Oakland-based Sungevity and lease the systems for $119 a month—less than a lot of conventional electricity bills. John Stanton, head of federal affairs for SolarCity—which recently closed a $350 million deal with Bank of America to install panels that will provide power for up to 120,000 military families—likens it to leasing Xerox machines to offices. "It's taking a 60-year-old business-equipment model and bringing it into the solar industry," he explains.

That leasing model, combined with a number of software advancements, has transformed the rooftop solar business. It used to take months to close a residential sale; now these companies can use a combination of remote mapping and mathematical calculations to help determine exactly how many solar panels an individual home would need and how they should be positioned. The whole process can be completed in a matter of weeks.

In at least one respect, these companies rely on a very old-fashioned boost: federal and state subsidies and tax breaks. When they install a solar system on someone's roof, they take all the government sweeteners that accompany the installation, which helps these firms offer their systems at lower prices. "Between 40 and 50 percent of the system is covered up front," says Danny Kennedy, founder of Sungevity. "The customer is getting an incredible value proposition: 'I'm going to save money from day one.' That's a hell of a thing. For no investment, I'm going to save money."

But there is an investor: the taxpayer. Government coffers have been compensating for a number of market challenges solar faces, including the incumbency advantage of the fossil fuel industry and private investors' distaste for capital-intensive enterprises that will take years to deliver a return. And in 2012, the solar industry may face a sudden reduction in these subsidies, as the post-Solyndra political climate grows less and less receptive to investments in clean energy. Despite the fact that renewable energy received only a quarter of the subsidies that fossil-fuel-based electricity received between 2002 and 2007, it's wind and solar that are on the chopping block.

Even solar's biggest allies on Capitol Hill—people like Edward J. Markey, a top Democrat on the House Energy and Commerce Committee—fear the industry's oil and gas foes may have gotten the upper hand now that the clean-tech bubble has burst. "We are not Panglossian about what lies ahead," Markey says. "The fossil fuel industry and its allies in Congress clearly see the solar and wind industries as a threat and will try to kill these industries as they have for the preceding two generations. They want this to be a five-year aberrational period."

In other words, John Doerr may once again have a good reason to shed a tear.

Juliet Eilperin (@eilperin) *is the national environmental reporter for* The Washington Post *and the author of* Demon Fish: Travels Through the Hidden World of Sharks.

Pages: Previous 1 2 3 4 | Full Page | Next

Tags: biodisel, clean tech, energy, fuel cells, green, solar, wind power

Post Comment |40 Comments | Permalink
Back to top

Like  and 2 others liked this. Login

Add New Comment

Type your comment here.

Sort by popular now

Showing 40 comments

Robert Fanney

This article is complete nonsense. The real speculative boom, right now, is happening in fracking. The gas is produced at a loss and the depletion rate is twice as fast as documented. So what will happen is instability. You'll have very low prices as long as the owners keep taking a loss. The drilling companies will make a killing, but wells will boom then bust at a much faster rate than traditional nat gas. The net result is to damage a renewable energy boom that is absolutely needed from a long-term climate and economic perspective. So we have oil and gas special interests, again, behaving irresponsibly. Small surprise.

3 weeks ago 17 Likes Like Reply

f451

Second on "
This article is complete nonsense." Some enterprises succeed, some fail. To take a few examples over a short term and claim a bust is just silly. Fracking has upset some business models in alt energy to be sure. But non-fossil fuel power is working its way into the mix pretty steadily over time.

1 week ago in reply to Robert Fanney 1 Like Like Reply

nicmart

Fine, so long as the industry isn't a corporate welfare case until success arrives.

3 days ago in reply to f451 1 Like Like Reply

tumaino

Disingenuous. Exxon-Mobil made $41 Billion last year, and continue to be one of the welfare queens of energy subsidies, by some estimates up to $15 billion as an industry. The clean energy sector together has incentives and subsidies only reaching into the hundreds of millions. Even if we remove global warming from the table, we still end up eating the costs of their research, their externalities (i.e. oil spills), and their tax brackets. The conversation is a non-starter until we treat the fossil fuel industry with their absurd profits the same as we'd like to treat the other industries.

