

Welcoming Remarks Smart Grid World Forum

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Good morning Mr. Liu, members of the organizing committee, and distinguished participants. It's a privilege to be here with you this morning.

On behalf of the IEEE, I would like to welcome you to the Smart Grid World Forum 2011, the second of what we hope will be annual events in locations around the world. I understand that over 400 technologists are here today to participate in this forum, and that well over half of us have come from about 15 countries outside of China. Those are impressive statistics.

I bring you greetings from the over 400,000 IEEE members who live and work in over 160 countries around the world. About 9000 IEEE members live in China.

And speaking for the IEEE community, I want to thank Mr. Liu and State Grid Corporation of China for sponsoring this forum and for being good partners. As I look at the program for the next few days, it's clear that this will be a stimulating and informative event.

My father and mother were born in 1906 and 1907, in a very rural part of the United States. They remembered when electricity first became available at their childhood homes. They often told me about it, and what it meant to them and their family.

First it provided lighting. They no longer needed kerosene lamps, except when a storm or some other event disrupted the electric service.

Then it provided refrigeration, and a much safer way to store food. They no longer needed "ice boxes," and a regular supply of ice. Eventually they acquired a freezer, and were able to store food for long periods.

Then it provided power for a washing machine, the first of many labor-saving appliances...vacuum cleaners, kitchen appliances, tools, and many others.

And then they acquired a radio, which provided news...and weather reports...and entertainment. And eventually there was a television.

Over time, electronics provided them better health care, improved travel opportunities, and better communications. They lived until about 2000, long enough to experience computers and the early impact of the internet.

It is not much of an exaggeration to say that innovative applications of electricity *defined* quality-of-life in most parts of the world in the 20th century.

But now we are a decade into the 21st century. And for every country in the world, the availability of reliable and affordable energy is at the center of concerns about quality-of-life, prosperity, security, and the environment.

The demand for electricity will surely grow, as billions of people have yet to experience the benefits that my parents discovered nearly a century ago. By some estimates, a quarter of the world's population has no access to electricity....they are "off the grid." If the entire world were to use electricity at the per capita rate that it is used in the United States, it would require a five-fold expansion in world-wide generating capacity. And I note that the United States is not the biggest per capita user of electricity. Eight countries use more, per capita, than the US, some of them much more.

Some of the increased capacity will come from new forms of generation. Some will be intermittent. Some will be located long distances from major markets. Some will come from distributed sources. Grids must be expanded, and new ones created.

In places where grids exist today, many are antiquated, with equipment nearing the end of its projected life.

Reliability is a growing problem. Three weeks ago, five million customers in the southwestern part of the US lost electric power for more than twelve hours. The cause was apparently a minor accident that occurred during maintenance. In August, Hurricane Irene caused over a million customers on the east coast of the US to lose power, some for several days. By some estimates, the frequency of major power outages in the United States has doubled in a decade.

And security is a growing concern.

Adding distributed intelligence to grids, new and old – adding more sensors, expanded communications, computers, and controls – can address all of these concerns and at the same time capture opportunities for increased efficiency and functionality.

And it is already happening. I live in Boulder, Colorado, a city of 100,000 people, where for the past several years our local energy supplier, Xcel Energy, has been conducting an experiment known as Smart Grid City. I have a smart watt-hour meter, on the back of my house, that communicates with a transponder on an optical fiber cable that runs nearby.

Our power company tells us that we no longer need to report power outages. They know we've lost power as soon as it happens.

From here in Beijing, I can monitor the power usage in my home in 15-minute increments. I can see anything unusual in our daily cycles of use. If I wish, I can install thermostats and other devices that can be controlled through the internet.

I can choose from a menu of pricing plans, with rates that differ at different times of the day. I can agree to give the power company control of my air conditioner, to help them manage their load. I expect that more options will be available in the future.

We are in Beijing this week to discuss how Strong and Smart Grids can be developed and deployed everywhere.

It is appropriate that we do this in China, which uses more electricity than any other country, and will surely experience a growth in demand that exceeds all others.

And it is good that the delegates gathered here come from around the world, because the issues are indeed global. And global responses will help achieve the full potential of smart grids.

I note, in particular, the importance of developing internationally accepted standards, to maximize interoperability and reduce the cost of equipment. And I am pleased to learn that many international collaborations have already been formed to help achieve this.

I believe that smart grids are one of the most important engineering challenges of the 21st century. I am optimistic about their future, and am pleased that this forum can help move their development forward.

Thank you.