



# Innovative Design

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## Solar Energy: Environmental Wackos' Socialist Plot? Countering the Anti-Solar Myths and Misinformation

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In recent months you have heard it all, every conceivable reason why our country should not be pursuing solar energy:

“Americans don’t think solar technologies are ready. Maybe down the road but surely not now, not in such a bad economy. They cost too much.”

“Without subsidies, solar can’t compete with coal or nuclear power. If the average American knew how much our government subsidized solar, they would be outraged.”

“Jobs are what our country needs, but solar isn’t producing any. There aren’t any green jobs being produced. If we go green, we won’t be able to compete in a global economy.”

“U.S. energy independence hinges on tapping our abundant coal and oil resources — not renewables.”

And, my favorite:

“Climate change is a socialist plot perpetuated by environmental wackos. It’s a fringe concept supported by fringe elements in our society.”

Ratcheted up by those who would make political hay of the Solyndra failure, these are the arguments that you repeatedly hear by those who stand to lose the most with solar energy’s rapidly increasing success. Let’s see how each of these arguments, in turn, holds up against the facts and the opinions of Americans.

## Solar Energy: Ready Today

A poll conducted in June 2010 by ABC/Washington Post found that 87 percent of Americans supported federal government action to develop more solar and wind power. A similar March 2011 CNN/Opinion Research Corp poll asked what energy technologies should be pursued by our country. What should we rely upon more to meet our future energy needs? Eighty-eight percent favored pursuing solar and 83 percent supported wind, while half that number supported coal (44 percent) or nuclear energy (43 percent). Only 28 percent of Americans felt that we should be relying more on oil for our energy future.

The fact is that the great majority of Americans have, for decades, consistently wanted our country to move toward solar and away from coal and nuclear energy.

An April ABC/Washington Post poll indicated that 67 percent would oppose building a nuclear plant within 50 miles of their home, while a March CNN/Opinion Research Corp poll found that 53 percent of Americans oppose building any nuclear plants anywhere in the United States. Perhaps that is because only 35 percent of Americans, according to a March CBS poll, felt that we are ready to deal with a nuclear accident.

But is solar cost-competitive today?

Ten percent to 20 percent<sup>1</sup> of a typical U.S. electric utility's capacity is implemented to provide electricity to consumers during peak load conditions that occur less than 100 hours of the entire year. In areas of the country where cooling loads are producing peak demand conditions, solar energy is ideal for solving this problem — ideal in that the highest peaks occur when the sun shines the brightest and ideal because solar is often the cheaper option to provide this peak power. Additionally, as utility power lines extend out from their central locations, they experience up to 10 percent efficiency losses. Solar energy systems are also ideal for solving this problem, in that multiple distributed solar systems can enhance the utilities' power distribution system and make up for these line losses.

Given the necessity of addressing peak load conditions and the financial impact it has on consumer utility bills, let's look at the costs that utilities now incur in constructing new power plants.

Duke Power's Cliffside coal plant, now being constructed in North Carolina, is projected to cost \$3,000 per kilowatt (kW) of capacity. However, that doesn't count the \$125 million<sup>2</sup> in federal subsidies, the cost of the coal or any environmental- or health-related externalities caused by coal burning. Nuclear power plants cost even more, and the externalities are even greater. Florida Power and Light's planned nuclear plants are now projected to cost ratepayers up to \$9,000 per kilowatt.<sup>3</sup> Add to this high construction cost the operational costs to fuel the plant, the billion dollars per plant subsidy that Congress provides for each new nuclear plant, decades of taxpayer-subsidized nuclear waste storage, national security-related protection and insurance against accidents, and nuclear power becomes, by far, the most expensive energy option.

In comparison, the installed cost of the Solargenix/Acciona Nevada Solar One thermal concentrating solar power plant, in Boulder City, Nev., designed for 64 megawatts (MW) and performing at 70 MW, was built for \$3,400 per peak kilowatt. Even photovoltaics, just two to three years ago costing more than \$10,000 per kilowatt and previously considered one of the more expensive solar technologies, is now typically being installed throughout the country for less than \$4,500 per kilowatt. And in some parts of the country, costs have dropped to below \$3,500 per kilowatt. It is also important to remember that once installed, there are no fuel costs — just free solar power.

