THE CHALLENGE OF CHINA'S GREEN TECHNOLOGY POLICY AND OHIO'S RESPONSE

HEARING

BEFORE THE

U.S.-CHINA ECONOMIC AND SECURITY
REVIEW COMMISSION

ONE HUNDRED ELEVENTH CONGRESS

SECOND SESSION

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July 14, 2010

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UNITED STATES-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION
WASHINGTON: September 2010

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THE CHALLENGE OF CHINA'S GREEN TECHNOLOGY POLICY AND OHIO'S RESPONSE

WEDNESDAY, JULY 14, 2010

U.S.-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION

Washington, DC

The Commission met at the University of Toledo, Hilton Hotel Dana Conference Center, Toledo, Ohio at 9:00 a.m., Chairman Daniel M. Slane, and Vice Chairman Carolyn Bartholomew and Commission Peter T.R. Brookes (Hearing Co-chairs), presiding.

OPENING REMARKS OF VICE CHAIRMAN CAROLYN BARTHLOMEW, HEARING CO-CHAIR

VICE CHAIRMAN BARTHOLOMEW: Good morning and welcome, everyone. Thank you all for coming to join us today. The Commission would like to thank the University of Toledo for hosting our hearing today, and, in particular, Dr. McMillen, the Provost and Vice President for Government Relations of the University.

I'd also like to extend our thanks to the Office of Senator Sherrod Brown for their assistance in pulling things together and to acknowledge the leadership of Ohio's congressional delegation on issues relating to U.S. and China relations, including Toledo's own Congresswoman Marcy Kaptur.

The House of Representatives and the Senate are back in session so we won't have any congressional witnesses here today, but I'm sure that they would be here if they were available.

My name is Carolyn Bartholomew. I'm the Vice Chair of the U.S.-China Economic and Security Review Commission. The Commission was created by Congress to advise it on policy towards the People's Republic of China. We hold eight hearings each year, and we

produce a book-length annual report to Congress which includes our recommendations for legislation and other actions related to U.S. policy on China.

Each year, one of our hearings is held outside of Washington in order for us to see firsthand the impact of competition with China on a particular state or region.

We have been to Dearborn; Akron; Seattle; northern and southern California; Columbia, South Carolina; Chapel Hill, North Carolina; Rochester, New York; and we're pleased to be this year here in Toledo.

We're here to investigate several things including how China's efforts to create a powerful green technology exporting sector affect Ohio's efforts to develop clean and alternative energy technology. Is it competition? It is opportunity? Or is it a little of both?

We want to hear what the U.S. Congress can do to make domestic efforts more successful. We have a variety of excellent witnesses who have prepared insightful testimony for the Commission. Their full written and oral testimony will be entered into the record so I would ask as we go along all of our panelists to limit their oral testimony today to seven minutes each so that we have plenty of time for questions and answers.

If any of you have followed any of our work over the years, you know that we're not shy about asking questions.

A transcript will be made of the hearing and will be posted on our Web site at uscc.gov. This afternoon, we'll have a public comment period at 3:15 p.m. Those who wish to speak must register to do so with our staff.

Thank you, again, Dr. McMillen, for your hospitality and your help in setting up this hearing.

Now I'll turn the microphone over the Co-Chair of this hearing, Commissioner Peter Brookes.

OPENING REMARKS OF COMMISSIONER PETER T.R. BROOKES, HEARING CO-CHAIR

HEARING CO-CHAIR BROOKES: Good morning, everyone. I'm Peter Brookes. I'm a Commissioner with the U.S.-China Economic and Security Review Commission and the Co-Chair of this hearing.

I would also like to thank the University for hosting us today. In addition, I would like to thank Senator Sherrod Brown and Representative Marcy Kaptur for their help in setting up the hearing and their interest in this important topic.

The Commission chose Ohio for its annual field hearing this year in part because it has long been a center of U.S. manufacturing, has

had experience in adapting to the challenges of globalization and with competition from China.

Here, in Ohio, we see examples of innovation. Ohio's manufacturers are retooling and rehiring to meet the challenges of energy independence and climate change. Specifically, as we will hear, manufacturers are working to make Ohio a leader in wind turbines and solar power.

We look forward to hearing from representatives of some of those companies, and we welcome their suggestions on how the Congress can make the United States a leader in the world economy in this field.

After our three panels, we look forward to hearing from any members of the public that wish to offer remarks. We ask any member of the public who wishes to speak to limit their remarks to five minutes and to register now with staff.

Thank you very much.

VICE CHAIRMAN BARTHOLOMEW: Wonderful. We're going to start with introductory remarks by Dr. McMillen.

INTRODUCTORY REMARKS OF DR. WILLIAM McMILLEN
PROVOST, UNIVERSITY OF TOLEDO

DR. McMILLEN: Thank you very much, Commissioner, and welcome, everyone.

My name is William McMillen. I am the interim Provost I will say for eight weeks now, and I'm Vice President for Government Relations. I bring greetings on behalf of President Lloyd A. Jacobs who is out of town on a well-deserved education.

For those of you who are not familiar with the university, we are on the Health Science Campus of the University of Toledo. Three miles to the north is the university's main campus. We are a large, state-assisted, urban university that is part of the University System of Ohio.

UT has more than 23,000 undergraduate and graduate students. We have a large number of professional schools, including a College of Law, College of Medicine, College of Pharmacy, College of Nursing, College of Engineering, College of Business, and College of Education.

We have a tertiary care hospital just a short distance from where we are now. We have nearly 7,000 faculty and staff, and we are one of the largest employers in northwest Ohio. We are pleased to welcome the Commission today.

The University of Toledo is one of America's foremost economic

and research centers for the development of alternative and green energy. From solar to wind to biomass, we are on the cutting edge of transforming the economy of not just northwest Ohio but all of Ohio and the upper Midwest.

In the words of Dr. Thomas Gutteridge, Dean of the UT College of Business, the university has a global scope and a regional impact.

In that regard, we clearly recognize the importance that China plays in the world economy. We have nearly 500 Chinese students on campus divided nearly equally between undergraduate and graduate students. In the last six years, we have had a 131 percent increase in the enrollment of Chinese students. We have an active Chinese Student Union, and we host a Confucius Institute in partnership with Yanshan University.

Just last week, I had the pleasure of participating in signing an agreement to offer an MBA degree program in Zhejiang University of Finance and Economics in southern China outside of Shanghai.

This matches other business programs that we offer in Egypt, India and France. We hope that these types of relations will lead to more companies and businesses around the world locating in Ohio. However, the university recognizes that international trade and international relations are complex topics that require attention and study.

Discussions about economic opportunities such as those that take place for the remainder of today are vital. Therefore, I welcome you again to the University of Toledo and thank you for coming. I am certain today will be informative and useful.

VICE CHAIRMAN BARTHOLOMEW: Wonderful. Thank you very much, and I would be remiss if I didn't note the leadership of our Chairman, the Chairman of the Commission, Dan Slane, who is an Ohioan, a proud Ohioan, and the former Chairman of the Board of Trustees of Ohio State University.

CHAIRMAN SLANE: Bill is a friend and thank you, Bill, for all your help.

DR. McMILLEN: Thank you, Dan.

VICE CHAIRMAN BARTHOLOMEW: Wonderful. Thank you.

I'm going to turn it over to Commissioner Brookes to introduce our first panel.

PANEL I: CHINA'S GREEN TECHNOLOGY POLICY AND DEVELOPMENT

HEARING CO-CHAIR BROOKES: If the first panelists would please come to the table.

VICE CHAIRMAN BARTHOLOMEW: Thanks very much, Dr. McMillen.

HEARING CO-CHAIR BROOKES: Thank you, Doctor.

DR. McMILLEN: Thank you.

HEARING CO-CHAIR BROOKES: Today on this panel on China's Green Technology Policy and Development, we have Mr. Ethan Zindler, Head of Policy Analysis, Bloomberg New Energy Finance in Washington, D.C.; Mr. Julian Wong, Senior Policy Analyst, the Center for American Progress Action Fund, in Washington, D.C.; and Mr. Devon Swezey, Project Director of the Breakthrough Institute from Oakland, California.

Mr. Zindler, it looks like you're ready to testify. Please limit your remarks to ten minutes or so, so we have plenty of time for question and answer. Thank you all for appearing today.

STATEMENT OF MR. ETHAN ZINDLER
HEAD OF POICY ANALYSIS, BLOOMBERG NEW ENERGY FINANCE, WASHINGTON, DC

MR. ZINDLER: Thanks very much. I guess I'm ready as I'll ever be. First, thanks to the Commission for inviting me here today to participate in this important discussion. I'm pleased and honored to be here.

I'm also pleased and honored to be in Toledo, which, as was mentioned a moment ago, is indeed a hub of clean energy investment and manufacturing technology development here in the U.S.

Before I get started, just a quick word about what Bloomberg New Energy Finance is and what we do. We're 150-person unit within Bloomberg. The goal of our group is pretty simple. We focus on the development of financing projects and technology in clean energy. In other words, we essentially track the dollars as they flow into the clean energy sector worldwide.

We do this with a team, as I said, of about 150 worldwide, and we have about a dozen offices. I head our operations, research operations, in Washington. We're a team of about half a dozen people, and we also have offices in Beijing, most relevant to today, but as well in Sao Paulo and any number of different cities around the world.

New Energy Finance was founded six years ago as an independent company and was acquired by Bloomberg in 2009. Today, our clients include most of the largest investors in this sector. This includes the majority of the bulge bracket investment banks, plus major hedge funds and venture capital funds.

It includes industry energy players such as wind turbine makers,

solar module makers, utilities, project developers and others. And finally, we serve government agencies, including the U.S. Department of Energy, UK Trade and Investment, the European Investment Bank, the National Renewable Energy Lab and others.

It's no exaggeration to say that our investment figures have become the essential benchmark for this industry in terms of where the money is flowing in clean energy.

In the past six months, our firm produced two reports, which I believe caught the eye of the Commission staff and is probably why I'm here today. The first, actually released by the Pew Center but using our data, presented country by country investment totals for the G20 nations, and it very starkly depicted the gap between the amount of money that's being invested in Chinese clean energy today versus U.S. clean energy.

The second report we produced ourselves was called "Joined at the Hip" and scrutinized a little more closely specifically the U.S.-China clean energy relationship and the sort of complexities of it, and I'm going to talk just a little bit about that in a moment.

The reports drew on thousands of hours of research from our firm and from those across the world who work for us, and what insights I can offer today really are based on their collective knowledge.

Given the current economic climate, there may be no two topics in Washington that seem to inspire more hope and fear respectively than clean energy and trade with China. The clean energy industry has been touted widely as one of the great economic development opportunities of the 21st century.

The Obama administration in particular has made it the centerpiece of its plans to revitalize U.S. manufacturing and exports. Indeed, I understand the President is due to attend the groundbreaking tomorrow at yet another electric vehicle--excuse me--battery plant in Michigan, and others in the administration will be making similar visits as well tomorrow.

Those from the other side of the aisle, Republicans, have been also supportive, particularly Republican governors in California and in other states.

Conversely, as this Commission I'm sure knows well, fears are growing about China's ascendancy as an economic player on the international stage. Before the economy dramatically fell into recession in 2008, relatively few public policy leaders loudly voiced concerns over the threat China might pose as an international economic competitor.

Times have clearly changed since then, and specific to our sector, there is one piece of legislation that has now been introduced

that would particularly target Chinese players and seek to bar them from receiving the benefits of a key stimulus program. And that bill has been cosponsored by Senator Brown of Ohio.

With all that as a preamble, let me say that my remarks today will focus on three key areas. First, I want to review the investment figures I touched on a moment ago. Second, I want to offer a few thoughts on the relationship, the trade relationship, of the U.S. and China on clean energy. And finally, I'm just going to offer a few parting thoughts on policy in the U.S. specifically.

First, on the investment totals. Within the past 18 months, China has become the undisputed global leader in attracting new investment dollars in support of clean energy. Last year, $34.6 billion in new private investment went into Chinese companies, technologies and projects. By comparison, U.S. attracted $18.6 billion, and UK finished third with about $11.2 billion.

These funds for Chinese firms and projects came from a variety of sources, including Western private equity firms, Chinese development banks, and balance sheets of large Chinese state-owned entities, and even Western small-time investors buying shares in publicly-listed solar companies in China.

While the cash has been put to use in a variety of ways, it primarily went toward spurring a massive build-out of new wind power generating capacity in China and toward expanding photovoltaic equipment manufacturing there as well.

Last year, no less than 14,000 megawatts of new wind projects were built in China. That represented 130 percent jump from the prior year when 6,200 megawatts were installed.

To put that in further context, just 1,300 megawatts were installed in 2006 in China, meaning the industry has grown more than tenfold in a period of just four years.

Virtually all of this demand for wind turbines is being met by Chinese domestic manufacturers led by three of the biggest equipment makers: Sinovel, Goldwin and Donfang. Foreign players, such as Gamesa of Spain, Vestas of Denmark, and GE of the U.S., are active in China, but most equipment is being supplied by local companies.

The biggest Chinese equipment makers now very much have their eyes on exporting to countries such as Brazil, Turkey and the U.S. However, for a variety of reasons, that are mostly market-based, I believe they'll find the U.S. market difficult to enter and to crack for the next few years.

Much of the rest of that $38.6 billion in China went towards expanding photovoltaic manufacturing there. As recently as 2006, Japan and Germany were the global leaders in terms of solar modules

produced.

Today, there is no disputing that China is number one. Last year, manufacturers there had capacity to produce solar cells for use in 4,500 megawatts of solar modules. That represented a bit over one-third of the world's overall supply.

This year, Bloomberg New Energy Finance has been projecting China would again meet a bit more than one-third of the world's overall demand with about 7,100 megawatts produced.

However, as of just last week, one manufacturer, Yingli Solar of Baoding, secured a massive $5.3 billion loan from the China Development Bank. That loan alone, and several others like it from the bank, could help double the world's solar manufacturing supply of solar modules in just the next several years.

Unlike with wind, China has seen relatively few megawatts of actual power-generating solar projects installed domestically. However, Chinese firms such as Yingli, Suntech, Trina and others are enjoying great success exporting, particularly to California.

At first, these equipment makers faced serious questions from installers here about quality, but those concerns have since been largely overcome. As recently as 2008, Chinese equipment accounted for no more than ten to 15 percent of the solar equipment being used in California, according to our research.

By the end of last year, two in every five megawatts of new solar installed in California were likely to be from Chinese equipment.

The reason is relatively straightforward: price. Photovoltaic modules have become commoditized. Developers, homeowners, and other buyers are simply making their decisions based on price, and the Chinese firms are selling for ten to 20 percent less than their competitors, sometimes even more than that.

A quick note I'd like to make before moving on about why it is that they enjoy this price advantage: there is often an assumption that China is essentially beating their competitors because of the low cost labor advantage. That certainly could be true in other industries; however, in the case of photovoltaics, this is not, in our view, the primary reason for the discrepancy. Rather, Chinese firms are succeeding by building the newest, most advanced manufacturing plants and enjoying the substantial benefits of economies of scale.

They are also rapidly integrating vertically up and down the value chain, buying their suppliers or customers to reduce costs.

Most of the figures I've quoted so far have been for 2009, but we just released our 2010 figures for the first two quarters of this year. The data suggest that, if anything, the gap between China and other nations may be widening.

Financing of new power-generating projects in China continues to be red hot even as it becomes more difficult to secure in Europe. The U.S. project finance market is stabilizing a bit after being hit very hard by the credit crisis.

One last note on dollars invested in the two nations before I move on. The one area where the U.S. has proven to be a global leader is in dollars invested by venture capital and private equity players. These funds have gone to support early stage firms looking to develop the most cutting-edge technologies.

This suggests that if or when there is a major technology breakthrough in these areas, it is more likely to come from the U.S. than from other nations because we have planted the seeds here in many cases.

Next, I'd like to turn my attention to the question of the clean energy value chain and its integrated nature between the U.S. and China.

Some have painted the competition between the two nations, in my view, in overly simplistic terms with China feared or admired as an exports winner and the U.S. criticized or dismissed as a manufacturing loser.

In reality, the clean energy relationship between the nations defies simplistic assumptions defined by economic nationalism. So-called "Chinese" PV modules are often manufactured using U.S. made capital equipment, while you would be hard-pressed to find a so-called "U.S." wind turbine that does not contain Chinese-made components. In this area, as in so many others, China and the U.S. are mutually dependent. Each much rely at least in part on the other to achieve its clean energy and carbon reduction goal.

Finally, a quick word about U.S. policy support for clean energy. In February 2009, President Obama signed into law the $787 billion American Recovery and Reinvestment Act, or the stimulus bill. The legislation contained, by our count, $66 billion in support for clean energy development, primarily in the form of grants, loan guarantees and tax credits.

I would argue that the stimulus bill on its own represents the most important piece of U.S. legislation ever passed in support of clean energy. However, the bill's subsidies all come on the supply side of the equation. They seek to subsidize the production of new wind turbines, advanced batteries, cellulosic ethanol, solar modules, or other goods by making them cheaper to produce.

But they do nothing to stir additional demand for clean megawatt hours, and lack of demand in the marketplace represents the primary conundrum today for clean energy. Electricity use has remained

relatively flat in the past two years due to the recession, and natural gas prices have fallen to $4 per million BTU from over $10 per million BTU a few years ago. Current market demand for renewables in the U.S. simply is not that strong, particularly for wind.

What could change this dynamic would be a federal policy that sets a clear national target for new megawatt hours of clean energy production. Such a demand side policy when coupled with supply side supports in the stimulus could trigger substantial additional investment in the U.S. Clean energy projects would most likely be the first to benefit as utilities would be under additional pressure to sign power purchase agreements with them to meet the national goals.

Other companies would benefit as well as the pressure to drive down the levelized cost of energy for renewables would grow.

It is just this kind of policy, a national renewable electricity standard that Congress is currently contemplating. Whether it will pass such a bill remains very much to be seen. As will be discussed, I know in a moment by Julian and others, China already has a national clean energy target in place, though there does remain some ambiguity about how it plans to pursue it.

I would again like to thank the Commission for this opportunity to present today, and I look forward to your questions.

[The statement follows:]

Prepared statement of Mr. Ethan Zindler
Head of Policy Analysis, Bloomberg New Energy Finance, Washington, DC

I'd like to thank the commission for the opportunity to take part in today's important hearing. Given the critical nature of these topics, I'm pleased and honored to have been invited.

I'm also pleased to be here in Toledo, a city that is proving to be a US hub of clean energy technology development and equipment manufacturing through the presence of important companies such as FirstSolar and others.

Before I begin, a quick word about my firm, Bloomberg New Energy Finance. We are a 150-person unit within Bloomberg, the most trusted source of information for businesses and professionals. The goal of our group is relatively simple: to track financing, technology, and policy trends in the clean energy sector worldwide. We're headquartered in London with teams in New York, San Francisco, Sao Paulo, Sydney, Perth, Cape Town and Delhi. Perhaps most importantly for today's discussion, we have approximately 10 staff based in Beijing, plus a team of five I've had the privilege to lead in Washington for the past five years.

New Energy Finance was founded six years ago as an independent company and was acquired by Bloomberg in December 2009. Today, our clients include most of the largest investors in this sector. This includes the majority of the bulge bracket investment banks, plus major hedge funds, and venture capital funds. It includes energy industry players such as wind turbine makers, solar module producers, project

developers, independent power producers, utilities, and oil majors. Finally, we serve governments and non-governmental organizations, including the US Department of Energy, the National Renewable Energy Laboratory, the European Investment Bank, the United Nations, the Pew Center and many others. Our quarterly and annual figures on dollars invested in clean energy serve as key benchmarks for this industry.

In the past six months, our firm produced two reports which I believe caught the eye of the commission's staff and are likely why I am here today. The first, actually released by the Pew Center but based on data collected by our team, presented country by country investment in clean energy in the G-20 nations. It rather starkly highlighted the large and growing gap between funds invested in China in 2009 and those invested in the US and other G-20 nations.

The second report -- "Joined at the Hip" -- tightened the lens a bit to look exclusively at US-China competitiveness and trade in the wind and solar sectors specifically. Bloomberg New Energy Finance produced this report on its own and released it to the public because we thought it offered important insights on this complex and expanding relationship.

These reports drew on literally thousands of hours of research from my colleagues around the globe. What useful insights I can offer here today are a reflection of their hard work. I have submitted to the commission both of these reports in electronic format for the record. I would also encourage those interested in learning more to go to www.bnef.com.

Given the current economic climate, there may be no two topics in Washington that inspire more hope and fear, respectively, than clean energy and trade with China. The clean energy industry has been touted widely as one of the great economic development opportunities of the 21st century. The Obama Administration, in particular, has made it the centerpiece of its plans to revitalize US manufacturing and exports. Indeed, I understand the President is due to attend the groundbreaking of construction on an advanced battery manufacturing plant in Michigan tomorrow and others in the administration will be visiting clean energy facilities elsewhere around the nation. Those from the other side of the political aisle, particularly Republican governors, have also emphasized that building a clean energy economy is a national imperative.

Conversely, as this commission knows well, fears are growing over China's ascendancy as an economic player on the international stage. Before the economy dramatically fell into recession in 2008, relatively few public policy leaders loudly voiced concern over the threat China might pose as an international economic competitor. Times have certainly changed. Specific to our sector, in recent months legislation has been introduced on Capitol Hill that would bar Chinese clean energy equipment makers from receiving support from one key federal government stimulus program. I believe that bill has been cosponsored by Ohio's Senator Brown.

With all of that as a preamble, let me say that my remarks today will focus on three key areas. First, I will review the investment figures I touched on just a moment ago and highlight the comparative rates of clean energy growth in China and the US. Second, I will offer some thoughts on the clean energy value chain and how it inevitably has become globalized and inter-connected between the US and China. Finally, I'll offer a few parting thoughts on US clean energy policy and what kinds of changes here might trigger additional investment.

First, the investment totals. Within the past 18 months, China has become the undisputed global leader in attracting new investment dollars in support of clean energy. Last year, $34.6bn in new private investment went into Chinese companies, technologies, and most importantly new projects. By comparison, the US attracted $18.6bn. (The United Kingdom received the third highest total with $11.2bn).

These funds for Chinese firms and projects came from a variety of sources, including Western private equity funds, Chinese development banks, balance sheets of large Chinese state-owned entities, and even small Western investors buying shares of publicly-traded Chinese solar firms. While the cash has been put to use in a variety of ways, it primarily went toward spurring a massive build out of new wind power generating capacity in China and toward expanding photovoltaic equipment manufacturing there. Last year, no less than 14,000MW of new wind projects were built in China. That represented a more 130% jump from the prior year when 6,200MW were installed. To put that in further context, just 1,300MW were installed in 2006 meaning the industry grew more than 10-fold in a period of just four years.

Virtually all of this demand for wind turbines is being met by Chinese domestic manufacturers led by the three biggest equipment makers -- Sinovel, Goldwind and Donfang. Foreign players, such as Gamesa of Spain, Vestas of Denmark, and GE of the US are active in China but most equipment is being supplied by local companies.

The biggest Chinese equipment makers now very much have their eye on exporting to countries such as Brazil, Turkey, and the US. However, for a variety of mostly market-based reasons, I believe they will find the US market very challenging to crack for at least the next few years.

Much of the rest of the $38.6bn raised for Chinese firms went toward the expansion of photovoltaic manufacturing in China. As recently as 2006, Japan and Germany were the global leaders in terms of solar modules produced. Today, there is no disputing that China is number one. Last year, manufacturers there had capacity to produce solar cells for use in 4,500MW of solar modules. That represented a bit over 1/3 of the world's overall supply.

