

What the U.S. Should Really Fear About Nuclear Power

From the US Chamber of Commerce: Institute for 21st Century Energy

Communications experts say that fear is the best way to get attention when you're trying to win an argument. Groups who oppose nuclear power have certainly mastered that technique by playing to economic, environmental, and safety fears. So I'd like to introduce a little element of fear into my argument here. I want to suggest what could happen if we don't adopt nuclear power as a more important part of our energy future- if Russia and China and a lot of other countries go ahead with nuclear - as they are now - while we get left behind. Are we going to be able to compete with countries that have cheap, clean, reliable nuclear power while we're stuck with a bunch of windmills and solar farms producing expensive, unreliable energy or, more likely, not much energy at all? The whole prospect of the United States ignoring this problem-solving technology that we invented is what I fear most about nuclear power. Let me give you an idea of what I'm talking about. A few years ago, in January 2006, the Chinese sent a delegation of nuclear scientists and administrators to the United States on a fact-finding mission. They toured the Idaho National Laboratory, the Argonne National Laboratory and visited GE and Westinghouse trying to decide which technology to choose for their nuclear program.

Now you might wonder why anyone would be seeking our advice when we haven't issued a construction permit to build a new reactor in the past thirty years. But as Kathryn McCarthy, deputy director of the Idaho National Laboratory, said at the time, "The world still looks to us for leadership in this technology. They'd prefer to copy what we've already done. They don't like being on the cutting edge." Well that may have been true in 2006 but it's not anymore. The Chinese eventually chose Westinghouse technology for their first reactors. At the time Westinghouse was an American company. In 2007, Toshiba bought Westinghouse so it is now a Japanese company. Then when the Chinese got their Westinghouse reactor, they insisted on having all the specs so they could see how it was put together. That's what we call "reverse engineering." As you might have guessed, China's next wave of reactors is going to be built with Chinese technology.

By 2008 the Chinese had shovels in the ground. The first four Westinghouse reactors are scheduled for completion by 2011. They also bought a pair of Russian reactors, which should be finished around the same time. They started talking about building 60 reactors over the next 20 years and just recently raised it to 132. They're in the nuclear business.

What have we accomplished in the meantime? Well, people have been talking about a "nuclear renaissance" in this country since the turn of the century. In 2007, NRG, a New Jersey company, filed the first application to build a new reactor in 30 years. They're still at the beginning of what promises to be at least a five-year licensing process before the Nuclear Regulatory Commission. No one really knows how long

it will take, since as soon as the licenses are issued opponents will file lawsuits and the whole thing will move to the courts. If they're lucky, they might have a reactor up-and-running by 2020. Other companies have followed suit and there are now 34 proposals before the NRC, but nobody has yet broken ground. So it isn't likely the Chinese will be coming to us any time soon for more tips on how to build reactors. In fact we'll probably be going to them.

