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Good morning Chairman Bingaman, Senator Murkowski, members of the Committee. Thank you for the opportunity to testify before the Committee this morning on this very timely topic.

This morning I would like to take a slightly different tack than some of the other witnesses. Rather than look at some of the current opportunities and issues that the United States and China face in green technology space, I want to provide some historical perspective that I think will be useful. There is a cliché that history tends to repeat itself. I think this is one of those cases.

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I was recently reminded of a conversation I participated in that took place in Vice President Biden's office in the early days of the Obama administration about how to put together the President's upcoming stimulus proposal. Part of the overall discussion dealt with the role of clean technologies and the possibility of using green jobs as one of the lynch pins of the program.

The room split into two camps. On one side, you had environmental activists who argued for a strong government role in helping these relatively nascent industries grow and flourish. On the other side, you had conventional economists making the opposite point that we should allow the markets determine which industries would succeed. These economists pulled out the old line about the government not picking winners and losers.

I felt a sense of déjà vu. I remembered having this exact same conversation more than 25 years ago when I worked in the Reagan administration.

After all, we have faced this question before in other industries, especially in the semiconductor industry in the 1980s with regard to Japan. In those days, Japan targeted key industries for development as part of its industrial policy. It protected them at home, provided special investment incentives and preferred financing, and promoted their exports also with special tax incentives and by maintaining an undervalued currency. The result was massive overinvestment and excess capacity in Japan that was dumped into the U.S. market.

The United States faced the question of whether this dumping was a gift to consumers or a force for destruction of an industrial capability of vital long term importance. We also faced the question of whether the gift would always be given or whether once Japan reached dominance, prices in the United

States would rise to Japanese levels. It is important that we remember the lessons learned from our issues with Japan in the 1980s when dealing with China.

In my opinion, this debate shows a continued fundamental misunderstanding of the way the world works. Rather rehashing the same old debate for the ten thousandth time, we need to realize that many of our trading partners are already intervening in the market. Whether it is China, Japan, Korea or Germany, all of these countries have long ago put in place policies – dare I say industrial policies – to promote these industries. They see clean tech industries – solar, wind, batteries and others – as the industries of the future and have put policies in place to support them.

Although China is not the only country that put policies into place to support their clean tech industries, it is one of the most aggressive.

One powerful element of China's industrial policy strategy is the 863 Program, a project launched in March 1986 (863 is the year and date of the project's birth) by China's then paramount leader Deng Xiaoping to drive its technological catch-up effort. In 2001 this program began to focus intensely on energy, especially new or green energy, setting targets for installing wind turbines, solar panels, hydroelectric dams, and other renewable resources. In 2006 the 863 Program drove China to double its wind power capacity, and then it doubled again the following year and again the year after that. In 2003 China had virtually no solar power industry. By 2008, it was making more solar cells than any other country and taking customers away from American and other foreign companies that had originally invented the technology.

In October 2009, President Hu commented that China must "seize preemptive opportunities in the new round of the global energy revolution." In response, U.S. Assistant Secretary of Energy David Sandalow acknowledged that "unless the U.S. makes investments, we are not competitive in the clean-tech sector in the years and decades to come." Not only did 863 provide funding but it also required that wind farms, for example, use locally manufactured equipment. The fact that this requirement went into effect in 2003 and was dropped in 2009 is instructive. In 2003, China was a high-cost producer. By 2009, it had achieved such economies of scale and advanced in technology sufficiently that it was the low-cost producer. Dropping the "buy Chinese" rule then had no effect. By now everyone was buying Chinese because they were the cheapest and of good quality.

Interestingly, the 863 Program was fashioned after similar programs at the U.S. National Institutes of Health and the Pentagon's Defense Advanced Research Projects Agency. Since the program got rolling in 1987, its budget has grown by more than fifty times.