This year, Bloomberg New Energy Finance had been projecting China would again meet a bit more than 1/3 of world's demand, this time with 7,100MW produced. However, as of just last week one manufacturer, Yingli Solar of Baoding, secured a massive $5.3bn loan from the China Development Bank. That loan alone could help to double the world's manufacturing supply of photovoltaic modules in just the next few years.

Unlike with wind, China has seen relatively few megawatts of actual power-generating solar projects installed domestically. However, Chinese firms such as Yingli, Suntech, Trina, and others are enjoying great success exporting, particularly to California.

At first, these equipment makers faced serious questions from installers here about quality. But those concerns have since been largely overcome. As recently as 2008, Chinese equipment accounted for no more than 10-15% of the solar equipment being used in California, according to our research. By the end of last year, two in every five megawatts of new solar installed in California were likely to be from Chinese equipment makers.

The reason is relatively straightforward: price. Photovoltaic modules have become commoditized; developers, homeowners, and other buyers are simply making their decisions based on price and the Chinese firms are selling for 10-20% less than their competitors.

A quick note about why it is Chinese manufacturers have been under-pricing competitors: it is often the default assumption that China produces cheaper due to lower local labor costs. However, in the case of photovoltaics, this is not the primary reason for the price discrepancy with the West. Rather, Chinese firms are succeeding by building the newest, most advanced manufacturing plants and enjoying the substantial benefits of economies of scale. They are also rapidly integrating vertically up and down the value chain -- buying their suppliers or customers -- to reduce costs.

Most of the figures I've quoted so far have been for 2009, but we have just released newer figures for the first two quarters of 2010. The data suggests that, if anything, the gap between China and other nations may be widening. Financing of new power-generating projects in China continues be red hot even as it becomes more difficult to secure such funds in Europe. The US project finance market is stabilizing a bit after being hit very hard last year by the credit crisis.

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Next, I'd like to turn my attention to the question of the clean energy value chain and its integrated nature between the US and China. Some have painted the competition between the two nations in overly simplistic terms with China feared or admired as an exports winner and the US criticized or dismissed as a manufacturing loser.

In reality, the clean energy relationship between the nations defies simplistic assumptions defined by economic nationalism. So-called "Chinese" PV modules are often manufactured using US-made capital equipment while you would be hard pressed to find a so-called "US" wind turbine that does not contain Chinese-made components. In this area as in so many others, China and the US are mutually dependent; each must rely at least in part on the other to achieve its clean energy and carbon reduction objectives.

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I would argue that the stimulus bill on its own represents the most important piece of US legislation ever passed in support of clean energy. However, the bill's subsidies all come on the supply-side of the equation. They seek to subsidize the production of new wind turbines, advanced batteries, cellulosic ethanol, solar modules, or other goods by making them cheaper to produce.

But they do nothing to stir additional *demand* for clean megawatt hours, and lack of demand in the marketplace represents the primary conundrum today. Electricity use has remained relatively flat in the past two years due to the recession and natural gas prices have fallen to $4 per million BTU from over $10 a few years ago. Current market demand for renewables in the US simply is not very strong.

What could change this dynamic would be a federal policy that sets a clear national target for new megawatt hours of clean energy production. Such a demand-side policy when coupled with the supply-side supports in the stimulus could trigger substantial additional investment in the US. Clean energy projects would be the first to benefit as utilities would be under additional pressure to sign power purchase agreements with them to meet the national goals. Other companies would benefit as well as the pressure to drive down the levelized cost of energy for renewables would grow.

It is just this kind of policy -- a national Renewable Electricity Standard -- that Congress is currently contemplating. Whether it will pass such a bill remains very much to be seen. China already has set such a target.

I would like to thank the commission again for this opportunity. I look forward to your questions.

HEARING CO-CHAIR BROOKES: Thank you very much, Mr. Zindler.

Mr. Wong.

STATEMENT OF MR. JULIAN L.WONG
SENIOR POLICY ANALYST, CENTER FOR AMERICAN PROGRESS ACTION FUND, WASHINGTON, DC

MR. WONG: Thank you. Good morning and thank you for the opportunity to testify before this distinguished Commission on China's clean energy policies.

My name is Julian Wong, and I am a Senior Policy Analyst at the Center for American Progress Action Fund. I speak before you today after having spent the past two-and-a-half years of my professional life almost exclusively devoted to analyzing China's energy policies.

A few months ago, I led a delegation of senior staffers from the Center along with key Senate staffers from Ohio and other important districts to Beijing and the surrounding area to look at China's advances in clean energy.

In a Washington Post op-ed last year, two esteemed business leaders, venture capitalists, John Doerr and General Electric CEO Jeff Immelt, said the following:

Do we want to win the race to lead the great next global industry, clean energy? We are clearly not in the lead today. That position is held by China, which understands the importance of controlling its energy future. China's commitment to developing clean energy technologies and markets is breathtaking.

Today, I would like to address three points. First, I would like to briefly describe the means by which China is pursuing the development of clean energy technologies. Second, I want to talk specifically about what China is doing on innovation in clean energy. Finally, I will describe what I see as the implications of all this for U.S. policy.

China's big push into clean energy begins right at the top when its leaders are able to articulate a clear, long-term vision for clean energy development, sending a stable market signal to local governments and companies.

This vision takes the form of specific, quantifiable energy conservation and renewable energy installation targets in its five year economic development plans, which are tantamount to their economic "Ten Commandments." Local officials and government appointed heads of state-owned companies are held accountable to meeting their allocated share of these targets through a variety of sticks and carrots.

Next, China is able to mobilize large volumes of low-cost capital through various channels, including state-owned investment vehicles and financial institutions and economic stimulus programs across the full value chain of clean energy development from R&D to manufacturing to deployment.

Finally, China is building out the necessary infrastructure upon which its clean energy transformation will take place. This includes not only physical infrastructure, like a national grid network using some of the most efficient high voltage transmission lines, or the world's densest electric high-speed rail systems, but also the economic infrastructure required to create a skilled workforce.

China has launched a medium-to-long-term talent development plan to oversee its human capital investments over the next decade. It is strengthening its education system, particularly its colleges and universities. It's seeking to bolster its innovation networks and supply chains through the establishment of over 100 science parks while luring foreign researchers and returning overseas Chinese scientists.

A common perception of China is that it is good at manufacturing and the deployment of infrastructure quickly but not at innovating world-class technologies. While this remains largely true, things are starting to change quickly and especially in the clean energy sector.

Science and technology innovation lies at the heart of the government's scientific development and its ongoing economic reforms.

It is a third of the way through its current 15-year Science and Technology Development Plan, which contains tangible benchmarks, such as achieving global top-five rankings in patents generated and citations in international science publications. The plan also identifies five priority industries with top priority given to technologies relating to energy, water resources, and environmental protection.

The plan calls for the increase in R&D funding to reach 2.5 percent of GDP by 2020, compared to just 1.5 percent today. Government funding has increased from $7 billion in 1998 to $39 billion in 2008.

In what may be a worrying trend for the prospects of American Innovation, China is also becoming a popular R&D destination for foreign multinationals, like Applied Materials, DuPont, IBM, and GE. Consistently, these firms are locating their R&D activities in China because that is where both the manufacturing infrastructure and the ultimate demand for their products are, and that it makes economic and business sense to conduct R&D close to other parts of the value chain.

Recently, certain aspects of China's innovation policies have

been attacked by the international community as being overprotectionist and inconsistent in the principles of free trade. While such claims may be legitimate, it is a distraction to the more fundamental question, I think, that we should have at home: why haven't we gotten our own house in order?

The implications for the United States cannot be any starker. If the United States wants our companies to thrive in the clean energy sector, we need to adopt a comprehensive package of policies that creates market demand for clean energy technologies and channels adequate levels of public and private finance across the full value chain of clean energy development, and not just R&D, and builds also the physical and economic infrastructure that can support this new market and enable the deployment of clean energy technologies right here at home.

In my written testimony, I point to previous work that details a range of concrete policies that fit within this comprehensive framework, but by far the most important elements are a comprehensive policy that sets a price and cap on carbon and sets a nationwide renewable electricity standard while strategically directing investment into renewable and efficient technologies at every stage of the value chain.

I would like to close with an observation that I gained from watching World Cup soccer over the past few weeks.

[Laughter.]

MR. WONG: In particular, I was struck by the recurring juxtaposition of two advertising billboards in the background of the soccer pitch, one in red by an American Company, McDonald's; the other in blue by a Chinese Company, Yingli Solar. I thought to myself this is the World Cup, the world's biggest sporting stage, and China is proudly showcasing the future of its economy with a solar technology company, and what is the U.S. best able to showcase? Hamburgers.

I believe this image speaks volumes about the state of the play, not only in the global clean energy race, but also in the global competitiveness landscape. At the same time, I do believe there is a window of opportunity to do the right things to get America's house in order so that it too can shape its own energy future.

Thank you, and I look forward to your questions.

[The statement follows:][1]

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[1] Click here to read the prepared statement of Mr. Julian L. Wong

HEARING CO-CHAIR BROOKES: Thank you, Mr. Wong.[2] Mr. Swezey.

STATEMENT OF MR. DEVON SWEZEY
PROJECT DIRECTOR, THE BREAKTHROUGH INSTITUTE
OAKLAND, CALIFORNIA

MR. SWEZEY: Thank you very much, Commissioner Bartholomew, Commissioner Brookes, and members of the Commission for having me today. It's really an honor to be here.

My name is Devon Swezey, and I am Project Director at the Breakthrough Institute, a climate and energy policy think tank based in Oakland, California. Since its founding in 2004, the Breakthrough Institute has advanced an innovation and investment-centered framework for addressing climate change, energy security, and U.S. economic competitiveness in clean energy.

It is my great pleasure to discuss with you China's comprehensive strategy for developing a domestic clean energy economy and the various policies and investments that the United States must prioritize to mount an effective response to the competitiveness challenges it faces today.

As the United States searches for new sources of growth in the midst of this sluggish economic recovery, the global clean energy economy represents an important job creation and export market opportunity. According to the World Economic Forum, global private investment in clean energy technologies is estimated to reach $450 billion by 2012 annually and $600 billion by 2020.

Unfortunately, the United States risks losing out on this opportunity as it lags behind economic competitors in Asia and Europe in the production of virtually all clean energy technologies. The United States produces only five percent of the world's solar cells, relies on foreign-owned companies to manufacture the majority of its wind turbines, and is losing ground on hybrid and electric vehicle technology and manufacturing.

Measured by market capitalization, only four of the world's top 30 solar, wind and advanced battery companies are American. At the same time, other nations are moving quickly to implement comprehensive clean energy investment strategies which will allow them to gain first-mover advantages ahead of the United States and capture a majority of the economic benefits in terms of jobs, tax

[2] Click here to read a letter for the record from Mr. Julian Wong dated July 23, 2010 as a follow up to his testimony.

revenues and growth associated with this burgeoning industry.

China, in particular, has emerged as a clean energy powerhouse. It's now the world's largest manufacturer of solar cells and wind turbines and has also taken the lead in commercializing plug-in hybrid and electric vehicles as well as manufacturing the advanced batteries that will power them.

China is not out-competing the United States through some inherent comparative advantage but through targeted and comprehensive public policy which is characterized by large and sustained public investment across the entire industry.

China's investment strategy includes major funding for clean energy research and development, subsidies and tax incentives for domestic manufacturers, ambitious clean energy deployment targets, and incentives and procurement policies to develop its domestic market and major investments in enabling infrastructure.

Local and provincial governments in China are also offering clean energy companies free land, tax breaks and other subsidies to facilitate the development of clean energy clusters, which are dense regional networks of investors, manufacturers, suppliers, universities, and other actors that can confer lasting competitive advantage to the region as a whole.

One prime example of this is the city of Baoding, which has transformed into the fastest growing hub of wind and solar energy equipment makers in China. The city is home to "Electricity Valley," an industry cluster modeled after Silicon Valley in the United States, which is composed of nearly 200 renewable energy companies.

To make matters worse, the Chinese government is set to massively out-invest the United States in clean energy technology over the next five years, even assuming passage of the American Clean Energy and Security Act, which is the House-passed Waxman-Markey bill.

We documented these clean energy investment estimates in our November report "Rising Tigers, Sleeping Giant," written with the Information Technology and Innovation Foundation, a D.C.-based innovation policy think tank.

Already, China's public investment strategy has helped the country attract the bulk of private investment in clean energy technologies. Last year, as Ethan mentioned, China attracted $34.6 billion in investment, while the United States attracted $18.6 billion.

As clean energy manufacturing and investment shifts overseas, research and innovation activities, America's historic comparative advantage, have started to follow. Perhaps the highest profile example of this, as Julian mentioned, is the Silicon Valley giant, Applied

Materials, which is the global leader in supplying the manufacturing equipment used to make solar cells.

Applied Materials recently decided to construct the world's largest, most advanced solar research and development facility in Xian, China. Applied Materials is not alone unfortunately. IBM has announced that it will invest $40 million to create the company's first "energy-and-utilities- solutions lab" to develop innovative new technologies for smart grid and other applications.

The new lab will also be located in China. These decisions follow those of leading U.S. companies such as GM, Dow Chemical, and Intel, who have all constructed high-tech research labs in China and show that high-value R&D is starting to follow manufacturing abroad, threatening America's historic leadership in innovation.

We believe that the decisions the United States government makes in the next five to ten years will largely determine whether or not the country can emerge as a leader in these new growth industries. Unfortunately, proposed legislation in both the House and the Senate would not be enough to keep the United States competitive.

Some say that pricing carbon is the most important policy the United States can adopt to become a leader in the global clean tech industry. But it's very important to understand what a price on carbon would and would not accomplish.

For political reasons, the carbon price established by the House and Senate bills would remain too low to substantially increase demand for clean energy technologies. A low carbon price would also not be sufficient to support growth in domestic clean energy manufacturing.

To develop a globally competitive clean energy industry, the United States needs a comprehensive investment agenda that prioritizes large and sustained public investment in clean energy technology. Today, clean energy is still too expensive to be widely deployed at scale around the world, and most governments are unwilling or unable to impose high carbon prices or large ongoing subsidies to make clean energy cost-competitive.

Therefore, the overarching goal of a new clean economy strategy in the United States should be to make clean energy cheap in real, unsubsidized terms. Accomplishing this goal will require robust and long-term investments in areas such as research and innovation, manufacturing, market creation, education, infrastructure, and the development of new clean energy industry clusters in the United States.

The primary role of carbon pricing should be to raise the needed revenue for these critical investments. We don't have to look far for examples of past public investment strategies that created whole new

industries and unleashed waves of economic prosperity. In the 1950s, the Defense Department's procurement of microchips facilitated market development and dramatically reduced chip costs.

Today's vibrant IT sector exists largely thanks to early sustained public investments in R&D, computer science, infrastructure and procurement. Government investment was also crucial for the development of railroads, radios, computers, the Internet, and the list goes on and on.

We believe that America can still lead the global clean energy industry. The U.S. remains one of the most innovative and entrepreneurial countries in the world, but without a comprehensive clean energy investment strategy that prioritizes these long-term investments, America will lose out on one of the greatest economic opportunities of the 21st century.

Thank you very much, and I'm happy to take your questions.

[The statement follows:][3]

PANEL I: Discussion, Questions and Answers

HEARING CO-CHAIR BROOKES: Thank you, Mr. Swezey. Thank you all for your insightful and thoughtful testimony.

We'll move to questions now. So far I have on my list Commissioners Wessel, Slane, Shea, Mulloy. Would you like to ask the first question?

VICE CHAIRMAN BARTHOLOMEW: No.

HEARING CO-CHAIR BROOKES: No. Okay. I guess everybody has questions. So why don't we start with Commissioner Wessel?

COMMISSIONER WESSEL: Thank you, gentlemen, for being here.

We're here in Ohio because while many of these are national policy issues, the fact is we're here to find out what they mean at the local level, and I hope that our witnesses will be willing to answer some questions in writing later on.

Mr. Zindler, for example, I disagree on question your analysis that the bulk of the money is going onto the investment side. In fact, the 1603 money is uncapped; the 48C money is capped. So I think the problem in going to an RES standard, et cetera, is we have, we are looking at deploying clean energy, but we're doing very little here nationally to assist in the development of the energy production sector.

[3] Click here to read the prepared statement of Mr. Devon Swezey

Here in Ohio, they've just announced recently a windfarm in Lake Erie. The question is where is that product going to come from? It's great that Ohio and other states, the Texas windfarm, are going to be using clean and green energy. We're looking at doing this, as you know, in nuclear and many other areas.

But the question as we look at our economy today is not just where, how we produce the energy, but where is the equipment going to be coming from? Are we going to be able to sustain the clean and green economy with American-made equipment?

When you look at the wind energy area the towers may be produced here because they're hard to transport, they're heavy, they're large, et cetera, but the nacelles, the collars, the gearboxes, many of them are going to be produced offshore, not just China, Europe too. Spain is a great leader

So my question for all of you is we're here in Ohio; what does this mean for Ohio? I think Ohioans, like all Americans, want to have a clean and green future, but they want to know that the jobs that have been lost in autos, at NCR, and all the other places up and down this state are going to be replaced, and they're going to be able to share in the promise of clean and green that the President and so many have talked about.

So what does this mean for Ohio? Are we simply going to be seeing China, Spain and others supplying the products to make clean and green energy, and while we may be installing the products here, while we may be doing the maintenance here, the vast bulk of the economic energy, the R&D, et cetera, is going to be happening offshore?

Please.

MR. ZINDLER: If I could take a stab. It's a very interesting question. I appreciate the desire to keep the conversation focused locally. I would just at least tell you our projections in terms of manufacturing of wind turbines on U.S. soil.

COMMISSIONER WESSEL: Please.

MR. ZINDLER: It is clear, to your point, that we were in essentially an undersupply situation in the U.S., and the U.S. was importing key components for wind turbines back over the last several years. We are very rapidly switching to an oversupply situation of wind turbines in the U.S., and I'm not talking about U.S.-owned companies. I'm talking about manufacturing of final wind turbines on U.S. soil.

We project in 2011 that the available capacity of wind turbines manufactured in the U.S. will grow from somewhere around 8,000 megawatts this year to about 12,000 megawatts, but we don't expect

demand or demand for new projects to rise much above nine or 10,000 megawatts next year.

So the problem now suddenly has actually become an oversupply situation.

COMMISSIONER WESSEL: Inventory overhang.

MR. ZINDLER: Inventory overhang in the wind sector, which gets back to sort of my earlier, my final point in my written comments, which is that, well, how do you solve that problem? And the way you solve that problem is you create more demand. And how do you create more demand? Well, to Brendon's point earlier, you know, these technologies aren't cost competitive right now so you need government. They aren't cost competitive on a purely unsubsidized basis so you need government involvement to create essentially artificial demand. So that's my view on onshore wind, for one second.

Now, I think you were talking--were you talking about the offshore wind project that's being discussed locally as well?

COMMISSIONER WESSEL: I'm talking about the Lake Erie project.

MR. ZINDLER: Well, that offshore project, that point is a point well-taken, which is that to actually build that project, there's a lack of availability of barges to get, to install the wind turbines there.

We don't have an offshore wind turbine manufacturing sector really of any size or substance in the United States at this point. And, offshore is still, I regard, as somewhat of a more cutting edge technology still, given the high cost, and there's no question that there could be additional supports in that area.

But if you take, for instance, the Cape Wind Project, the 470 megawatt project being proposed for Massachusetts, that project could potentially get a loan guarantee, could potentially get a 30 percent grant from the program we were just talking about, the 1603 grant, to offset, and could enjoy the benefits of accelerated depreciation, and when you factor all those things in, over half of the cost of the project could already be being taken up by government as things stand at this point.

The problem still, I would maintain, is on the demand side of the equation.

COMMISSIONER WESSEL: And, again, for questions later, or in writing, has your organization looked at disaggregating the whole wind turbine, looking at where the collar, all the value parts are? Simply assembling them here from high valued components offshore does not create the same kind of value as having an indigenous innovation industry.

MR. ZINDLER: I don't have the numbers at my fingertips, but I

will say this, for instance, for the gearboxes, which was clearly a pinch point in the industry two or three years ago, a lot of that problem is being solved. There is more capacity coming on line.

Again, it's important, though, to understand that that's not necessarily by companies that are, quote-unquote, "U.S. owned."

COMMISSIONER WESSEL: Right.

MR. ZINDLER: Those are companies that might be foreign-owned on U.S. soil.

COMMISSIONER WESSEL: Right now I think most Ohioans and most Americans are looking at where the jobs are going to be and not who owns the company that produces them.

Please.

MR. WONG: Thanks for the question.

I guess I would answer this with a rather long-term perspective, and I think in terms of what this means for Ohio, looking at the China example, what you see is the importance and effectiveness of national leadership and how that trickles down to the provinces and local levels.

So I talked about, in my oral statement, how everything begins at the top. By articulating a broad, nationwide, long-term policy, over five years, over ten years, that sends a very strong signal to provincial leaders, and that, in turn, sends a strong signal to local leaders because they know that this is a priority for the nation, and they know that as they move up the ranks of the bureaucracy, their performance is going to be evaluated on their ability to deliver on priority projects that the central government has pronounced.

Obviously, we live in a different system in the United States. You know, we don't, it's not a military government structure; it's not a one-party government. However, we should not underestimate the value of articulating very clearly a vision that the business community can understand, that the general public can understand, because quite truly the energy industry is a truly transformative industry that cuts across so many different sectors and so many different stakeholders, and everybody has a stake in it.

The other thing, just to flush out, that we can learn from China is the very importance of a long-term policy. So what we have in the United States, you know, we might have--you know, the Recovery Act put in some 60 or $80 billion of investment into the clean energy sector, and this was the largest investment in clean energy in the United States in history.

The problem with it, though, is that the grant money, for the most part, expires after two years. It's short-term. And we have a history of production tax credits, investment tax credits, that are

subject to the whims of congressional reauthorization, and that's just not sustainable from the business community.

It's certainly not sustainable from businesses that are looking to put in large investments in places like Ohio and the hinterlands all across the United States because there is just no stable policy, and, you know, the incentives and tax credits can be yanked. They don't know if they're going to be reauthorized when they expire.

That's not the case in China. It's very clear there's a ten-year vision, a ten-year goal, and there is a lot of supporting policy infrastructure in the way of incentives, R&D grants, manufacturing grants, and so forth, that support that long-term vision.

MR. SWEZEY: Thank you so much for the question.

This is a really important question. If I understand it correctly, I think that what you're getting at is, "how do we build a robust clean energy manufacturing industry in the United States?"

And to start, I'd like to echo Ethan's point about the importance of long-term stable demand. Even if we encourage technology supply in the United States, it's not likely to stay here very long if there's not a stable demand for those technologies in the U.S. market.

At the same time, we do not have an explicit manufacturing agenda in the United States, and I think that that's a real important oversight. I know Senator Sherrod Brown here in Ohio has been a major champion of this, recognizing that manufacturers need a lot more support in terms of financing, in terms of technical expertise, to scale up their operations in the United States, and it's not going to happen from the PTC and the ITC and these various incentives that we've been throwing at them over the years.

And so one of the things that Senator Brown has proposed that we are very much supportive of is something called the IMPACT Act, which would create a $30 billion revolving loan fund to provide access to low-cost financing, which is something that our competitors are doing very well, to domestic manufacturers to help them scale up in the United States.

But, again, I think that we also need to be thinking about this strategically. If you talk to some of these clean energy companies that are making decisions about where they want to site their manufacturing facilities, I completely agree with Ethan that labor costs are really not the biggest issue.