Remember August of 2003 when the Northeast United States experienced a \$7 billion to \$10 billion electricity blackout? This blackout could have been averted if just 500 MW of distributed solar had been implemented.<sup>4</sup>

## **Subsidies: Oil, Coal and Nuclear Benefit Most**

Big Oil's subsidies far exceed the \$20 billion in tax loopholes that President Obama identified as what the oil industry will receive over the next 10 years. Just the amount the U.S. taxpayers pay annually to defend oil shipping lanes in the Persian Gulf exceeds \$20 billion, and that doesn't even consider the 4,287 U.S. soldiers killed, 30,182 wounded<sup>5</sup> and the trillion dollars spent on the Iraq War, waged primarily to protect our country's "vital" interest — oil. If all the hidden costs, now paid by U.S.

taxpayers, were included in what they pay at the pump, the cost per gallon for Middle East oil would easily be \$2 a gallon higher. Our reliance on imported oil is responsible for a third of our deficit and costs us millions of jobs every year. We are currently importing more than \$300 billion in oil every year.<sup>6</sup>

While oil subsidies are critical for keeping oil competitive, nuclear power's hidden subsidies are even more important to this industry, for without them nuclear power would not exist. Without the Price-Anderson Nuclear Industries Indemnity Act, which limits a utility's liability in the case of an accident to \$10 billion, nuclear plants would never be built in our country — no utility could afford the full premium. Nuclear power's profits are privatized, while the risks are passed on to the taxpayers, who will have to pick up the tab if the United States were to experience a disaster like Fukushima Daiichi, which is now estimated by Japanese officials to exceed \$300 billion.

Nuclear power's subsidies don't stop there. Who is paying for the waste storage? Who is paying for the design and construction costs of power plants before they even produce 1 kilowatt of electricity? Who is guaranteeing the cost overruns that almost always occur at these plants?

In June of 2010, the International Energy Agency identified \$557 billion in 2008 worldwide subsidies for fossil fuels, while all renewable energy options received 8 percent (\$43 billion) of this amount.<sup>7</sup> In the United States, taxpayer subsidies for fossil fuels dominate as well. The American Recovery and Reinvestment Act allows investors in coal plants to utilize tax-exempt bonds to finance the construction of the plants, with the interest received by the investors being exempt from any federal tax. The many other subsidies include special tax credits for extracting oil from tar sands and the billions of federal dollars paid into the Black Lung Disabilities Trust Fund.

The Energy Policy Act of 2005 created loan guarantee programs that are now being highly criticized because of the failure of Solyndra. But it was this same loan program that enabled the fossil fuel industry the benefit of receiving more favorable lending terms.

From 2002 to 2008, the direct federal subsidy of the well-developed fossil fuel industry was \$72 billion.<sup>8</sup> A significant benefit of these subsidies is that they were established as permanent provisions of our tax code. The subsidies for renewable energy, however, in addition to being considerably less, are time-limited incentives that cannot be counted on to attract long-term investors.

While climate deniers cast doubt about the science of climate change, with deep implications as we delay curbing coal emissions, coal burning is negatively impacting Americans in many other ways. These range from increased occurrences of congestive heart failure and asthma attacks to reduced life expectancy and degradation and loss of ecosystems. In 2009 the National Research Council, in conjunction with the National Academy of Science, National Academy of Engineering, Institute of Medicine and the U.S. Department of the Treasury, estimated the health impacts caused by fossil fuels in 2005 to be \$120 billion.<sup>9</sup>

In February, a report produced by *Dr. Paul Epstein at the Center for Health and the Global Environment at the Harvard Medical School* established the lifecycle societal cost of coal, including extraction, transportation, processing and combustion in the highly impacted regions of the country, at between \$175 billion to \$500 billion annually. The study indicates that at the most likely level of impact, the \$345.3 billion in externalities would add 17.8 cents per kilowatt-hour to the typical 12 cents per kilowatt-hour rate paid by residential consumers in their utility bill. Even on the lower end, the estimated externalities would be equivalent to an additional 9 cents per kilowatt-hour.<sup>10</sup>

Add to these subsidies the inequities created by the fact that in most locations, because of the lobbying strength of the local utilities, solar energy producers cannot sell electricity directly to consumers, and you have to ask, who is benefiting most from energy subsidies?

In August, Progress Energy CEO Bill Johnson, in announcing the planned merger of Duke Energy and Progress Energy, stated that “what utilities really do is raise private capital to implement public policy.” With these types of gross incentives for well established fossil and nuclear technologies, should the solar energy industry be penalized for receiving a fraction of the same incentives while raising capital for solar installations? And what “public” policies is Johnson talking about, considering that the great majority of the public supports solar over nuclear or fossil fuels?

