

## **Senate Finance Committee**

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Written Testimony of

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Mr. Chairman and members of the Committee, I am John Krenicki, President and CEO of GE Energy ("GE"). I appreciate the opportunity to testify today on tax policies that will contribute to moving renewable energy further into the mainstream of our national energy future.

GE is a power generation technology leader and has been in the energy industry for over 100 years. We currently have over 700 sites operating in more than 100 countries, and a team of 36,000 employees. Our diverse product portfolio consists of steam turbines, gasification systems, gas turbines, nuclear, solar, biomass and wind technology.

We commend the Committee for holding this hearing today to examine clean energy generation options. I will focus on the issues involved in expanding the opportunities for renewables, specifically wind and solar energy, the benefits of these resources, and challenges in growing the renewable generation sector, and particularly the wind industry. We have made considerable progress in expanding our use of renewables, and supportive tax policies, especially the renewable energy production tax credit ("PTC"), have been essential. There is much more that remains to be done, however, to secure the energy security and environmental benefits of renewable energy generation.

### **Summary of Key Recommendations**

Congress should act this year to extend the existing tax credit for production of electricity from wind energy and the investment tax credits for solar energy. Action this year – before the credits expire – will assure that the stimulus provided for the growth of the wind and solar industries continues undiminished by financial uncertainty.

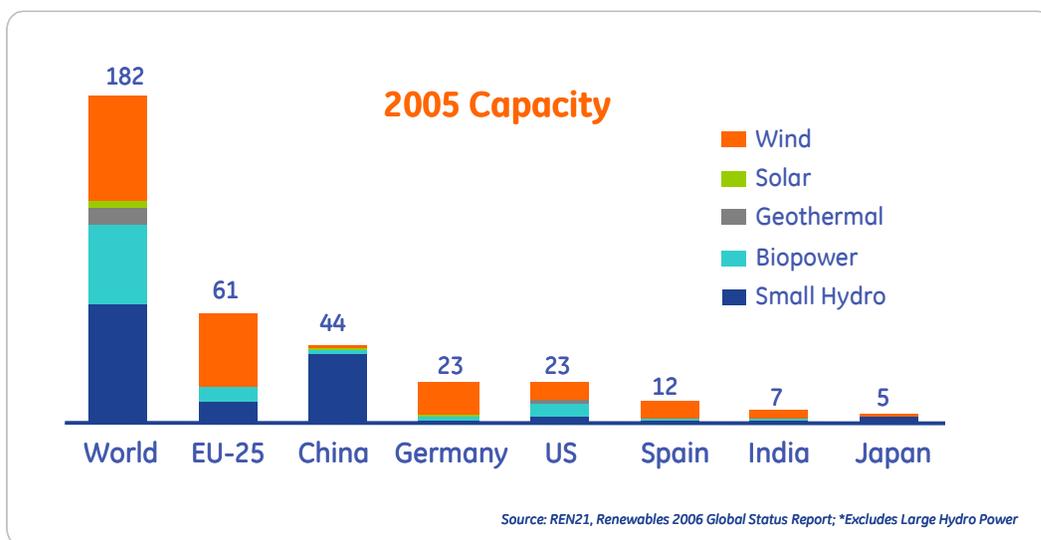
### **Putting Renewable Generation in Context: Global Demand For Renewables**

Today, the renewable energy sector (excluding large-scale hydropower) represents only 3% of global electricity production. However the

global demand for renewable solutions is significant, growing more than 20% annually over the last five years. We expect this rapid growth to continue over the coming years. We also estimate that renewables currently represent approximately 40% of global power capital spending.

In 2006, global renewable installed capacity was over 200GW, of which wind energy represented over one-third. At present, there are 50 countries installing wind power and 38 countries with renewable targets. Some examples include the European Union, where all EU member states have adopted national targets for electricity consumption from renewable resources. If all these national targets are met, EU-wide, 21% of electricity consumption will come from renewable resources in 2010.<sup>1</sup> In China, a Renewable Energy Law, passed in 2005,<sup>2</sup> seeks to increase the country's renewable energy capacity to 10% by 2020. The government's wind power development goal is 30 GW of wind by 2020. India is targeting 10 GW of renewable energy by 2012.