It's which governments are offering the tax incentives and the subsidies and the money for R&D and the free land that are going to attract them to locate there, and also what are the kinds of synergies and systems that they're going to be moving into. And that's really the importance of this idea of clusters. It's that if you have strong

education, you have suppliers that already exist, if you have strong R&D support, and R&D facilities, that's a major attraction for a lot of these companies as well because they know that they will benefit from the networks that already exist within the different areas.

So, to close, I guess I'd say we need to be thinking about this strategically. It's not just demand; it's not just supply; it's everything. It's R&D, and it's support for the development of these kinds of clean energy innovation clusters that can really accelerate the pace of innovation throughout the entire industry.

That's what companies are looking for and that's what we're not providing in the United States.

COMMISSIONER WESSEL: Thank you.

HEARING CO-CHAIR BROOKES: All right. Commissioner Slane.

CHAIRMAN SLANE: Thank you. First, I'd like to thank the three of you for taking time to come here and testify. It's been very enlightening.

It's very clear from your testimony that without a total commitment from the Federal Government, this industry will never really get off the ground. And the problem here is that Ohio companies are not competing with Chinese companies but are competing with the Chinese government.

And there's really no way that they can prevail in the long-term, and when I look at what the Federal Government did with their energy bill a number a years ago in the ethanol industry, and when they mandated that ten percent of gasoline has to have ethanol in it, all of a sudden Wall Street flooded the market with all kinds of investments, all kinds of ethanol refineries popped up all over the Midwest, and you can see the impact that Federal legislation mandating a long-term sustainable support for an industry has.

This is an industry that will never survive without price supports, without some sort of incentives. You can't make it work on $4 gas prices and the cheap coal prices. So without subsidies, the industry doesn't work.

I think we're probably all beating a dead horse here, but I think, if I'm understanding the three of you, that we need total commitment from the U.S. government in order to get this industry off the ground.

Is that a fair statement?

MR. ZINDLER: Well, yes, no, let me beat that horse as well.

MR. ZINDLER: To Devon's point--and I called him Brendon earlier--my apologies.

MR. SWEZEY: No problem.

MR. ZINDLER: The goal has to be--and I would take slight

issue with one thing, which is that we will, I think, eventually reach the Promised Land where you can produce a megawatt hour cleanly for competitive costs with dirty energy. I think we can get there.

I don't think subsidies have to be there till the end of time, but I do think that the goal is to get there, and the race is on, and so I guess the good news/bad news is the Chinese, you can argue, have zipped out ahead by all this investment and this scale-up. That's the bad news.

The good news is that they're not there yet either. They're not producing solar or wind for cheaper than producing megawatt hour from coal or natural gas unsubsidized now.

So there's still a lot of innings left to be played in this game because once we get into that zone where you are actually down at a levelized cost below coal or natural gas, that's when we can declare a winner, and so the goal really has to be keep an eye on the long-term, to build there, and I completely agree on the example of the renewable fuel standard, where Congress essentially set mandates as to number of gallons that had to be blended into the nation's fuel supply year-on-year.

The analog would be to set the number of megawatt hours that have to be clean, blended into the U.S. power supply, year-on-year, and that would, as you point out, I think provide certainty in long-term growth.

It does have its potential pitfalls. I think anybody here who is familiar with the ethanol industry knows that it's had its share of challenges in the last several years, but it is the way in which you spur such a boom.

MR. WONG: I don't have much more to add, but I think, as I put forth in my oral statement and also my written testimony, I think the approach that has to be taken is one that's comprehensive, one that looks at all parts of the value chain, not just being satisfied as being the leader, the world leaders in early stage innovation, but making sure that we can translate policy into bringing back the manufacturing, and that all really begins with setting, creating a market demand.

And so that's going to be key, and certainly we're not going to be able to mobilize financing the way that the Chinese can, and I'm not sure that we want to because, quite frankly, who knows how sustainable that model is going to be. Some people fear that the Chinese financial system is headed towards a banking crisis of sorts with all the new loans that they're originating.

Just last year, they had $1.5 trillion worth of new loans coming out of the financial system, and it's anybody's guess where that is going to lead.

But there are things that we can do in the United States. We may

not have, the shape of our public finances isn't in great shape, but let's not forget that we have private sector and a corporate sector that has substantial cash on their balance sheet, and so the key is to unlocking and leveraging private finance, and the key to that certainly is setting strong market signals, but by also providing some support mechanisms for early-stage technologies, and one of the proposals that the Center for American Progress has been pushing is the idea of a green bank or a Clean Energy Deployment Administration.

There are various proposals in Congress for this green bank, but the general idea is that this green bank, which is a public entity, government, either government-run entity or independently-run entity with public finances, would serve as a backstop for loan guarantees to provide that risk reduction in financing these early-stage technologies, and this is just one example.

I think one element that does not get emphasized enough in thinking long term about our vision to really transform our economy to a low-carbon one is the amount of skills and workforce that we'll need to get to the promise land, and so I think investing in science, technology and math education in this country--and engineering--is going to be extremely important.

Our kids in high schools and middle schools, quite frankly, if you look at the international rankings, are just not doing that great at all. A lot of the other countries are forging ahead with strong fundamentals in their education curricula. Having a strong science, technology, engineering and mathematics background is going to be very important if we want to transform our economy technologically into a clean energy economy.

And as I pointed out, not just in China, but, quite frankly, if you look at other countries, in Europe--Germany, especially, is a role model, and we talk about that in our report "Out of the Running," which I reference in my written testimony--they do an excellent job in government programs to really boost their vocational institutes and impart the necessary skills needed for clean energy economy.

Thank you.

CHAIRMAN SLANE: I just want to clarify. Our job is to make recommendations to Congress, and it just seems to me that to ask them to do an enormously comprehensive bill is just not going to work here.

The solution is if the Federal Government can mandate usage of this form of energy, and then Wall Street will open up, the infrastructure, kids will study, and it will all follow, and I appreciate the problems with ethanol, but you saw what happened. When ethanol was mandated, all of a sudden all the money was there, the plants got built, people were being educated, chemists were being employed, all

of those things, and to me it seems the solution here is for the Federal Government to mandate the use of this energy.

Am I missing something here?

MR. SWEZEY: This is a really important question. So to your first question, I want to affirm your supposition that this market doesn't exist without subsidy or without policy, and that's why we think that the long-term goal that needs to be accelerated is to drive down the price of clean energy technologies in real unsubsidized terms.

Now, how do you do that? I don't think that it's going to happen just by mandating the use of these technologies because these decisions don't exist in a political vacuum, which is to say that even renewable energy and renewable portfolio standards come up against cost containment mechanisms when the cost of these technologies are too high for the public to bear.

This is another reason why the carbon price established in the Waxman-Markey bill or the Kerry-Lieberman bill is expected to be so low, because politicians are not going to raise the price high enough to make most clean energy technologies cost competitive.

So that means that we do need a major investment in the development of these technologies, and so the first thing that I would recommend that we recommend to Congress in terms of making clean energy cheap is a major scale-up in funding for energy research and development, which has been languishing in this country for more than 20 years.

We've advocated on the scale of $15 billion per year or more, and there's a gathering innovation consensus of leading think tanks, Nobel Laureate scientists, private firms like Google, and now folks like Bill Gates and Jeff Immelt and others, who have called for a major increase in energy R&D to help develop these advanced technologies, but that's not just going to get us there.

It's not just the R&D side. It's also helping manufacturers scale up and produce technologies at the cutting edge, and it's also creating demand incentives that actually encourage price reductions in technologies. One of the things that Julian mentioned is the Clean Energy Deployment Administration. The House version of that bill is more like a green bank, which would just finance the deployment of more wind turbines and other technologies.

The Senate version out of the Bingaman Energy Committee is actually geared towards and has the stated mission of procuring at the cutting edge of financing at the cutting edge of new technologies to bring those technologies down in price over time.

In other words, it has explicit cost reduction and performance

improvement goals as part of its mission. These are the kind of things that we need to bring down the price of clean energy in real unsubsidized terms, and we're not thinking about it like that.

We think that we can put a $15 per ton price on carbon, and then the market will make this work, and it's just not going to happen because the technology is still too expensive.

HEARING CO-CHAIR BROOKES: Thank you.

Commissioner Shea.

COMMISSIONER SHEA: I want to thank all three of you for being here as well. I have two quick factual questions, and then I would like you to comment on an observation.

First question--China produces a substantial portion of the global market for solar panels, but how much of that, how much solar energy is part of their energy mix domestically? Zero; right?

MR. ZINDLER: A couple hundred megawatts.

COMMISSIONER SHEA: So virtually nothing.

Second question. Have the Chinese produced/created windfarms of substantial size that are not connected to any grid? Is that correct?

MR. WONG: I think the most commonly cited statistic is something like 20 to 30 percent of the currently deployed wind turbines are not connected to the grid, but it's a question of time that they'll get to that. It's not a static situation.

COMMISSIONER SHEA: Okay. Well, let me just make an observation. Some people would say renewable energy is great, we should have a focus on it, but people in America want to have lights in their conference rooms and electricity to run the microphones and air-conditioning to keep us comfortable. So perhaps we should be focusing more on natural gas fossil fuel, which is, as I understand it, cleaner than oil and coal.

We have large reserves of natural gas in this country, more so than the Chinese, as I understand it, and President Obama just signed a memorandum of understanding with the Chinese government to share our natural gas extraction technologies with the Chinese so they're interested in that. And nuclear. We haven't licensed a nuclear facility in this country in about thirty years.

So, yes, let's focus on renewables, but, as you point out, there's no market demand for it; it's not cost competitive to get there; let's not oversell it. Maybe it's a 40-year march to get to the Promised Land. It could be a longer period of time than maybe you would want, but let's focus on something we have a lot of, natural gas, which is cleaner, and nuclear, as a bridge to getting to renewables.

So I would love for each of you to comment on that.

MR. ZINDLER: I'll comment first on the grid connection

question. I agree with Julian. We track it every quarter out of our Beijing office--I'm looking at it here--it ranges anywhere from about 63 to about 78 percent of the new capacity added per quarter is on line. So, yes, there's clearly--but there is a lag. It takes six, sometimes seven--

COMMISSIONER SHEA: Doesn't that say something about our systems?

MR. ZINDLER: No, clearly, it does.

COMMISSIONER SHEA: The free market system--

MR. ZINDLER: It's clear. You put a windfarm up here in the United States and then for six months don't operate, your creditors will come; right? So it's a little bit different to some degree over there. That's first.

Second, my view on the question of natural gas or nuclear, these are not either/or questions.

COMMISSIONER SHEA: Right.

MR. ZINDLER: Right. We're not an advocacy for more market researchers, but I think our general view is the overall energy infrastructure is going to have to change. There are a lot of opportunities for many parties, and supporting natural gas does not necessarily have to be exclusive of support for renewables.

But I think, to these guys' point, which is that if you are looking five or ten years down the road, 20 or 30 years down the road, then you really do need to be investing in these new technologies so that you eventually get where you want to be eventually over time.

And part of that, I would view that as sort of two tracks. One, there is all that R&D money, and all that energy invest--looking at the newest, fresh-out-of-lab technologies. But there's also an argument to be made for investing to make sure that you're finding ways to produce existing technologies cheaper and cheaper every day.

And that's what the Chinese essentially are doing with photovoltaics. And they have helped to drive the price of a watt of photovoltaics down to about two bucks, less than $2 for crystalline silicon per watt in just the last 18 to 24 months, from about $4.

So process improvements are not something that should be necessarily overlooked in the name of doing futuristic R&D research as well.

MR. WONG: I agree with all that. Back to your first question on solar, it is true that solar power accounts for a negligible share of China's electricity production. But that's going to change over time.

COMMISSIONER SHEA: I know they have a renewable goal of 15 percent by 2020.

MR. WONG: Right, and part of that goal is to scale up to some

20 gigawatts of solar, installed capacity of solar. Certainly, in the next ten years, solar is still going to play a relatively small role compared to wind, compared to hydro, and compared to certainly fossil fuels and nuclear, and that's a function of it being a relatively more nascent industry compared to the rest.

However, I think what the Chinese have done, it has been quite strategic and smart. They have leveraged their own manufacturing progress by serving overseas markets that have offered really generous incentives, particularly in Europe, and so they've increased the delta. The costs are low, the revenues are high, and they've reinvested those profits and retained earnings into upgrading their capital equipment to make it more efficient and to make it more productive.

But, lastly, I will point out that they've announced two major policies to start the deployment of solar nationally. Just last week, they announced 13 bid concession projects that they're going to invite the private industry to bid for, and these account for 280 megawatts of wind across 13 different areas across the country. So they are moving ahead.

I don't have too much more to add on the natural gas and nuclear issue. I think I'd defer to both Ethan and maybe Devon.

MR. SWEZEY: Yes, I would agree with Ethan that this is not an either/or proposition. We need all of these technologies, particularly if we're looking at fully decarbonizing the global energy supply over the next 50 years, which is essentially what we would have to do to avoid the worst consequences of climate change.

We need all these technologies to become radically cheaper. Nuclear power plants need to get smaller and cheaper. Right now, there's a lot of interest in modular nuclear reactors, 100 megawatt scale nuclear reactors that can be mass produced.

Secretary of Energy Steven Chu has said that we need fundamental breakthroughs in different areas to make these technologies cheaper.

For solar cells, we need to increase efficiencies and improve material science. For batteries, we need to dramatically increase the energy density of batteries, and these are things that we need to be able to accelerate through policy. When I say we need to be investing a lot more in R&D, I don't mean basic science. I don't mean putting a scientist in a lab somewhere where he's thinking about some kind of irrelevant questions.

I'm talking about basic science and applied science and what's called the technology "valley of death," which is the area between applied science and commercialization where a lot of funding dries up for a lot of really good ideas that still have about five to seven years to

reach commercial scale.

VC money is great, but they usually focus on two to five years out and how they're going to get their return. Private companies focus on the next quarter or the next year. So we need smart public investments in research and development and manufacturing scale-up that provides the needed patient capital for a lot of these ideas to come to commercialization, and it's going to be all technologies.

COMMISSIONER SHEA: Thank you, and I'd like to have another question after, if we have a second round. Thank you.

HEARING CO-CHAIR BROOKES: Commissioner Mulloy.

COMMISSIONER MULLOY: Thank you all, again, for being here. It heartens me that we have smart young men like you out there thinking about these important issues.

Mr. Wong, you made the point that we have to have a vision. I have on my computer something I cut out from the Book of Proverbs that says "without a vision, the people will perish," and I think that's where we are right now.

I think that the United States has inadvertently thrown its people into a globalized economy where other countries have clear strategies on how they want to be winners in that global economy, and we have not.

And I think this is a very important matter for our people, and when our unemployment rate is now at ten percent, I think our people are beginning to understand something is very wrong with the way we're operating our economy.

I was struck by something you said, Mr. Wong, about Yingli Solar. I wanted to ask Mr. Zindler--you mentioned Yingli Solar in your testimony--are they a government-owned company?

MR. ZINDLER: No, they trade, I think, on NASDAQ.

COMMISSIONER MULLOY: They do. I note in your testimony, you say that the government of China, Yingli Solar of Baoding--is that a province?

MR. ZINDLER: That's a city. That's actually the cluster that--

COMMISSIONER MULLOY: Okay. It's one of these clusters.

MR. ZINDLER: Yes.

COMMISSIONER MULLOY: You say that they've just given them a $5.3 billion loan.

MR. ZINDLER: Yes. And, in fact, I was just looking this morning, that same China Development Bank has offered a $6 billion line of credit to Goldwind, one of the largest wind turbine makers over there, and $12 billion has been offered to Suntech and Trina Solar, two other solar module makers in China.

COMMISSIONER MULLOY: See, the point you made, Mr.

Wong, is you have McDonald's and then you have Yingli Solar. But McDonald's is a private company. Yingli Solar, as Commissioner Slane pointed out, we're competing not just against companies; we're competing against national strategies. And so I think that's what we have to understand.

Mr. Swezey, you made a very important point here on page five of your testimony when you begin to talk about how China incentivizes these clusters and offers people to come and invest.

I'm trying to understand, Applied Materials, did they benefit from those kinds of incentives when they invested into China?

MR. SWEZEY: Well, they benefitted from the manufacturing facilities that they were working with already being in China and an expected major market demand, but, yes, I believe that the government, the Xian government, provided them a number of incentives. Perhaps Julian can speak better about that.

COMMISSIONER MULLOY: Okay. So we had a major American company moving its operations to China partially because they were incentivized by the Chinese government.

MR. ZINDLER: I would also add, and I know that Julian has been there as well, to connect the dots here, that Applied Materials actually provides capital equipment to Yingli Solar. Both he and I took, at different times, took tours of their plant, and we couldn't help but notice that as you walked through the plant, you see different pieces of equipment that has been produced by Applied Materials, and so my other guess is they want to be closer to their customers, and that's part of what's going on here as well.

COMMISSIONER MULLOY: I wanted to follow up on this point, and I agree with all of you. I think you all talk about we need to set some kind of a comprehensive national energy policy and that will incentivize, as Commissioner Slane pointed out, a lot of other things to follow. Just like President Kennedy talked about put a man on the moon in ten years, the government didn't do that; they incentivized. They set a goal and then a lot of private companies found ways to contribute to making that possible, developed a lot of new technology.

My worry is that even if we set a goal like that, and we start incentivizing things, that we're going to import so much of the stuff that we're going to use to make these new renewable energies, that the jobs aren't going to be here; they're going to be in Asia.

So I'm wondering, do you want to comment on that, Mr. Swezey?

MR. SWEZEY: Sure.

COMMISSIONER MULLOY: And then if other people want to comment. That's my worry because I see the Chinese have strategies,

and we don't have one comprehensively thinking about how to do this.

MR. SWEZEY: Yes, Commissioner, thank you for the question.

You know, I'm worried about that, too. That gets back to the point of having an explicit manufacturing agenda for the United States so we can not only encourage demand for imported technology but encourage supply for technology that's manufactured here.

One study I'd like to point to, a 2004 study by the Renewable Energy Policy Project, found that for every one gigawatt of wind turbines installed, 70 percent of the jobs associated with that were in design and manufacturing, higher up in the value chain, while only about 30 percent of those jobs were in installation and maintenance.

So the idea that we're going to create millions of green jobs, which our politicians have continually promised us, by retrofitting some buildings and installing some solar panels is, I think, a fantasy, in my view.

The way that we're going to create these jobs is by developing competitive, domestic high-tech manufacturing industries, and one of the biggest problems is that we don't see it like that.

I think that there's this tendency to see manufacturing as something that we can afford to let go abroad; that we can continue to be a competitive national economy by relying solely on services. I think that we all saw where that got us with the financial crisis, and, more to the point, with high-tech manufacturing, we're not talking about manufacturing textiles. We're not talking about cheap plastic toys.

We're talking about very capital intensive high-tech products that create a lot of spinoffs and have a lot of different innovative components imbedded within those products, and when that moves overseas, and research and development facilities follow those overseas, then what we may start to see, and what I'm worried about us seeing, is that the next iteration of that technology is developed overseas, and that that industry begins to thrive abroad and not in the United States.

And that means that the majority of jobs are going to be associated with those technologies will be abroad.

MR. ZINDLER: I had one other comment. One thing I would also say, though, I wouldn't, just to put a finer point on that, or maybe differ ever so slightly on this, is that, you know, I think, well, two things. Driving down the cost of, levelized cost of energy from clean sources is a global good. Let's start with that assumption, and the quicker we drive down those costs, the more quickly it will get deployed, and the more quickly it will get deployed, the more jobs we can create in doing installations.

And while in wind, and we've done, I confess we've done very little looking at jobs because frankly most of our clients are investors that are just much more interested in making money than they are in creating jobs, per se.

But if you look at solar, about half the jobs per megawatt are common installation, and these aren't bad jobs. You know, these are good blue collar jobs. Installing things on roofs--I sometimes worry that we turn our nose up so much at the sort of end game of installation, and, the faster--look, the Chinese have made massive inroads in the California market, and as a result they're driving down the cost per watt of solar in California, and as a result, we're going to see quicker uptake of solar in California, and, as a result, there's going to be more jobs created putting those systems on people's roofs.

So I don't think we should overlook some of the short-term benefits. The sooner we get costs down, the faster we can have deployment, and if China plays a role in that, I don't think we should necessarily try and stop it.

MR. WONG: In my conversations with multinational companies who have entered the Chinese market and made foreign direct investments, whether it's--in most cases, it's setting up R&D centers. In some cases, also, it's manufacturing plants to sell into the domestic market. The reason for them knocking on China's door is consistently clear: it's that that's where the future of the sector appears to be going in today's world.

So I am confident that if the United States is able to articulate a clear policy, a clear national policy, a clear strategy, that these multinational companies will bring investments and operations back to the United States, and, you know, I think there are just--there's a lot of literature that really points compellingly to the value of locating various parts of the value chain in a cluster because there are synergies, and you want to be close to market.

Geography really matters because you can imagine for a variety of reasons, and one simple reason is there comes a point where transporting and hauling a 1.5 megawatt turbine across the ocean is just not going to be economic. So those are logistical issues for one.

But, secondly, there's also something to be said for being close to your customer, and that's exactly why Applied Materials invested and opened its R&D center in China because that's where its customers were. It's selling its capital equipment to Chinese manufacturers, and it's the interaction between customer and the production that provides the value added for the customers, and the customers like that.

So, I think you create the market and create the long-term vision, and the investments and subsequently the jobs should follow.

COMMISSIONER MULLOY: Thank you.

MR. SWEZEY: Can I just add one other point? I agree with Ethan. I mean I don't think that we should be downplaying the importance of jobs in installation and retrofitting buildings and those kinds of things. We don't see those as the kinds of long-term jobs that are going to be driving sustained employment in this industry.

Those are the manufacturing jobs, and this is also the importance of this idea of first mover advantage. If these governments are creating these clusters that are creating these synergies, economies of scale, learning by doing, and market experience for these technologies ahead of the United States, that provides a much greater incentive for future companies to locate there. Even if some companies die and some companies move out of the area, that area is still a thriving hot bed of economic activity.

That's really the importance of the next five to ten years, in my view, which is I think something that we're not looking at carefully enough.

COMMISSIONER MULLOY: Thank you very much.

HEARING CO-CHAIR BROOKES: Thank you.

Vice Chair Bartholomew.

VICE CHAIRMAN BARTHOLOMEW: Thank you very much and, thank you, gentlemen. This is all very interesting, and you've been great at helping to paint the picture and put forward some solutions.

I feel like there are two aspects of these issues. It's like a Venn diagram. There's the clean energy, and then there's the U.S. economy, and there's an overlap between those things, and obviously different people position themselves differently.

What I find particularly interesting in this discussion, Mr. Swezey, you mentioned China's subsidies, but we haven't really had a discussion of this. Everybody has focused on something else, and I guess one of the things I'm particularly concerned about is we will never be able to match the level of financing that the Chinese government throws at the industries that it decides are important to its economic future, and it has decided that clean energy is important to its economic future.

The anomalies of some of the response to the banking crisis aside, Mr. Zindler, the U.S. government cannot direct banks to lend billions of dollars to energy companies. So one of the questions that I have is, I know you all are not trade experts, but one of the questions I have is as we look at the way that China has built its sector, is it competing fairly? Is it competing with subsidies and things that are not part of acceptable behavior in the global trading system?

Because I think Chairman Slane put it really well at the beginning: Ohio companies aren't competing with Chinese companies; they're competing with the Chinese government.