That's one aspect of what's going on in the world today. Here's another. As countries began constructing new reactors, it quickly became clear that the bottleneck would be in forging the steel reactor vessels. These are the huge, three-story-high, forged steel units that hold the fuel assembly - the reactor core. That means forging steel parts that may weigh as much as 500 tons. In 2007 the only place you could order a reactor vessel was at the Japan Steel Works and they were backed up for four years. Everyone started saying, "This is going to be what holds up the world's nuclear renaissance. They'll never be able to produce enough of those pressure vessels." So what happened? Well, first Japan Steel Works invested \$800 million to triple its capacity. They're going to be turning out 12 pressure vessels a year by 2012. Then the Chinese decided to build their own forge. In less than two years, they put up a furnace that can handle 320-ton parts. They turned out their first components in June. Now they're building two more forges. So you won't see the Chinese standing in line in Japan any time soon. The Russians are doing the same thing. They're in the midst of a big revival, planning to double the production of electricity from nuclear power by 2020. They're also building a forge and just cast their first 600-ton ingot in June. France, Britain, South Korea and India are all following suit. Very soon, every major nuclear country in the world is going to be able to forge its own reactor vessels - except one. And that's us. No steel company in America is capable of forging ingots of more than 270 tons. We're still stuck in the 1960s. That means when it comes to building reactors we'll have to stand in line in Japan or somewhere else. In fact, just about everything in our first new reactors is going to be imported. The nuclear industry tells us that at least 70 percent of the materials and equipment that go into those first few reactors will come from abroad. That's because we've let our nuclear supply industry wither on the vine. In 1990 there were 150 domestic suppliers making parts for nuclear reactors. Today there are only 40 and most of them do their business overseas. Of the 34 proposals before the Nuclear Regulatory Commission, 20 are designed by Westinghouse, now a Japanese company and, nine are from Areva, the French giant. General Electric, the only American company left on the field, has partnered with Hitachi. They sold five reactors to American utilities but fared poorly in the competition for federal loan guarantees. Two utilities have now cancelled those projects and there are rumors that GE may quit the field entirely. They don't seem very enthusiastic about nuclear anyway. Have you seen those GE ads for windmills? They're all over the place. Have you seen their ad for the smart grid, where the little girl says, "The sun is still shining in Arizona?" That was pretty good, too. Now, have you seen any GE ads, in this day of concern about climate change, that 70 percent of our carbon-free electricity comes from nuclear power? I certainly haven't.

Babcock & Wilcox is the one American company that stirred some interest recently when it announced plans for a new "mini-reactor." This is a 125-megawatt unit that can be manufactured at the factory and shipped by rail to the site, where several units can be fit together like Lego blocks. This left the impression that America might be innovating again, forging back into the lead. But the complete prototype for the Babcock & Wilcox reactor is still two years away and then it may take another five years to get the NRC's design approval. Meanwhile, the Russians are already building a mini-reactor that will be floated into a Siberian village on a barge to produce power. They've already got orders for mini-reactors from 12 countries. In spite of Babcock & Wilcox's fine effort - and I'm certainly proud of them - the Russians are considerably ahead of us. So let's take stock. There are 40 reactors now under construction in 11 countries around the world, none of them in the United States. In fact, only two are in Western Europe - one in Finland and the other in France, both built by Areva. All the rest are in Asia. Although we haven't gotten used to it, Asia may soon be leading the world in nuclear technology. Japan has 55 reactors and gets 35 percent of its electricity from nuclear energy, almost double the 19 percent we get here. The Japanese have two reactors under construction and plans for ten more by 2018. They are finding they can build a reactor, start to finish, in less than four years. That's less time than it is taking to get one American reactor through licensing at the Nuclear Regulatory Commission. South Korea gets nearly 40 percent of its electricity from nuclear and is planning another eight reactors by 2015. So far they've bought their reactors from the Japanese but now they have their own Korean Next-Generation Reactor, a 1400-megawatt giant evolved from an American design. They plan to bring two of these online by 2016. Taiwan also gets 18 percent of its electricity from nuclear and is building two new reactors. In September, Bloomberg News reported that Japan Steel Works' stock had risen 8 percent on the Tokyo Stock Exchange because of China's decision to double future construction from 60 to 132 new reactors. They figure they'll get some of the action. Much of China's \$586 billion stimulus package is going toward developing nuclear power. "While China had been focusing on building new coal plants, it has now shifted its focus to nuclear because of the environmental issue," said Ikuo Sato, president of Japan Steel Works, in Bloomberg. Meanwhile, India is embracing thorium; a technology a lot of people think may eventually replace uranium as nuclear fuel. Thorium is twice as abundant as uranium and it doesn't produce the plutonium that everybody worries will be used to make a bomb. There's a lot of enthusiasm for thorium among scientists in this country. But it's India that's going ahead, with six reactors under construction and ten more planned. They began with a Russian design but are also trying some American technology they acquired in signing their 2005 agreement with the Bush Administration.