While the United States does not yet have a statutory renewable energy mandate, the American Wind Energy Association and The Department of Energy have identified a goal of generating 20% of electricity from wind by 2030. In addition, there are 21 US states with renewable portfolio standards ("RPS") that have been instrumental in fostering wind and other renewable investments. However, the US is

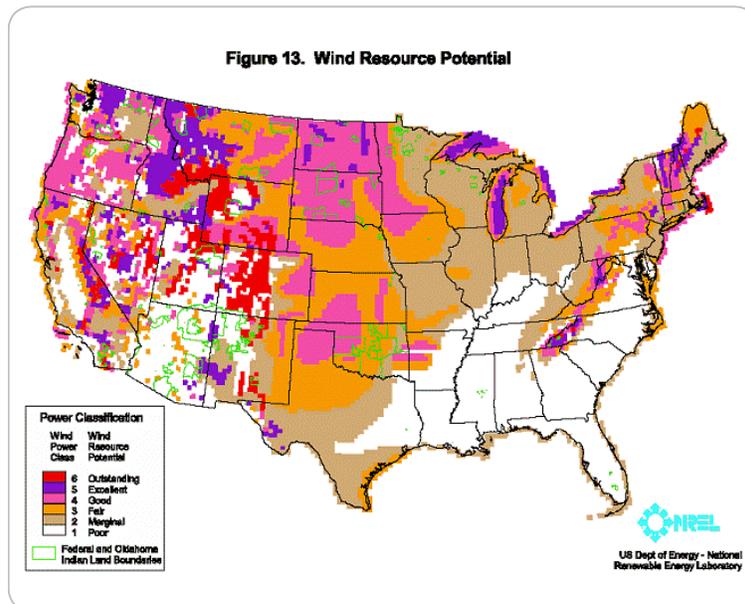


<sup>1</sup> A March 2007 report of the European Commission recommended the establishment of an “overall legally binding EU target of 20% renewable energy sources in gross inland consumption by 2020.” See “Renewable Energy Road Map: Renewable energies in the 21<sup>st</sup> century: building a more sustainable future,” available at: [http://ec.europa.eu/energy/energy\\_policy/doc/03\\_renewable\\_energy\\_roadmap\\_en.pdf](http://ec.europa.eu/energy/energy_policy/doc/03_renewable_energy_roadmap_en.pdf)

still trailing other regions in renewable installations. At GE, we believe wind energy can become a significant player in the US energy portfolio.

## **Wind Energy in the US**

The US has some of the world's best wind resources. When compared to Germany, the country with the world's largest wind energy installed base, and other top country wind installers, the US has significantly better wind resources. In fact, the American Wind Energy Association (AWEA) estimates that current US wind resources have the potential to supply up to two times the total electricity generated in the US today.



Due to our country's strong wind resources and support from the Federal and State governments, the industry has recently seen record-breaking growth; in 2006, the US installed 2,454 MW of wind energy contributing to a total installed base of 11,603 MW, which is enough energy to serve 3.2 million homes.

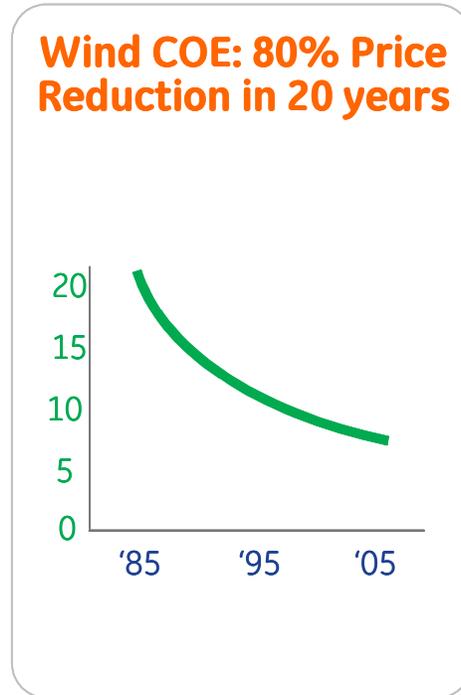
Although today's wind technology supplies less than 1 percent of US electric generation, the total installed base has nearly doubled over the last three years and new unit installations are up more than 45 times from a decade ago. Wind energy is currently being used to generate power in 40 states and delivers significant economic and environmental benefits:

