

**Testimony of  
John Krenicki  
Vice Chairman, GE  
President and CEO, GE Energy Infrastructure  
Before the Environment and Public Works Committee  
United States Senate**

**Hearing on  
Ensuring and Enhancing U.S. Competitiveness while Moving toward a Clean  
Energy Economy**

**July 16, 2009**

**Introduction**

Thank you, Madam Chairman, Ranking Member Inhofe, and members of the Committee. I am John Krenicki, GE Vice Chairman and President and CEO of GE Energy. I appreciate the opportunity to discuss global competitiveness in cleaner energy. We believe that leadership in cleaner, smarter energy technology is vital to economic growth and energy security for the nation. As the world stands today, the leadership roles in cleaner, smarter energy are being hotly contested. I'd like to offer you a few thoughts on what I believe are required for the U.S. to lead.

My perspective comes from my role as CEO of GE Energy, the energy technology business Thomas Edison started more than 100 years ago in Schenectady, NY. Today we are truly a global company with more than 1/4 of the world's electricity generated utilizing GE technology. Our technology portfolio includes electricity generation from solar, wind, nuclear, cleaner coal, high efficiency gas turbines, and biomass and smart grid products, with operations in over 140 countries, 65,000 employees and almost \$39 billion revenue in 2008. We are an export driven company with approximately 70% of our sales derived outside of the United States. GE has played a central role in the world's energy economy for 120 years. It is a role we have been honored to play, and is a source of pride for the many manufacturing and technology employees we have in the United States.

In recent years we have seen a worldwide, rapid transition toward cleaner and more efficient technologies in the electricity industry. This change has created millions of jobs and opened up tremendous possibilities for innovation and economic growth. That transition has been partly fueled by the recognition that climate change demands a movement away from greenhouse-gas intensive technologies and toward cleaner sources of power, such as wind, solar, natural gas, nuclear, or cleaner coal with carbon capture and storage. It has also been fueled by the knowledge that cleaner energy could become the dominant job-creating industry of the 21<sup>st</sup> century, and the companies – and countries – that move quickly to seize that opportunity will reap the rewards.

## **WHAT IT TAKES TO LEAD**

The energy business is a scale driven business. Time horizons are measured in decades; capital investments in billions, and suppliers and competitors engage globally to deliver the lowest unit cost. Competitiveness and leadership in this industry require a long-term, sustained, highly committed effort. It requires massive investment, discipline, and vision that spans beyond the next quarter, the next fiscal year, or the next election cycle.

Will the U.S. lead the world in cleaner, smarter energy technology? Let's examine some of the factors.

For a nation to lead in energy technology, and take part in the economic growth that goes along with that leadership, I believe it needs five things:

- A big domestic marketplace – a pull for technology that will spur investment and job creation.
- A scalable, competitive supply chain that can deliver the lowest unit costs to the end customers over time.
- Best-in-class technologies. In this business, the best technology wins
- Strong intellectual property protection. In order to make technology investments, investors expect a fair return.
- Free and open markets. The ability to trade commercial products with advanced technology freely is vital to grow markets.

Let me offer an example from the history of energy technology. Today, almost 90% of the nuclear energy produced in the world comes from light-water reactors, such as pressurized water reactors and boiling water reactors. The U.S. led the world in the commercialization of these technologies and as a result, during the nuclear build out in the 60s, 70s, and 80s, tens of thousands of people were employed in the U.S. nuclear industry. Key policy decisions embodied in the Atomic Energy Act of 1946, President Eisenhower's "Atoms for Peace" proposal in 1953, and the Price-Anderson Act of 1957, helped shape the domestic market, and enabled private and public investment in critical technologies and manufacturing capability. Through a concerted, sustained effort, both public and private, the U.S. led the world in this new energy technology. Today, nuclear energy generates nearly 20% of the electricity in the U.S., and about 370 GW of power worldwide.