MR. ZINDLER: Well, I as a researcher, as an industry analyst, I'm going to take a complete pass on what's fair and what isn't fair in the global economy. I just don't think that's my place to make value judgments on that. My fellow panelists may feel comfortable in doing that.

But I do think your point is very well-taken, which is that they are in China taking advantage of a tremendous amount of available liquidity to provide very low cost capital for expansion of these companies. And you're exactly right--it's hard for me to see how in the democracy that we have that the U.S. government can make exactly the same kind of move necessarily.

I will say this, though, I still think, and I think to Chairman Slane's point earlier, and his other point, is that when there is market demand, the banks do get motivated and do make loans.

I mean you look at two or three years ago, the wind industry was growing quite rapidly, and even without the existence of this grant program, which has been put in place in the stimulus, just based on the production tax credit, which is the primary federal stimulus, there were banks getting into making these kinds of so-called tax equity investments, and, you know, in states where there are renewable portfolio standards, and there are about 30 of them, that are driving demand, financing will come along.

Essentially, if the private banks think they can get a good return and make a decent loan on a project that's going to earn a good return, they'll do it, and I do think that sort of a top down market signal that creates demand could help solve a lot of these problems.

But to your basic point, is the U.S. government going to shell out--what was it--about $20 billion just the way the China Development Bank is not tomorrow. Maybe this green bank that's being talked about could put some money in, but nothing on that scale. It would be hard for me to imagine that.

VICE CHAIRMAN BARTHOLOMEW: Mr. Wong.

MR. WONG: Sure. Yes. As I acknowledged, it is going to be impossible really for our financial system and our banks to mobilize capital in the way the Chinese are doing, but I think, to Ethan's point, there are certainly a lot more things that we could be doing in terms of mobilizing capital right here in the United States, and, quite frankly, if you look at any new industry, not just clean energy, but any upcoming nascent industry, banks are going to be reluctant to invest when they don't see a long-term stable market for the development and

deployment of that technology.

And right now, and just talking to folks in the business community and finance community, that's the biggest opposition. With a long-term federal policy and state policies to support that, it reduces the risk for these lenders, and ultimately that's what they're doing. They're evaluating the risk of a non-repayment of their loans, and the way to reduce that risk and increase their confidence that the loans will be repaid is for them to understand and appreciate that there is going to be a long-term future for these technologies.

On the question of whether--I go into it a little bit in my written testimony about some of the specific policies in China in promoting "indigenous innovation," as we call it, and I will acknowledge that many of the claims and many of the complaints that the international business community has about market access into China and protectionism are very valid, and it is an issue of high importance, not only for the business community but really for the country as a whole because, you know, American businesses and the health of the U.S. economy is partially dependent on a healthy export economy.

However, I think, that there are two things that I would say to that briefly here, is that the importance of continued engagement on a government-to-government basis with the Chinese is going to be both important but also has shown progress over the past, just past year, year-and-a-half.

At the Strategic and Economic Dialogue and also the JCCT, which is the Joint Commission on Commerce and Trade, this was a high priority at negotiations between the U.S. government and the Chinese government in terms of specific market access provisions for the clean energy sector and also the potentially discriminatory government procurement policies in China.

But what the Chinese have shown is a good faith willingness to listen and they have revised some of those specific guidelines and policies and dropped some domestic content requirements.

Obviously, that's not going to resolve all the issues, and there are many other measures that the Chinese still have in place that really protect its industry, but it's important not to downplay the importance of diplomacy.

And, secondly, I would say that despite China's big push in investments in clean energy technology, you know, these are still early innings, and there's a lot of technologies and a lot of potential for future research and development that China hasn't tapped, and I outline some studies that point to this fact and also point to the fact that China is open to foreign direct investment in sectors where it doesn't have the capacity or competence.

And we see that--Applied Materials, I just talked about--they have the best capital equipment for manufacturing solar technology, and that's why Applied Materials is relatively successful in China.

Yingli Solar, for example, uses Applied Materials equipment, and another solar company that I visited in April used all Applied Materials equipment and all foreign-made equipment and nothing domestic.

First Solar, we saw--which we will hear from later on, I believe--they have the world's best thin-film technologies, and China doesn't have that, and so they are welcoming of their investment. There are some questions of, you know, since the announcement, there has been a bit of a stall in negotiations on market penetration, on actually breaking ground, but I think it did catch people by surprise when it was first announced that a relatively young solar company from the United States was able to penetrate the Chinese market.

eSolar is another example in this concentrated solar thermal space. So there are examples where--and actually as I document in my written testimony, there are more than a number of examples of different technologies where China's going to be welcoming of foreign direct investment. It's revising its foreign direct investment guidelines to promote foreign direct investment in these sectors such as clean energy and other high tech sectors which it doesn't have the competence.

So I think the picture is a little more nuanced, but it doesn't eliminate your concerns that it's going to be hard to compete. The importance I guess at the end of the day is that we need to make best do of the circumstances, and part of it is developing a strategy here at home.

VICE CHAIRMAN BARTHOLOMEW: Mr. Swezey.

MR. SWEZEY: So on your first point about the WTO, I think that the actions, particularly the procurement policies that have essentially shut out foreign firms from participating in those projects, are clearly inconsistent with what we would expect from our other trade partners.

I'm not a trade expert, but I believe that China has not signed on to the WTO Procurement Agreement, which is one of the reasons why they're able to or they say they're able to do this.

I think that we certainly need a much more vigorous effort on the part of the United States government to challenge those kinds of policies that, you know, many see as overtly protectionist and shutting off market opportunities.

The question of investment is a really important question. I think that in this era of fiscal constraint in Washington, D.C., the first

thing I would say is that it's important to distinguish between government spending, some of which is very wasteful, and government investment in things like new technologies and new industries that we believe are going to propel this economy into the future.

That said, there is clearly a need for sources of revenue to make some of these critical investments, and that's where the Breakthrough Institute has long proposed using any kind of cap and trade or carbon pricing scheme to direct the large majority of that revenue to clean energy technology.

Unfortunately, the bills that we have today in Congress don't do that. The House bill would only invest about 12 percent of the revenues over the first ten years of the program into clean energy.

We need a lot more money than that. I mean we're not going to compete with these other countries in this space. It's not going to happen on the cheap. And we need to find ways to use public finance to leverage private capital into these markets. Other sources of revenue could be sunsetting existing subsidies for fossil fuels or using federal revenues from oil and gas exploration.

There are places that we can look to for sources of revenue, but I think what's required first is understanding that we need a clean energy investment agenda in the United States, not just a carbon pricing agenda that assumes that the private sector on its own will be able to accomplish this task.

The one last thing I would say on that is that it's really in the face of the entire history of technology development in the United States that people assume that if we put a price on carbon, that the private market will be able to accomplish this on its own. The public sector has always taken a primary critical role in helping to develop new technology industries and enabling further private sector investment, from IT to pharmaceuticals to other industries.

One of the things that we like to say at the Breakthrough Institute is that the government did not create the digital revolution by putting a cap and trade system on typewriters. And, again, we're not going to create the clean energy revolution by putting a price on carbon, particularly one that's politically constrained and would be too low to have a major effect.

VICE CHAIRMAN BARTHOLOMEW: Thank you.

MR. ZINDLER: If I could just for one second revisit the question--for one moment--and still ducking on whether or not what's fair and what's not fair, I would just say that one thing that does concern me about focusing too much on what China does or isn't doing is that you risk shifting the attention away from what the U.S. could and should be doing itself.

There are certain factors here having to do obviously with the macroeconomic picture and the availability of capital in China that are simply way beyond the scope of the clean energy sector, and there's also the basic fact of globalization, and I know that someone will be speaking here from First Solar this afternoon.

The so-called "U.S." solar companies, if you ask them where their most recent manufacturing capacity is being added, it is not in the United States. It is in China. It's actually mostly in Southeast Asia, Malaysia.

So the reality of it is, is that there are certain fundamentals about the global economy that are defining this sector, and I do--my only sort of concern about focusing too much about what China is or isn't doing is that the U.S. might take their eye of the ball about what could and should be done policy wise here in the United States.

VICE CHAIRMAN BARTHOLOMEW: Yes. Mr. Zindler, I for sure don't believe that the U.S. government should abdicate its responsibility for the policy challenges here, but what we've seen over the course of the past 20 years is that the way the Chinese government goes about developing sectors of its economy, and this is only the most recent, is by throwing everything that it has at it, and there are situations that no matter what the U.S. government did, we would be unable to break open some of these sectors and opportunities for American jobs and American manufacturing if we don't address how China is skewing the entire process.

MR. ZINDLER: Fair enough.

HEARING CO-CHAIR BROOKES: Thank you.

Commissioner Blumenthal.

COMMISSIONER BLUMENTHAL: Yes. Thank you all very much.

I have two factual questions, and then an observation I'd like all of you to respond to. The first question is the premise, the basic premise, about a clean tech race. So if there isn't demand in the United States, and I'm guessing there isn't great demand in China, is there really a race?

So to answer that question, I would like you to just give me the facts on what percentage today does China use in its energy mix in terms of meeting its demand for energy? What percentage is wind, solar, biomass, versus hydrocarbons, coal, and natural gas and traditional forms? And what do you project that mix to be in the next five to ten years? That's the first question.

China is a very big coal country, and also hydrocarbon and petroleum imports seem to be only growing.

The second question is for Mr. Zindler. In terms of creating

demand in the United States, if you could play that out for me a little bit more, who would pay the transition costs and the costs of creating demand, which--and all of you can answer this--which sectors would you pick for investment as potential winners in the so-called "clean tech race"?

How could you assure taxpayers that those investments would actually pay off and that policies to create demand would work? How would you convince sectors and businesses that don't get the investments, how would you tell them why they wouldn't get those investments? And what would be the cost to the American taxpayer from a creation of demand and transition from traditional uses of coal and natural gas to clean tech?

And third, I have an observation: China is cornering the market on various materials and is not going to sign up to any carbon reduction. So here is me just putting a puzzle together. If China can corner the market on rare earth and basically have a natural competitive advantage--well, artificial, in the building of wind and other types of technology, others sign up to carbon reductions, and therefore become more dependent upon the importation of wind and other types of technologies, while China continues its carbon-based energy, I can see how this is very attractive for China, very unattractive for the rest of the world, the United States, in particular.

MR. ZINDLER: A lot of questions.

COMMISSIONER BLUMENTHAL: Take whichever.

MR. ZINDLER: First, I don't know the exact percentage of overall generation in China that's from renewable. It's got to be well below five percent is my best estimate.

Second, our projections in terms of new wind capacity, last year, as I mentioned--I've got the numbers in front of me--China went from 1.3 gigawatts installed in 2006 to 14 gigawatts last year. We're projecting 18 this year but not rising actually a whole lot higher than say 25.

COMMISSIONER BLUMENTHAL: How about on the demand side?

MR. ZINDLER: Well, that's sort of our equivalent for demand. That's what they're going to put up, and, as was discussed, there is probably--there's a bit of a lag time--it seems at any given time, only about three-quarters of that is actually grid connected.

But it does catch up. So they take six months to connect it, so assuming it all eventually gets connected, maybe not the moment it comes on line we're looking at potentially--our buyer estimate--I'm looking at somewhere in the neighborhood of about 20 gigawatts per year, 2012, 2013.

COMMISSIONER BLUMENTHAL: And so with--

MR. ZINDLER: By contrast, U.S. installed ten last year, which was the all time high.

COMMISSIONER BLUMENTHAL: Yes. So what percentage then of the total energy supply--

MR. ZINDLER: Still that would keep them well below five percent.

COMMISSIONER BLUMENTHAL: Five percent. Okay.

MR. ZINDLER: Just to be clear.

COMMISSIONER BLUMENTHAL: So 95 percent projected outward would still come from traditional sources of energy?

MR. ZINDLER: Yes. That's my best estimate off the top of my head.

Second, on the much more nuanced question about who pays the cost of transition, it's a very good question. The reality of it is this stuff isn't free, and, I guess as Devon has mentioned, there is every quarter we look at the levelized cost of energy generation between renewables versus coal, natural gas, and you're talking maybe two times the cost for wind and three maybe for offshore. There's a gap. No question about it, and someone has to pay the tab, right.

And how does that get paid? If you put a national target in place, inevitably, one of the things that could emerge is a national renewable energy credit trading system that utilities would have to use to comply, and eventually, again, that cost would have to get passed on to someone. It is the reality that the costs will eventually come down to consumers.

COMMISSIONER BLUMENTHAL: Yes.

MR. ZINDLER: Those are costs that will get passed along.

COMMISSIONER BLUMENTHAL: Roughly how much are we talking about in terms of numbers--how much would it cost over a ten-year period to make, through various policy mechanisms, to make that transition?

Are we talking trillions?

MR. ZINDLER: To make which transitions?

COMMISSIONER BLUMENTHAL: Transition, well, first, to create a market demand, as you mentioned, to create the market demand that doesn't exist today, and the second is to try to transition off of coal, and just the electricity sector just in particular?

MR. ZINDLER: That's a little bit of a hard question for me to answer. We've looked at different scenarios, and I can get back to you about that.

COMMISSIONER BLUMENTHAL: Yes, that would be great.

MR. ZINDLER: If the U.S. wants to hit Waxman-Markey

targets, for instance, how much that's going to cost. I'm happy to--

COMMISSIONER BLUMENTHAL: That would be great. Yes, thanks.

MR. ZINDLER: --find out for you, to give you an exact answer. But your point is well-taken. This isn't free, and, if we determine--however, if we determine that it is in the national interests and, frankly, in the global interests to address the issues of economic development, climate change and energy security--

COMMISSIONER BLUMENTHAL: Sure.

MR. ZINDLER: --then it will cost, and I would argue that it's most likely it would cost, a personal view, aside from Bloomberg Energy Finances, it's a cost worth paying.

COMMISSIONER BLUMENTHAL: Right.

MR. ZINDLER: U.S. compared to Europe pays exceedingly low amounts for electricity on a consumer basis. So, I think that there is a cost. I think from the political leadership, do we hear a lot about those costs?

COMMISSIONER BLUMENTHAL: Right.

MR. ZINDLER: No. Do we hear a lot about the wonderful promise of technology?

COMMISSIONER BLUMENTHAL: Yes.

MR. ZINDLER: Yes. But, and could the political rhetoric sometimes be a little bit more realistic? Probably.

[Laughter.]

MR. ZINDLER: But, you know--

COMMISSIONER BLUMENTHAL: Probably not.

[Laughter.]

MR. ZINDLER: But should it be? Probably.

COMMISSIONER BLUMENTHAL: But it would be great if you can get some of those scenarios to us.

MR. ZINDLER: Yes.

COMMISSIONER BLUMENTHAL: And I certainly agree with the premise that sometimes a country has to pay for things that matter, but it would be good to get some numbers out there to the consumer.

MR. ZINDLER: One last really quick point, which is that I will say this, which is that right now we are beholden to fluctuating prices for fossil fuels in terms of the cost of electricity and for fuel, and the one thing about renewables is that it does largely eliminate that; right.

You put the cost--it's all sunk costs. Once you build your wind project and once you build your solar project, you've spent the money. It may be expensive, but you have now eliminated price variability going forward, and that's something that has a real value for consumers of electricity or for fuel, and I don't think that should necessarily be

diminished.

That is a cost savings potentially because people spend millions of dollars hedging fluctuations in natural gas, oil, electricity prices.

COMMISSIONER BLUMENTHAL: Yes. I guess we're running out of time, but do you agree with the projection that, say, five, ten years from now, China will meet its energy needs, five percent of its energy needs will be met by new renewable sources of energy?

MR. WONG: I think it depends on the definition of clean energy and new energy.

COMMISSIONER BLUMENTHAL: Well, I guess hydrocarbons, coal, petroleum, versus wind, solar?

MR. WONG: See, the one thing that China has a lot of is hydropower. And, in fact, hydropower accounts for eight to nine percent of its overall energy use. A lot of this is large hydropower, which is not necessarily the most ecologically friendly sort of installations.

But talking purely about carbon, then it is low carbon energy, but a lot of side effects. The latest statistic that I remember seeing about 2009, just looking at electricity, not other forms of power, is that some 16 or 17 percent comes from non-coal sources of energy so large hydropower, small hydropower, nuclear, wind, tiny bit of biomass, and solar.

And I guess one other statistic to target, to bear in mind, is by 2020, is the country's goal to hit 15 percent of its overall energy mix with non-fossil fuel sources of energy so it includes nuclear, includes large hydro. So that's the big picture goal of what the China--

MR. SWEZEY: Can I just make a brief comment about this? I think this is really important--the discussion about cost--and really this underscores the urgent priority to make clean energy cheap in real unsubsidized terms through radical innovation.

The IEA, the International Energy Agency, projects that by 2030, the amount of investment needed to radically change the energy infrastructure, to put us on a path globally to reach 450 parts per million in the atmosphere, is $10.5 trillion. This is a lot of money. This is not going to happen cheaply. And it will happen more cheaply if we actually innovate and develop the technologies and bring them down in cost in order to meet that goal.

I think that really urgently underscores the point that we need, a clean energy innovation policy to help make these technologies cheaper in real unsubsidized terms.

COMMISSIONER BLUMENTHAL: Thank you.

HEARING CO-CHAIR BROOKES: All right. Thank you.

Let's start a second round. We have a few more minutes left.

Commissioner Wessel.

COMMISSIONER WESSEL: Thank you, gentlemen, and I have probably an hour's or two worth of questions. But I will make it very short.

A couple of questions, if I can. Mr. Wong, I appreciate your comments about S&ED, et cetera, and this Commission has been in existence roughly nine, almost ten years. This is the tenth anniversary of WTO accession, as you know. The vote is this October.

The Chinese, as you pointed out, have a great willingness to listen, but they don't have a great willingness to do much about the issues we raise. And we have a great willingness to talk and engage, but the results have not been terribly evident for the American people in terms of rising trade deficits, lost jobs, lost opportunities.

Mr. Zindler, you talk about markets and investors. China is a non-market economy. They don't operate by standard economic rules. So when we look at all the discussion that we've had today about the cost of energy, the cost of doing all of this, how do your investors look at this?

We had a Commission meeting two weeks ago with the SEC where we got into a discussion on materiality. Are the activities of our manufacturers who are going to China based on performance requirements, based on subsidies they're getting, et cetera, are those material events? Should we as a nation, as we look at our corporate governance statutes, be looking at how our companies do business and, in fact, what the balance of benefits here?

People of Ohio are interested. They want great things for China. They want great things for Ohio. They want to know that the jobs that come are not just from installation--and those are great jobs. The installation and maintenance jobs are great. They also want to have the manufacturing jobs that create the R&D and the pull through long term.

What are we going to do about this? How should we try and get our business community to understand it's not just where the shortest term profit is, but it's about putting American taxpayer dollars to work employing Americans within the bounds of trade? China is not a member of the Government Procurement Agreement. There's no balance of benefits here.

MR. ZINDLER: Just clarifying that question, are you saying that there is discussion about making it a required disclosure that U.S. publicly-traded companies disclose all of their activities in China? I just want to make sure I understand the question.

COMMISSIONER WESSEL: Not any material event. You know we had the tire case here last year--the Ohioans know it well. $1.7

billion of restrictions were placed on Chinese tires coming here. So U.S. companies that went to China gained subsidies,--those who are sending back--Cooper Tire, for example, had agreed to 100 percent export requirements.

If I'm an investor in Cooper Tire, they accept these subsidies to go to China, and then they have to export everything else, but risk a U.S. sanction. To me, that's a material event. Their stock took a hit. Now the stock is going up because they're reinvesting in America, but initially a countervailing duty case, a dumping case. Aren't your investors worried about what the impact of rising concerns about China's activities in U.S. companies vis-à-vis that? Isn't that material?

MR. ZINDLER: It's a very good question, and I honestly have to say it's the first time I've really thought about it. I'm not sure I can give you a really comprehensive answer about it, but I think it is--look, I work for Bloomberg. Our main job in life is to provide transparency wherever we can find it.

COMMISSIONER WESSEL: Right.

MR. ZINDLER: So I guess my general view is we would like as much transparency on any activity on any company worldwide, and I'm generally supportive of more disclosure rather than less.

COMMISSIONER WESSEL: So I assume you sit in on investor calls, that kind of thing. So when GE has an investor call focused on your area of expertise--do you ask them how much are you investing in China? Are you able to export one wind turbine from the U.S. to China? Or have they told you if you want to sell here, you have to produce here? That they're moving R&D? Isn't that a material issue that an investor would want to know?

They may decide the Chinese market is so great and provides so many opportunities that that investment is a good investment, but some may decide that the risk of that investment based on all that's happening in the world economy is great.

MR. ZINDLER: Well, first, unfortunately, the GE example, we get very little transparency about their wind division. Because it's a massive company, their wind turbine business is--

COMMISSIONER WESSEL: Have you asked a question when you were on the investor calls about it?

MR. ZINDLER: No, I haven't, but I'll certainly be willing to do so. I'm curious. We do have a team in a China that I know is tracking what GE is just doing over there on the ground. So we have some intelligence on that, that specifically. But, no, I think it's an important--there's some regulatory, essentially some regulatory risk, I guess, that the investors face when these companies do business in China.

On the flip side, there's some concern, looking back this direction, there are some publicly-traded Chinese wind turbine makers, and there is some concern that the U.S. may put up some trade barriers or some other kind of policy to make life more difficult for them to enter the U.S. market as well.

So it goes both ways, Generally speaking, my view is more transparency is better than less in almost any case.

COMMISSIONER WESSEL: Okay.

HEARING CO-CHAIR BROOKES: Thank you.

Commissioner Slane, do you have a second question?

CHAIRMAN SLANE: Yes, thank you.

First, I'd like to acknowledge, Mr. Zindler, your point that we really can't be blaming China. And I agree with that, and, you know, I have met the enemy, and it's not China. So I think you've made a good point there.

One of the things that worries me is that going back to China now is that their strategy when I look at their steel industry and their chemical industry and their electronics industry and their pharmaceutical industry, and the list goes on, they intentionally overbuild state-of-the-art manufacturing facilities to develop an overcapacity in the global economy.

And one of the things that worries me is that this leads to a form of quasi-dumping, and it's another nail in the coffin of U.S. manufacturers. Is this something that you worry about here that may develop in the future?

MR. ZINDLER: Well, that's a very interesting question. I realize I'm hogging the mike here so that these guys can answer that in a second. To me it's fascinating to look at the difference in the way that the Chinese solar market has developed compared to the Chinese wind market.

The Chinese wind market last year, three of the top ten wind manufacturers in the world were Chinese companies, but they were supplying all their turbines to Chinese projects.

Meanwhile, I don't know what the number is, five or six of the top ten solar module makers out of the world's module makers for solar are Chinese, but they're exporting entirely. So there's very two different templates here that have gone on, and, essentially, on the solar side of things, they nailed the timing just right.

A number of these companies actually attracted investment from the Goldman Sachs of the world, Western investors, private equity, and then they IPOed two or three years ago when the markets were hot. And now they've scaled up, and they have proven themselves on the global market, and they're exporting in a big way.

On the opposite side of things, wind turbine makers have been essentially learning their craft and practicing it in the domestic market and building this 14 gigawatts, not all of which is connected, with an eye towards eventually exporting.

Now, is this strategy towards dumping? I don't know enough about what the minds of the strategy is of the public policymakers. I will say this, which is that last year, at a moment when solar market was at acute oversupply, in part because of massive ramp-up in China, China put in place a temporary stimulus program--I think it's called the Golden Sun Stimulus--essentially to create more domestic demand to soak up some of that excess supply.