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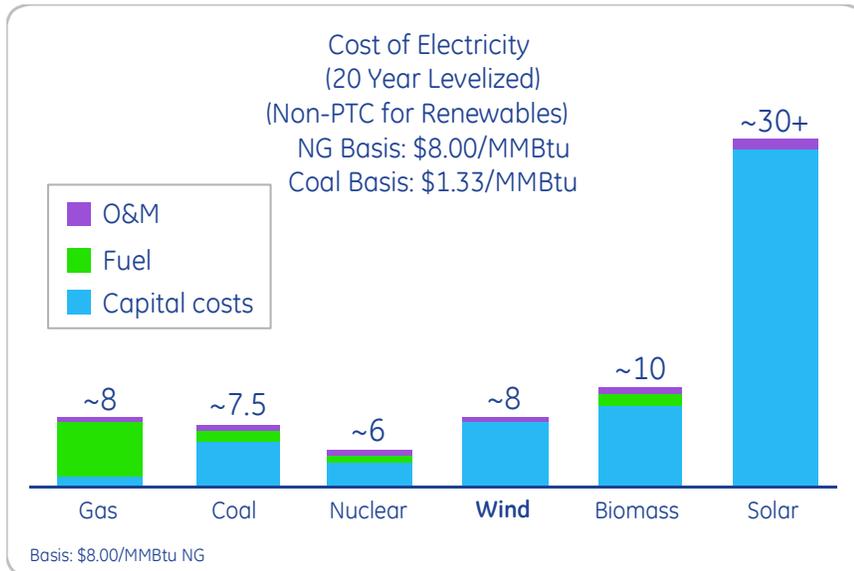
<sup>2</sup> The law is available at: <http://china.lbl.gov/publications/re-law-english.pdf>.

### 1) Predictable and Competitive Cost of Electricity ("COE")

According to the American Wind Energy Association, since 1980, the cost of wind-generated electricity has seen an 80 percent price reduction as the result of technology advancements in availability, efficiency and output.



Furthermore, wind energy is a fixed cost source of electricity which hedges rising prices of other energy sources, such as oil and natural gas. Today, depending on a site's wind resources, development costs and capacity factor, the range of the Cost of Electricity for wind, exclusive of any incentives, is approximately 8 - 10 cents/kWh and is becoming competitive with other power generation technologies.



## 2) Environmentally Sound

Tapping the potential of wind as an energy source makes use of this *abundant, domestic, zero carbon emissions resource* while reducing overall US dependence on imported energy. Wind also emits zero criteria emissions (sulfur dioxide or nitrogen oxide emissions) and consumes no water in the generation of electricity.

A recent study conducted by GE Energy concluded that a 100 MW wind farm in New York State would produce the energy equivalent to 590,000 barrels of oil per year and displace 400,000 pounds of NOX per year, 800,000 pounds of SOX per year and 260 million pounds of carbon dioxide per year.

As a result of these benefits, we believe wind energy is the most commercially viable renewable energy resource today. It can help us achieve energy independence while emitting zero criteria pollutants, zero greenhouse gas emissions, and consuming no water.

