

U.S. China Green Energy Conference - Beijing

Conference Notes 1

Link:

<http://www.cleanergreenerchina.com/2008/11/23/us-china-green-energy-conference-beijing-conference-notes-1/>

November 23rd, 2008 ·

China's Energy – Challenges and Strategies by Professor Ni Weidou **Academician, Chinese Academy of Science**

“We are running out of the atmosphere faster than we're running out of fossil fuels”

5 Challenges in China: 1) Huge pressure for energy by 2020. From 2010 to 2020 energy demand will double according to estimates that are under-calculating; 2) Shortage of liquid fuels leading to oil imports of up to 60% by 2015; 3) Severe pollution: 30-40% of China's territory already suffers from acid rain; 4) Huge increase in Greenhouse Gas (GHG) emissions; 5) Energy supply to 800 million rural residents in the face of rapid urbanization leading to more energy demand as they move because urbanites consume 3.5 times more energy than rural residents.

According to Professor Ni, the only way to mitigate the shortage of liquid fuel is via coal alternatives such as F-T synthetic fuel, Methanol, or DME (dimethyl ether). Coal produced methanol/DME is good for residential use but producing it emits a lot of CO₂. A way out is “polygeneration” where the CO₂ is captured. The reason wind power is not a viable option for Methanol production is because wind power areas are usually too far away from load centers and grid structures are still very weak in China.

Energy Research at Berkeley by Professor Sastry

CA has a carbon roadmap that is incumbent on currently available technologies.

Need to look at the left side of the equation....WHO CONSUMES, Transportation, Industries, Buildings. Buildings: 60% residential 40% commercial. Bldgs matter because they use 72% of all electricity and 55% natural gas.

Big problem is that no one monitors buildings after they are built. Buildings are just assumed to be efficient according to their design plan, not if they actually deliver. To get around this, Berkeley has created “smart dust” where micro sensors are put into buildings to monitor energy efficiency and demand response.

For innovative way to produce methanol and other fuels by the sun (like splitter water by sunlight), check out the HELIOS Initiative (www.climatechange.ca.gov/events/2008_conference/presentations/2008-09-10/Elaine_Chandler.pdf).

Trying to use the most abundant material in the earth’s crust (rust) to create future solar panels.

Envisions a future where fuel manufacturers tell engine/car manufacturers what they need rather than the car telling fuel manufacturers now.

Working on thermoelectrics where waste heat is converted into electricity

Transportation is the no. 1 producer of GHGs in developed nations and is on the rise on China. Berkeley is working with Chengdu to design an affordable transportation system that will use cell phones to map real-time traffic.

Sees nuclear plants as a major player and green cement (cement that can sequester CO₂)

Plenary Panel Discussion: Energy Policy in China and CA – Implications for Greenhouse Gas Emissions

What China and CA have in common is they are both leaders in innovation via policy and technology

Shi Dinghuan:

- Many Chinese energy companies have been listed in the U.S. and have received financial support from U.S. stock market. Companies need better enforcement of policies in China.

Diane Grueneich:

- CA leadership and innovation is paralleled in China. CA energy efficiency is covered in AB32 legislation, which has specific targets. No. 1 tool CA is using is energy efficiency because the technology is here now, energy efficiency saves \$ (1 dollar invested in efficiency saves \$2), the economy can still grow.
- How CA is achieving economic growth without growth in energy demand is through their Utility Efficiency Program, which has both mandatory standards and market transformation. Energy efficiency uses “de-coupling” where you receive a carrot if you do and a stick if you don’t. This is the most effective way for compliance.
- The CA Energy Efficiency roadmap is available to the public and also translated in Chinese! See: www.californiaenergyefficiency.com
- CA is going to be installing a Demand Side Management web portal. China is also on track to do the same. Sees potential source of collaboration.
- CA is also launching a huge project to bolster green job training.

John Geesman:

1. Renewable energy is CA’s second most important plan behind energy efficiency. Electricity, transportation and buildings are the areas that need most transformation.
2. Primary challenges:
 - High voltage transmissions access to remote sites (too far away from load centers)
 - Stable, long-term financing provisions. Too many on-again off-again tax incentives from Congress. CA is adopting feed-in tariffs.
 - Integration of variable wind and solar generation.
 - Investment in smart grid and storage (storage suffers the most from lack of money).
 - Continued credibility of technology cost-reducing curves.

- Hostility by utilities to distribution of electricity generation by alternative means.

He Zhouxiu:

- In China, solar energy is 10 times the cost of coal. Sees more of a coal future for China with improvements made on the technology plus using high-ranking coal for industry but not for low-ranking uses such as heating homes. For boiler design, the same high-rank/low-rank coal combination should be adopted (low-rank for initial boiler heating and high-rank for higher temperatures).

Panel Discussion: Smart Grid A

Paul Hamilton:

Real power is on the demand side. Key element is making our buildings and industry more participatory (via decentralization). We must integrate power and information so that consumers will be able to manage their cost and choices.

The process would be: 1) Fix your basics (change lights, motors, etc.) 2) Automation and regulation 3) Monitoring, maintaining and improving

The consumer will be motivated through either: cost, liability or CO2 footprint size. “The power of the smart grid is the power to enable consumers to be informed about their energy use.”