So if you are thinking that they're essentially trying to drive down the price so much that they create dumping, I'm not quite sure why they would then go to that step to create a domestic program to buy off the excess supply that they themselves were creating.

So, anyway, that's a bit of background. I don't know if it's entirely in answer to your question. I don't know the motives here, but the general point that they're driving costs down in the global market, absolutely, no question about that.

Whether that amounts to a strategy to try and take a larger share of the market or rather that equates to dumping, I'm not sure.

MR. WONG: I too am unable to comment specifically on whether it's a dumping strategy or not. Overcapacity is an issue. The top planners recognize it, and in a major policy speech by--who will probably be the next premier of China--Li Keqiang, in February, he outlined a very comprehensive vision for economic reform in the next five, ten years or so, for China.

Overcapacity of infrastructure and industry was one of the problems, one of the imbalances that he highlighted, and so it's not just necessarily hurting its trade partners like the U.S. in terms of the implied dumping issue, but it is hurting their own economy in terms of wasteful investments.

And part of the strategy to correct that or at least attempt to correct that is to keep the new high-tech infrastructure that has been built out and to shut down and eliminate some of the older backward infrastructure so that in the long run, that's good too in terms of their efficiency because the average efficiency basically over time increases because it's gotten rid of the backward capacity.

It doesn't directly answer your question, but my main point is that the Chinese planners are aware of that, and it is a problem internally as well.

CHAIRMAN SLANE: Thank you very much.

HEARING CO-CHAIR BROOKES: Commissioner Shea.

COMMISSIONER SHEA: Thank you.

I just want to join everyone in complimenting our witnesses. You are three very intelligent young men, and I can say that as a middle-aged guy. You really are.

MR. ZINDLER: And let me say thank you for calling me "young."

COMMISSIONER SHEA: You're welcome.

So far we've mostly or overwhelmingly talked about, and rightfully so, jobs and the economy. I think Mr. Swezey briefly touched on another issue, which is climate change, when he talked about decarbonizing our energy sources.

I just want to get back to this issue that Commissioner Blumenthal raised about energy mix, and roughly speaking, as I understand it, today, China gets about 70 or 80 percent of its total energy consumption from fossil fuels, somewhere in that general category; nine percent from hydro; some nuclear; and a very small amount of non-hydro renewable, solar, wind, biomass.

And from your paper, Mr. Zindler--and China has also put in place this goal of getting 15 percent of its energy from renewables, and I assume that includes hydro--

MR. WONG: Includes nuclear as well. Non-fossil.

COMMISSIONER SHEA: Non-fossil. By 2020. So let's get back to climate change. Let's look at 2020. Even if they achieve this 15 percent renewable energy goal, the economy will probably be twice the size or substantially larger than it is today. So the total energy pie will increase.

Even if you reduce the current consumption of fossil fuels from its current levels, it won't be a substantial reduction, and you'll have a larger total energy pot. I guess the question is “are you optimistic?” Is the glass half full or half empty in terms of climate change with the reality of China's energy mix in 2020?

MR. SWEZEY: That's a really great question. I actually just read a New York Times article the other day by Keith Bradsher about how the energy demands of China's growing consumer class are completely swamping the efficiency gains that they're expecting, particularly as reflected in the baseline scenario of the IEA about China's energy intensity declines. It's proving to be very optimistic.

I think that I am a glass half full guy if we actually make a concerted effort to understand the energy technology challenge that we have before us. There is not enough emphasis on the global challenge to reduce carbon emissions and what that actually looks like.

There's not enough political reality injected into the debate about the fact that China will never impose a high carbon price. They will

never sacrifice economic growth in favor of climate change. Environment, climate change is a serious concern for China, but energy security is a greater concern. And pulling people out of poverty is a greater concern, and perhaps Julian can speak better about this.

But this underscores for me the need for us to actually have the technologies available, and I'm not just saying technologies that don't exist today, but technologies that are available at low cost to make this transition.

So I'm optimistic that if we actually invest in these technologies and understand that this requires radical innovation to get there and major investments in research and development, new scientists and engineers, manufacturing scale-up, everything that goes into that, I think we can get there.

But right now the discourse is so focused on targets and time tables without an understanding of the technological reality that underlies the transition of our energy system.

COMMISSIONER SHEA: Thank you.

HEARING CO-CHAIR BROOKES: I think with that, we're going to have to suspend. We'll just have closing remarks if there's anything.

VICE CHAIRMAN BARTHOLOMEW: Two things--I do actually. Mr. Zindler, one thing I think you should consider in trying to understand what China might have done on overcapacity on solar cells is one of the things that the government there does is keep people employed, and that very well might have been the explanation, and because they have a centrally controlled economy, they have the ability to do things that we don't have, and I wish and I hope that it becomes a higher priority for the American government keeping people employed needs to be part of the solution.

I also want to acknowledge that Senator Sherrod Brown's representative, Beth Thames, has joined us in the audience today. Thanks very much.

And we're going to break for 15 minutes. Thank you, gentlemen. It was really interesting. We look forward to having continuing conversations with you about all of these issues. Thanks.

MR. ZINDLER: Thank you very much.

MR. WONG: Thanks.

[Whereupon, a short recess was taken.]

PANEL II: OHIO'S RESPOSE TO THE CHALLENGES

VICE CHAIRMAN BARTHOLOMEW: Shall we go ahead and get started? We're actually running a little bit early for a change instead of a little bit late.

HEARING CO-CHAIR BROOKES: I run a tight ship.

VICE CHAIRMAN BARTHOLOMEW: You run a tight ship; right. That's a Navy man talking.

I'm really pleased to welcome our second panel today. The first panel really helped set the stage on the bigger picture question, and the second panel here is really why we've come to Ohio. The second and third panels will both be focused on some of the Ohio aspects of the challenge.

So our second panel is on "Ohio's Response to the Challenges from China," and I'm really pleased to be able to introduce Ms. Megan Reichert-Kral, who is the Director of the Clean and Alternative Energy Incubator here at the University of Toledo. She has recently returned, I understand, from a trip to China. I'm not sure how recently.

MS. REICHERT-KRAL: I got back two weeks ago.

VICE CHAIRMAN BARTHOLOMEW: Two weeks ago. So you've already readjusted time wise and everything. We really look forward to hearing some of your observations and talking about some of these issues.

Mr. David McCall, who is the District 1 Director of the United Steelworkers Union, based in Columbus, Ohio, home of our Chairman, Dan Slane; and Mr. Ty Haines, who is the Vice President for Manufacturing Services at WIRE-Net, of Cleveland, Ohio. We really look forward to all of it.

Ms. Reichert-Kral, let's start with you.

STATEMENT OF MS. MEGAN REICHERT-KRAL, DIRECTOR CLEAN & ALTERNATIVE ENERGY INCUBATOR, UNIVERSITY OF TOLEDO, TOLEDO, OHIO

MS. REICHERT-KRAL: Vice Chairman Bartholomew, Commissioner Brookes, and the rest of the Commission, welcome to Toledo, and thank you for inviting me to engage with you on this important topic.

For the last four years, I have had the pleasure of working with companies in this dynamic emerging green energy market. I've watched this young industry grow from frequently being viewed as a tiny market niche to an industry that the region, state and national economies are hoping and praying will bring much needed

revitalization to the manufacturing sector here in the U.S.

The University of Toledo, in partnership with several local entrepreneurs, has a long history, going back to the mid-'80s, in the renewable energy field, specifically in thin-film photovoltaics. The university invested in faculty positions and labs and worked closely with local entrepreneurs, Harold McMaster and Norm Nitschke, and developed thin-film technology that is marketable that drives the solar panel manufacturing strengths in our region today.

While many people focus on the fact that China has captured so much of the solar cell market, they may fail to realize that where we sit today is within 100 miles of roughly 60 percent of the solar panels that are manufactured within the USA.

These thin-film panels are produced by the powerhouses of First Solar in their Perrysburg, Ohio manufacturing facility and across the line in Michigan at Uni-Solar in Auburn Hills.

Both of these organizations' cost per watt is well below the $2 watt of silicon wafers. This impressive percentage does not take into account the young solar panel manufacturers that have been developing in the northwest Ohio region--Xunlight, Calyxo, Willard & Kelsey Solar Group. All of these new companies are also thin-film photovoltaic manufacturers.

Northwest Ohio and the University of Toledo, in particular, is a prime location for the continued research and development in the second generation of photovoltaics. In partnership with Bowling Green State University, we're also working on third-generation technologies that will shape the market in ten to 20 years.

We were able to capture a leading position in thin-film PV technology partly because of R&D funding available at the federal and state level. State funding allowed UT to purchase important equipment that allowed us to work with technology entrepreneurs moving laboratory scale technology and making it ready for full manufacturing.

Thin-film photovoltaics is approximately 15 percent of the solar cell market and it's growing in market share due to the affordability of the product. This technology capitalizes on the mass-production automotive skill set that the workers in the region have integrated with world-class research that continually improves the efficiency of these thin-film panels.

Our technology coupled with strong entrepreneurship, workforce and investment has slowly built into an industry cluster that has great growth potential. This industry cluster is diversifying, and with the assistance of local, state and national support, we are gaining in reputation internationally as one of the places to forward renewable

energy research and build that technology into viable businesses.

The state of Ohio continues to be instrumental in building this industry, and we were pleased that Governor Strickland designated our region as the Ohio Hub of Solar Energy Innovation. The state's Third Frontier Program, which was recently renewed by state of Ohio voters, provides much needed research and commercialization grants to universities and businesses that collaborate in moving the technology into the marketplace.

Our Wright Center for Photovoltaics Innovation and Commercialization at the University of Toledo is one such program, funded by the state's Third Frontier Project.

This program has provided the much needed investment and has furthered the development of the renewable energy cluster. In addition to R&D funding, the legislature in the state has passed Senate bill 221, the Renewable Portfolio Standard, that requires that 25 percent of Ohio's energy be supplied by renewable and advanced energy by 2025.

12.5 percent of the power may come from energy efficiency and advanced energy technologies, such as clean coal, advanced nuclear, and carbon sequestration, while the other 12.5 percent must come from renewable energy sources.

One unique feature of Ohio's RPS is that in the renewable section, there is a .5 percent solar carve out. This was done specifically to assist in the further development of the solar industry within the state.

In addition, 50 percent of the renewables from our RPS must be sited within the state, thus ensuring that our workers will have viable activity.

Although some people criticize Ohio for taking a little longer to pass an RPS, as the fifth largest user of energy in the country, thanks to our heavy industry base, it was important to ensure that the RPS in the state of Ohio was strategic in nature and benefitted the community.

Ohio's solar carve out requires installation of 825 megawatts of solar, making it one of the most aggressive in the country. In addition, there are annual benchmarks that require and encourage that the utilities make early investments in the new technologies.

In 2009, Ohio House bill 1 was signed into law. This allowed for the creation of Solar Energy Special Improvement Districts, SIDs, also known as Property Assessed Clean Energy. This allows communities to create a plan for financing the implementation of solar energy through property assessments.

The assessments must be approved by 100 percent of the property owners who are assessed, and those who do not sign authorization cannot be forced to pay. Thus, with the SID, a property owner can

spread the cost of a solar installation over a number of years, up to 25 years, by policy.

In June of this year, the state legislature passed, and the governor signed, Senate bill 232. This bill, through the end of next year, will exempt qualifying energy facilities from real and personal property taxation if special requirements are met.

In addition, a payment in lieu of taxes will be paid in the amount of $7,000 per megawatt of solar or six to $8,000 for projects using other renewable energy such as wind, clean coal or nuclear projects.

The requirements include county commission approval for the exemption of power over five megawatts. For larger projects, a service payment of up to $9,000 per megawatt may be negotiated by the county commissioners with developers.

Smaller projects, under 250 kilowatts, will be permanently exempt from tangible personal property tax and real property tax.

The state of Ohio has encouraged the development of solar, wind and fuel cell supply chains. Identifying these suppliers is a constant challenge, as so many of our existing firms are entering into the renewable energy market and new firms are forming all the time.

As the renewable energy market is so young, in many ways like the automotive industry at the start of the last century, I expect that we will see many more companies grow, technologies develop, and investment made to expand this industry and Ohio's impact on it.

According to many in the wind industry, Ohio is positioned to be one of the most competitive states due to our resident skilled workforce and the depth of knowledge that we have in metals and advanced materials.

I recently returned from a trade mission to China led by the Ohio Department of Development, and I saw evidence of how their government is making it a national priority to capture a lead position in solar energy and other renewable energy technologies.

The U.S. must not allow technology developed locally to build industries in other nations without some sort of benefit to the U.S.

Federal government must support continued research in renewable energies, particularly in the applied research area, and, in addition, it should support small firms who are developing the promising technology but lack the resources that a nation such as China is so ready to invest in their future.

Thank you.

[The statement follows:]

Prepared Statement of Ms. Megan Reichert-Kral, Director, Clean &

Alternative Energy Incubator, University of Toledo, Toledo, Ohio

Vice Chairman Bartholomew and Commissioner Brookes, thank you for inviting me to engage with you on this important topic. For the last four years, I have had the pleasure of working with companies in this dynamic, emerging green-technology market. I have watched this young industry grow from being frequently viewed as a tiny market niche to an industry that the region, state and national economies are hoping and praying will bring much needed revitalization to the manufacturing sector in the US.

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We were able to capture a leading position in thin-film PV technology partly because of R&D funding available at the federal and state level. State funding allowed UT to purchase important equipment that allowed us to work with technology entrepreneurs in moving laboratory scale technology to being ready for full manufacturing.

Thin-film photovoltaics, is approximately 15% of the solar cell market and it is growing in market-share due to the affordability of the product. This technology, capitalizes on the mass-production, automotive skill set of the workers in the region integrated with world class research that continually improves the efficiency of these thin-film panels. Our technology, coupled with strong entrepreurship, workforce and investment, has slowly built into an industry cluster that has great growth potential. This industry cluster is diversifying, and with the assistance of local, state, and national support, we are gaining in reputation internationally as one of “the” places to forward renewable energy research and build that technology into viable businesses.

The State of Ohio continues to be instrumental in building this industry and we were pleased that Governor Strickland designated our region as an Ohio Hub Solar Energy Innovation . The state’s Third Frontier Program, which was recently renewed by the State of Ohio voters, provides research and commercialization grants to universities and business that collaborate in moving technology into the marketplace. Our Wright Center for Photovoltaics Innovation and Commercialization is one such program funded by the state’s Third Frontier Project. This program has provided the much needed investment that has furthered the development of the renewable energy cluster. In addition to R&D funding, the legislature in the state legistature passed Senate Bill 221, the Renewable Portfolio Standard (RPS) that required that 25% of Ohio’s energy be supplied by renewable and advanced energy by 2025. 12.5% of the power may come from energy efficiency and advanced energy technologies like clean coal, advanced nuclear, and carbon sequestration; while the other 12.5% must come from renewable energy sources. One unique feature of Ohio’s RPS is that in the renewable section, there is a .5% solar carve-out. This was done specifically to assist in the further development of the solar industry in the state. In addition, 50% of the renewable must be sited within the state. Although some people criticize Ohio for taking a little longer to

pass an RPS, as the 5th largest user of energy in the country thanks to our heavy industrial base, it was important to ensure that an RPS in the state was strategic. Ohio's solar carve out requires the installation of 825 MW of solar, making it one of the most aggressive in the country. In addition, there are annual benchmarks required that encourage the utilities to make early investments in these new technologies.

In 2009, Ohio House Bill 1 was signed into law. This law allowed for the creation of Solar Energy Special Improvement Districts (SID) also known as Property Assessed Clean Energy (PACE). This law allows communities to create a plan for financing the implementation of solar energy through property assessments. These assessments must be approved by 100% of the property owners. Also, those who do not want to sign authorization cannot be forced to pay for an assessment. Thus, with the SID, a property owner can spread the cost of the solar installation over a number of years – up to 25years.

In June of this year, the state legislature passed and the governor signed SB SB 232. This bill, through the end of next year, will exempt qualifying energy facilities from real and personal property taxation if special requirements are met. In addition, a payment in lieu of taxes will be paid in the amount of $7,000 per MW of solar or $6000-$8000 for projects using other renewable energies, clean coal and nuclear projects. The requirements include county commission approval for the exemption of projects over 5MW. For larger projects, a service payment of up to $9000 per MW may be negotiated by the county commissioners with the developers. Smaller projects under 250kw will be permanently exempt from tangible personal property tax and real property tax.

The State of Ohio has encouraged the development of the solar, wind and fuel cell supply chains. Identifying these suppliers is a constant challenge, as so many of our existing firms are entering into the renewable energy market and new firms are forming all the time. As the renewable energy industry is so young, in many ways like the automotive industry at the start of the last century, I expect that we will see many more companies grow, technologies develop, and investment made to expand this industry and Ohio's impact in it. According to many in the wind industry, Ohio is positioned to be one of the most competitive states due to our resident skilled workforce and the depth of knowledge of metals and advanced materials.

I recently returned from a trade mission to China led by the Ohio Department of Development and I saw evidence of how their government is making it a national priority to capture a lead position in solar energy and other renewable energy technologies. The U.S. must not allow technology developed locally to build industries in other nations without some benefit to U.S. citizens. The federal government must support continued research in renewable energy, and in addition should support small firms who are developing promising technology but lack the resources of a nation such as China who is ready to invest in companies of the future.

VICE CHAIRMAN BARTHOLOMEW: Thank you. Mr. McCall.

STATEMENT OF MR. DAVID McCALL
DISTRICT ONE DIRECTOR, UNITED STEELWORKERS UNION
COLUMBUS, OHIO

MR. McCALL: Good morning. I'd like to thank the Commission for the opportunity to appear before you today and to share the perspective of steelworkers on the opportunities offered by the

growing clean energy technology sector, as well as the challenges posed by China's clean energy policies.

I'm David McCall. I'm the District 1 Director for the United Steelworkers, which encompasses the state of Ohio. The USW represents 850,000 workers from a variety of manufacturing industries like steel, glass and paper, as well as workers in health care and in the public sector.

We are ready to help lead the way in the development of clean energy technologies. We along with our strategic partners, such as the Blue Green Alliance, are prepared to help the U.S. rebuild our economy while mitigating the effects of climate change.

We all share the same hope for the development of a clean energy technology sector that provides a sustainable long-term solution to America's energy and economic needs. To achieve these goals of clean energy and robust job creation, policies that will encourage the development of clean energy technologies and grow the domestic clean energy manufacturing supply chain must be enacted.

If, on the other hand, the U.S. simply trades a dependence on foreign oil for a dependence on foreign solar panels and hybrid batteries, we will have missed a huge opportunity to reengineer and retool our economy for this and the next century.

Policies that are critical to achieving this include access to capital. Starting a new manufacturing operation and retrofitting existing production lines to make clean energy products requires a great deal of start-up capital. Tax incentives for this development, such as tax credit bond authority, production tax credits, research and development tax credits, and a continuation and expansion of the federal Advanced Energy Manufacturing Tax Credit can all help companies invest in clean energy technology.

Senator Sherrod Brown's proposed $30 billion revolving fund loan to help small and medium-sized employers retrofit their facilities is another necessary tool.

We also need to create a stable long-term market. Even if companies have the necessary access to capital, the biggest driver of clean energy development is the existence of a stable demand for clean energy.

While traditional sources of energy have benefitted from long-term policies that ensure market stability, clean energy technologies have only received similar benefits intermittently.

In recent years, 28 states have adopted state level renewable electricity standards, RESs. In Ohio, RES increases the percentage of state electricity that must be derived from renewable sources up to 12.5 percent by 2025. While state RESs are positive developments and

are helping to drive the market for clean energy technology, an ambitious national RES is needed to catalyze the development and increase manufacturing of clean energy technology component products.

It is essential that as the market grows these components be made domestically. Vigorous enforcement of trade laws is crucial if the American clean energy manufacturing sector is to grow and thrive.

In addition, strict attention should be paid to growing technology theft by China, another threat to U.S. manufacturing competitiveness, one that we also discussed in 2004 when this Commission was in Akron.

China is making huge institutional investments in clean energy manufacturing and will attempt to corner that market by flooding world markets with cheaply made subsidized products. Strong enforcement of antidumping and countervailing duty laws, increased pressure on China to abandon its currency manipulation policies, and protection of American intellectual property rights will help American companies compete on a level playing field.

The potential for American manufacturing sector to lead the way in development of clean energy component products is significant. Much of the skills required to efficiently manufacture and maintain clean energy technologies is transferrable from established precision manufacturing industries.

Whether that is the solar panel industry here in Toledo, or precision tool companies retrofitting to produce components for wind turbines, or building wind towers with plate produced in Cleveland, or making titanium for components in Louisville, there is a wealth of experience and job skill just waiting to be harnessed.

Hopefully, the U.S. can emulate the good about China's clean energy agenda--the massive, sustained, stable government investment in these technologies--while acting in accordance with our national ideals to avoid the bad--unfair trade practices, currency manipulation, and outright theft.

Again, I would like to thank the Commission for the opportunity to appear before you and discuss these issues. A great opportunity exists for American workers who will, with properly crafted policies, build clean energy technology products that will improve our environment and rebuild the American economy.

Thank you.

[The statement follows:]

Prepared Statement of Mr. David McCall

District One Director, United Steelworkers Union
Columbus, Ohio

Good morning. I'd like to thank the commission for giving me the opportunity to appear before you today to give the prospective of American workers on the opportunities offered by the growing clean energy technology sector, as well as the challenges posed by China's clean energy policies.

My name is David McCall. I am the District Director of the United Steelworkers for the district that encompasses Ohio. As I think you know, the more than 850,000 members of the United Steelworkers produce more than just steel. We supply almost every sector of the economy and produce a wide array of products and services, including paper, glass, ceramics, cement, chemicals, oil, aluminum, tires and rubber. We also represent workers in health care and the public sectors. We are ready to help lead the way in the development of new clean energy technologies that will allow the US to rebuild our economy while mitigating the amount of destructive carbon pollution that is being produced now.

We all share the same hope for the development of a clean energy technology sector that provides a sustainable long-term solution to America's energy and economic needs. Still, it is critical that in devising policies to bring about the growth of these technologies, special attention is paid to the manufacturing sectors that will make them. If the US puts in place policies that will encourage the development not just of the clean energy technologies, but of the manufacturers and the supply chains, the twin goals of clean energy and robust job creation can be achieved. If, on the other hand, the US simply trades a dependence on foreign oil for a dependence on foreign solar panels and hybrid batteries, it will have missed a huge opportunity to reengineer and retool our economy for this and the next century.

I would like to discuss a few of the potential policies that can have a large impact on the development of clean energy technologies. On the federal side, many of these have been and must be included in a comprehensive energy and climate package that incentivizes clean energy and jobs. The first thing that is critical to the development of the clean energy technology sector is access to capital. Starting a new manufacturing operation requires a great deal of startup capital, as does retrofitting existing production lines to make new clean energy products. During the latest economic downturn, companies have had trouble getting credit even for necessary maintenance, let alone the sort of long-term investment capital that this process requires.

Policies that lower this high barrier to entry into these markets will allow the sector to be developed more quickly. Tax incentives for this development, such as tax credit bond authority, production tax credits, research and development tax credits, and a continuation and expansion of the federal Advanced Energy Manufacturing Tax Credit can all help companies invest in clean energy technologies. In addition, more direct help can and should be given to encourage these companies to enter this market. Senator Sherrod Brown has proposed a $30 billion revolving loan fund to help small employers retrofit their facilities, a policy that will greatly help advance clean energy manufacturing when it is passed, either on its own or as part of a comprehensive energy bill.

