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Testimony of

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The IBM Corporation

"Facilitating the Transition to the Smart Electric Grid"

Hearing by the Subcommittee on Energy and Air Quality

House Committee on Energy and Commerce

Thursday, May 3, 2007

Chairman Boucher and members of the House Energy and Commerce Subcommittee on Energy and Air Quality, my name is Brad Gammons and I am Vice President of IBM Global Energy and Utility Industry. IBM appreciates the opportunity to testify before this Subcommittee.

Innovation is a major theme of any leader's agenda today. CEO's, academics and government leaders agree that innovating their business designs, policies, problem-solving approaches and execution models are key drivers of economic opportunity. In fact, the pressure to innovate is heavy in order to establish and sustain competitive differentiation, institutional value, and to make advances in the world's most pressing issues from healthcare and globalization to energy efficiency and the environment.

It is easy to confuse innovation and invention. Invention of new technologies is important to IBM and other companies in the technology industry. However, technology invention, in and of itself, is not what we mean by "innovation." Instead, we think about technology as an enabler of business, academic and government innovation. Technology is an enabler of new ways to do things whether that is developing a set of products and services, executing a set of management processes or rethinking entire business models.

Across industries, there are two significant changes in technology which are providing great leverage:

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1) The Internet. The Internet and other communications technologies have connected a million businesses and a billion people. The Internet is, in essence, the world's operational infrastructure. And, it is still only in its infancy. Right now, we have nearly three billion people subscribed to wireless technology. This network ubiquity provides the vehicle for people and things to work and operate in a collaborative way.

2) Open Standards. Starting with Internet Protocol, the software industry has made major strides in establishing and delivering to the market open standards-based products and technology. Whole new classes of software, like middleware, make it easier to build solutions faster and based on "off the shelf" components and products. Open standards has been evolving over the last decade beyond traditional IT to include networks, digital media, industrial components like sensors and more. It has expended IT standards to previously closed and proprietary domains.

Leaders want to put in place new business designs that break down traditional and operational silos and enable horizontally-integrated institutions and enterprises. This is made possible with these open and ubiquitous technologies. The horizontally-integrated institution can make firms incredibly flexible in responding to business, marketplace and global needs.

In the utilities industry, there is a great desire to achieve new levels of operational effectiveness and to reach beyond efficiently managing generation, transmission or distribution. There is a desire to have business management and operational visibility

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across these domains and even to include raw materials, transportation, supply management and the customer experience – in effect, the entire energy ecosystem.

The desire is to improve network planning, operations and maintenance – improve the transparency of information, experience fewer and shorter outages, provide better customer service, and provide a platform for adding renewable energy and improved utilization.

The power grid is the "connective tissue" of the utility ecosystem. Today, we are here because we know the power grid challenges need to be dealt with now.

We need appropriate infrastructure investment as well as policies to encourage investment. No one cares about putting in a smart grid or what IBM calls an Intelligent Utility Network (IUN) just for the sake of it. What truly matters is creating advantage for your enterprise, value to your customers, and the ability to improve long-term environmental effects.

The utility industry faces a series of significant dilemmas. How can utility companies contain costs while increasing power reliability? How can they ensure energy security, while still providing access to all? How can they deliver increasing levels of service while at the same time being unaware that entire neighborhoods are without power? How do they bring new supply into the system – to meet growing load – when the current system is challenged to accommodate new energy sources? How do they build new

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generation and transmission facilities when there is significant social and political resistance? And, as a matter of policy, how can energy be a source of economic growth while preserving environmental sustainability?

In order to address these dilemmas, we need to innovate. Other industries have faced their own dilemmas and have responded by innovating their business models.

Let's consider another capital intensive "grid," but for the transportation industry – the airline industry. Airlines are able to change pricing structures and how they manage supply and demand in almost real time. If airlines operated the same way utilities do, they would charge one price for every seat, regardless of the class of service or the time of purchase or available capacity. This scenario is not different from demand management and pricing in the utility industry where customers are challenged in their ability to monitor and adjust their energy consumption.