What about Chernobyl? Well, just like everybody else, Russia stopped all construction of new reactors after that horrible accident. But they learned their lesson and started constructing much safer reactors in the 1990s, completing the first in 2001. Now they have plans to expand along the lines of France, building two reactors every year from now through 2030. They have a very good reason. Russia

has huge natural gas supplies but is wasting them by using one-third of it to produce electricity. They could get six times the price by selling it to Western Europe. So they're replacing gas generation with nuclear - which is exactly the opposite of what we're doing here. Since 1990 every major power plant built in this country has burned natural gas. We now get 20 percent of our electricity from natural gas - more than nuclear's 19 percent - and the natural gas percent is still going up. And be aware, all these countries that are developing nuclear aren't just building for themselves. They're selling to the rest of the world as well. Areva is building reactors in Finland, China, India, Italy, Brazil and Abu Dhabi. The Russians have signed deals with China, Iran, India, Nigeria and Venezuela. They are even selling to us! In July, Tenex, Russia's uranium enrichment corporation signed a long-term contract to supply fuel to Constellation Energy, which has reactors in Maryland and upstate New York. It was the sixth contract Tenex signed with an American utility in the past two months.

How did the Russians end up supplying us with uranium? It's an interesting story. In 1996, Senators Sam Nunn, Pete Domenici and Richard Lugar pioneered a remarkable deal with the post-Soviet government where we would buy highly enriched uranium from old Soviet bomb stocks. The uranium would be sent to France, where it would be "blended down" from 90 percent fissionable material to three percent to be used in American reactors. For the last two decades, old Soviet stockpiles have supplied half our nuclear fuel. One out of every ten light bulbs in America is now powered by a former Soviet weapon - one of the greatest swords-into-plowshares efforts in history, although few people seem to know about it. Now the Russians have learned to do de-enrichment themselves. They've decided they don't need France. They say, "Hey, we don't have to import this stuff anymore. We'll just produce it here." Of course, producing things is one way countries get rich and raise their standard of living.

Once upon a time we were pioneers in nuclear technology. Forty years ago we were the only people in the world who knew how to deal with the atom. That's not true anymore. We've shied away from the technology while everyone else has forged ahead. Even Europe is coming back. The British have announced they're going to go nuclear -they just hired the French national electric company to help. Italy closed all its reactors right after Chernobyl but ended up importing 80 percent of its electricity at a huge cost. Now they've announced they're going back to nuclear as well. France already gets 80 percent of its power from nuclear and has the cheapest electricity in Europe - not to mention the second-lowest carbon emissions (behind Sweden, which is half nuclear). France also sells \$80 billion worth of electricity to the rest of Europe each year. Notice how well France did in the latest downturn - it barely went into recession at all. That's not because the French spend less on government bureaucracy or work harder than us and take fewer vacations. It's because nuclear power is helping to keep their whole economy afloat. So does that mean we've fallen completely behind? Not at all. In fact there's a great irony to all this. We still know how to run reactors better than anyone else. Our fleet of 104 plants is up and running 90 percent of the time. No one else even comes close. France, for all its

experience, is still at 80 percent. Other countries are even lower. We still understand the technology better than anyone else in the world. But because we've placed so many obstacles in our path, we aren't allowed to build reactors anymore. And that's what scares me. We're gradually losing our economic place in the world.

Now a lot of people say, "Well, what's the difference? So what if we fall behind on nuclear technology? We'll just forge ahead with something else." Well, there are several reasons to be concerned.

1) First there's energy security. America already spends \$ 300 billion a year importing 2/3rds of our oil from other countries. If we remain on the current path of no new nuclear power or start depending on other countries to build our reactors and supply us with fuel, we're going to be even more vulnerable than we are now. The best way to reduce imported oil, aside from ramping up domestic production, will be to use electricity to power cars and trucks. At first we can plug our electric vehicles in at night, when there is much unused electricity. After that, we should be using nuclear. We can't have Americans going to bed every night hoping the wind will blow so they can start their cars in the morning.