The question becomes, if ALL of these incentives for all energy options were removed, who could then compete in a real open market economy. Solar’s advantages would be much more apparent. However, until that time comes, we must start with addressing the inequity by creating a level playing field. Many of the same tax advantages being viewed by opponents of solar as unjust are the same types of credits being claimed by a utility when constructing a nuclear plant.

A January USA Today/Gallop poll found that 83 percent of Americans favor Congress passing bills that "provides incentives for using solar and other alternative energy sources," while only 15 percent opposed incentives.

## **Jobs: More Than 100,000 Direct U.S. Solar Jobs**

In 2006 renewable energy and energy efficiency represented 8.5 million green jobs and \$972 billion in revenue nationally, according to a Management Information Services Inc. report prepared in conjunction with the American Solar Energy Society. A year later, jobs created within the renewable energy and energy-efficiency industries were responsible for more than 9 million jobs and \$1.045 trillion in revenue. Ninety-five percent of the jobs identified in the MISI report were in private industry.<sup>11</sup> But while the recession has slowed construction in general, there are positive signs that renewable energy jobs are still going up. In North Carolina alone, sustainable energy jobs have increased from 10,250 in 2009 to 12,500 now, a 22 percent increase.<sup>12</sup>

Within that larger U.S. green energy sector, more than 100,000 Americans, working in more than 5,000 companies, are now directly employed by the solar industry. That represents more than 250 percent growth in jobs since 2008. While GDP growth in 2010 was 3 percent, the U.S. solar industry’s installed electrical capacity grew 67 percent — up from \$3.6 billion in 2009 to \$6 billion in 2010. Since 2010, 27 new U.S. solar manufacturing facilities started operations or were in the process of gearing up for production.<sup>13</sup>

In 2011, photovoltaic installations in the second quarter were up 69 percent compared to 2010 and 17 percent more than the first quarter of 2011.<sup>13</sup> Meanwhile the average installed cost of photovoltaics has dropped from \$11 per watt in 1998 to well under \$5 per watt today. Additionally, 1.5 million homes now get their hot water from solar water-heating systems.<sup>14</sup>

In announcing Germany’s decision to abandon nuclear power in May, Chancellor Angela Merkel said that she hoped her country’s transformation to a renewable energy path would serve as a roadmap for other countries. Germany’s plan is to reduce carbon dioxide emissions by 40 percent and double renewable energy reliance, by 2022, from 17 percent to 35 percent. Currently 370,000 people are employed in Germany’s renewable energy industry.<sup>15</sup>

Considering the fact that the U.S. population is 380 percent greater than Germany’s, if our country’s federal policies supported renewable energy to the same level as in Germany, we can extrapolate that 1.4 million renewable energy workers would now be employed in the United States. This is despite the fact that the sunniest city in Germany does not have as much sunshine as Buffalo, N.Y.

## **U.S. Energy Independence: Solar Is the Safe, Long-Term Option**

In 2007 the United States consumed 20.68 million barrels of oil per day (7.548 billion barrels per year), of which 12.04 million barrels were imported. That is up 400 percent from 1970s consumption level of 3.16 million barrels. In 2010 our consumption, even in a depressed economy, was 19.15 million barrels per day, or 22 percent of worldwide consumption. More than 40 percent of what the United States consumes is imported from OPEC countries. At the same time, our country's proven oil reserves are 21 billion barrels and, if you consider all U.S. technically recoverable oil, including that in the Arctic National Wildlife Refuge and the Outer Continental Shelf, we have only 134 billion barrels left — an amount equal to six to seven years at our current consumption rate.<sup>16</sup>

Every day the United States imports more than \$1 billion in oil. Annually we import \$56 billion from Saudi Arabia, \$36 billion from Nigeria, \$23 billion from Iraq, \$20 billion from Algeria and \$7 billion from Columbia.<sup>17</sup> Our country sends billions of dollars every year to countries that the U.S. State Department labels as unstable or dangerous. With only 2 percent of world reserves, the United States cannot continue to rely on oil for its major transportation fuel.

Our nation's proven reserves of natural gas in 2009, excluding those that could be questionably extracted through hydraulic fracturing, was 238 trillion cubic feet, while our current consumption is 22 trillion cubic feet.<sup>18</sup> Proponents of fracking see potentially decades of natural gas production. However, if allowed to continue, many parts of our country will see increasing public health problems and growing water shortages for even longer.

