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Critics of Nuclear Power's Costs Miss the Point

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Carbon-capping legislation and recent studies¹ that conclude that a massive build-up of nuclear power is needed to minimize the negative economic impact of CO₂ caps have spurred several high-profile articles on the costs of nuclear energy.² One such article notes that estimated construction costs for nuclear power plants and the overall costs of nuclear power have increased significantly since 2000 and espouses wind power, solar power, and energy efficiency as alternatives to new nuclear plants.

What these articles do not recognize is that energy prices are increasing broadly. When considered properly, nuclear power is the only available technology that is adequate, affordable, reliable, safe, and environmentally clean. If the nation wants to limit CO₂ emissions, then it must turn to nuclear power.

Though nuclear energy is expensive and lowering its real costs (as opposed to artificial discounts through subsidies and mandates) should be a primary goal of public policy—especially in light of its critical role in meeting CO₂ targets—those who criticize nuclear energy based solely on costs do not fully appreciate the broader context of energy policy, energy inflation, and rising construction costs in general.

Rising Costs Are Not Unique to Nuclear. Cost problems are not specific to the nuclear industry. Energy and construction prices are escalating across the board. Much of the increase is a result of rising commodity prices for products like cement, steel,

and copper.³ The truth is that coal, wind, and solar projects are all becoming increasingly expensive. If those sources were inexpensive, few would even consider building new nuclear plants, yet nearly 20 companies are pursuing construction and operating licenses for up to 30 new reactors. Renewable energy sources would not need mandates and subsidies to survive if they were affordable.

Furthermore, assigning all of the costs of the first few nuclear plants to future plants is inaccurate. As more orders are placed, economies of scale will be achieved. Today, it is very expensive to produce nuclear-qualified components and materials because steep overhead costs are carried by only a few products. Additional production will allow these costs to be spread, thus lowering costs overall. Further savings should be achieved by applying lessons learned from initial construction projects. Because nuclear plants could have an operating life of 80 years, the benefit could be well worth the cost.

To argue that nuclear power is not viable based on cost alone while ignoring the many problems, including costs, that are associated with wind, solar, and efficiency measures is to present an inaccurate picture.

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Wind and Solar Have Problems Too. Wind and solar power do have a role in America's energy mix, but those technologies alone are not ready or able to power the United States. Despite efforts to portray these sources as viable alternatives to nuclear power, they have their own problems. They are expensive, intermittent, and inappropriate for broad swaths of the United States. For example, wind turbines are virtually useless in the Southeast, where there is little wind. Even environmental activists are beginning to oppose wind projects because they kill birds, despoil landscapes, and ruin scenic views.

The costs of wind power have been increasing. The Department of Energy reports that the price of wind turbines has gone up 85 percent from 2000–2007, citing the declining value of the dollar and the increased input prices of steel and oil as the primary reasons.⁴ In fact, the cost of planned wind generation in the Rocky Mountain region now exceeds \$14.5 billion for about 8,000 megawatts of capacity. This may seem like a bargain until two important points are taken into consideration.

First, wind is intermittent, producing electricity only about a third of the time. This means that power plants are needed to provide electricity when the wind is not blowing. If one is going to rely on

wind and the additional power-generating capacity that is needed when the wind is not blowing, those additional costs should be assigned to wind power as well.

Second, the life expectancy of windmills is projected to be 20 years.⁵ Nuclear power plants produce power for up to 80 years. This must be taken into account when considering costs.