### Challenges in Growing the US Wind Sector

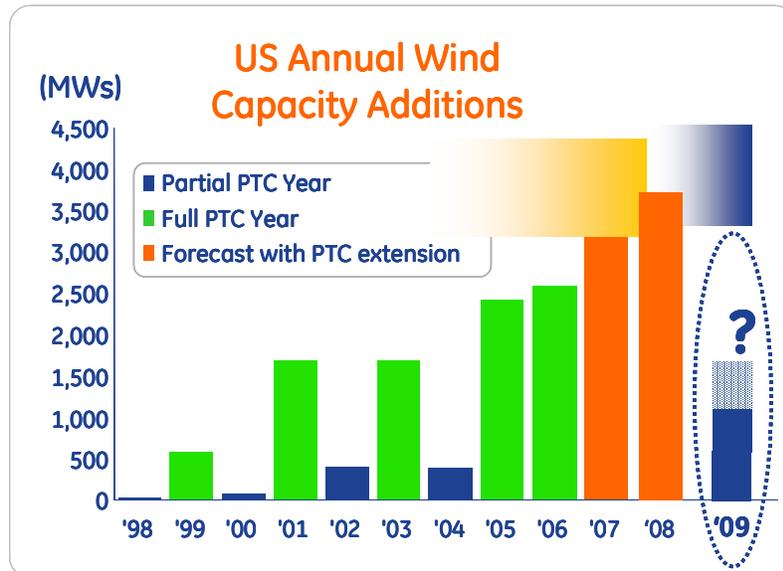
In order to grow wind in the US to 5%, 10% and even 20% of the total electricity generated, we believe there are three needs: 1) predictable and stable public policy, 2) more investment in the supply chain, and 3) advances in wind turbine technology.

## **1) Predictable and Stable Public Policy to Encourage Wind Generation**

GE recommends the following actions to accelerate the growth of wind energy in the US: extension of the renewable energy PTC, steps to assure that wind-generated electricity will have access to the transmission grid, and national policies to expand the use of low and zero-carbon technologies.

**PTC Extension:** Wind is more competitive when the 1.9-cent per kWh production tax credit is applied. The PTC provides a necessary economic incentive for power producers to generate power from wind.

As illustrated below, the role of the production tax credit in stimulating the installation of wind generation is clear. This success comes despite the on again, off again nature of the PTC. When the PTC was initially enacted as part of the Energy Policy Act of 1992, Congress provided a multi-year duration for the credit. As the deadline for the credit to expire in July 1999 drew nearer, investment ramped up in order to take advantage of the credit. Congress then extended the credit, but not until December 1999. The credit was again allowed to expire in January 2002, before being extended via legislation enacted in March 2002. The longest period of expiration occurred in 2004, when the credit expired on January 1, but was not extended until October. The benefits of a timely extension of the PTC through the Energy Policy Act of 2005 and again through legislation enacted in December 2006 are already being seen in the strong capacity additions made in 2006 and forecast for 2007 and 2008.



Simply stated, when the wind production tax credit has been allowed to expire, new installed capacity has dropped dramatically in the following year due to lack of component availability.

Therefore, a more stable incentive for wind generation will create the confidence for suppliers to make the long-term investments needed to assure the availability of critical components. Today, there is industry discussion of a 5-year PTC extension, versus the 1-2 year extensions that have been common in recent years. The objective of such a multi-year extension would be to provide a greater degree of financial certainty to encourage long term investment by suppliers.

A 5-year Production Tax Credit extension would be very impactful on the growth of wind energy in the US. However, such an extension would need to include intermediate milestones spurring continuous investment. Without such provisions, the industry may be susceptible to a “wait and see” approach, withholding investments until the final years of the extension. This could result in the same “boom and bust” cycle we’ve seen from the late 1990’s to 2004. With that in mind, the Committee should consider provisions in a five-year Production Tax Credit that would require participants to attain intermediate installation milestones.

National and/or state renewable portfolio standards, which include specific intermediate milestones, would also further enable continuous, consistent growth. While they may take longer to construct and enact, fair and equitable portfolio standards would ultimately drive the industry towards large-scale deployment of wind generated power. Think of the Production Tax Credit as the spark, and portfolio standards as the fuel for long term, sustainable wind energy growth.

Timing is just as critical to success as the strategy. By acting this year, before the PTC expires, Congress can eliminate the uncertainty that stymies investment and growth in renewable energy sources.

### **Transmission Investment**

Delivering wind power to the grid is a significant challenge facing the wind industry. Many of the nation's most promising wind resources are located in relatively remote areas where there is little or no transmission access. In other areas, congestion on the existing grid also may limit opportunities to deliver wind-generated electricity to the areas where electricity is consumed.

Further investment in transmission lines is essential for large-scale wind installations to be built. Congress is to be commended for providing important incentives for transmission investment in the Energy Policy Act of 2005. Continued attention to the need for transmission investment in connection with the growth of renewable energy will be required.