Thanks to the research from Bloomberg New Energy Finance, we also know about the large amounts of subsidies the central and provincial governments have provided Chinese companies. A new World Bank report, co-authored with the Development Research Center of the State Council (DRC), reports that the Chinese government considers its solar and wind power industry – along with its nascent solar polysilicon industry – to be state controlled. We also know that the Chinese have instituted policies,

recently updated in the most recent Five Year Plan released earlier this year, to support these industries and provide some level of coordination.

There are specific plans for each of the individual clean tech sectors, but for illustrative purposes, I would like to focus on the plan for China's solar industry.

The recently published solar plan, which covers the period through 2015, reflects the Chinese government's resolve to ensure the industry's continued rapid development by directly managing its planning, policy and growth. According to one of the publicly available translations of the latest plan, the Chinese government once again designated its solar sector as one of seven "strategic emerging industries." As a result, the Plan calls for significant government financial assistance, preferential treatment and significant oversight. This includes new financial and price subsidies; more support in industry, financial and tax policy; and further aid with development and production of equipment used to produce polysilicon, silicon ingots, wafers, cells and panels within the crystalline-silicon solar industry. Moreover, the portfolio includes plans to support industrialization of China's as-yet-undeveloped thin-film industry, specifically harnessing silicon and copper indium gallium diselenide solar technologies.

The new Five-Year Plan also provides even greater support for exports than previous government plans. The 2011-2015 plan calls for identifying and promoting "national champions." It aims for consolidation of "the industry's position in the international market," partly so that "Chinese PV enterprises' international influence will be greatly enhanced" and be better able "to cope with international competition and market risks."

The programs the Chinese lay out in their new Five-Year Plan are not necessarily bad and, per the request of the Committee, I will not comment as to whether they are WTO-legal or not.

The more important point is that the Chinese government had a plan that helped its solar industry to grow from a non-factor in the industry to the world's largest producer on solar in less than a decade. It is now moving forward with the next generation of a program that consolidates these gains.

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So, what do we need to do? Again, I believe history has an answer.

To the extent that the United States and China can work together to develop new technologies through non-commercial research, we should applaud and support these programs. Programs such as the U.S.-China Clean Energy Research Center (CERC), funded by the U.S. Department of Energy, could have a significant long-term impact. As we have learned through programs such as DARPA, Sematech and the new ARPA-E, there is a role for the government to play in this process and these programs can be extremely successful.

However, there is much more that we need to look at doing if we, as a nation, decide we want to be players in the clean tech industries in the future.

I believe that we need our own program to support industries we deem important – and I believe clean tech is important. This is not, as the conventional economists I mentioned at the start of my testimony claim, picking winners and losers. We are already doing that – we just don't want to say we do it using those loaded terms. Indeed, we should not worry about these criticisms. We need to accept them, move on and enact policies that will help American manufacturers and promote global innovation.

Although the United States eschews a formal economic strategy and any kind of stated industrial policy, we have such policies. We cannot avoid having a de facto economic strategy and de facto industrial policies of all kinds.

For example, the FCC must choose how to regulate telecommunications. The choice of focusing on competition (a process) rather than on deployment (a result) is a form of industrial policy—or perhaps of anti-industrial policy.

I would argue that for the government to stand to the side and do nothing is a de facto industrial policy of the worst kind. We are in effect saying we don't care where the next generation of clean technologies are designed and built. We are willing to step aside and let another country dominate a sector. We are also saying we are sticking with the status quo and continuing our reliance on imported oil and dirty coal.

I would argue that the ongoing existence of DARPA, ARPA-E, and the National Institutes of Health and many other agencies and programs is an example of current U.S. industrial policies. The U.S. government is very large, spends an enormous amount of money, and sets standards and regulations that have an enormous impact on the business environment, on the shape of various industries, and on the conditions of consumer life.

As a result, I believe there is a significant role that the U.S. government can play that will support the development of an American – and global – clean tech industry.

The United States government did this back in the 1980s. In order to help American manufacturers deal with Japan's industrial policy that specifically targeted the semiconductor industry, the federal government enacted a wide variety of initiatives. I would like to list four, along with their current policy equivalents.