3 days ago in reply to nicmart Like Reply

Tom Gray

1) Wind is close to cost-competitive with new natural gas generation, even at today's unsustainably low natural gas prices, and has positive offsetting benefits.

Adding wind farms to a power system helps lower fuel prices and electric rates and make them more stable and predictable. For example, the Colorado Public Utility Commission recently approved a 25-year, 200-megawatt (MW) power purchase agreement between Xcel Energy subsidiary Public Service Co. of Colorado and NextEra Energy for power from the Limon Wind 2 project. The Colorado PUC underscored how the contract would be cost effective for consumers, saying, "the contract will save ratepayers $100 million on a net-present-value basis over its 25-year term under a base-case natural gas price scenario."

As Bloomberg New Energy Finance lead wind analyst Justin Wu recently commented, "The public perception of wind power tends to be that it is environmentally friendly, but expensive and intermittent. That is out of date in the best locations, where generation is already cost-competitive with fossil fuel electricity, and that will be the case for the majority of new onshore turbines installed worldwide by 2016."

2) States that rely more on wind power have seen their electricity rates rise more slowly than states with little or no wind.

According to the Energy Information Administration (EIA), the 40 states with least

wind installed (and the District of Columbia) saw electric rates rise by just over 34% between 2005 and 2010. By contrast, the top 10 states in wind generation (with wind providing between 5.1% and 15.4% of electricity) saw an increase of less than 11%, or less than one-third as much.

Electricity rates are the result of a number of factors, so wind can't get all the credit. However, it makes sense that a resource with zero fuel costs, when it is available, is going to push the most expensive (and dirtiest) power plants on a utility system off line and save consumers money.

3) Rep. Stearns is misinformed. Wind energy is an American manufacturing success story. The wind industry has been a bright spot through the depths of the recession, creating one of the fastest-growing U.S. manufacturing sectors. Wind is actually insourcing a whole new manufacturing sector. Sixty percent of a wind turbine's value is now produced here in America, compared to 25% prior to 2005. As the nonpartisan Congressional Research Service recently found, American wind manufacturing facilities have grown to almost 400 in 2010, up from as few as 30 in 2004. The key to that expansion has been the federal Production Tax Credit for wind, which has helped the companies that build wind farms to attract investment and create a market for turbines.

A recent study from Navigant Consulting finds that with stable tax policy, the wind industry can grow to nearly 100,000 American jobs in the next four years, including growing the wind manufacturing sector by one third to 46,000 American manufacturing jobs. This will keep the wind sector on track toward supporting the 500,000 jobs by 2030 envisioned in a report by the U.S. Department of Energy during the George W. Bush administration.

The development of clean, renewable energy sources such as wind power is critically important for the future of the country and everyone who uses electricity now and in the future. Wind energy is clean, abundant, and homegrown, and its cost is dropping. The case for continuing to invest in its growth through a reasonable low tax rate remains strong. And to change course now would only shut down a new U.S. manufacturing sector, just as it is starting to deliver on a large scale.

Let wind finish the job. - Tom Gray, American Wind Energy Association

3 weeks ago 12 Likes Like Reply

sethdayal

Wrong.

Since each solar/wind plant must be load balanced at 100% name plant capacity with filthy low efficiency gas plant. there are no GHG or air pollutions savings whatsoever. Far cheaper less gas skip the wind/solar and build high efficiency CCGT plant instead.

Of course if low information politicians and green groups were really interested being green, they could insist that each wind/solar operation came with at least 2 hours of green storage, enabling the low efficiency OCGT gas plant to be replaced with CCGT.

It would only add another 20 cents a kwh to the current 30 cents a kwh for wind and 70 cents for solar all inclusive. Course why not go all green with 100% green backup at only another buck a kwh.

Nuke by contrast costs 3 cents a kwh and could in less than fifteen years end all green house gas emissions in the US with no transmission builds, with a virtually zero environmental footprint.

3 weeks ago in reply to Tom Gray 6 Likes Like Reply

Chris Young

The true cost for nuclear energy is virtually unknown. Germany estimates that on a risk adjusted basis, it is over $3.00/kWh. Nobody has fully costed Longterm Storage into the equation.