Still, even if companies have the necessary access to capital, the biggest driver of clean energy development will be the existence of large and stable demand for clean energy. Absent a strong and stable market for clean energy, no company will move into the clean energy sector, regardless of how many incentives are put in place to encourage it.

A variety of policies can have the effect of creating a stable long-term market for clean energy products. For example, the previously mentioned Advanced Energy Manufacturing Tax Credit could be expanded and extended, as can the production tax credit. Traditional sources of energy such as oil, coal, and natural gas have long benefited from long-term policies that ensure market stability, whereas clean energy technology has only received similar benefits intermittently. With annual reauthorizations required, the pace of development has been slowed due to the potential that funding and tax incentives may be cut at any time.

Beyond these, however, the single initiative that has the most potential for creating a stable, long-term market would be the passage of a Renewable Electricity Standard, or RES. In recent years, 28 states have adopted state-level RESs, including Ohio. The Ohio RES increases the percentage of state electricity that

must be derived from renewable sources up to 12.5% by 2025.

While these state RESs are positive developments and are helping to drive the market for clean energy technology – and more states should adopt them – what is sorely needed is an ambitious national RES. Many state RESs are set too low to really drive clean energy development. Moreover, the wide variance in target levels has produced a market that is inconsistent from state to state. A strong national RES that mandates that 25 percent of all electricity be derived from renewable sources by 2025 will allow for economies of scale to be built and broad national supply chains to be established.

An RES can and will catalyze the development and increased manufacturing of clean energy technology components products, but the question is where will those components be made. America has seen so much of its manufacturing sector lost to China that it must remain vigilant as it develops these new industries. In particular, vigorous enforcement of trade law is crucial if the American clean energy manufacturing sector is to grow and thrive.

As we know, China is making huge institutional investments in clean energy manufacturing, and if the pattern we have seen over the last several years holds, they will attempt to corner that market by flooding world markets with cheaply-made, subsidized products. That outcome simply cannot be allowed. Strong enforcement of anti-dumping and countervailing duty laws, increased pressure on China to abandon its currency manipulation policies, and protection of American intellectual property rights will help American companies compete on a level playing field.

Industrial theft and espionage by China is said to be increasing and poses as great a risk as dumping, subsidies, and currency manipulation. The potential for this theft may chill the desire by these companies from engaging in the research and development necessary to develop clean energy products. This applies not only to the traditionally thought-of clean energy sectors, but to all sectors where increased efficiency can have a significant positive impact on energy use. For example, Goodyear has been developing new tires that maintain stability while improving automobile fuel efficiency. This is a difficult balance and Goodyear has made a huge substantial investment in it. It would be disastrous if they made these safety and efficiency improvements only to see the design stolen and cheaply manufactured in China at a lower cost, forcing Goodyear to have to compete against a version of its own design that does not bear the cost of the R&D. It is therefore critical that the US make stopping these unfair trade practices a top priority.

The potential for the American manufacturing sector to lead the way in the development of clean energy component products is massive. We have already seen how it can happen right here in Toledo and throughout Ohio. It was not only the innovative designs of thin-film solar panels that helped Toledo become a solar industry leader; it was the existence of a ready-made manufacturing base and population of workers with applicable skills forged by years of glass manufacturing. The same transition is happening throughout Ohio and the nation. One of our great advantages as a state and a nation is the already existing skill set of American manufacturing workers. Much of the skills required to efficiently manufacture and maintain clear energy technologies is transferrable from established precision manufacturing industries. Whether that is the solar panel industry in Toledo, or precision tool companies retrofitting to produce components for wind turbines, there is a wealth of experience and skill just waiting to be harnessed.

Still, as this transition continues, the challenge of China cannot be far from the minds of policymakers. Hopefully, the US can emulate the good about China's clean energy agenda – the massive, sustained, stable government investment in these technologies – while acting in accordance with our national ideals to avoid the bad – unfair trade practices, currency manipulation, and theft. With room to breathe and grow and a level playing field, a wide variety of clean energy industries can thrive in Ohio and the US. But this involves ensuring that these industries have access to the necessary capital to make investments, that there is a stable market for these products, and that the threat of unfair trade practices is minimized.

Again, I would like to thank the Commission for the opportunity to appear before you and discuss these issues. A great opportunity exists for American workers who will, with properly crafted policies, build the new clean energy technology products that will improve our environment and rebuild the American economy.

VICE CHAIRMAN BARTHOLOMEW: Thank you.

Mr. Haines.

STATEMENT OF MR.TY HAINES
VICE PRESIDENT, MANUFACTURING SERVICES, WIRE-Net
COLUMBUS, OHIO

MR. HAINES: Yes, thank you, Commission, for having us here today and placing me on such a fine panel. I appreciate that.

Based on what I heard from the first panel this morning, I threw out my prepared section, and I will be doing this off the cuff and try to hit more of the questions that were posed to me in the original letter.

The Commission has established a pattern that China has followed. That pattern has carried their desire to gain expertise, acquire technology, and basically grow their market internally, grow their jobs internally. I acknowledge that.

If I hit something that does not make sense, I'm figuring that you're going to be asking me questions.

The protectionist stance of China has been examined with the result of it is good for China, not so good for the US. I've heard in today's testimony that financing for China manufacturers has been an advantage the US cannot match at this time. The advantages of the Chinese VAT tax rebates, it sounded like you're up to speed on that as well. The domestic sourcing requirements that China has placed on their internal markets and companies that are starting up inside of China, have been covered.

The currency valuation policy: I think everybody in the room has been keeping tabs on strong one-sided advantage. We have heard China's Renewable energy law also is there to protect China's economy while the US lacks a similar incentive.

The good actions: one of the things that we were asked was what good actions has our country done, our government provided? The production tax credit where we started taking a look at expanding it from a one-year production tax credit to three years, that was a good thing. That's one of the things that we would love to see continued.

The timing and planning framework for most manufacturers is much longer than one year. Having a three-year time frame in place is good because that fits better with a business person's planning about I'm going to invest "x" number of dollars, I'll have a return over these years, that they can count on a tax credit like that being there. That's a good idea. Suggest you go with five or ten years if you can.

The National Renewable Energy Lab for middle-wind turbine development. One of the aspects of WIRE-Net (www.wire-net.org) is a program that we have called GLWN (www.glwn.org). That's the

Global Wind Network. It's the largest supply chain network in the U.S. It's focused solely on wind turbines – from manufacturing through operations and maintenance.

My next step is to expand our efforts for supply chain management to two to three other markets. That's not a part of our big discussion here right now.

The things in Ohio that we are looking at that were special to us besides what you've heard from the other panelists here: Yes, the renewable energy standard is one of the strong points. That helped us attract OEM attention to get OEMs to link up with Ohio manufacturers. That was one of the things that the large European OEMs were looking for. That's a good thing. If that were to be coordinated on a national basis, that would help our manufacturers and jobs.

The Ohio Department of Development contracting with WIRE-Net to build a network that's the strongest in the nation, that was outstanding foresight. They did a really good job on helping manufacturers learn, evaluate, and for some, enter the wind market. The timing was most fortunate as well. This first supply chain has helped create jobs in Ohio and, as we found, in the US. Supply chains and OEM attraction are much larger than just an Ohio initiative.

The state's updating of its energy tax policy to better support renewable energy in the state helps the generators but also provides an incentive that helps keep Ohio workers making parts.

The reverse investment missions to China to attract China investment back into Ohio, that, again, is a good thing. Things that we can do to support these initiatives on a national basis would help Ohio as well as the manufacturing base throughout the nation.

In an overview of opportunity for us, we've already talked about things that we can't do as a nation. There is a focus that I've got from manufacturing and probably shared with other folks in this room, that is: do what we can do. And to do what we can do, we can: integrate a longer-term approach into our legislation, (including taxes, tax credits and trade law enforcement) to foster development of the economy around renewable energy.

We can integrate initiatives. We can better integrate initiatives. When I say "initiatives," that's start with education through the investment through the finance, through the tax policies, through the domestic content requirements if we choose to go that way, and, again, to reinforce creation of a national renewable portfolio standard. That energy policy I feel is critical to gaining jobs in Ohio and the U.S.

Thank you again for having me here.

[The statement follows:]

Prepared Statement of Mr. Ty Haines
Vice President, Manufacturing Services, Wire-Net
Columbus, Ohio

Testimony before the U.S. – China Economic and Security Review Commission
The Challenge of China's Green Technology Policy and Ohio's Response

The Global Wind Network (GLWN™) is in general agreement with the publication dated March 2010, titled: China's Promotion of the Renewable Electric Power Equipment Industry by Dewey & LeBoeuf LLP for the National Foreign Trade Council. The article below by Ed Weston was published in summary form by Wind Power, May 2010 Special Report. WIRE-Net is the parent organization of the GLWN™ program.
– Ty Haines, VP Manufacturing Services, WIRE-Net July 12, 2010

Pivotal Year for US Wind Supply Chain June 2010
By **Ed Weston**

Two utility-scale turbine assembly plants began American operations last year and three more are coming online in 2010, bringing the domestic total to nine. This should be great news for manufacturers looking to diversify and take advantage of regional opportunities. But larger turbine designs, a temporary drop in demand, and investment uncertainty are making this a pivotal year for the US supply chain.
Already, the US parts sourcing base are affected by the increasing size of turbines. Ductile iron castings, which comprise many of the largest structural elements of a turbine, are growing beyond the capability of many foundries to produce them.
For instance, if a 1MW turbine requires a 10-ton casting, there are probably a half dozen domestic suppliers. As turbines increase to 3MW, castings requirements increase to 30-tons, for which there may be just two or three suppliers. At 5MW, domestic sources may be reduced to just one or two.
Towers manufacturing will also be affected. Larger turbines call for larger rotors requiring taller towers of up to 120 meters. New designs may include concrete bases and modular construction to reduce weight and transportation costs. At the same time, crane requirements will be extended to accommodate the additional height and nacelle weights, which will reach 300 tons for offshore turbines.
Blade length will also grow with turbine size, requiring larger production facilities and additional handling equipment. New plants will need to be built in locations close to both expected project sites and an available workforce.

Supply Chain Outlook

Since the fall of 2008, several factors have chilled the rate of manufacturing orders to supply chain companies. New orders for turbines dried up until the US federal government's economic stimulus package took effect last summer. World turbine prices dropped, and when combined with extra inventory stockpiled from undelivered orders, excess capacity now available offshore, plus a falling euro, the result has been a return to the wrong side of the boom-and-bust cycle for domestic wind component manufacturers..
But signs of market recovery are in place. "We're seeing financing coming back, which puts additional burden on getting deals done," says Dan McDevitt, VP of Supply Chain for Nordex USA, the German wind turbine manufacturer which is currently constructing a factory in Arkansas to build its turbines.
Siemens, which plans to open its new Hutchinson, Kansas assembly plant in December, reported in February that its entire capacity for new turbines was sold out worldwide through the end of the year. Meanwhile, a number of wind turbine manufacturers, or original equipment manufacturers (OEMs), and specialized suppliers from Europe continue to operate in a holding pattern, awaiting a stronger market before ramping up new North American operations.

US manufacturers remained logistically advantaged within the world's leading wind market for the past four years until finally overtaken by China last winter, and there's a desire by domestic wind turbine plants to capitalize on the proximity of available suppliers. "I deal with the majority of the large OEMs operating here in the US," added John Purcell, VP of Wind Energy for Leeco Steel, "and all have told me their preference is to buy locally in each of their markets. They much prefer this over an extended international supply chain."

For large components, the savings from buying American currently translates into 10-20%, plus avoiding weeks on a boat. Most turbine OEMs prefer to assemble turbines and source parts in a chosen market because it protects against currency fluctuations between countries.

Other US supply chain strengths include an incredible appetite for diversification, as evidenced by the record-breaking crowds at recent annual conferences hosted by the American Wind Energy Association and strong attendance at regional supply chain events.

There's a real interest in investing, too. Top notch machining capacity has been added across the Midwest, and European supply chain veterans are bringing their technology to US facilities. ThyssenKrupp's Rotek, for instance, invested $80 million last year in an Ohio ring mill as part of an expansion to eliminate a former industry bottleneck for slewing rings. These are the giant diameter rings coupling the top of a turbine tower to the moving nacelle base and the blades to the rotor hub. In February the US Department of Energy announced the awarding of economic stimulus grants to 29 component manufacturers for additional capital projects totalling $160 million.

Looking forward, the best opportunities on the manufacturing side will include large castings, bearings, generators, composites for blades and nacelle housings and turbine control systems. On the services side, demand will be robust in operations and maintenance, turn-key contractors that cover engineering, procurement, and construction (EPC), and logistics companies (trucking, rail, barges for onshore and offshore) as well as suppliers to these industries.

Many components for wind are industry-specific, and joint ventures with experienced off-shore suppliers can provide a jumpstart for US manufacturers wanting faster results. Another source of competitive advantage will be to offer an entire ready-to-assemble component or system rather than individual parts. For example, a company could sell castings as a final package that takes the product from raw casting, machining and finish coating instead of the business being broken up as it often is in today's domestic wind supply chain.

For US component suppliers, major challenges remain. The nature of wind turbine OEMs is extremely risk-averse, and the qualification process to approve even the most capable component suppliers can extend beyond a year. Competition is global and fierce. Over the past decade Europe has developed a robust, cost-effective network of suppliers, many of whom are delighted to export to the US. In Asia, recent investment has created new supply chain resources with available capacities that are targeting the US market. For US domestic manufacturers, the mandate for wind industry success is extraordinary quality and a ruthless commitment to beat down costs through best practices, continuous improvement and new technology.

The Path Forward

Industry executives see cost-competitiveness as crucial to long-term growth, and new capital investment that adds both capacity and efficiency will be critical. Most agree that the government has an important role to play. "The number one thing needed is to establish a balanced, well-thought out national energy policy including a renewable energy standard that runs for at least ten years out," says Richard Morrison, President and CEO of Molded Fiber Glass.

A renewable energy standard, or renewable electricity standard (RES), is a public policy that requires electric utilities source a rising percentage of their power from renewables. More than half of US states have such policies and the push is fierce in the wind industry to establish a federal RES for the country. "Doing this will change the uncomfortable, risky situation we now have in which we're facing making large, long-term investments in an uncertain market environment."

Nordex's McDevitt agrees. "When I talk with people in Europe, I hear a real concern about whether the US

wind market will come back strongly. A good national energy policy will remove lots of those doubts and give our industry the long-term footing we need to compete against other technologies."
But many agree that there's another important policy step to fully develop the domestic supply chain, and that is to create parity between US and Asian companies. Complaints are frequently heard of Asian components being sold here for the cost of raw materials. Causes are traced to currency manipulation of the Yuan (which some economists estimate has created a subsidy of 25-40%) and to common practices such as loan forgiveness, which enables start-up companies to write off their overhead debt and quote new orders on only variable costs (Windpower Monthly, May 2010).
"We need the government to level the playing field," explains Joe Simko, Vice President of Business Development for Hodge Foundry. "If we received economic stimulus money, we would invest to improve our competitiveness, win more business, and create jobs on American soil."

About the author:

Ed Weston is director of the Global Wind Network, GLWN™, an international wind energy supply chain advisory group and network of manufacturers and suppliers whose mission is to increase the domestic content of North America's wind turbines and grow the wind industry. Ed has led manufacturing teams in start-up, turn-around, and fast growth situations for multi-national and privately-held firms. He holds degrees from the University of Illinois and Purdue University.

PANEL III: Discussion, Questions and Answers

VICE CHAIRMAN BARTHOLOMEW: Thank you very much. We'll start with questions. Commissioner Wessel.

COMMISSIONER WESSEL: Thank you all for being here.

I asked the previous panel or maybe at the concluding comment that we're here in Ohio because we want to understand specifically what the impact of the Chinese activities in this area are at the local level. We have seven Washington-based hearings. We talk a lot about national policy, all of which we appreciate and want to hear from you as well, and it's exciting what the University of Toledo and others are doing in this area.

In a lot of ways, you're ground zero in this economy right now, having a heavy industrial state, a lot of auto jobs, a lot of other things, and some real suffering, and you hear from Washington that the promise of clean and green is really the future. What do you think of that, number one?

Number two, understanding that if we do the RES and everything else, unless we have both investment in domestic manufacturing as well as potentially requirements that supply chains, domestic supply chains, utilize, we may find out that. I think Dave, you said that all we'll be doing is replacing dependence on foreign oil for the componentry that will replace it.

What do you see the China challenge here? What do you think your government is doing to address it, if anything, both well or not so

well, and what recommendations do you have for us to do a better job?

Dave, do you want to start?

MR. McCALL: Sure. Thank you very much.

In terms of how do we do a better job, the first thing that I think we lack in the U.S. is a manufacturing policy. We don't have a policy that establishes what I think is an important part of a growing economy, and that's a manufacturing base. We, our success and our past history has been surrounded in manufacturing entrepreneurship. We need a solid manufacturing policy for this country and connect it with tax incentives for companies to be able to have access to capital and to be able to have access for sustainable long-term profitability.

In many ways, we need to set up policies that allow businesses to plan for the long term, not for the short-term, next quarter's profitability, but rather for the decades that people who support the economy at its strongest level, and it's what I believe to be working men and women in their communities, to have sustainable long-term jobs and security so that they can help grow the economy and can help move forward.

I think that we fool ourselves if we don't believe that clean and green is the future of not only our economy but our national security as well. I think that we're always going to use our traditional sources of energy in different ways, but we need to find new renewable sources and maintain those renewable sources, and it will help grow our economy.

It is the future of our economy. It is the next generation of building a strong economic base in this country. So if we start out with a foundation of a manufacturing policy, I think that's significant. If there's other corners of that foundation, it really is enforcement of our trade policies and our trade laws to make sure that, you know, trade is a good thing, but there has to be something in it for both partners.

And for us to be manipulated by foreign countries, whether it be in the renewable energy field or whether it be in the making of steel or paper or any of the other products that the members that I'm honored and privileged to represent produce, I think it's important that we not give up our laws or our policies for the sake of some foreign relationship that at the end of the day is not going to be sustainable because there's nothing in it for both sides of the partnership.

VICE CHAIRMAN BARTHOLOMEW: Okay.

MR. McCALL: I think generally in many ways, that's the kind of needs that we need from Washington and our government leaders.

COMMISSIONER WESSEL: Thank you.

MS. REICHERT-KRAL: To the first question, is green

manufacturing the future? As a former automotive manufacturer, it certainly has some huge potential. I think it's very important that we're all very cognizant of the fact that the green economy is not a one-trick pony.

It's not just one technology but a broad base of technologies that will replace our reliance on foreign oil. And, investment in the research and development to scale the technologies and make them competitive is very important so that applied research activity that really takes those technologies that are close to market and makes them cost competitive, makes them fully manufacturable, will be very key because I think that we've shown with what limited investments we've had in northwest Ohio with the manufacturing from First Solar and so many of our other companies, we've been able to create those jobs and compete based on technology, and the efficiency of our workforce, capitalizing on our core strengths and moving them forward.

With the China challenge, certainly, there's a lot of them, and I'm certainly not a policy expert. I have heard a number of very smart people talking about, as opposed to putting trade limitations on, requiring domestic workforce content, which could encourage foreign direct investment into the, into the region for us, our focus, but also across the U.S.

If there's a strong renewable energy standard that solidifies a REC market and that makes financing of deployment of renewable energies much more affordable, and certainly education plays a very key role.

University of Toledo has been working on a grant from the National Science Foundation to look at stackable certificates for everything from the trade skills that are working closely with our community colleges, all the way through the bachelor's, master's and Ph.D. level programming. That ongoing effort and having the students from our own communities going into those STEM technologies is very key.

We have lots of foreign students that come into our core technologies, our hard sciences and our engineering field. We need to see the young men and women from this country embracing technology as the way of the future because even the basic manufacturing jobs that we have, even in the installation jobs, the core skill set is ever increasing because it's not just becoming an electrician, but it's becoming an electrician that understands the construction technology and having that broad range of skills and to be adaptable because this market will change readily.

VICE CHAIRMAN BARTHOLOMEW: Great.

MR. HAINES: Thank you.

Taking a look at what our needs are, yes, green manufacturing is important to us. As an engineer and a manufacturer, I need to know more about what that green manufacturing produces. Specifically, the products that are required in green manufacturing are what we are doing research with the University of Akron on right now to determine what emerging markets are going to be best for the most manufacturers in Ohio.

And I'm looking at Ohio as being a pretty representative cross-section of other industrial states. We are heavy here in Ohio with companies that fabricate metal, steel, companies that cut chips, they make chips, they CNC, they mill, they machine. Those are the companies that have most of my attention right now. Those are the companies that we have moved, the ones with the larger size equipment, into the wind turbine industry. WIRE-Net's next goal is to get more work in this state for those companies.

So how can you help? That longer-term approach that we were talking about, Dave did well at explaining. One of our challenges is the planning horizon that our government is working to. When we compare ourselves to China, they've got a five or ten-year plan in place. Their wind turbine plan has been in process for close to a decade. The US Government jumped into it, fragmented and late. By looking at increased planning horizon, that will help us compete.

I agree with the manufacturing policy discussion here today. In northern Ohio, manufacturing has been the number one employer in northern Ohio consistently over the past 50 years. That is changing at this time. Health care in northeast Ohio. The urgency is that we are losing jobs in manufacturing while China and Asia's manufacturing continues to grow.

Anything that we can do to assist with the finance, assist with the education of attracting more young people into manufacturing, things that we can do with the taxes, renewable energy standard on a national basis, these are all positive things that can be done.

Can the US Government put a few billion dollars into financing new companies and start-ups? Probably not at this time. We all recognize that, but I'm looking more at the things that we can do that are within our power.

VICE CHAIRMAN BARTHOLOMEW: Okay. Thank you.

Commissioner Mulloy.

COMMISSIONER MULLOY: Thank you, Madam Chairman.

In your testimony you talk about how the University of Toledo and government from both the state and the federal government investment helped to develop this thin-film panel.

MS. REICHERT-KRAL: Uh-huh.

COMMISSIONER MULLOY: So the United States innovated these thin-film panels. They're quite good then, are kind of the state-of-the-art on solar cells?

MS. REICHERT-KRAL: Thin-film panels are the second generation of photovoltaics so energy produced directly from a panel. The first generation is silicon and then poly-silicon. They have a very high efficiency, but they're a very high cost panel. They're also a labor-intensive panel to manufacture.

Thin-film technology is a lower efficiency but works with a broader spectrum of light so actually a solar panel installed with thin-film technology in Toledo, Ohio, produces very similar power as southern California with a silicon panel.

But the thin-film technologies, there's a whole host of technologies, amorphous silicon, cadmium telluride, CIS and others, and these technologies can utilize the mass production skill set that we have here.

So you can produce them in-line in continuous operations, thus, driving down the cost. First Solar's manufacturing cost is now below a dollar a watt, which is technically where the horizon is for grid parity.

Now they're not selling them for that, but they have widely publicized that their production cost is below the dollar per watt.

COMMISSIONER MULLOY: You talk about 60 percent of the solar panels that are manufactured in the United States are these thin-film--

MS. REICHERT-KRAL: Absolutely.

COMMISSIONER MULLOY: --technology. So I'm thinking, boy, this is great. Then I was reading the testimony of Kathleen Weiss, and you mention that First Solar is using this technology, which was helped be developed here through federal, state, University of Toledo, and all that.

MS. REICHERT-KRAL: And local entrepreneurs, yes.

COMMISSIONER MULLOY: But then she comes in and says First Solar--page three of her testimony.