Mixture of panelists: Need for large-scale aggregation of loads from the utilities side...but is best not managed by utilities.

U.S. is going from a market-based smart grid approach to a more regulatory while China is going from a regulatory to a market based. This creates a great opportunity for the two to get together and assess where the happy middle is.

Biggest challenge is having storage technology catch up.

Debate on whether it should be web-based information or meter-based information system.

For the U.S., they are curious to see how much the new administration will put towards renewable energy and smart grid.

Panel Discussion: Sustainable Transportation System

Dr. Dan Sperling: Currently 1 billion vehicles, by 2020 there will be 2 billion.

Transportation uses about ½ the oil in the world. There needs to be a transformation of vehicles, fuels and structure of the transportation system, which could reduce GHG emissions by 80% by 2050.

Wei Belle: Works on improving airport and BRT (Bus rapid transit) systems. The surface area of an airport consumes 20% of total energy. Improving ground operations by 5% can save millions of gallons of oil. BRT...instead of light rail you have bus, which is cheaper and easier to set up.

An Feng: iCET works on low carbon technologies for vehicles and fuels in China. Is an NGO established in both China and CA.

Working with China's National Development and Reform Commission (NDRC) to establish a series of fuel economy standards. Standards for private, commercial (N1, M2) and rural vehicles are completed. Fuel economy standards for heavy duty vehicles are still in progress.

Dr. Tom Turrentine: Advocate of the hybrid car because when it comes to recharging the battery, less than 1% of America's power system is fueled by oil. Most people would charge their car at night, which happens to be when there is the most energy capacity on the grid. Several grid regions, like CA, have grid regions that are not reliant on coal/oil. Hybrid car is better than the electric car because it has more range (thus more practical for the consumer's needs), smaller battery and would be charged at night when electricity is cheapest.

Even though there were great discussions on private car technologies, there was not much on commercial vehicles and heavy-duty trucks which are involved in transporting our goods every day. I asked Mr. An what China has in the works for heavy duty trucks

since they will soon pass fuel efficiency standards for them. He replied that China is not looking for at revolutionary technology; rather they are looking at improved diesel engines for light and heavy commercial vehicles.

Panel Discussion: Green Building

Zhou Wei: Buildings account for 40% of total energy consumption and we spend 90% of our time in buildings. They matter!

Carolina Woo: As an architect, she says a major problem is how the living environment and communities can catch-up with technology. She believes that the proper utilization of the best-available technology should be the benchmark of the success of a building. The future success of green buildings depends on education. Greening is a gradual process that requires educated people from all sectors of society.

Robert Wise: We are in a planetary emergency, already using the equivalent of 10 planets in terms of our ecological footprint. A major challenge is future urbanization.

Needs to be a humane eco-city vision where the happiness of communities are taken into consideration, communities are modeled after nature, waste=food for other systems, circular economy and dealing with water scarcity issues (must look at how much water is being reused instead of flushed down the river).

Renewable energy is everywhere. In Hawaii they use Deep Sea Water Conditioning to air-condition their buildings. District Energy Systems are used in many major U.S. cities.

Living buildings harvest all their own energy and recycle it all. There is a payback period of 3-5 years for investing in a living building.

Walking should be planned into a city's main form of transportation.

Professor Wei Qingpeng: Worked a lot of compiling data for building energy consumption, of which there is really a lack of information. Buildings in China consume much less energy than developed countries. Lots of efficiency is lost via poor installation of equipment and poor operation maintenance.

Harrison Fraker: Throughout the whole day, speakers have all looked at green technology implementation through a centralized system. Harrison offers a more holistic, de-centralized developmental model called the eco-block. A community comprises an eco-block and has all of its energy on-site, recycles waste on site and has all of its water (and food possibly) needs on site while it is linked within 5 to 10 minute walking blocks to public transportation.

Such eco-blocks have been created in Qingdao and Tianjin. $\frac{1}{2}$ the energy is gotten from wind on the roof, $\frac{1}{4}$ from solar on the roof and the rest is from a biogas generator that feeds through a smart grid and recycles waste.

The only problem they have come across has to do with load balance. There is excess energy at night and not enough during peak times during the day.

Utilizing a tidal wetland which recycles the community's water in the block by purifying the water through wetland treatment.

Eco-blocks have a payback of 3-5 years.

You can have all the policy you want but you need monitoring and penalties, otherwise it will never work (Carolina Woo)

Also in need of a financing system for these projects.

Another area of improvement in the building process has to do with the process of developer codes and the lack of consultation between the various professions involved in designing buildings. Developers are just interested in a way to just satisfy the market and make a profit: From the way the storm water is dealt with or the way electricity is distributed...it is all according to a lackluster standard. There is no allowance for thinking holistically by various professional disciplines to create a living environment. There needs to be a different way of operating where various systems and disciplines get together to construct the project.

Also important to have end-users involved in the process to prevent green-washing. There are many studies that show that energy efficiency buildings have more wasteful occupants, making the buildings consume more energy than older buildings (Tsinghua is a case in point).

Don't overbuild...the majority of people's needs should be met in the simplest way possible so that space is used in a sustainable fashion. The best solar device in the world a window.