3 weeks ago in reply to sethdayal 10 Likes Like Reply

sethdayal

Actually the German numbers are from a wacky anti nuclear organization with an imaginary assessment of nuclear liability.

In the US nuke liability for an impossible accident in an industry that has never killed anybody is limited to $15B. Big Oil which kills

millions annually and pollutes all over the planet, and wind/solar which kills tens of thousands with it's gas backup emissions are limited to $150M in liability. It is illegal to sue for air pollution deaths. That same $150M liability holds for 250k dead at a time dam bursts, nuclear bomb sized LNG explosions, and city destroying Bhopal incidents.

For nuclear costs at the mature end of the learning year we have costs of less than 3 cents a kwh after the first score of Candu's were built. Here is an example of units 26 and 27 of Candu technology.all on time in 4 years and on budget at $2B/Gw or less than 3 cents a kwh.- the cheapest reactor available anywhere outside China. The last one was completed in 2007 in Europe.

Google cnnc 168 candu

All the worlds nuclear waste now perfectly contained would fill 1% the volume of the Great Pyramid at Giza which has lasted 5000 years - less than a football field buried 40 feet deep.

The NRC assesses a .1 cent a kwh fee for nuke power now in a fund totalling $35B, It is not waste but fuel enough to power the world for hundreds of years while being destroyed in gen IV reactors like India's new 500 MW first of 5 units. Ironically that is the only way to get rid of it.

3 weeks ago in reply to Chris Young 6 Likes Like Reply

mantis42

Careful with your facts Seth, it always sends the anti-nuclear folks scrambling to find a link that disproves what you say. But you're right, all the nuclear waste the US has ever produced could fit inside a single Best Buy store. It is not unmanageable. Moreover, once we finally get around to developing liquid fluoride thorium reactors (LFTR) or integral fast reactors (IFR), we'll just burn up all that waste and use it as energy. The world's current stock of spent

nuclear fuel can meet the planets energy needs for at least a century.

What would you rather do with the waste? Bury it in a mountain? Or use it to meet our energy needs and drastically reduce its harmfulness and volume? I think the answer is obvious...

3 weeks ago in reply to sethdayal 5 Likes Like Reply

Walt Stawicki

and if we sent some developement money tonuclear projects, we could have those no uranium, no plutoniu, fussion generators in abandoned warehouses down the street running 24/7/365...but lets not waste any cash on a proven bust...lets stick with the crap we got. FRACKIN RIGHT!

1 week ago in reply to mantis42 Like

tumaino

I'm sorry, but a 200 mile radius circle of unlivable conditions around a nuclear plant after a disastrous melt-down, sensu Fukishima, is not a "virtually zero environmental footprint"

3 days ago in reply to sethdayal Like Reply

sethdayal

The radiation levels outside the Fuku front gate have reverted to natural background levels and are far less than those in downtown Denver - no exclusion zone needed.

3 days ago in reply to tumaino 1 Like Like Reply

Dave

I am a physicist in energy conservation and renewable energy. My work is booming right now and will be for as long as I want it to.

Application Error: There was a problem getting data for the application you requested. The application may not be valid, or there may be a temporary glitch. Please try again later. Why? because I look at problems and figure out how to solve them in a new way. I don't do anything particularly exotic - I just integrate existing technologies and ideas while considering people's behavior patterns and needs. My projects are elegantly simple and should be in place for many, many years. I have a very long list of extremely happy customers.

Energy conservation is here to stay and it is the ONLY energy 'resource' that can save our asses. Why? Because it is immediately deploy-able by necessity or quickly deploy-able by design - which is UNIQUE in terms of all energy sources.

And once we have greatly reduced our energy demand through aggressive energy conservation efforts, we will have to meet our needs by renewable, environmentally benign energy sources.

That all having been said, the real problem with the renewable energy is quite simple: the cost of conventional energy does NOT even come close to covering the costs that are borne by society: health effects, environmental degradation, safety costs (nuclear power plant targets and waste disposal), etc, etc, etc.

In my experience, most of the folks who cannot or will not hear this argument seem to be unable or unwilling to consider this fact - and if they do, they point to the uncertainties in the studies - e.g., the real health cost of coal is, at best, an estimate - rather than acknowledge that the basic premise (in this case, that coal causes very significant health costs) to be truth.