Solar energy projects are also running into trouble. Like wind, solar is intermittent: It produces electricity only when the sun is shining. The general economic problems of solar power were recently described in a study by Severin Borenstein, a professor at the University of California, Berkeley's Haas School of Business and director of the UC Energy Institute. He looked at the costs of 26,522 photovoltaic solar panel installations, equal to 103 megawatts of capacity, that have received state support from California and found that their cost (\$86,000–\$91,000) far outweighed their value (\$19,000–\$51,000).⁶

Other problems have arisen as well. For example, Solar, Inc., the world's largest solar company, recently told investors that its largest market, the European Union, may ban its solar panels because they contain toxic cadmium telluride.⁷ To replace

1. William W. Beach, David W. Kreutzer, Ph.D., Ben Lieberman, and Nicolas D. Loris, "The Economic Costs of the Lieberman–Warner Climate Change Legislation," Heritage Foundation *Center for Data Analysis Report No. CDA08-02*, May 12, 2008, at <http://www.heritage.org/Research/EnergyandEnvironment/cda08-02.cfm>; U.S. Environmental Protection Agency, *EPA Analysis of the Lieberman–Warner Climate Change Security Act of 2008*, March 14, 2008, at http://www.epa.gov/climatechange/downloads/s2191_EPA_Analysis.pdf (May 22, 2008); U.S. Department of Energy, Office of Integrated Analysis and Forecasting, *Energy Market and Economic Impacts of S. 2191, the Lieberman–Warner Climate Security Act of 2007*, April 2008, at [http://www.eia.doe.gov/oiaf/servicerpt/s2191/pdf/sroiaf\(2008\)01.pdf](http://www.eia.doe.gov/oiaf/servicerpt/s2191/pdf/sroiaf(2008)01.pdf) (May 22, 2008).
2. Joseph Romm, "Nuclear bomb," Salon.com, June 2, 2008, at http://www.salon.com/news/feature/2008/06/02/nuclear_power_price; Rebecca Smith, "New Wave of Nuclear Plants Faces High Costs," *The Wall Street Journal*, May 12, 2008, at http://online.wsj.com/article/SB121055252677483933.html?mod=hpp_us_whats_news.
3. Ken Simonson, "Prices Surge for Imports, Steel, Copper, Oil, Gas," *Purchasing Magazine*, April 16, 2008, at http://www.pmmag.com/CDA/Articles/Economics_Week_in_Review/BNP_GUID_9-5-2006_A_1000000000000311931 (June 5, 2008).
4. U.S. Department of Energy, *Annual Report on U.S. Wind Power Installation, Cost, and Performance Trends: 2007*, May 2008, at <http://www1.eere.energy.gov/windandhydro/pdfs/43025.pdf>.
5. Industrial Info Resources, "Planned Wind Generation to Exceed \$14.5 Billion in the Rocky Mountain Region, an Industrial Info News Alert," June 4, 2008, at <http://www.earthtimes.org/articles/show/planned-wind-generation-to-exceed,419278.shtml#> (June 5, 2008).
6. Severin Borenstein, "The Market Value and Cost of Solar Photovoltaic Electricity Production," University of California Energy Institute, Center for the Study of Energy Markets *Working Paper 176*, January 8, 2008, at <http://www.ucei.berkeley.edu/PDF/csemwp176.pdf> (June 10, 2008).

the cadmium model with a silicon-based model would quadruple the production costs.

The intermittent nature of wind and solar energy is important to the overall economics of energy and how these renewable sources relate to nuclear power. Given the low cost needed to operate a nuclear plant, lifetime costs are very low once the plant has been constructed.⁸ It is therefore difficult to conclude that wind or solar power should be built at all.

This could explain why many opponents of nuclear power are committed to renewable portfolio standards.⁹ These standards dictate that a certain percentage of energy-production capacity must come from wind and solar sources. This forces energy producers to invest in wind and solar even though such investment may not be economically rational.

Instead of mandating how energy is produced, the government needs only to set the regulatory framework and should allow the market to dictate how best to meet America's energy needs. If wind and solar are competitive, they will succeed. The same holds true for nuclear.

Efficiency Mandates Do Not Discount the Value of Nuclear Energy. Even critics of nuclear energy acknowledge that renewable sources alone will likely not meet America's growing energy demand. These critics assert that any shortfalls in supply will be met by increased efficiency, and they want mandatory energy reductions to assure that it happens. Such draconian measures are not needed and would not work without dire economic consequences. Energy efficiency standards

have run into their own problems with higher costs and unintended consequences, such as lower productivity.