2) Second, there's technological leadership. Americans produce year in and year out 25 percent of all the wealth in the world. Most of that wealth has been driven by new technologies. We were the birthplace of the telephone, the electric light, the automobile, the assembly line, radio, television and the computer. But nuclear energy - perhaps the greatest scientific advance of the 20th century - is passing us by. The 21st century is going to run on clean, cheap greenhouse-gas-free nuclear power. And, how can we criticize India and China for not reducing their carbon emissions when we refuse to adopt the best technology ourselves?

3) Then there's weapons proliferation. In the 1970s we gave up on nuclear reprocessing in the hope that by not dealing with plutonium we would prevent nuclear weapons from spreading around the world. That has turned out to be an unwise decision. France, Britain, Russia, Canada and Japan went right on reprocessing and no one has stolen plutonium from them. Instead, rogue countries such as North Korea and Pakistan have found their own ways to develop nuclear weapons. The technology of bomb-making is no big secret anymore. The real problem is that, by reneging on world leadership we have left the field to others. For instance, right now the Russians are building a commercial reactor for Hugo Chavez in Venezuela. He's not exactly friendly toward the United States. Just to make things more interesting, Manhattan District Attorney Robert Morgenthau recently wrote in The Wall Street Journal that his office has uncovered evidence Iran may be providing Venezuela with missile technology.

But what really worries me are these two things:

*** First, if we move toward a nuclear-based economy and we have to import 70 percent of the technology and equipment, how are any better off than when we're importing two thirds of our oil? We'll just be creating jobs for steel workers in Japan and China instead of in the United States.**

*** Second, if we don't move toward a nuclear powered economy but try to do everything with conservation and wind and solar, we're going to be sending American jobs overseas looking for cheap energy.**

So to insure we have enough cheap, clean, reliable electricity in this country to create good high-quality, high-tech jobs, here's what we have to do. The United States should double its production of nuclear power by building 100 nuclear reactors in 20 years.

*** Nuclear today provides 70 percent of our carbon free electricity. Wind and solar provide 4 percent.**

*** Nuclear plants operate 90 percent of the time. Wind and solar operate about one third of the time.**

*** The Obama Administration's Nobel prize-winning Energy Secretary, Steven Chu, says nuclear plants are safe and that used nuclear fuel can be safely stored on site for 40-60 years while we figure out the best way to recycle it.**

*** Producing 20 percent of electricity from wind, as the Obama Administration proposes, will require building 186,000 fifty story turbines, enough to cover an area the size of West Virginia - plus 19,000 miles of new transmission lines to carry electricity from remote to populated areas. 100 new nuclear plants could be built mostly on existing sites.**

*** To produce 3-6 percent of our electricity, taxpayers will subsidize wind to the tune of \$29 billion over the next ten years. The 104 nuclear reactors we have today were built basically without taxpayer subsidies.**

*** It will cost roughly the same to build 100 new nuclear plants (which will last 60 to 80 years) as it would to build 186,000 wind turbines (lasting 20 to 25 years). And this does not count the cost of transmission lines for wind.**

*** There will be twice as many "green jobs" created building 100 reactors as there would be building 186,000 wind turbines.**

An America stumbling along on expensive, unreliable renewable energy, trying to import most of our energy from abroad, is going to be an America with fewer jobs and a lower standard of living.

Nuclear opponents continue to prey on fear of nuclear power. The truth is that if we want safe, cost-effective, reliable, no-carbon electricity we can no longer ignore the wisdom of the rest of the world. The real fear is that we Americans are going to wake up one cloudy, windless day when the light switch doesn't work and discover we've forfeited our capacity to lead the world because we ignored nuclear power, a problem-solving technology that we ourselves invented."

<http://alexander.senate.gov/public/index.cfm?FuseAction=PressReleases.Home>