This is both ethically and intellectually dishonest, just the way cliimate deniers 'think'.

I don't care what fossil fuel you use - or even what nuclear fuel you use - it has a much shorter time horizon than you realize. One of the reasons is the absurd way that reserves are calculated. For example, when they talk about how many years of coal we have, it is a snapshot of today's reserves at today's consumption rate.

While it is true that we do find more reserves from time to time, the world rate of energy and resource consumption is increasing exponentially - with the population and the rising wealth of China, India, Brazil, etc. So we have many fewer years of coal left

than the estimates would indicate.

Anyone who thinks we have reserves of coal, oil, gas or uranium that will not be stripped out in several decades at MOST needs to study and TRULY understand the concept of EXPONENTIAL GROWTH.

Think of it this way: it took us about 150 years (and really only the last 50 to 60 years) to consume about 1/2 of the world's energy reserves. Those reserves took hundreds of millions of years to form AND we've taken the stuff that was easiest to get to.

Nuclear will end up being the next mess - if we don't wake up and realize that Fukashima can happen anywhere. And that is just the most dramatic example of why nukes are a terrible idea.

Winston Churchill was correct: you can count on Americans to do the right thing - AFTER they've tried everything else.

In this case, we have used non-renewable energy in very irresponsible ways for decades now and we need to get beyond that to sustainable practices.

I gotta get back to work saving those kWhs.

3 weeks ago 6 Likes Like Reply

Atlasslugs

Dave, I'm glad you are working to save us from ourselves. Too bad no one is listening. However, it is like taking apart a buggy whip to come up with a way to make the horse run faster. Why not find a replacement.

I can't see conservation working on a broad level. Sure my company can save money right now through conservation but I'm still using energy provided by 19th century technology. Add nuclear (just another way to boil water for steam turban generators) and natural gas (just a turban spun by heat) and the other work-in-the-lab toys and you are still calling for conservation. Most people don't think of where energy comes from as long as it keeps coming. My kids still view a power outage as a problem inside the wall and only want dad to fix it, Now.

We will not go back to a pre-energy level. My energy footprint is huge and I don't know if I could list all of the ways I waste energy in my day to day activities and I at least think about it at times. Most don't.

If I were smart enough to tell you what is the next form of energy will be I would develop it myself. You have an advantage in that you know what has a chance because you can see what has worked and what won't. The buggy whip has been unraveled and the vision to see beyond it is up to guys like you. Leave the problems of today to today and move your thoughts and energy to the next level.

2 weeks ago in reply to Dave 1 Like Like Reply

Hightech_Hats

No wonder we're wasting resources, all those power stations are slacking off faffing around with HATS! DO HO HO HO HO. It's a Turbine mate.

2 weeks ago in reply to Atlasslugs Like Reply

nicmart

How much of your funding comes directly or indirectly from government?

3 days ago in reply to Dave Like Reply

Andrew Morriss

The article misses a huge difference between truly disruptive technologies and the solar/wind/biofuel industries - real disruptors don't depend on government subsidies. Even worse, the article fails to as even basic business questions about Solyndra - why was it building a plant in California, one of the highest cost business locations in America? Did it ever have a business model that made sense? And it manages to almost completely ignore the political connections between Solyndra and the Obama administration, probably the biggest part of the story. Shoddy work, not up to Wired's usual standards

3 weeks ago 5 Likes Like Reply

WakeUp_Call

This is an incredibly naive article on renewable energy. Ms Eilperin makes the ridiculous assumption that nat gas will be the panacea to all our energy problems. Anyone familiar with the electric utility industry, knows that their pricing is slanted to their favor. A typical electric bill in CT has generation at about 1/2 of the bill (9.2 cents/KWH) - the rest is transmission and maintenance of the infrastructure both of which are inflated. So the real cost does not reside in generation alone. DTE in Michigan follows a similar model but at 6.9 cents and 4.9 cents/ KWH respectively. Meanwhile 2 ski areas in Massachusetts (Jiminy Peak and Berkshire East) have installed windmills that have significantly reduced their operating costs. So much so that they are on track to getting 4 year payback on investment - 25% ROI isn't too shabby in this economy. It certainly helps when the fuel is free. Anyway they are too remote for nat gas lines. Regrettably though, they get short-changed when pumping back into the grid - because of the credit only for generation.