The history is interesting to note, and very applicable to this discussion as we contemplate U.S. competitiveness in the cleaner energy technologies of today: Since the U.S. hiatus from the nuclear industry in the 80s, many critical components and expertise for the manufacture of nuclear reactors are now sourced from outside the U.S. The U.S. stepped back from new nuclear and the technology followed the market to other countries.

Let's discuss a more contemporary example, in which the U.S. has forged its way to the lead, but now faces a collapse.

## **THE RACE TO LEAD TODAY'S RENEWABLE INDUSTRY**

Over the past four years, the U.S. has been at the forefront of renewable energy, and that's particularly true of wind energy. Growth in U.S. wind projects has led to an increase in domestically manufactured wind turbines and components from less than 25% a few years ago, to now approaching 50% with current manufacturing announcements. According to the American Wind Energy Association (AWEA), in 2008 the industry spurred \$17 billion in investment and created more than 35,000 jobs. Also in 2008, over 55 new facilities came online, were announced, or expanded, increasing our nation's total wind industry supply capacity by fifty percent.

The U.S. Wind industry hit its high watermark to date in 2008, when over 8.5 gigawatts (GW) of wind power were installed, enough to power approximately 7 million homes. That capped a three-year run, where the U.S. wind industry added over 16GW of power and now supports more than 85,000 jobs. Wind energy is clean energy, and in the U.S. wind power avoids the emissions of 28 million tons of carbon dioxide from traditional power plants annually – equal to taking six million cars off the road.

GE has worked very hard to play a central role in the clean energy revolution, and our renewables business has grown dramatically to keep up with growing U.S. and global demand. Since entering the industry in 2002, GE has invested over \$850 million in renewable energy technology and production.

Wind energy lends itself to a highly localized manufacturing base and supplier network and our U.S. business growth has therefore translated into new American jobs. In the U.S., GE employs more than 2,000 people in our Wind and Solar businesses. These include wind turbine manufacturing jobs in Pensacola, Florida; Greenville, South Carolina; Salem, Virginia; Erie, Pennsylvania; and Tehachapi, California. They include solar manufacturing and professional jobs in Newark, Delaware; Montague, Michigan; and Golden, Colorado. And they include professional jobs at our headquarters in Schenectady, New York, where since 2007 we have added over 300 jobs in Engineering, Project Management, and Services to support our Wind and Solar businesses. In addition, more than 4,000 sub-supplier jobs have been created in the U.S. to support these endeavors.

At that high watermark in 2008, the U.S. briefly led the world in wind energy production and cumulative wind power generating capacity.

Today, the story is much different. In the last nine months, the world has changed a great deal, as we all know. With a slow-down in electricity demand, policy uncertainty, and lower natural gas prices, the U.S. is projected to install about 5GW of wind in 2009, or about half of what was installed in 2008. The stimulus might stir a couple of more gigawatts of installs, although we haven't seen stimulus dollars actually get to many developers yet – less than 1% of energy stimulus dollars have been spent year to date. But let's say the stimulus fulfills expectations, our projections show that the U.S. will still move from #1 to #3 in new wind installations, behind the EU and China.

Stimulus is a tactic not a strategy. For the wind industry, its impact will fade over the next few years. During that period, 2010-2013, we project that the U.S. wind industry will only average about 4GW of installations a year. That's half of what the industry delivered in 2008.

That means that of the 85,000 jobs created through 2008, half we would expect to go away. Small and medium size companies, who are suppliers of key components for the U.S. wind industry, may have to close factories and slash employment. At GE alone, we've already canceled \$5 billion worth of material orders from our sub-suppliers in the last eight months.

The U.S. finds itself at a crossroads. Will the U.S. capitalize on the brief leadership in renewables achieved in 2008, or will it, like the 80's and 90's in the nuclear industry, take a hiatus and watch the technology leadership, manufacturing investments and jobs materialize in countries with more certain commercial prospects?

