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## Can the U.S. build a clean, green economic machine?

By [David Biello](#) | Wednesday, March 9, 2011

Can cleaner sources of energy not only power our economy but also drive a recovery from the Great Recession? That's the question confronted by policymakers across the U.S.—and by debaters in the Intelligence Squared series hosted March 8 by New York University.

The list of political proponents of a clean, green energy economy is long, ranging from President Obama down to John Fetterman, the mayor of Braddock, Pennsylvania. And the anecdotal evidence thus far seems strong: 2,600 manufacturing jobs in Colorado as a result of Danish wind turbine-maker Vestas—plus the farmers in that state who reap profits from the wind blowing over their fields while continuing to grow crops like wheat. Or the green jobs growth in China, Germany or California.

"Green jobs are the largest source of growth in California [with] job growth 10 times higher than in any other sector," former Governor Arnold Schwarzenegger told the second annual Advanced Research Projects Agency for Energy summit on March 1. "China has made the decision, backed by billions of dollars, that green is where the economic action is going to be. China is an ancient culture with new ideas. We cannot let America be a young culture with old ideas."

But the list of economic counter-examples is also long, including the offshoring of the steel industry that laid Braddock—and all of the Pittsburgh area—low, jobs-wise. In fact, the Rust Belt might also be called one of the downsides of cleaner air: If you want to avoid local air pollution, a simple solution is to shift the coal burning responsible for it far away—as outlined in an infamous memo from Lawrence Summers, then chief economist at the World Bank. And, faced with diminished economic prospects, clean energy companies—Evergreen, Solyndra, Range Fuels—have recently begun laying off American workers.

There are two fundamental questions at the heart of this debate: what is clean energy exactly? And what creates jobs?

The answer to the former depends on who you ask, but it certainly encompasses renewable energy sources such as dams, hot rocks, solar and wind, and may include sources like nuclear or cleaner-burning natural gas. Or even "clean coal."

"Clean coal is an oxymoron akin to family vacation or jumbo shrimp," argued pundit Robert Bryce, author of *Power Hungry: The Myths of 'Green Energy' and the Real Fuels of the Future* at the debate on March 8. "If everything is clean energy, then nothing is."

Setting aside that question for the moment, consider the question of jobs. Not only is there the issue of the quantity of jobs created by any given industry but also the quality. So perhaps there are more jobs

in installing or cleaning solar panels than in making them in the first place, a process that tends to be automated. But are those good, high-paying jobs? The kind of jobs to replace the often unionized, say, autoworker jobs that vaulted immigrants and Americans alike into the ranks of the middle class in the 20th century?

At present, there are three engines pumping out American jobs: construction, innovation and services. Rebuilding the American energy infrastructure would ultimately drive job growth in all three, from building new nuclear power plants to retraining auto mechanics to work on electric cars. And there's the export market to think about: most of the growth in energy infrastructure will take place in the rest of the world, noted private equity investor Kassia Yanosek of Hudson Clean Energy Partners. "Clean energy will drive exports, which are critical to future growth."

And that growth depends on manufacturing—because any energy revolution would require a lot of hardware. But if ET (energy technology) follows IT (information technology), most of that manufacturing may be done elsewhere, like China, just as Apple's iPhone is conceptualized in Cupertino but assembled in China. And if we lose manufacturing, we might, in the end, lose innovation.

"If pilot scale manufacturing goes away, which is closely related to [research and development], R&D will suffer," says ARPA-e director (and mechanical engineer) Arun Majumdar. "That is a big danger and we should do all we can to keep at least that manufacturing—if not more—here in the U.S."

That said, large equipment like a wind turbine tends to be manufactured close to where it will be used, simply because it's difficult and expensive to transport large, heavy pieces (think of all those wind turbines not fitting under highway overpasses). And that uncovers another facet of the clean energy debate: any energy source starts to look dirtier and dirtier the bigger it gets.

So there's the mounting opposition to wind farms from Cape Cod in Massachusetts to the Columbia River valley in Oregon. There are the ongoing lawsuits about the endangered desert tortoise holding up solar thermal power plant development in the Mojave Desert. There's the furor over Big Corn, which has received at least 40¢ per gallon in subsidies since 1978 to ferment the 200-proof "corn whiskey" that now amounts to some 10 percent of the nation's fuel supply, 13 billion gallons of ethanol in all. And there's the fact that burning natural gas releases half the CO<sub>2</sub> of burning coal, which is still a lot of CO<sub>2</sub> as far as the atmosphere is concerned.

"If the goal is to reduce CO<sub>2</sub> emissions to 1 billion tons by 2050, today, right now, CO<sub>2</sub> from natural gas use is 1.2 billion tons," said Steven Hayward, think-tanker at the American Enterprise Institute at the Tuesday evening debate. "It's above the target for every source."

No energy source is without its flaws, but there are economic, environmental and military reasons to avoid spending \$1 billion a day on imported oil, among other spurs for an alternative energy revolution. "National security is very dependent on energy security," noted Steven Chu at an address to the ARPA-e summit on March 1. "Energy we create at home is wealth creation at home."

And America needs all the wealth creation it can get. "Americans are not a people who sit out a revolution," former Colorado governor Bill Ritter noted in the debate at NYU. "There is a revolution upon us now, a clean energy revolution and it's global. Will we lead or will we follow?"