Fracking processes like those used in Pennsylvania are tapping millions of gallons of water per day from that state's aquifers and other fresh water supplies. To frack each well typically requires more than 3 million gallons and, during the course of one well's usefulness, it might be fracked 10 times. Through the use of carcinogenic chemicals injected by the gas drilling companies into the water during fracking and the resulting underground exposure-related contaminants, the 20 percent to 40 percent of water that flows back to the surface is being found to be laced with radium, strontium, benzene, heavy metals and corrosive salts. Depending upon local restrictions, a significant amount of this wastewater is then permitted to be discharged into rivers.

One could also argue that the United States has enough coal resources to last for decades. The question is, with \$175 billion to \$500 billion in negative societal costs annually, can we afford this option either?

## **Climate Change: Who Are the Wackos?**

A June/July 2010 Pew Research/National Journal Congressional Connection Poll found that 87 percent of Americans supported Congress-imposed requirements that utilities produce more energy from wind, solar or other renewable sources. Another two-thirds supported stricter regulations on oil drilling (69 percent) and limits on greenhouse gas emissions (66 percent).

According to a June 2010 USA Today/Gallop poll, 56 percent of Americans support Congress passing legislation that would regulate energy output of private companies in order to reduce global warming.

A June 2010 Pew Research/National Journal Congressional Connection Poll found that Americans feel that U.S. energy policy should, to a much higher degree, consider environmental protection (56 percent) over energy price (37 percent).

Despite the claims of climate deniers, Americans' concern about climate change remains strong. September 2011 polling by Yale's and George Mason's Project on Climate Change Communications

found that 78 percent of Democrats, 71 percent of Independents and 53 percent of Republicans believe that global warming is occurring.

The people whose opinions are represented in these polls are not wackos. They are average Americans who have for decades strongly supported a sustainable energy future centered on renewable energy. Like Sen. John McCain, who in 2008 co-sponsored national carbon cap-and-trade legislation, and Mitt Romney, who supported a regional cap-and-trade program as governor of Massachusetts, and Jim Rogers, CEO of Duke Energy, who in 2007, reinforced the need for our country to address global warming by proclaiming that “the No.1 environmental issue is climate change,” Americans understand the need to address climate change now.<sup>19</sup>

From religious leaders of every faith, we hear a similar call for world leaders to consider global warming’s impact on the most vulnerable. Pope Benedict XVI, urging global action, called climate change a “growing crisis” that is impacting the rights to life, food, health — and ultimately peace.<sup>20</sup> Rev. Michael Livingston, president of the National Council of Churches, stressed that, “While not all of us agree on much, we do agree on the need to protect God’s creation. It has become clear that global warming will have devastating impact on those in poverty around the world.”<sup>21</sup> With 84 percent of evangelicals supporting mandatory limits on greenhouse gas emissions, Rev. Richard Cizik, vice president for governmental affairs for the National Association of Evangelicals, said that addressing climate change is not a matter of political persuasion, but “of moral leadership.”<sup>22</sup> These are not wackos.

With the average coal plant already being 45 to 50 years old and most nuclear plants between 25 and 40 years old, by 2040 three-quarters of our current power supply will need to be replaced.<sup>23</sup> Even assuming energy efficiency can offset a good portion of this demand, there will be a tremendous need for new clean energy supplies. The U.S. economy, let alone the sustainability of our planet, is at stake.

For the past decades, our energy path has been directed by lobbyists for the fossil and nuclear industries that have controlled Congress, controlled state legislatures and controlled our state’s utility commissions. They use terms like “environmental wackos” to redirect attention from the facts that solar energy is viable today, the American public wants solar and the great majority of the subsidies have actually gone into the same pockets as those that bash solar energy. They resort to name calling because their arguments are no longer technically valid — just self-serving.

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- 8 Estimating U.S. Government Subsidies to Energy Sources: 2002-2008, Adenike Adeyeye, James Barrett, Jordan Diamond, Lisa Goldman, John Pendergrass, and Daniel Schramm  
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- 10 “Full cost accounting for the life cycle of coal,” Annals of the New York Academy of Sciences, Dr. Paul Epstein, associate director of the Center for Health and the Global Environment at Harvard Medical School Reported in Climate Progress, Feb. 16, 2011, Joe Romm

- 11 Green Collar Jobs in the U.S. and Colorado, Roger H. Bezdek, Ph.D., Principal Investigator, Management Information Services Inc.: [www.ases.org/greenjobs](http://www.ases.org/greenjobs)
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