For several decades, forward thinking government policy has helped to support the spread of clean energy and the economic opportunity it brings. The federal Investment and Production Tax Credits that Congress rightly extended in 2008 have helped companies and investors large and small bring highly innovative technologies to market that otherwise may not have had a chance. More than thirty states across the U.S. have adopted Renewable Portfolio Standards (RPS) or renewables targets that support installations of renewable energy and the creation of tens of thousands of jobs.

These policies, standing alone, are an incomplete solution. Short-lived tax credits have led to a "boom-bust" pattern in the wind industry; when the production tax credit expired at the end of 1999, 2001 and 2003, wind power installations declined by 73-93%. State-based RPS policies, which help create individual pockets of renewable energy growth, also create a patchwork of rules and incentives that large companies – those with the most capacity to create jobs – have difficulty negotiating.

Some would point to the cap and trade system as a future driver of clean energy investment, and while GE supports carbon-based decision making, massive new investments in manufacturing will not be made in the U.S. today based on the hope of a strong carbon price signal 10 years from now.

While the U.S. struggles to determine the future of clean energy, other countries around the world are setting aggressive near-term and long-term standards and incentives to create large domestic markets for renewable energy. The policies now in place to support renewable energy in the U.S. are insufficient to counter weak investor confidence, and fall far short of incentives now being put in place by other nations. As history has shown, technology will follow the promise of future commercial sales. The current trajectory would suggest the future technology and expertise of the renewables industry will be concentrated outside the U.S.

## **Current Federal RES Proposals Are Too Weak**

The good news is Congress is considering national renewable electricity standards, which would require an increasing percentage of electricity be provided by clean energy or energy efficiency. The bad news is that both the RES passed by the House of Representatives and the RES approved by the Senate Energy and Natural Resources Committee last month are far too weak to keep the U.S. wind industry from collapsing in the next three years. Allow me to explain why.

The current RES proposals for 2012 – anywhere from 3 to 6 percent of total U.S. electricity generation – are essentially equal to or below the status quo, where renewable energy accounts for about 5% of the baseline requirement as defined in those proposals. Therefore, those proposals would not incentivize the addition of a single wind turbine in the United States in the next three years. Those proposals also allow energy efficiency to be applied toward an RES, an option GE strongly supports, but in the near term that option lowers requirements for renewable energy even further.

In February my colleague Edward Lowe from GE's renewables business testified before the House that the stronger RES targets then under consideration would support the creation of "100,000 new jobs between the end of 2008 and the end of 2012, with even greater long-term potential." But the weakening of RES targets by House and Senate committees in the last five months has reversed the potential for near-term jobs creation and made the RES's long-term potential irrelevant.

The fact that longer-term targets, for 2020 and beyond, would increase wind and other renewables is immaterial, because the current weak near-term targets would drive the U.S. wind technology and manufacturing expertise overseas to the countries that have thriving commercial activity over the next 3-5 years. In other words, without a significantly higher RES target for 2012, the federal government will be offering long-term support to an industry with no long-term future.

One way to address this challenge is through near-term renewable requirements that will help drive a domestic wind industry consistent with the last three years. For example, it would take a 12% renewable electricity standard by 2012, with reasonable percentages to be satisfied by energy efficiency measures, to enable U.S. wind deployments to continue on the current growth trajectory. Such a standard would also help drive dollars to small companies and developers waiting for stimulus checks to begin rolling out, and help sustain a domestic industry that cannot wait for longer term carbon legislation to come into effect.