2 weeks ago 3 Likes Like Reply

Josh V

The solar industry is dead! Just because it is in a period of small company bankruptcies and consolidation! SOLYNDRA SOLYNDRA SOLYNDRA!

In 2001, lots of people - including people quoted in the NYT - noted that of all of the companies starting into solar, only a few would come out on top. The rest would go bankrupt and be bought out by others, or fold entirely, leaving a few dominant manufacturers in each sector like you see in mature industries. Foxconn just announced it's going to go IN to solar panel manufacturing. Hardly sounds like a dead industry to me. In fact, it sounds like the period of consolidation and pain that everyone predicted ten years ago is happening, just as it happens in other nascent industries and in the boom-bust/undercapacity-overcapacity cycles that characterize other commoditized products (e.g. petrochemicals, plastics, rubber).

Also, cellulosic biofuels commercialization is on track this year... look up: POET project liberty...

Reading this article convinced me that all of the information Wired has is two years out of date. Grats.

3 weeks ago 4 Likes Like Reply

David Hrivnak

It is sad they had to use a sensationalized photo-shopped picture that does not represent the truth. Yes at the moment with fracking natural gas has dipped slightly below wind power. But while the article talked about some of the challenges with renewable technology, they do not cover the possible earth quakes, and ground water contamination that are happening in areas with a lot of fracking. So all energy sources have their challenges, but renewable have the advantages of a very low carbon foot print and the energy costs will not rise as the cost of the wind and sun will not grow with inflation in the future.

3 weeks ago 4 Likes Like Reply

zmith

19 years of happily reading Wired, until now. Sorry to see you finally succumb to Big Carbon's propaganda machine. Come on, conflating Solyndra with Clean Tech here is like saying Netscape's browser sunk the World Wide Web.

3 weeks ago 3 Likes Like Reply

Roy LeMeur

Is this Wired Magazine? Or the Weekly World News? Or perhaps the National Enquirer?

2 weeks ago 2 Likes Like Reply

Marios P.

cool. Lets exploit some more oil from Canada's tar sands and fuck up things a little more. Who cares its Canada after all.

3 weeks ago 2 Likes Like Reply

BMCSL02

Plain and simple it's a numbers game. There is no demand for green energy. because there is no need for it. you can't create artificial demand for a product and expect to create an industry. Green energy fails, because there is no viability to it. The dollar rules. If people have a choice of paying more for energy and not being able to afford a new Xbox, PS3, Droid or iPhone they won't go for it. Period. Apple didn't have to create an artificial market for the iPhone they saw a need and the market responded. The market hasn't responded, because there isn't a need. The f'n gov't propping companies up with subsidies and rebates doesn't make it an industry. When has the gov't gone into small town America and given a toy store subsidies for selling wooden toys? Never. Why? It's not good business sense, there's no demand, but that's what they're doing with clean energy and that same logic should be applied to the toy store that sells wooden toys. Why? Wooden toys are . . . 1. Green 2. renewable 3. recyclable 4. low carbon foot print 5. non-toxic etc. etc. Oh, but wait then we have . . . 1. the destruction of forest 2. the destruction of natural habitat 3.the destruction of natural resources 4. displacement of furry woodland creatures etc. etc. Which causes increased water run off, which increases the chances of flooding and destruction of natural fish habitats and . . . F'n A you guys are recockulous! Modern man will never be able to live to the standards that he desires and live in peace with nature or vice versa or in peace with man as has just been laid out, because the clean energy nuts run into the environmentalist, who run into business, who run into enough energy to produce products that consumers demand, who bitch about the price of energy, the environment and business, because they're to f'n brain dead and stupid to do their own research they rely on dipshits like this author and the talking heads on t.v. to tell them how to think and what they should think. It's demand , Dummies!