This is not to downplay the importance of efficiency. Energy resources are precious, and society benefits by their conservation. However, the value of efficiency mandates is questionable. People's interests are served by efficiency, and they will pursue it where it most benefits them. That is why consumers and producers, not government, should drive the push for efficiency.

Mandatory efficiency requirements often raise the price of consumer goods and force engineering in directions that technology is not ready to support. The result is often lower productivity and less efficient technological innovation. This not only affects everyday lives (toilets do not effectively flush, and washing machines do not effectively wash), but also can have broader technological effects.¹⁰ For example, new CAFE (Corporate Average Fuel Economy)¹¹ standards will force automobile manufacturers to focus their research and development resources on meeting new miles-per-gallon mandates instead of on revolutionary transportation technologies.

The Market Should Decide. Government has no business making any decisions about nuclear power based on costs. Its role should be to provide adequate oversight and fulfill its legal obligations on nuclear waste. It is primarily private companies that produce America's power,¹² and consumers pay for it. Their interactions in the marketplace should determine the best way to meet America's energy needs.

7. Christopher Martin, "First Solar Shareholder Signals Swoon With Sales" June 2, 2008, at <http://www.bloomberg.com/apps/news?pid=20601072&sid=a086oapk9iBA&refer=energy> (June 5, 2008).

8. Nuclear Energy Institute, "Costs: Fuel, Operations and Waste Disposal," at http://www.nei.org/resourcesandstats/nuclear_statistics/costs (June 18, 2008).

9. Select Committee on Energy Independence and Global Warming, U.S. House of Representatives, "About Chairman Markey," at <http://globalwarming.house.gov/about?id=0001> (June 18, 2008).

10. "Washers & Dryers: Dirty Laundry," *Consumer Reports*, June 2007, at http://www.consumerreports.org/cro/appliances/laundry-and-cleaning/washing-machines/washers-and-dryers-6-07/overview/0607_wash_ov_1.htm.

11. National Highway Transportation Safety Administration, "CAFE Overview—Frequently Asked Questions," at <http://www.nhtsa.dot.gov/cars/rules/cape/overview.htm> (June 18, 2008).

12. U.S. Nuclear Regulatory Commission, "List of Power Reactor Units," at <http://www.nrc.gov/reactors/operating/list-power-reactor-units.html> (June 18, 2008).

The irony of mandates is that wind and solar may well have a place in meeting America's long-term energy needs. Massive wind farms that attempt to duplicate the model of high-output centralized power stations and individual photovoltaic solar installations on rooftops may not be the appropriate models. It may be that a decentralized model where households or neighborhoods have their own energy sources would work better for some of these technologies while more centralized models may work for others. But because the government attempts to funnel investment in one direction rather than allow the market to respond to peoples' needs, wind and solar many never get the opportunity to succeed.

A Sustainable Approach to Nuclear Power. In comparison to other emissions-free energy sources, nuclear power is both competitive and critical to the success of CO₂ reductions. Even without those goals, nuclear power's many advantages make it an attractive energy source. The United States should

allow nuclear power to reemerge as a viable and robust American industry.

A recent Heritage Foundation paper outlines ten market-oriented action items to reduce the cost of nuclear energy and prepare for a nuclear renaissance.¹³ It recommends such policies as capping financial support at the level provided by the Energy Policy Act of 2005, liberalizing commercial nuclear trade, removing commodity tariffs, and resolving the impasse over Yucca Mountain.

Conclusion. Nuclear power must be expanded if CO₂ caps are to work. Despite claims of high costs, nuclear power is competitive with renewable energy sources when all costs are factored in. The time has come to acknowledge the critical role that nuclear power will play in the United States.

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13. Jack Spencer, "Nuclear Power Needed to Minimize Lieberman–Warner's Economic Impact," Heritage Foundation WebMemo No. 1944, June 2, 2008, at <http://www.heritage.org/Research/EnergyandEnvironment/wm1944.cfm>.