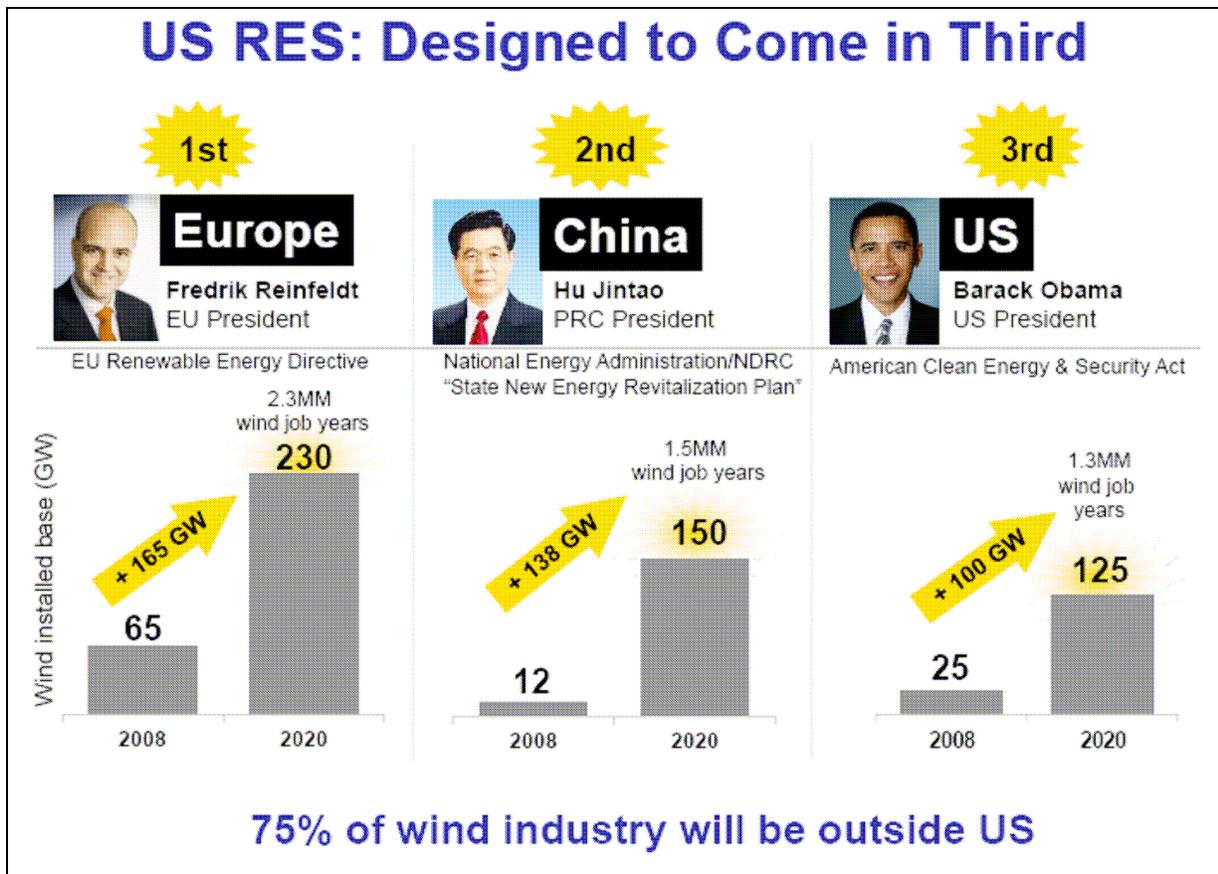
## **International Competition for Cleaner Energy Leadership**

While there are many reasons why a stronger near-term requirement is essential, perhaps the most important is international competition.

Both Europe and China have publicly committed to strong, long-term renewable energy policies, with aggressive near-term goals. The EU's Renewable Energy Directive commits member nations to 20% renewable energy by 2020, with targets beyond "business-as-usual" that begin in 2012. Countries like Germany, which have significantly less wind power potential than the U.S., have policies that help Germany and other EU countries to lead the world in the manufacture and export of wind and solar technologies. That is one reason why European companies account for the vast majority of the wind industry leaders.

China presents an even greater challenge. China has doubled its wind power capacity in each of the last four years, and is on track to pass the U.S. this year as the country with the largest number of wind installations in 2009. China expects to have 30 gigawatts of wind installed by the end of 2010 – 10 years ahead of schedule – and has established a goal of having 100 gigawatts of wind installed by 2020. They are also in the process of raising that goal to 150 gigawatts. Compare that to a total of about 25 gigawatts installed in the U.S. at the end of 2008 and you begin to see the scope of the challenge. Over 70 countries worldwide now have national targets for renewable energy, but the United States is not one of them. Interesting note: GE competes against 70 domestic Chinese wind manufacturers in China.

