EVENT RECAP
Scaling Up Solar: How far can we go?
April 28, 2010

On April 28, the Energy Security Initiative at Brookings hosted the first in a series of events that will examine the prospects for potentially game-changing energy technologies that can wean our nation away for dependence on fossil fuels.

The event, *Scaling Up Solar: How far can we go?*, featured two expert panel discussions and a keynote address by Dr. Stephanie A. Burns, Chairman and Chief Executive Officer of Dow Corning, a major U.S. and global company on the technological forefront in solar technology. The event explored a wide range of issues from economics and financing to policy and technology. Key questions included: What will it take to grow a viable solar industry in the United States? What policies could move solar energy into more widespread use and achieve grid pricing parity? What are the job implications for the United States if other countries take the lead in developing the technology? What role is public awareness or a lack thereof playing in solar energy's adoption?

Keynote Address
Dr. Stephanie Burns, Chairman and Chief Executive Officer, Dow Corning

During her remarks, Dr. Burns stressed the importance of the United States becoming a leader in solar technology so that it does not miss out on what will likely be the next technological revolution. Moreover, re-establishing leadership as a solar power producer will provide domestic jobs in the development, production, and deployment of this energy source.

With the United States now behind other nations in harvesting the sun's power for electricity generation, we run the risk that most solar manufacturing will be done offshore. Confident that the U.S. government will enact policies that will accelerate solar development and deployment and reinstate our position as a global solar leader, Dow Corning has invested billions of dollars in domestic research and development facilities.

In addition to encouraging policies and regulations that will accelerate the growth of renewable energy, Dow Corning has a four-point plan that will address the technical, legislative, regulatory, manufacturing, and workforce related factors that will reinvigorate America's declining solar power sector.

1. "Tax incentives, renewable electricity standards, feed-in tariffs, federal smart grid and net-metering protocols to promote the growth of this industry" are all needed for the solar industry to grow. Their implementation will allow the U.S. to compete with low-cost producers in the Philippines, Singapore, and China who have aggressive tax mechanisms that attract multinational solar industry firms. The United States now ranks fourth in global PV installation, behind Germany, Italy, and Japan. All of these countries have solar-friendly feed-in tariffs that promote sustained investment in solar power.

2. The U.S. also needs increased government investment in solar technology innovation and supporting research that can help make solar power more affordable throughout the supply chain.

3. Our nation needs to adopt policies that will advance training and education in solar power from manufacturing to sales and installation. This will build upon the initial steps the U.S. has already taken. Investment in such training programs has the ability to diversify our economy.

4. State and federal governments should provide an example to the private and residential sector by designing new federal facilities, or retrofit old ones, to run on renewable energy.

Undermining any progress in solar development – or the development of any renewable technology – is the lack of a carbon pricing mechanism. Congress needs to implement legislation that encourages the production of clean energy.

Government programs are taking effect. Suniva, Global Watt, Evergreen Solar and Fulcrum Industries are all solar technology companies that are benefitting from government funding and/or federal, state, or local tax credits. In turn, these companies are providing scores of jobs to states that have been devastated by the recent economic downturn. Moreover, there are political leaders in Congress who have the desire and ability to accelerate this "energy transformation."

Panel 1: Policy and Economics
Charles K. Ebinger, Director, Energy Security Initiative (Moderator)
Hal Connolly, Legislative Counsel, Office of Senator Robert Menendez (D-N.J.)
Charles Hemmeline , Market Transformation, Solar Energies Technology Program, U.S. Department of Energy
Dr. Lola Infante, Director, Generation Fuels and Market Analysis, Edison Electric Institute
Richard Kauffman, CEO, Good Energies

This panel examined several policy options that have been adopted both domestically and internationally to help level the playing field for solar power and also addressed issues surrounding the current economic situation and its impact on financing renewable energy.

The U.S. government's tax credit program to incentivize solar development was cited as one example of an ill-targeted policy. The program does not benefit start-up companies as during their infant stages they will have little or no income to report. Also, the government has not provided the feed-in tariffs that Germany and Spain enjoyed that grew their respective solar sectors. Feed-in tariffs allow for a long-term, investment grade, revenue stream. The loan guarantee system provided by the federal government has done a lot to help but falls short of the necessary levels of loans to make sustained deployment economically feasible.

Implementing successful policies will require canny leadership. In the case of feed-in tariffs, getting a correct price is the inherent challenge. Finding the correct price, however, is only the first step. Have you created a market or just a program? There are cautionary tales of feed-in tariffs, particularly in Spain. The Spanish government depressed the prices of solar power to such a low rate that the utilities were unable to generate any returns on electricity sold in the market. Thus the government intervened and repaid utilities for excess losses until the deficit burgeoned to a point at which generating solar power was a serious economic concern for the country.

The deregulated nature of the U.S. utility system poses further problems for renewables development. Utilities across the country are not interested in paying more to supply electricity and, similarly, some regulators do not want to force citizens to pay more for electricity. The counter argument is that many citizens may embrace spending slightly more money for power, if they know that it benefits national energy security and is more environmentally friendly.

High costs remain the biggest hurdle to solar power development. Utilities have a statutory obligation to provide affordable and reliable electricity to their customers and the integration of solar power bears huge costs.

Finally, another major impediment to solar power generation is the lack of a distributed grid. Despite the distribution potential of solar power, the existing central station system is going to be existent for at least another 40 to 50 years since the only way to maximize the distribution of solar is through long distance transmission. However, in most cases, the areas where the resources are the strongest, in the Southwest, are far from the major electricity consumption areas. A good transmission system is critical for the development of renewables.

Panel 2: Technology, Market Deployment, and Job Development
John Banks, Nonresident Fellow, Energy Security Initiative (Moderator)
Robert Boehm, Director, Energy Research Center at University of Nevada, Las Vegas
Steve Kalland, Director, North Carolina Solar Center at North Carolina State University
Kathleen Weiss, Vice President, Government Affairs, First Solar Inc.

This panel examined the state of solar technology and the differences in efficiencies and prices among them. It also addressed the linkages between market deployment and demand and job creation.

The three major forms of photovoltaic (PV) technologies are: silicon, thin film, and concentrated PV. Solar energy was traditionally produced from silicon based systems which have low efficiencies and are essentially locked in to their current prices. There may be a minor decline in price, but nothing dramatic. Thin film technologies are generating a lot of attention these days as they are the cheapest form. Finally, concentrated PV systems are more of a niche market as they require more focused radiation, such as what is available in the southwest US. These systems have a higher efficiency (they will soon be surpassing 30%).

In addition to the aforementioned 'mainstream' systems, there is much fanfare surrounding future technologies: printed cells, nano-materials, etc. There are a large number of these projects, however, they rarely develop into the game-changing technologies for which they are initially promoted. There is a disconnect between the research and commercialization. The solar industry could benefit from further government investment in R&D, which is beginning to be ramped back up.

Regarding job creation, the most effective policy to get a well-trained workforce is a feed-in tariff. Currently, the government has placed substantial resources in training a workforce of solar technicians without there being a large enough market for their employment. Recent developments in solar power development have been encouraging for the workforce.

Finally, there is a misperception that the jobs provided by solar deployment are not permanent as the ones provided by manufacturing, thus they are viewed as inferior. As in the case of housing

construction, where after one project is done a worker moves on to another one, if the market allows for the ramp-up of solar power, deployment will no longer be a temporary solution. Furthermore, the number of jobs provided by a manufacturing plant often clouds government's views in creating incentives for solar deployment. More importantly, unlike manufacturing jobs which are often outsourced to nations where labor costs are cheaper, deployment jobs are impossible to export.