Let's think about the banking industry. Banks can account for every dollar of every transaction every time. They can even leverage the data they have about consumer habits to target customers with new products and services. In the utility industry, kilowatt hours are the currency. But utilities are challenged to track kilowatt hours completely and use data to improve customer service.

Let's look at some examples of how utilities can innovate their business designs by leveraging technology.

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We can use technology in three important ways.

1) To automate the power grid to make it stronger, cleaner and less costly;

2) To integrate the power grid and create an end-to-end network;

3) And, to expand the value of the grid with new services and new markets.

If we do these things, the grid can evolve to become a Smart Grid.

Building intelligence into the grid provides the information backbone to better understand our energy use, and empowers utilities, regulators and consumers to better manage their energy environment and practices.

A smart grid represents the transformation into an interactive energy-management system. The proliferation of sensors and existing technology such as smart meters, analytical tools, Services Oriented Architecture, high-speed communication networks and digitally-enabled equipment have made this possible.

In most cases, these technologies are not new. What's new is how proven technology, often developed for solutions in other industries, is being applied to the utility industry to generate tangible benefits and foster innovative business models today.

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Again, we're not talking about new technology invention. We're talking about applying mature technologies to new approaches. In my view, there's tremendous potential to seize the "low-hanging fruit" for "no-regrets" investments.

Utilities are extending equipment life and minimizing unnecessary substation inspections through remote asset monitoring and control. This defers costly equipment upgrades, maximizes the utilization of existing assets, and reduces and mitigates blackouts.

Utilities like Xcel have consolidated their multiple operational and IP networks and are using existing telecommunications infrastructure to transport data from equipment to the back-office to make it available across the enterprise and apply analytical tools to turn data into information.

Utilities are extending the value of their networks by using Advanced Meter Management. The installation of AMM includes the customer premise as part of the network enabling demand response and time-of-use pricing models.

CenterPoint Energy is deploying a number of smart grid solutions including remote connect/disconnect and Advanced Meter Management for Houston area customers. This will give utilities serving consumers better usage information and make power distribution more reliable. With more detailed information on usage and pricing, consumers can potentially save money by changing their consumption patterns.

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A smart grid will allow for safe and reliable integration of distributed energy – such as wind, solar, storage and other environmentally desirable solutions – into the power grid. Examples of innovation at the intersection of the transportation and utility sector are: Pacific Gas & Electric, Southern California Edison, Xcel, and Austin Energy's vehicle-to-grid technology. This technology allows for two-way sharing of electricity between electric vehicles and plug-in electric hybrid vehicles and the electric power grid. The technology turns each vehicle into a power storage system, increasing power reliability and the amount of renewable energy available to the grid during peak power usage.

Imagine if a company were to integrate all of these capabilities. Such a pilot is underway in Washington State. The GridWise Pacific Northwest Gridwise Project represents a groundbreaking collaboration between the Pacific Northwest National Laboratory and utility companies and technology partners such as IBM.

This initiative will give homeowners on the Olympic Peninsula more information about their energy use and its cost as an incentive to reduce their power consumption at peak times. Automated controls will adjust appliances and thermostats based on pre-determined instructions from the homeowners. This allows consumers to choose to curtail energy use when prices are higher than their set preferences.

The smart grid is a platform to enable the future. It can improve the nation's ability to respond to increased energy demands and increased need for energy independence while mitigating security concerns and the economic impact of blackouts.

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Smart grid can also help drive innovation across the energy supply chain providing value to and enhancing the competitive position of all players in the US energy industry.

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Smart grid can enhance energy independence and protection of the nation's critical infrastructure, save billions in energy productivity, and substantially increase national competitiveness.

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The invention of new technology is not a factor from a policy standpoint. The technology is sufficiently mature and the adaptations for utilities can be addressed.

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At the same time, utilities must embrace innovation and collaboration to transform their business models and substantially improve the infrastructure. Technology providers must seize the opportunity to demonstrate how existing technologies can be applied for immediate improvement, as well as be a strong partner in research and development for future solutions on the horizon -- for the benefit of consumers, the market and the environment.

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We've talked about how applying technology can help us address the current state of the grid . . . the benefits of our nation's transformation to an Intelligent Utility Network will make that journey well worth it.

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