As I have testified, a large and relevant domestic market is key. If the wind industry moves to Europe and China, U.S. jobs that currently support the industry will evaporate. If Congress passes the weak RES targets now being contemplated, the U.S. could see up to half of our 85,000 domestic wind jobs disappear. As a country, we are contemplating climate and energy legislation with the potential to lose 42,000 clean energy jobs, in places like Illinois, Iowa, North Dakota, South Dakota, Oklahoma, and Texas, which have become hubs for renewable energy suppliers. Enacting no legislation will have the same result. Rather than doubling the renewables industry in the next three years, we will take half of it out. By 2012, up to 75% of the global wind industry will be outside the U.S. The promise of making this country a center of excellence for cleaner, smarter energy jobs and exports – still a very real possibility today – would not be fulfilled and communities that had just begun to feel the promise of these technologies would witness its flight to overseas countries.



Source: American Wind Energy Association

### A Turning Point and a Clear Choice

As I stated before, the U.S. is at a crossroads. Policy will play a pivotal role, in determining whether there is a U.S. industry for cleaner, smarter energy technologies. The debate is not limited to wind alone. There are other cleaner energy technologies on the verge of emergence, or in the case of nuclear, resurgence. Consider this: over the next three years, of the 483 gigawatts of electricity generation expected to be installed worldwide, 62% of it will be based on coal, nuclear, wind, and solar. The U.S. can stand by and watch other countries take the leadership role in these technologies, and accrue the economic benefits that go with it, or act swiftly to ensure that there is a large domestic industry for the best technologies.

The deployment of cleaner coal technology is another example of an immediate opportunity with job and environmental benefits that we can either seize or relinquish to others. Coal is a national and globally abundant, low cost resource that is and will continue to be a predominant generation choice in developing nations such as China and India. In order to achieve climate change goals, the future of coal needs to incorporate carbon capture and storage. The potential for cleaner coal globally has not gone unnoticed by European countries that are aggressively pursuing funding for their domestic technologies and collaboration with China.

Integrate Gasification Combined-Cycle (IGCC) is a superior technology for low carbon coal power that is ready for deployment today. The U.S. holds the lead in IGCC technology. Duke Energy is building the first 630 megawatt commercial IGCC plant at its Edwardsport, Indiana site. This plant is a template for future IGCC plants, including hopefully the option for carbon capture. GE has made significant investment in IGCC and carbon capture including development of a retrofittable Carbon Island™ for achieving a carbon footprint at parity with natural gas. Our High Plains Gasification Advanced Technology Center in Wyoming will expand IGCC's coal envelope to include coals found around the world. But if IGCC is to win globally, it will need supportive policy for immediate deployment in the U.S. combined with support for parallel deployment in China.

As a founding member of the United States Climate Action Partnership (USCAP), GE supports the need for balanced climate change legislation consistent with the USCAP's Blueprint for Legislative Action. GE and USCAP stand ready to work with this Committee and the other committees to support enactment this year of legislation consistent with the principles in the Blueprint. GE and USCAP have not endorsed any particular bill. Our goal is to facilitate the compromises on the difficult issues that must be resolved to build the bipartisan, political center that we believe is necessary to enact legislation.

Policy to support cleaner, smarter energy leadership is a challenge worthy of a great debate in this country. I am not a legislator, but as a businessman, what I can tell you is that technology leadership and jobs will go where the big markets actually develop, and market development follows directly from policy. I can also tell you that policy uncertainty not only inhibits growth, it causes disinvestment. Not acting on this issue sends a signal to industry – one that may have economic ramifications for a generation in the large-scale energy business. I encourage you to address the need for energy policy quickly, and help support the development of markets in the technologies that will drive economic growth for the 21<sup>st</sup> century.