MS. REICHERT-KRAL: And I do not have her testimony. I'm sorry.

COMMISSIONER MULLOY: She says: "It should come as no surprise that, although we expanded our Ohio plant last year, most of our plants are built outside the United States."

MS. REICHERT-KRAL: They followed their market. Germany had a large feed-in tariff and so they built a facility in Germany. For the first five years, the five years when they first had their IPO, first five years of production produced in Perrysburg, Ohio, 100 percent of that product or virtually 100 percent of that product was shipped to

Germany.

So they went where their market was and just like any other multinational firm, they will go and put a facility where their market is, and then the global market continued to grow, and Malaysia was where they put their next two facilities.

COMMISSIONER MULLOY: That may be. Here's what I'm thinking. Applied Materials, they put, they're moving their production to China.

MS. REICHERT-KRAL: For equipment.

COMMISSIONER MULLOY: But their market is back here in the United States. They're selling to this Chinese company, which is then selling the stuff back here in the United States. I'm glad we innovated this stuff, and I'm glad we're doing it. But how can we make sure that those jobs that are being created by these innovations are here, and that the companies sell their product?

I don't understand why this company has to go sell--why can't we export this stuff? Why do we have to follow a market by investing and making the stuff in the other guy's market when the other guys are making it in their market and shipping it here? What's wrong? Something is wrong.

MS. REICHERT-KRAL: Glass is heavy.

COMMISSIONER MULLOY: I want to understand that.

MS. REICHERT-KRAL: Glass is very heavy to ship and also fragile, and First Solar solar panels are produced on glass.

COMMISSIONER MULLOY: But the Chinese are selling their solar panels here. Why?

MS. REICHERT-KRAL: Cost and a lot of people when they specify solar installations will specify silicon, and so there are many federal projects where the request for pricing for the government, the government's own purchase of solar panels, it's specifying silicon-based solar as opposed to specifying the technologies that are inherently U.S. driven.

COMMISSIONER MULLOY: Do you have any comments on this, Mr. McCall or Mr. Haines? What's going on here?

MR. McCALL: Well, my perspective on this and many other products that we produced here in the U.S. over the last few decades is because we don't have a manufacturing policy, and we don't have incentives to keep companies here when we ignore our trade laws.

I'm not so sure the biggest problem is in other foreign countries. They make more than the capacity of their market, and the excess production then gets sent to the U.S. If we're competitive in the U.S. in that market, we become uncompetitive when those governments subsidize whatever product it is, whether it's solar panels or whether

it's steel or whether it's paper or whatever it is, and there gets to be a practice of overproducing in a market in China or in Germany or in Brazil, and then dumping that excess material back in the U.S. market, and it's gone on for decades in the metals industry, and without protections we will never be able to establish these kinds of industries in the United States, and we will weaken our well-established industries.

So, and in terms of competitiveness, we either compete or we don't in terms of production, and we should, and if we don't compete, then we ought to lose the market. I don't think that, for example, putting restrictions on products that have a domestic labor content in them is a good thing.

I think we need to be educated. I think we need to have the training. We need to have the incentives for entrepreneurs to be able to start up businesses and build those businesses from small businesses to mediums to large.

We need to make sure that we recognize that it has to be long-term viable entity, and that's how we should compete in the world. We should have fair level playing, a level playing field trading partners, and if we can't compete, then we shouldn't trade with them on a particular product line, but in this case we do compete.

Why we invest in a country that will just, such as China, who will eventually just produce those products in excess of their own market and then dump them back in the U.S. is beyond me. It makes no sense.

COMMISSIONER MULLOY: Do you have anything, Mr. Haines?

MR. HAINES: I'd like to pass at this time.

COMMISSIONER MULLOY: I'll leave it there.

MR. HAINES: I would like to support the previous testimony here today.

COMMISSIONER MULLOY: Thank you very much.

VICE CHAIRMAN BARTHOLOMEW: Commissioner Shea.

COMMISSIONER SHEA: I want to thank all three of you for being here today. I appreciate it.

I just want to discuss this issue of renewable energy standards or renewable portfolio standards, and your testimony, Ms. Reichert-Kral. You talk about the Ohio standard, which is, says that 12.5 percent of the power may come from energy efficiency and advanced energy technologies, like clean coal, advanced nuclear and carbon sequestration, while the other 12.5 percent can come from renewable sources.

And you say that the RPS has some unique Ohio features.

There's .5 percent carve out for solar, 50 percent of the renewables just come, must be sited in the state.

Mr. McCall, as I understand your testimony, you support a national standard, as does Mr. Haines, and I think our Chairman might as well. You suggest a 25 percent target for renewables, and you say that some states, the targets for renewables are too low.

So my question for Ms. Reichert-Kral is, is there some benefit to having state-by-state standards as opposed to a uniform national standard? Is there some advantages to that?

And for Mr. McCall, I'm reading into your testimony, and it suggests that you think the Ohio standard is too low. I was wondering because you say that most states are too low, and you think it should be 25 percent, which is not what Ohio requires. Were you active in the debate? Were the steelworkers active in the debate over the standard?

MR. McCALL: Thank you.

COMMISSIONER SHEA: That's a long-winded question. I apologize.

MS. REICHERT-KRAL: I certainly don't feel that I have the appropriate background to make a truly intelligent comment about whether state versus national policy--as a person who works with the small industries and the companies that are forming this sector, certainly having the renewable energy portfolio standard here in the state of Ohio helped create a market and it is propelling things forward.

I believe a national standard would also be beneficial. I think that because Ohio is the fifth largest user of energy in the state, you know, a renewable portfolio standard in one state that says 25 percent, but if they only use ten percent of the power that the state of Ohio does, it's not an apples-to-apples investment because the Midwest with its heavy industrial base has unique challenges because our renewable portfolio standard carve out for solar is greater than some states' power requirement.

COMMISSIONER SHEA: Thank you.

Mr. McCall. Mr. Haines, if you want to weigh in, that would be great, too.

MR. McCALL: Thank you.

First of all, I think that a national policy is better than a state-by-state, but I want to also say that I recognize that I think that each state has a very unique set of circumstances facing it, and so although I think our initial movements on a state-by-state is a good thing and showed progress, I think eventually we ought to be looking at it more on a national standard.

We did participate in the discussion over Senate bill 221 that

became the policy. I support the policy. I think, again, Ohio, very unique in the challenges that we had. I think the governor provided huge leadership in being able to get laws passed and standards accepted. It was really a great--to watch it happen as it happened really we got buy-in from many, many different disciplines and people with maybe different points of view.

So I do support it, but I support it as an initial first step, I think, is the best way to put it. I think we can do better; we should do better. In Ohio, the fifth-highest state in terms of usage, we are also unique not just as a heavy industrial producer but across all sections and jurisdictions. Ohio is very, very unique in terms of the products that we do produce.

Call us a commodity state if you want. It's heavy in manufacturing but in manufacturing in many, many different markets and products, and so that sort of makes us a cross-section of America in terms of our density compared to the density of America. So I think the standard is acceptable, and I do support it. We supported the governor in his efforts to attain the standards by 2025.

Hopefully, by then, we get an opportunity to see it, we will get lots of new renewables in the state, and we can even do better.

COMMISSIONER SHEA: Thank you.

Mr. Haines, do you have anything?

MR. HAINES: Yes, I would encourage the Commissioners to ask this same question to a panelist this afternoon— especially Greg Noethlich from Elyria Foundry.

When it comes into the question of by this certain date, we have to have so much of our power from renewable sources, it comes into a challenging manufacturing capacity equation. Do we have enough capacity in Ohio, in the U.S., to meet these requirements that are coming up? If you explore those with a person I'd call an expert on that with Elyria Foundry, you'll tease out their perspective on capacity issues in attainment of that goal.

COMMISSIONER SHEA: Okay.

MR. HAINES: Now the goal is a good goal. Absolutely, positively a good goal. When the goals were set, we didn't anticipate having a recession come in and curb that wonderful growth line, aggressive growth curve of wind turbine industry, of solar installations, and of fuel cell development in Ohio. That was not anticipated. So we will regain that sharp growth in the next year or two. We anticipate that to happen.

That national policy will help attract foreign investment into the U.S. That's a good thing for us.

And the incentives that we talk about, anything that will level

that playing field that we speak of to get it a little bit closer is what we're looking for, and that may be--if we take a casting made here in the U.S. and ship it to China, they put a 40 or 50 percent duty on that. We get that in from China for assembly here, they put an under ten percent duty on that. That just doesn't seem to make any sense to me or why we are subsidizing China's economy when we need to be focused on our economy.

Thank you.

COMMISSIONER SHEA: Thank you.

VICE CHAIRMAN BARTHOLOMEW: Commissioner Blumenthal.

COMMISSIONER BLUMENTHAL: Thank you all very much for testifying today.

Ms. Reichert-Kral, can you tell me the thin-film photovoltaics industry is growing, you say, because of affordability and growing market share because of affordability. Can you tell me where you see these areas of growth and in what industries, in what sectors, and what countries, and does China play a role at all in your growth projections?

MS. REICHERT-KRAL: Well, thin-film photovoltaics can be used in many of the same applications that crystalline silicon although there are some unique opportunities because many of the thin-film photovoltaics can be put on flexible substrates.

So when you think about tenting or disaster relief tenting, that could have thin-film photovoltaics integrated into that. That's something that crystalline silicon, at least at this point, doesn't have in its potential. So there's some unique applications that are available for thin films.

The market for thin-film technology is international. It's not only within the U.S., but particularly when you're taking a look at areas that have lower levels of solar radiation than say California or Arizona, which are kind of the historical U.S. markets, thin-film photovoltaics because it generates power in indirect light, it generates power, adequate power, on a cloudy day, you look at the whole northern half of the U.S., and this is a great application.

You look at Germany who has 30 percent less sunshine than the state of Ohio, and it's no wonder that thin-film photovoltaics had a market there and that First Solar was able to sell their product there so quickly.

I think that Canada will be a huge market, and I think that there are huge areas internationally that the U.S. thin-film market can penetrate, and there are others making investment. Certainly, China is making an investment, but the few photovoltaic companies that I saw that were in the thin-film market did not have the continuous

operations that we do.

They were doing batch processing so the consistency did not match what our U.S. manufacturers are able to do with their continuous operation, but there's large investment in this area, not only from China but also from the Middle East, and all the European countries. But, there are international firms that have come to Ohio, in particular, that I'm aware of, that are looking at investment here because they want to work with our technologists and they want to invest in this area.

I don't have a big story to tell you right this moment, but there are a number of companies that are looking at the area because the research and development in this technology is largely done here. There's also some that's in New South Wales on solid foundation, but certainly the technology is what's driving that.

COMMISSIONER BLUMENTHAL: And do you feel as though that you're competing in order to get, say, some of these foreign companies to invest here in your technology, or not in yours, but in thin-film PV technology? Do you feel like there's competition for those same companies' investments in other states and other countries? How do you feel you're stacking up in terms of the competitiveness of attracting that investment here?

MS. REICHERT-KRAL: The technology that we have here, particularly in northwest Ohio, southeast Michigan, with our community partners, within the kind of mega-region, we have the technology here that the companies want. What we're seeing now is where people may have had one or two researchers in an area, they're attracting partners because they're in the historic investment areas, I'll call them, where people throw tens of millions, hundreds of millions, of dollars, and so it certainly kind of creates an attraction.

Oh, this other private investment is going in, so huge, into these other areas, or the federal government is investing in areas where they traditionally invested. We've a very modest research university. Our research budget last year was 71 million, and a third of that is in photovoltaics. So we've put a lot of eggs in that basket, but we really do see that this has played a transformative role in our community.

But further investment is going to be needed if we want to keep our competitive advantage.

COMMISSIONER BLUMENTHAL: Now are you seeing competition in this particular technology and industry from Chinese companies?

MS. REICHERT-KRAL: Everywhere. It is literally everywhere.

COMMISSIONER BLUMENTHAL: The companies competing with you?

MS. REICHERT-KRAL: They are everywhere.

COMMISSIONER BLUMENTHAL: Thank you.

VICE CHAIRMAN BARTHOLOMEW: Okay. Finished?

COMMISSIONER BLUMENTHAL: Yes.

VICE CHAIRMAN BARTHOLOMEW: Wonderful. As always, there are more questions probably than time, but I think we'll have the opportunity for a second round so I'll defer some of my own questions to that.

I want to start first, particularly, Mr. McCall, by acknowledging George Becker, who some of us had the privilege to serve with on this Commission, noting that in 1995, I think, it was when Magnequench happened that George was forward-thinking, as always, and noted concern about rare earth minerals, and what was going to be happening with the future of rare earth minerals, which it turns out, of course, are critical in the development of some of these green technologies, as well as other things, and note that Commissioner Blumenthal asked a question, as China is starting to clamp down on rare earth minerals, what does that mean for all of these things?

So George was right ahead of the game as always. We miss him a lot.

MR. McCALL: Thank you very much. He's a personal hero and a mentor to me as well.

VICE CHAIRMAN BARTHOLOMEW: Yes, to many of us.

You mentioned also, Mr. McCall, the 2004 hearing that this Commission did in Akron, and I remember that one of our witnesses at that hearing said that Ohio's biggest export was its young people because there was no economic future, and that was six years ago when the picture actually was looking better than it is today.

One of the things we heard on the panel this morning is that we need domestic demand in order to drive domestic production, which I understand it, but if you look at something like China's production, for example, on solar panels, it turns out that China's domestic consumption of solar panels doesn't really exist, but that what they're doing is producing for export.

They are, of course, an export-driven economy. What I'd really like to get from all of you is some input into how can U.S. producers of green technology penetrate the Chinese market? I understand that first we want to have U.S. consumers using U.S. products, but we need to be able to export, and we should be able to export some of these things. What are the barriers that our companies are facing?

MR. McCALL: I would hate, for my part, to be simplistic about it because it becomes very complex, but the truth is, is that China will put barriers up to products coming into their country and will subsidize

products coming out. And of course, we can talk about the currency manipulation in terms of their advantage as well.

But they want to enter the WT--they want to be part of the WTO. They want to participate in the WTO, but they want the rules to be rules for them, or at least that's our experience. We have attempted in the steel industry, we have attempted to send steel to Europe and to China, and we've found, in many cases, blockages to those markets unless there are products that are uniquely made here in the U.S.

Reflecting back to 2004, I will never forget two stories that were told by the panelists there. One was--and I don't remember their names--but there was a gentleman that talked about his family business, that they'd had a family business for years and years producing ceramic tiles. They were doing very, very well. They had an exclusive contract with Kentucky Fried Chicken, or KFC, I guess, is the proper name, to build 100 stores in China.

And he had an exclusive contract to build the tiles on the KFC stores. KFC--he invested a huge amount of money in terms of what his profitability was in the investment, in the return on investment, and a new factory to produce these tiles. He produced the first shipment, sent them to China, they set on the docks and wouldn't be released and could not be released until he gave up his intellectual property rights on how these tiles were built to meet the Kentucky Fried Chicken standards.

His testimony was he no longer is in that business because now all those tiles--he had to give it up in order to keep the contract going. They produce those tiles in China, and now they're the exclusive purchaser of KFC.

Cooper Tire and Rubber built a new factory in China, and Cooper Tire and Rubber based in Findlay, Ohio, one of their, their major plant based in Findlay, Ohio, is one of the highest quality, low-cost producers of replacement tires in the U.S. They wanted to build a factory in China. They built a factory in China.

Part of the deal in building the factory in China is 100 percent of the tires had to be produced in China for export. Thank goodness for the recent 421 actions so that now in Findlay, Ohio, because of the barriers that had been put on the tires produced in China, now we're hiring people in Findlay, we're building new facilities. Cooper is investing in the U.S.

A Cooper Tire sold in Columbus, Ohio sells for $50. One built in China sells for $50. But today, the margins are much greater on the tires that are made in Findlay than they are in made in China.

So it's about fair and level trading. It's about making sure that, as I said earlier, there is something in it for both parties and both

partners, and if countries are going to put subsidies on their products or put barriers to ours, we have to take actions, and, look, I believe that American business, American manufacturers, American workers, we can compete on all levels.

We can produce all products. Where we can, where somebody else has an advantage to us because of their education or their training or their entrepreneurial ideas or philosophies or technology or whatever, that's fine. That's what neoclassical economics is all about, in my mind.

But for people to have the unfair advantage and for us to go on for decades supporting that unfair advantage weakens and weakens and weakens our economy, and, frankly, that's why, that's why young Ohioans move out of Ohio to go somewhere else to get a job because the manufacturing base is eroding and eroding and eroding.

In 2002, my union was honored and privileged to represent 70,000 workers here in Ohio. Since 2002, we've had a major merger in our union, which brought an additional 20,000 members to our district. Today, because of the loss of manufacturing facilities in Ohio, many of them from plants that are shut down and moved overseas, and a lot of them in China, we only represent a little less than 60,000 members. We have lost huge--and that's the opportunities for the young people in Ohio that they're not getting here in Ohio.

There has to be fairness and recognition that there has to be a level playing field when it comes to our trading partners.

VICE CHAIRMAN BARTHOLOMEW: Great. Thanks.

Mr. Haines.

MR. HAINES: When talking about retaining more of our college graduates, keeping them in Ohio, that's one of the big problems we've got. We've got a good number of fine schools in northern Ohio. But we continue to lose our college graduates when they complete their studies. They typically leave the state

What we seem to lack is a technology transfer set-up like I observed at MIT. That system helps keep their graduates local, encourages business development of these new technologies and helps keep the jobs local. The collaborations between universities and businesses are one of the things we need to strengthen.

We have plenty of competition from school to school, but we lack that coordination of being able to take what we are doing in our universities and transfer that into products that we can make here in Ohio. That's one of the disconnects that we struggle with here in Ohio.

The level playing field, I can't reinforce that enough. Just to enforce the trade policies that we've got will help us compete on a global basis.

My background in manufacturing for 30 years was making molds, making tools, plastic parts, that kind of thing. I moved to Ohio in '95 because Ohio was a hot bed for plastics and rubber. That's changed. Most of the plastics jobs have gone offshore. Why did they go offshore? They went offshore because of the low labor that was involved in labor intense operations. It went offshore for tooling, making molds.

I found, and you can talk to plenty of mold makers that are still alive here, that you can buy a tool from China for the cost of the material in the U.S. The material cost is largely a fixed cost.

What comes into play are the multiple incentives that China has in place, how when they add up, it adds up, up to a 20 or 40 percent or more discount on the cost of a tool, of a finished product. That's not a level playing field.

VICE CHAIRMAN BARTHOLOMEW: Right.

MR. HAINES: That's the intention.

VICE CHAIRMAN BARTHOLOMEW: Thanks.

Ms. Reichert-Kral.

MS. REICHERT-KRAL: One thing that the Commission may not realize, that China is Ohio's third-largest export market. So the state of Ohio is very actively involved in exporting product from the U.S. to China. If you need more detail about that, I would suggest that maybe you contact Deborah Scherer at the Ohio Department of Development-Global Markets Division, and she could give you much more detail on that.

When I traveled to China, this certainly was a trade mission to encourage direct foreign investment from China in Ohio to explore what was going on policy-wise and infrastructure-wise in China, but also for some of our delegates to identify and establish customers in China, and some of our delegates, some of the members on our delegation did indeed find customers, and they are looking forward to working on negotiations and selling their Ohio product to China.

So it can work, but it's not something that you just say, oh, I want to sell this widget. You have to be very strategic. Companies need to pay very close attention to the Chinese market and identify where the U.S. has strengths and skills that we can fill the gaps that they haven't figured out.

Another thing that I think is very important and has been mentioned throughout the time here is that it is critical that the U.S. protect its intellectual property. Where we are competing in many cases is with the high technology. The Chinese market is going out and buying R&D facilities.

They are purchasing the IP not just in license agreements, but

they are taking over corporations, hiring the researchers, making that intellectual property theirs so that they have the ability to develop and compete.

I certainly support the importance of tech transfer in incubation. As an incubation director, I think that's very important. One thing that you all may not realize, that the National Business Incubation Association studied incubation and companies that incubate, 85 percent of them stay in the region where they were incubated.

So the Economic Development Administration is one of the few federal programs that directly supports incubation, and that's been very beneficial.

University of Toledo's Tech Transfer Department is nationally ranked when you take a look at license agreements and spinoff businesses, when you equalize it based on research dollars. So University of Toledo, as I said, modest research budget, but we have spun off more businesses and created more license agreements last year than many research universities that are ten times our size as far as research budget.

And by having technology transfer and incubation work very closely, that's how we're developing and building this renewable energy cluster in our area, and the companies that we're developing, they start off not only looking at the Ohio market but looking for their export opportunities initially.

I think that many of our international competition look at a global market to start, and a lot of times in America, we have a tendency to look at the U.S. market because it's been so big. But it's a new day, and competition is coming from everywhere, and we have to make sure that we are training our entrepreneurs of the future, that they're looking at the entire market so that they can compete and so that our workers can do the good work and show the world where we can go.

VICE CHAIRMAN BARTHOLOMEW: Great. Thanks.

Chairman Slane, your turn for questions.

CHAIRMAN SLANE: Thank you.

I've seen this movie before, and I have little or no confidence that we are ever going to get our act together and be able to retain this industry in the United States.

I think the best that we're going to be able to hope for is that the Chinese come over here and open up factories in the United States to be closer to their customers, and we would have the installation and maintenance contracts.

My question to Mr. McCall is we've heard a lot of issues about training and are American workers able to do this type of work. Does

your union have any training programs? Do you have any ability to supply qualified workers with the skills needed to produce these products?

MR. McCALL: Yes. Let me say first that I've been watching the movie for a long time myself. And to quote George Becker, George Becker used to say--maybe it's not a quote--maybe it's a paraphrase. But I'm very close. And he would always promise that if we fought, we wouldn't win, wouldn't guarantee we would win, but if we didn't fight, he would guarantee that we would lose.

So although I've watched the movie on several occasions, I think it's well worth the continuing effort to try to bring fairness and enforcement into our trade policies and into trade agreements with partners all over the world.

The United Steelworkers in 1986 created what we called the Institute for Career Development, a partnership between our union and at that time all the major steel companies. It has now expanded to include many other companies that we represent the workers at, whether it be tire and rubber, paper, and, in some cases, public sector.

As a matter of fact, in Lorain, Ohio, the city workers now participate in our Institute for Career Development as well. It is a joint project between the companies that participate in the union in terms of offering training for workers in all aspects of their interests whether it be in higher education, whether it be in technical skills, in some cases whether it be in hobby skills.

It is established and now has provided services for literally hundreds of thousands of workers in the United States and the industries in which they participate.

We currently are doing a project based out of Merrillville, Indiana, in which we are training workers who have an interest in green technology, in green jobs that not only produce products that are green in nature, but the process of it as well is green.

In addition, training workers around metallurgical content on the important kinds of plate, as I understand it, that towers have to be built out of, or the metallurgical content of it, and in developing the wind turbines themselves into products under the repair and maintenance of them.

So our union does have an arm for retraining, on continuing training, and upgrading of skills. We use it also to upgrade current workers' skills as new technology comes in the various industries, whether it's steel or tire and rubber, paper, oil, chemical.

So it would be better if it were bigger and if it could be expanded, but we continue to work very hard with our partner companies in developing that training program.

CHAIRMAN SLANE: Great. Thank you.

Mr. Haines, I'd love to get your answer, but before that, could you just tell me a little bit about what your company does?

MR. HAINES: With WIRE-Net?

CHAIRMAN SLANE: Yes.