3 weeks ago 1 Like Like Reply

Robert_N

Crazy rant aside, I guess that depends on your perspective/whether you think there's a lot of dirty coal capacity with substantial externalized costs to replace. It's good to have diversity in any portfolio, including energy. We can't just bet the farm on the promises of the natural gas industry, and most people realize that more coal carries great risk as long as "clean coal" with large-scale CCS remains a commercial pipe-dream.

3 weeks ago in reply to BMCSL02 1 Like Like Reply

Dave

So are you just going to throw in the towel and give up?

My hope is that educating people is what must happen. And I have serious doubts that it can be done in time.

But to give in and give up is just too lazy and cynical.

3 weeks ago in reply to BMCSL02 Like Reply

jhughes66

The bust is only in USA. The rest of earth is still moving ahead with large projects in 2012 and large investments in the near future

3 weeks ago 1 Like Like Reply

sethdayal

Yup none of them generating any net energy. Here's Germany's experience too date.

Google spiegel 0,1518,809439,00

3 weeks ago in reply to jhughes66 1 Like Like Reply

Patrick Henry

There are niche and specific opportunities for 'alternative' energy sources worthy of investment, but not in the mainstream energy world. Anytime the government has to subsidize an industry it means it isn't economically viable. I have no sorrow for the John Doers who allowed their eco religion to overtake their rational thought as he has lost his and his colleagues investments. I am angry at my money, via taxes, this Administration (and the previous to a much smaller tab) has thrown away at Solyndra, ethanol and the others. One of the crimes and unintended consequence of ethanol mandates is it has hurt the impoverished in developing countries by driving the costs of food up due to diverting a base crop (corn) to an inefficient use, thereby raise its price.

3 weeks ago 1 Like Like Reply

Chris Young

There is no energy source that is not subsidized in some way or another. Coal & Natural Gas get the benefit a free ride on health & environmental impacts. Nuclear, Gets massive subsidies to cover construction cost over runs & liability caps.

3 weeks ago in reply to Patrick Henry 7 Likes Like Reply

Robert_N

Fossil fuels over the decades have take substantially more subsidy, direct and indirect, than renewables ever have. And Solyndra is not representative of the solar industry in general, which is progressing in achieving economies of scale/bringing down costs. But it is a relatively fledgling industry in America, unlike entrenched fossil fuel interests that have been making money hand over fist while taking government help. We're probably going to need solar and other renewables, combined with maximized efficiency, as part of a future energy portfolio that doesn't burden our future economy with ongoing fuel and other costs. Given that plants and infrastructure are in service for decades, now is a good time to start thinking ahead.

3 weeks ago in reply to Chris Young 5 Likes Like Reply

Robert Fanney

According to that logic, fossil fuels would have gone bust long ago. They receive far greater subsidies than any other source -- 80 billion per year. No. This is crony capitalism to the greatest extent imaginable. You have one party -- Republicans -- wholly owned by oil and gas interests and you have another Democrats partially owned by the same. So you can't have any concerted national action to build alternative energy to the scale needed.

This failure will have terrible long-term consequences for the US and world. The move to fracking has been nothing more than an idiotic adventure in long-term failure.

3 weeks ago in reply to Patrick Henry 4 Likes Like Reply

Neil Thompson

Using a single company, Solandra, to claim a failure in all clean tech is pretty far fetched. The current economy is tough on all businesses and we don't hear much about another cement company or Mexican restaurant that went bankrupt. This brings up a big issue: "A recent Department of Energy road map includes a 33-item list of R&D challenges—from assessing environmental risks to creating efficient conversion methods—that must be overcome for algae to be viable. In fact, researchers still aren't able to cultivate the stuff on a large scale." Pretty big assumption that they cannot be scaled, if scaling in a single firm is important at all. To scale means two things: scale in a single firm, and scale by multiple firms to impact the entire market. Many clean tech try to introduce technologies with the belief that they should resemble fossil fuel scale and efficiency (big is good from the 1950s), which is a matter of re-producing existing assumptions about energy production. On the other hand, Algae is most likely going to be smaller companies that collectively influence the energy landscape, unfortunately that's not what our current system of financing has in mind when compared to ICT (get rich quick). The real answer lies with this: "There was an additional factor at work: impatience. Venture capitalists tend to work on three- to five-year horizons. As they were quickly finding out, energy companies don't operate on those timelines. Consider a recent analysis by Matthew Nordan, a venture capitalist who specializes in energy and environmental technology. Of all the energy startups that received their first VC funds between 1995 and 2007, only 1.8 percent achieved what he calls "unambiguous success," meaning an initial public offering on a major exchange. The average time from founding to IPO was 8.3 years. "If

you're
signing up to build a clean-tech winner," Nordan wrote in a blog post, "reserve
a decade of your life." This is entirely the issue at hand for clean
tech ventures.

