Powering the Future and Internationalizing Research

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By Celina Jiang, Ph.D. Candidate, Department of Electrical Engineering at Stanford University

Cleantech Initiative and Efforts in Smart Grids in Japan

On 7th November, Dr. Sofronis introduced us to some new research initiatives in Japan with I²CNER, and this is in fact the 2nd presentation in the EE402A series that talks about open innovation in research in Japan. I am really glad that the Japanese government is doing as much on fundamental research as we are discussing today.

In this seminar, Prof. Sofronis talked about open innovation especially in the energy sector, and illustrated several problems that the world is facing today: fossil fuels, renewable energy sources, nuclear power, etc and all these are very much in line with shortcomings of Japan's physical location and the simple fact that Japan is small. Recently, there is a huge surge in the energy sector and much investment was made in cleantech, such as solar cells, pollution control, and we are seeing a trend that major investments are made by the public sector, for example, by the government to take the lead in promoting these new technologies. Take China, for example, the city government of Beijing has promised to reduce the PM2.5 pollution density by a factor of 25% by 2017 and the city of New York has pledged to reduce the tax incentives to households by 25% per year if the residents install solar energy devices for the next 14 years. The push and pull factor for such a demand in cleantech has never been seen any time previously.

I would like to take this opportunity to learn about the future of cleantech and what is more, the relevant issues that are surrounding Japan right now. One thing that we might have come across many times is the smart grid. I would like to study in this section what is smart grid, the technology behind it and what can smart grid do to make our life better.

There are 4 central parts to the smart grid initiatives: 1) customer applications, AMI/smart meters, grid applications and also plug-in electric vehicle(PHEV) integration. And we are likely to see the 5th category- the backend data processing, and back-office integration is a key area of focus, too providing further insights into the area of big data. The advantages of using the smart grid are many and it is reportedly able to save large amount of energy usage depending on the fees set to charge on the users. Though the elasticity of demand for electricity is rather low and it could still make people reduce 10% of consumption for prices over 5 folds and 20% of reduction for price over 10 folds. Another interesting development of smart grid is again we are seeing new ecosystems develop. For example, the AMI could be smart applications that can be distributed by the service providers and used to incorporate into digital electronics products. Also, the development of the backend data center could

leverage its strength in data analytics and supposing that such an infrastructure is built on the cloud, it is literally going to innovate the utility industry.

Currently, the development of the smart grid economy in Japan is on the rise, especially after the great earthquake in 2011. However, according to reports, the penetration level of 'smart grid' is still rather low and one survey showed that only 36% of the people have "known or ever heard about smart grid". However, this simply shows that for what has been in a fast-developing stage in the US right now would herald the future trend in Japan. The government in Japan has implemented many greentech initiatives and many Tech companies have taken up their responsibilities to make the nation a great and convenient place to stay in. One particular example is Japan has started several smart grid projects in Hawaii, Jeju, Toyota City, Kitakyushu City, Rokkasho Village and Okinawa. The participants of these projects include government, big corporations like Fujitsu, Toshiba, KDDI and international ones like IBM and GE. We are seeing a great start to Japan's smart grid development movement.

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