## **2) Supply Chain**

A major challenge for the global wind industry is meeting growing customer demand. Today, all wind turbine manufacturers are struggling with the same global challenge: obtaining sufficient components from their suppliers to manufacture and assemble wind turbines. Current bottlenecks in the wind turbine production chain result from the long lead times associated with mechanical components such as gearboxes and large bearings.

In 2006 and throughout 2007, GE is making large investments in the supply chain. We have made many long-term agreements with critical suppliers in thirteen states from coast to coast, giving them line-of-sight to our anticipated production volume, so that they have the confidence to expand with us, using their own investments as well. However, more investment in the supply chain is needed.

The ability to make this investment – particularly the investment needed from our suppliers themselves – is directly affected by Federal tax policy. When the wind production tax credit has been allowed to expire, new installed capacity has dropped dramatically in the following year as component suppliers slashed their investments in long term plant and equipment, scaled back their workforces and reduced their inventories in anticipation of reduced demand. Then, when Congress renewed the credit, the key components required to produce wind turbines were in limited supply. As a result, industry's ability to add new generating capacity has not been able to keep pace with demand.

An on-and-off policy scheme has made it difficult for suppliers to make long-term commitments. Conversely, a more stable long term incentive for wind power would generate the confidence for suppliers to make the long-term investments in manufacturing capability that are needed to assure the availability of critical components.

### **3) Technology**

Continued development of low wind speed technologies – an important focus of government/industry research and development partnerships – will allow the use of wind turbines in lower class wind locations that would otherwise not be economically feasible. GE is investing more than \$70 million annually in advancing wind turbine technology to further lower the cost of electricity. These efforts are focused in three key areas: larger and more efficient rotors, advanced loads management and enhanced grid stabilization:

**Rotors:** The rotors on wind turbines define the energy capture capabilities of the unit. Larger rotors, lighter weight material and computer modeling will allow significant increases in blade efficiency, resulting in more energy capture.

**Load Management and Grid Stabilization:** Voltage regulation is key to electrical grid stability. Wind turbines have progressively increased their capability to stay on line during grid voltage fluctuations and assist with voltage regulation. In the future, wind turbines will be a vital part of grid voltage stabilization through advanced power electronics which will be capable of managing grid voltage, even when the wind is not blowing.

In conclusion, wind power is a cleaner, viable offset to fossil fuel generation. The U.S. is well positioned to benefit from this ample, domestic resource and it is evident that wind can become a significant player in the US energy mix through its proven technology and strong growth. Predictable incentives, however, are still needed to sustain this momentum and drive costs down.

## **Solar Energy**

GE Energy's solar products portfolio includes single crystal solar cells and modules for both on-grid and off-grid industrial, commercial and residential applications. Our industry leading roof integrated solar tiles for residential applications provide seamless integration and aesthetic appeal while maximizing the amount of solar energy provided for the homeowner. GE Energy manufactures solar cells, modules and systems in Newark, Delaware.

As with wind technology, GE sees two vital components of efforts to increase the generation of electricity from solar energy: technology advancement and supportive tax policies.

With respect to technology development, GE recently was selected as one of thirteen industry-led solar technology development projects for participation in the Department of Energy's Solar America Initiative. GE will collaborate with a team of industrial partners to develop various solar technologies, simplifying the integration of photovoltaic ("PV") systems into residential and commercial buildings currently consuming

over 60% of electricity generation in the U.S. This program will help foster solar energy industry growth, resulting in reduced greenhouse gas emissions and positive economics.

However, in addition to being able to overcome material shortages of silicone material and technology advancements that will drive down the COE, federal incentives are also necessary for continued growth of the solar industry and to help make solar energy competitive with other power generation technologies.

### **Solar Tax Credits**

The Energy Policy Act of 2005 established 30% investment tax credits for businesses and residential taxpayers who installed qualifying solar energy property. Last December's tax bill extended the availability for these credits to property installed before January 1, 2008. GE recommends that Congress act this year to extend the Federal investment tax credit through 2016 for residential and commercial solar installations. The extended availability of this incentive will foster greater investment in solar technology and in the supply chain. The eight year extension will provide the long term policy stability that is required to support major investments in Concentrated Solar Power ("CSP") and other long term research and development programs, and in manufacturing facilities.