- In 1985, the United States, in conjunction with the France, Japan, United Kingdom and West Germany, negotiated the Plaza Agreement. By reducing the value of the American dollar, a Republican administration was able to help make American exports more price competitive. This, in turn, allowed American companies to continue to invest and improve their products so

that could become more competitive in the global marketplace. Unfortunately, even this significant agreement was not enough.

We are seeing the same thing today with China. Both the Bush and Obama administrations have gone out of their way to avoid labeling China a currency manipulator. While the Chinese government has made a few moves to increase the value of their currency, its recent decision to devalue its currency in order to prop up exports is a sign that jawboning and looking the other way will not work. We need an aggressive currency policy, enacted in conjunction with our allies, in order to ensure change.

- We used the purchasing power of the federal government to build a market for semiconductors and, when necessary, codified this preference through "Buy American" laws.

  Although conventional economists eschew such rules, they are WTO-legal as they long we include products made by countries that have signed the WTO Government Procurement Protocol. This still gives many of our global competitors in solar access to the American government marketplace. However, it does send a signal that we believe it is important where we purchase products, especially for the military.

- The federal government also took a strong look at using our trade laws to remove market distorting measures enacted by the Japan government and Japanese manufacturers that both helped American companies in our market and worked to open up the Japanese market to competition. This included self-initiating an anti-dumping case against Japanese semiconductor manufacturers and negotiating the 1986 Semiconductor Agreement. We also learned to stay vigilant, as we learned that the Japanese government replaced official trade barriers, such as tariffs, with non-tariff barriers, such as production subsidies and government-industry collusion.

  In cases where we believe our competitors are not playing by the rules, we should not hesitate to push to use our trade laws. Last year, President Obama, acting on a complaint by the United Steelworkers, spoke out against Chinese practices in the wind power sector his administration thought were WTO illegal. By taking the Chinese to the World Trade Organization, the administration was able to get the Chinese to agree to stop subsidizing wind power firms that used Chinese-made parts at the expense of imports. The administration's decision, in conjunction with the European Union and Japan, to force China to lift export limits on rare earth minerals, is another example. As the Committee knows, rare earths are important parts of green technologies such as wind turbines, hybrid car batteries, and energy-efficient lighting. Finally, should the government take action against China, or any one or our other trading partners, we must ensure U.S. Customs and Border Protection has the resources it needs to prevent circumvention.

- We developed government initiatives to help support our domestic manufacturers through funding basic, non-commercial research and development. Sematech is just one example of a successful program. As the Chairman knows, we also gave wider latitude to our national laboratories to work with industry as opposed to only focusing on government problems. A Democratic Congress passed, and President George H.W. Bush, signed the High Performance Computing and Communication Act of 1991. This one piece of legislation helped put in place many of the necessary building blocks of the Internet we know today, including high-speed fiber optic networks and the Mosaic browser.

  In addition to funding the China Clean Energy Research Center, I also believe that we should take a serious look at increasing support for the U.S. Photovoltaic Manufacturing Consortium, a U.S. research consortium built along the lines of, and with the support of, SEMATECH. I was an early proponent of SEMATECH and continue to believe that these types of programs that solve common manufacturing problems by leveraging resources and sharing risks are helpful in ensuring that we leverage the power of our corporate and university R&D to help American industry.

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The challenge we face is that if we want the United States to remain competitive globally in clean technologies, we need to do something that is rare in Washington these days. We need to be bold.

There are opportunities to work with China and the United States government should explore them, just as we would with any other country. But we should remember that the Chinese government has a policy to not just be a leader in a number of technologies, but **the** leader. The United States must determine how we are going to respond and decide how much we want to be a leader. With strong action, we have the opportunity to develop a globally competitive industry in a sector that has great promise both economically and environmentally. Without it, we face a future where the United States is sitting on the sidelines.

Thank you again for this opportunity and I look forward to your questions.