3 days ago Like Reply

VivlianWozz

I am a 27 years old doctor,mature and beautiful. and now i am seeking a good man who can give me real love, so i got a sername Andromeda2002 on Agedate.CòM, a nice and free place for younger women and older men,or older women and younger men, to inte ract with each other.Maybe you wanna check out or tell your friends.

1 week ago Like Reply

Walt Stawicki

chep gas? tell the people i know payng $600-700 a month!

1 week ago Like Reply

sales

TBH, most of the article is right on base, i own a solar install company and i agree it's a boom for us now just the tech on the manufacturing side is a bust. What i tell my customers is as long a black lung is cheaper then energy it will be mined by 14/hr people in WVa. I CAN INSTALL solar at 3/watt but choose not to, a 5yr ROI is doable with our local 13cent/Kwh. What most do not realize the subsidies are here to help you start a business and be able to maintain it after they are gone. The OIL and GAS company want the lions share of the market, and complain about the money to other sectors but never tell you that is how they got started as well. Again if you can own your own energy with a 5yr ROI that is a 20% return on investment. MADOFF lied about 12%, and I can guarantee you 20% with a life of over 25yrs. Everyone wants

to compare energy to energy, but we are not allowed to burn our own coal, or product power to supply others in any scales to be compete as the local utilities. If you buy products from china you really should not complain about the lose of US manufacturing jobs, really can not have it both ways. I can be competitive with coal, but really (ignoring any unknown environmental concerns) Nat Gas is our short term energy solution. Does not mean that solar can not be a part of the solution also, but huge demand spikes usually happen on the hottest day that the perk of the solar afternoon. As for China and making the turbines and panels, if they are high quality then the US has lost yet another market. If they are cheap (quality) then someone else will fill that void. I spec each job for its requirements not the cost.

2 weeks ago Like Reply

roger

Big Coal and Big Oil write interesting fairy tales about replacement tech that is making them as relevant as those shuttered rust belt blast furnaces in Ohio... Energy now looks like Wind, Solar, Nukes, and Hydro, with hydro used for peaking energy storage... I dont see any CO2 in any new tech stuff... What we are really good at is making all kinds of petrochemical fibers and plastics... we should convert Cotton, Flax, Hemp, Palm nut, Corn, Soy bean, ect. to food production products... Keep GMO or Non-GMO agriculture, Keep our amazing Organic Grown Foods, Keep our Fair Trade Spice, Coffee, Tea, and Chocolate production... Maybe convert our Meat processing industry to Euro Standards... all of this is doable-right now... Even keep the cars-Just ban those that must presently pay the gas guzzling tax... Wheres My electric Scooter, Smart Car dealer, Local Bus station??? all no CO2...
EOF

2 weeks ago Like Reply

jhs24

The article says that the solar industry estimates that by 2016, the industry will employ 500,000 people. Then the article, in the next sentence, goes on to say that "the number is more like 100,000" ....without clarification. What the author MEANT to say was that RIGHT NOW, the solar industry employs OVER 100,000 people in the US. And yet, from spotty writing, the author seems to hope to imply to the reader that the estimate is that by 2016 there will be 100,000 instead of the 500,000 referenced earlier. Be fair about it.

2 weeks ago Like Reply

JonMueIIer

Thank you for publishing an article about "renewables" based on fact and reality. It's an unpopular thing to say that fossil fuels remain the best choice for transportation and electricity generation, and the many vicious attacks below prove it.

2 weeks ago Like Reply

WakeUp_Call

This is an incredidbly naive article on the progress of renewable

2 weeks ago Like Reply

* Subscribe by email . RSS

Reactions

Show more reactions