Provisions to extend the solar tax credits are included in S. 590, bipartisan legislation introduced by Senators Smith, Salazar, Snowe, Kerry, Wyden, Cantwell and eight others. In addition to extending these vital incentives, S. 590, and its House companion legislation, H.R. 550, would make important improvements to the tax credit provisions. The legislation proposes to remove the caps under existing law on the maximum credit available for both commercial and residential solar photovoltaic property. The credit would be based instead on the capacity of the system and calculated at \$1500 per half kilowatt. This change would provide an incentive to increase the output and efficiency of solar technologies. Our analysis shows that the revised approach proposed in S. 590 would make the residential and commercial credit a far more effective incentive for new installations at both homes and businesses.

The Solar Energy Industries Association ("SEIA") has estimated the benefit of extending the solar tax credits. SEIA projects that the longer term of the credit would create approximately 55,000 jobs by 2016 and encourage the investment of billions of dollars in renewable energy infrastructure. SEIA estimated the savings to consumers from the use of the solar technologies receiving the tax credits at \$32 billion over the lifetime of the equipment. .

Opportunities abound to pair solar energy generation technologies with other components in an integrated product system. To provide the most effective incentive for these new technology applications, the investment made in the non-solar aspects of the product system also should be deemed a qualified expenditure and made eligible for the tax credit.

Finally, consideration could be given to an investment tax credit for investments in capital equipment to expand the capability to manufacture new solar products in the United States. Publicly funded research and development efforts are producing important technical advances. A complementary tax policy that supports the establishment of domestic manufacturing capacity to turn this intellectual property into commercial products would further American competitiveness in the global economy.

Along with the extension and modification of the credit structure, the Committee should consider providing relief from the alternative minimum tax in connection with the commercial and residential solar credits. Doing so would provide a meaningful incentive to further accelerate the flow of investment capital by third party project financiers and other investors.

### **Accelerated Depreciation for Solar Energy Property**

Another important incentive incorporated into S. 590 is accelerated depreciation for business solar energy property. The legislation proposes to reduce from 5 years to 3 years the amortization period for qualifying property used in a trade or business. This would provide a substantial incentive for the more rapid introduction of business solar technologies.

## **National Policies to Encourage the Use of Low- and Zero-carbon technologies**

GE is a participant in the US Climate Action Partnership (USCAP), an alliance of a diverse group of businesses and leading environmental organizations. The group came together in January to call on the US government to quickly enact strong national legislation to achieve significant reductions of greenhouse gas emissions. The USCAP's solutions-based report "A Call to Action," issued on January 22, 2007, offers a set of principles and recommendations for a policy framework on climate change. Wind energy is a strong solution that fits into this framework well.

Today, we find ourselves at a crossroads, perhaps as important as the one GE's founder, Thomas Edison, faced at the end of the 19th Century. At the dawn of the 21<sup>st</sup> century, climate change and energy security compel us to search for smarter and cleaner ways to use energy and slow, halt and ultimately reverse the impact of climate change.

This challenge is what brings us here today. What we confront is the need for a fundamental transformation in the way we do business. This is clearly recognized in the USCAP's *Call to Action*, when it states: "The scale of the undertaking to address climate change is enormous, and should not be underestimated. For this issue to be successfully addressed—and failure is not an option—the way we produce and use energy must fundamentally change, both nationally and globally." Clearly, some of the weapons in our arsenal to address this challenge include the measures we are discussing today about how to incentivize maximum deployment of wind and solar as essential elements of any solution. Clear policy is needed to achieve sustainable solutions to the climate issue.

## **CONCLUSION**

GE Energy appreciates the Committee's early attention to mechanisms that can drive further growth in the use of renewable energy resources in the United States. With the technology advancements of recent years and the promise of continued improvements, these resources are poised to play an ever increasing role in national efforts to reduce reliance on foreign energy sources and to minimize the emissions

associated with the energy sector. As Congress considers energy and energy-related tax legislation in the coming weeks, we urge action this year to extend and enhance the available incentives for renewable resources.

Thank you again for the opportunity to testify. I would be pleased to answer any questions.