MR. HAINES: I was going to add on to what Dave was talking about. We're 20 years old, we're about 21, 22 years old, a nonprofit organization that started up in Cleveland. The Global Wind Network is one of our programs. Another one of our programs is education, meeting the needs for manufacturers. We're manufacturing run; we are responsive to manufacturing needs. I have a need for 100 trained CNC machine operators now. I don't have those--

CHAIRMAN SLANE: In Cleveland?

MR. HAINES: In the Cleveland area, in northeast Ohio.

CHAIRMAN SLANE: Cleveland, uh-huh.

MR. HAINES: And that's the situation that is common throughout the state, and it's common throughout the country, is that our school systems are directing, and our school systems are measured by the number or students that go to college. They're not being measured with an alternative path that will take them through trade training. They're not measured in that transition.

So we're getting an awful lot of college graduates that right now if you talk to a recent college grad, it's really tough to get a job out there.

CHAIRMAN SLANE: Yes, it is.

MR. HAINES: Okay. I've got a shortage of CNC machine operators today. If I had qualified ones, we have jobs for them now. What we work to do is we have people in Max Hayes Technical High School in Cleveland that helped pull and create the curriculum to educate these students so that they'll make the transition into manufacturing.

We just ran a summer AIM camp--we call it AIM, Advanced Introduction to Manufacturing--to get youth involved, get them exposed to manufacturing. Our manufacturers host tours of their facilities to help draw youth into manufacturing, to consider it as a viable career. So hopefully that gives you a little bit of a background of WIRE-Net, what we do for education.

We also have a slice that works with advocacy for manufacturing. My background, yes, my expertise, I go in and help companies with their problems, whether it's coaching, whether it's putting in an ISO system in a fuel cell manufacturer, whether it's a wind manufacturer. I don't care what industry that they serve so much. I care that they have jobs here in Ohio.

CHAIRMAN SLANE: Thank you.

MS. REICHERT-KRAL: If I could just offer a couple of comments?

CHAIRMAN SLANE: Yes, please.

MS. REICHERT-KRAL: The steelworkers, I know do have great training programs. Also the electrical union in our area is training regularly its workforce in both solar and wind. This is an area that all of our unions, at least across our area, have fully embraced, and they are working very closely also with the community colleges that are training those union and non-union, and our university, as I had mentioned before, is working closely with those community colleges and those other community partners to kind of create those pathways.

Our workforce development agencies in this region have developed a green jobs partnership and are offering programs for displaced workers to train them in some of the basic skills that can then enable them to go into some of these solar installation jobs or windsmith jobs. And so... it takes coordination and collaboration and pulling from the strengths of all of the partners within the region to make this kind of activity successful, and it can be replicated obviously across the U.S.

CHAIRMAN SLANE: Thank you.

VICE CHAIRMAN BARTHOLOMEW: Mr. Chairman, I actually want to jump in because I think it's really interesting. People aren't focusing enough on this, which is we're also going to have a generational problem that for manufacturing having the next generation of people who have experience is going to be really critical. And that gets to the whole issue of career paths, too, that if people don't see that there's going to be a future in manufacturing, they're not going to try to aim themselves that way.

But I also think that there's a misunderstanding and a myth in some ways in the land still about what manufacturing is. Many manufacturing processes, as you know, are quite highly sophisticated now and need computer skills, and frankly there's a whole generation of kids out there playing computer games and very adept on computer things, and we need to get them to understand that there's a future for them in manufacturing as long as there's a future for manufacturing. So it's multifaceted.

I know that some companies also work with the unions to have apprenticeship programs to try to start breaking that open.

Commissioner Brookes.

HEARING CO-CHAIR BROOKES: Thank you very much, and thank you all for your testimony.

I have a couple of semi-related Ohio questions here. The

Chinese recently announced restrictions on export of rare earth elements. Will that affect manufacturing here in Ohio?

I open these up to the panel, but I'll give you the three questions. It might be the most expedient way to do it.

Where is the real future of energy production in Ohio? In other words, production of electricity? Is it green? Is it fossil-based? And then, can green technology produce a significant number of jobs in Ohio based on where the future of energy production is in Ohio?

So I open that up to the panel and have at it. Please. Thank you.

MS. REICHERT-KRAL: I guess I'll jump in.

HEARING CO-CHAIR BROOKES: Okay.

MS. REICHERT-KRAL: The Chinese export restriction on rare earth minerals certainly could impact this industry, but again, I urge you to focus on the fact that this is not one industry; it's a whole conglomeration of industries from small wind to large wind, to solar, to hydro, to geo-thermal. It's a very diverse industry sector with more diversity than many of the other sectors that we've faced in the past.

It's also truly an emerging industry, and so if we know that there are bottlenecks in a certain area, I think as long as we're investing in research and development, the American researchers are certainly creative enough to be able to find the workarounds.

HEARING CO-CHAIR BROOKES: To work around in case there are restrictions--because the Chinese produce about 97 percent of rare earth elements.

MS. REICHERT-KRAL: That takes time, effort and resources in order to develop that technology and secure those additional options.

Where is the future or renewable energy? Again--

HEARING CO-CHAIR BROOKES: For energy production.

MS. REICHERT-KRAL: Or energy production. Energy production, I think, very similarly to the Ohio renewable portfolio standard, will be very broad, and I think I had said before, you know, one technology is not going to replace our reliance on petroleum. We're bathed in petroleum. We are--it's in everything from our bottles to shampoos to how we power our cars.

And there are a whole family of technologies that we will need to embrace. All of the biofuel work we have now, this is good and solid and will create an industry, but it will also create the feedstocks that will create bio-based plastics. It will create feedstocks that will create bio-based lipids and things that will go into the cleansers and detergents and things that we use now that have petroleum as their base.

But it's important that we balance those needs for those oils and those other raw materials against the food issue. So there's lot of

complex things that need to be evaluated, but I think that we have to really balance between the optimization of the cleaner dark technologies, or whatever, the fossil fuels, using natural gas as a bridge technology.

It's cleaner than coal. It's cleaner than petroleum, but it's still a fossil fuel, but it could be a good bridge to get us to where the renewables are cost effective and have the capacity to truly replace one of our other needs.

So I think that we have to really take a holistic approach and look at what are our transition technologies. Could hydrogen supplementation into internal combustion engines increase fuel efficiency so we can reduce our need of foreign oil until the fuel cell technology is really ready and affordable in the marketplace? And then we can obviously branch there.

But then how do we build the infrastructure for the hydrogen technology? So there are many things to be considered and a lot of areas to invest in and work on policy.

Can green replace--

HEARING CO-CHAIR BROOKES: Create a significant number of jobs? That was the question.

MS. REICHERT-KRAL: It definitely can create a significant number of jobs. At least in northwest Ohio, you know, we have thousands of jobs that are green jobs.

HEARING CO-CHAIR BROOKES: How do you define "significant"?

MS. REICHERT-KRAL: Well, First Solar, I believe is over a thousand employees now. I think that's significant.

HEARING CO-CHAIR BROOKES: I'm talking about future.

MS. REICHERT-KRAL: And in the future, I expect we'll see continued growth. If you look at the wind supply chain work that the Global Wind Network did, it shows, as well as AWEA shows, that because of our history in metals and composite materials, as these foreign wind turbine components, you know, the parts are just way too heavy to put on a boat and ship consistently.

The cost of transportation and the logistics that are required for installation of these super-sized turbines really requires a domestic supply chain so that costs can be contained.

Ohio and the other manufacturing strengths from the heartland really stand to benefit from that because all of our skills are resident. You know we have generations of knowledge in working with metals. Yes, it's a change to go from an automotive component or an aircraft engine turbine to a utility scale wind turbine, but it's just a matter of scale. The skill sets are transferable, and it's the investment in the

infrastructure and the ability to help those businesses bridge that financing.

Can we offer those loan incentives? Can we give them affordable equity or affordable financing so that they can take them there themselves?

HEARING CO-CHAIR BROOKES: Okay. Thank you. Mr. McCall and Mr. Haines, do you have any views on those three questions I threw out there?

MR. McCALL: First, let me say that I wanted to say earlier, and I want to emphasize, that I agree that there's not one magic wand here. We need a whole wide variety of renewable sources and concentration on new energy sources.

I would, however, say, that if the thought is, is that wind turbines and towers and all the rest of that is going to be too heavy to put on a boat and bring to the U.S., I would submit to you that for decades now there are literally hundreds of millions of tons of slabs that have been transferred to China into the U.S. that have been dumped, have illegally been imported, and, you know, if there's a way, they'll find it.

If there's any one issue, it's not about being competitive. It's about whether or not they can enter the market, and so there the only answer is not that it's too big or too heavy or that we've been so good at it for so many decades that they can never succeed in doing it, we have to have a level playing field.

It's the point I got back to, that I made earlier. Because it's too great, whether it's the Chinese or somebody else, they will find a way to manipulate the market. I think this most recent restriction that you ask in the question is about beginning to manipulate the market.

Again, I'll reflect back to 2004 when we had these hearings in Akron. There was another small businessman there who talked about how he had produced and his family had produced microchips for technology to detect nuclear submarines all over the world. And through Chinese industrial espionage, from stealing the stuff, the Chinese were now producing the chips that he and his family had been producing for years.

So, look, there are bad people everywhere in the world. All Chinese are not bad, and that's not what I'm trying to say. But their attempt to get into our market sometimes is to ignore the trade laws and other laws that govern an acceptable society, and so I think if they can find a way--some will find a way, and the Chinese government will help them export their unemployment to us because that's, in essence, what happens.

If their market, you know, if they invest in their own market,

they grow their own market, that's fine, and we should compete globally on whatever products we can compete on.

Where are the green jobs and how many are there going to be, I think the question is yet unknown. There's going to be a lot of--I think there's going to be a lot of new jobs, some that we haven't thought about. I think that there's great potential, and maybe it's the old machinist and not CNC operator in me that says that someday instead of pulling up to the service station and putting gasoline in your car, you're going to pull up to the service station and you're going to exchange your batteries.

So how many jobs does that create and where are they going to create them, I don't know, but there's going to be a lot of them.

An example of that, for me, I can't claim to be a Buckeye all my life or somebody from Columbus, Ohio. I grew up in Gary, Indiana, and only, when I moved to Ohio, both states increased their average intellectual content and IQ. I occasionally will go back to northwest Indiana and will drive down I-65 towards Purdue University, where both my daughters graduated from college at, and now ten miles north of Lafayette for literally ten miles, there are nothing but windmills on the east side of the highway.

It is a beautiful and gorgeous sight among all the corn that is grown in northwest Indiana, in central Indiana, there are all these, literally hundreds and hundreds of windmills. I am told that it is a power source that once the grid is set up and all the rest of that will be used for Chicago.

It is an amazing, an amazing scene to witness. I'm also told that every one of those towers, every one of those generators, every one of those blades, were built in China. It is an absolute opportunity that we've lost for manufacturing in America because I think, as I said earlier, we haven't set up the incentives for manufacturing America to build those towers, to build those windmills.

Now, sure, we're going to maintain them, and we'll make sure that the wires are all connected and all the rest of that, but the opportunity to build and continue to replace that type of technology and that type of renewable energy could go up anywhere, and as I said, all the farmers in the area are still growing the corn, and by the way, it's the best sweet corn you'll ever eat in the world.

They're still growing all the corn amongst all that power that's being generated. So there are huge opportunities. I love Cleveland, I spend a lot of time in Cleveland, I think people talk all the time about the opportunities to have windmills off the lake, in Lake Erie, and the production of energy using the lake.

I think there are huge, bright, new young men and women, who

are graduating from the best schools in the country, here in Ohio, who will come up with ideas and new locations and new types of jobs. So I think it's unlimited. I think it is much bigger than a lot of people think in terms of what's going to happen in our future.

I think that it will create literally thousands and thousands and thousands of jobs, and it is a great new frontier for us.

HEARING CO-CHAIR BROOKES: Thank you.

MR. McCALL: And we should move forward.

HEARING CO-CHAIR BROOKES: Yes. Mr. Haines, if you could quickly give your views.

MR. HAINES: Yes. You identified two points on a circle that are related: where energy is going, are there green jobs there for manufacturing and the impact of China's control of certain rare earth minerals. Okay.

Rare earth minerals: one of the anticipated shortages with tying up that natural resource on a global basis is in magnets. Magnets are used in every wind turbine, every cell phone, every generator, every electric motor.

Manufacturing is classically energy intense: if we start looking at the cost of manufacturing, okay, if the generator cost is going to go up because we don't have control over the supply, it's not a free market supply, okay, that's going to raise my manufacturing cost here in the U.S. because I need the electric motors.

A manufacturer also needs to buy the electricity from the power company, and that's going to cost me more because their generators rely on those magnets as well. So I found that a very interesting combination.

HEARING CO-CHAIR BROOKES: Up until about the year 2000, the U.S. was the largest producer and innovator in rare earth elements.

MR. HAINES: Right.

HEARING CO-CHAIR BROOKES: And this is something that we just--when we stopped producing, closed some of the mines.

MR. HAINES: And this also plays over to the Department of Defense. They have a strategic materials need that becomes jeopardized when global control exists with one government.

HEARING CO-CHAIR BROOKES: They have it in their supply chain, which can be problematic as well. So if the supply is not there, I don't know how you're going to produce, and I don't know how many years it takes you to get around that from a technological standpoint, but this is something we really need to address, and China produces 97 percent, probably closing on 100, and then they're going to restrict exports and manipulate the market. So there's real challenges there for us.

MR. HAINES: This can yield multiple higher cost impacts to the manufacturing supply chains when the control of rare earths is out of the hands of the free market. Higher US costs usually mean jobs lost to another country.

On green jobs, we do have a lot of green job potential here. This state is coal intense in its production of electricity. We know that. We have a lot of companies here employed in coal scrubbers, the scrubbers that are going to remove pollutants from the emissions. That is good business for us.

As things change--we spoke briefly about a transition period, natural gas to carry us over--whatever that intermediate solution is going to be is going to rely on manufactured parts, pieces, and equipment. That is going to produce jobs for Ohio.

HEARING CO-CHAIR BROOKES: Thank you very much.

VICE CHAIRMAN BARTHOLOMEW: Thank you very much to all of our witnesses.

Commissioner Brookes, I would note on the rare earth minerals topic that one of the concerns of some of us when CNOOC, the Chinese oil company, was trying to acquire Unocal, had they succeeded at doing that, they would have acquired one of the last remaining U.S. sources of rare earth minerals, and that was now--what--four or five years ago, so they have certainly had their eye on the rare earth minerals ball for a whole lot longer than people here have.

Before we break for lunch, I want to acknowledge that Martin Gelfand from the office of Congressman Dennis Kucinich is the audience, and we thank him for his interest and for his participation.

Again, thank you to all of our panelists. It's a very interesting and productive panel. We're going to break until 1:45 for lunch, and we'll see people back here then.

Thank you.

[Whereupon, at 12:43 p.m., the hearing recessed, to reconvene at 1:48 p.m., this same day.]

A F T E R N O O N S E S S I O N

PANEL III: CLEAN TECHNOLOGY COMPANIES ADDING JOBS AND GROWTH

HEARING CO-CHAIR BROOKES: Good afternoon. We'll start our third panel today. Thank you for being here. This panel is on "Clean Technology Companies Adding Jobs and Growth."

Joining us today is Ms. Kathy Weiss. She's Vice President for Government Affairs at First Solar, which is in Washington.

Mr. Greg Noethlich, Chief Operating Officer of Elyria Foundry in Cleveland, Ohio.

Mr. J. Ross Bushman, President, Cast-Fab Technologies, Incorporated, Cincinnati.

And then Mr. Patrick Valente is the Executive Director of Ohio Fuel Cell Coalition, Cleveland, Ohio.

Why don't we start with Ms. Weiss, if you would? Thank you.

STATEMENT OF MS. KATHLEEN WEISS
VICE PRESIDENT, GOVERNMENT AFFAIRS, FIRST SOLAR
PERRYSBURG, OHIO

MS. WEISS: Thank you, Vice Chairman Bartholomew, Commissioner Brookes, and members of the Commission. I'm very pleased to have the opportunity to be here today and discuss the expanding use of clean, affordable solar energy and related policy challenges both here and in Ohio as well as in China.

I'm Kathy Weiss, Vice President-Government Affairs of First Solar. First Solar is the world's largest PV solar manufacturer, North America's largest PV solar power plant developer, and the low cost PV manufacturer.

Our advanced technology thin-film modules are the cornerstone for rapid manufacturing scale-up, progress toward grid parity, and job creation that we have experienced. However, stable, long-term government policies accelerated our journey.

In 2009, First Solar had revenues totaling $2.1 billion, which is an increase of $900 million over 2008, and we were added to the S&P 500 Index.

Between 2005 and 2009, we scaled our annual solar module production from 20 megawatts to over 1,100 megawatts. That's an increase of more than 50 times. During the same period, we increased employment to more than 4,500 people worldwide and invested over $1 billion in equipment and research. The ability to scale the business

enabled a 70 percent cost reduction in our modules.

For high irradiance projects, the installed cost is on a pathway towards grid parity with U.S. installed costs between 12 and 15 cents per kilowatt-hour, which includes federal subsidies.

Our associates take great pride in their work and the knowledge that based on 2009 capacity, First Solar modules can generate enough electricity to power 160,000 homes and simultaneously avoid emissions of 30 million tons of Co-2 over the 25-year life of the modules.

Plans to increase our global solar manufacturing capacity from 1,100 megawatts to 2 gigawatts by 2011 were announced earlier this year.

The critical component of First Solar's success has been our game-changing thin-film technology, which was developed in the United States, and as noted earlier, in collaboration with University of Toledo, by a visionary glass manufacturer named Harold McMaster.

Today, our growing Ohio operations directly employ over 1,000 associates and remain a nucleus for research and technology innovation. In a state with over ten percent unemployment, our operations continue to expand and offer high-tech jobs. Our cutting edge research has attracted dozens of Ph.D.s. and engineers with advanced degrees who live and work in the greater Toledo area.

Equally important is that our Perrysburg facility employs many former auto workers who possess manufacturing skills that are both specialized and transferable to solar manufacturing.

The decision to expand our Perrysburg campus was enabled by a package of incentives provided by the state and local government. The Strickland administration has demonstrated a commitment to an energy agenda that will leverage the state's innovative spirit and world-class manufacturing infrastructure and prepare Ohio's economy to thrive in a low carbon economy.

The governor's initiatives include an Advanced Energy Portfolio Standard, as well as investments in jobs and economic development. As noted earlier, earlier this month, northwest Ohio was designated an official hub of solar energy research and innovation by Governor Strickland.

In 2009, over 90 percent of our global production was sold outside of the United States. As a growing number of countries combine carbon emission reduction goals with renewable energy policy, the proximity to markets and low cost manufacturing will drive investment and manufacturing overseas unless policies here help drive market growth.

CHAIRMAN SLANE: Excuse me. How much did you say went overseas?

MS. WEISS: Over 90 percent of our revenues were generated from overseas.

CHAIRMAN SLANE: Thank you.

MS. WEISS: Germany remains an excellent example of how forward-looking policy increased renewable energy use and created green jobs. Renewable energy consumption in Germany increased from four percent to 15 percent as a result of renewable energy feed-in tariffs that created growing, transparent, and predictable renewable energy markets.

The German government reports over 280,000 renewable energy jobs have been created since the feed-in tariff was adopted, and 53 billion tons of CO2 emissions have been avoided.

Germany's success has driven the adoption of similar programs across most European countries and ongoing consideration of such programs in China and India. U.S. solar resources are significantly higher than those in Germany or other solar markets of significance.

However, without a growing and predictable domestic market and competitive incentive policies, the United States, the U.S. risks losing the global race for solar technology and associated green jobs and could be relegated as an importer of products developed and manufactured in other countries.

The good news is that it's early in the energy's development path and the outcome can still be influenced.

Recent project financing, market development, and manufacturing policies, alongside export promotion policies and activities, are an important first step for the United States to reenter the global race for solar technology and associated green jobs.

Specifically, the combination of maturing renewable portfolio standards and federal policies established under the 2009 American Recovery and Reinvestment Act, ARRA, mark an important inflection point in the development of the U.S. solar market.

Several ARRA programs, in particular, are making a difference--the Treasury Grant Program, the DOE Loan Guarantee Program, the Section 48C manufacturing investment tax credit, and the Interior Department's Fast Track Initiative.

These policies represent an important step to helping reestablish U.S. leadership in clean technology, and equally important will be assuring access for these products and services to global markets.

One of the solar industry's most significant constraints is efficient access to capital. In 2009, ARRA includes a grant in lieu of the investment tax credit for solar generation, which is having a positive effect on the U.S. solar market and related job creation.

The Section 1603 Treasury Grant Program provides direct

payments to energy producers in place of tax credits. And this was done to help compensate for the dwindling tax equity markets and to provide a cash incentive at a time when the solar industry as a whole was not profitable.

Speed up here a little bit. Approximately five percent of the power--

VICE CHAIRMAN BARTHOLOMEW: Slow down. It's okay. You're talking really fast already.

MS. WEISS: I'm watching the clock here.

VICE CHAIRMAN BARTHOLOMEW: It's okay.

CHAIRMAN SLANE: It's all right. Take your time.

MS. WEISS: Okay. Approximately 85 percent of the power price received for a large-scale power plant goes to repay the capital invested to build the project. So First Solar is the leading solar power plant developer in the U.S., and we've got just about 2 gigawatts of projects that are under development with power purchase agreements in place.

But due to the 2011 sunset date of the loan guarantee program, combined with permitting redundancy and the complexity of the program, the ultimate value of the loan guarantee program is extremely limited, and the result will be more expensive financing and higher cost solar electricity.

The Department of Energy loan guarantee program could play a key role in supporting industry growth by reducing financing costs and fostering the development of robust private capital market to finance large solar projects.

So we believe that it's critical that the program's lifespan be extended to 2016, which would make it coterminous with the investment tax credit and therefore synchronized to the long development timelines of the projects with these important government policies.

The third initiative that I want to talk a little bit about is the manufacturing investment tax credit. As part of the ARRA, there was a manufacturing investment tax credit created and funded with $2.3 billion. That program is wildly successful. It was oversubscribed in pretty short order.

The President has called on Congress to direct an additional $5 billion to the 48C program to support more domestic manufacturing of renewable energy equipment, and so keep in mind the manufacturing investment tax credit is different than the Treasury grant program, which is a tax credit for power generation projects.

As was noted earlier today, a decade ago, the U.S. made more than 40 percent of all solar panels. Since then other countries have

supported clean tech manufacturing with various incentive policies, and the result today is that our nation manufactures less than ten percent and China has leapfrogged as the world's largest producer.

I want to touch on the issue of actually cutting through some bureaucracy in terms of getting things built, and I'd like to recognize the improvements in the regulatory process to deploy solar on federal land with greater speed, certainty, and transparency, but done without compromising stewardship of our nation's precious resources.

Based on First Solar's experience, the MOU that was signed between the Department of the Interior and the state of California, which is the country's largest solar market, has fostered a sense of collaboration and commitment around advancing large solar projects.

However, recently issued rental policy for right-of-ways on public lands needs to be revisited, in our view. Charging royalties is typically done to recover for the taxpayer the value of the commodity being extracted and depleted, and there is no energy resource or commodity being extracted or depleted by building solar power plant.

At this stage in the development of the solar industry, policies should be focused on reducing the cost of delivered energy.

And just a final comment on our view of global markets and our experience in China to date. We're committed to working with China to develop a healthy and sustainable solar industry and promoting positive U.S.-China energy relations.

First Solar and the city of Ordos in Inner Mongolia have been actively developing a 30 megawatt demonstration project, which is phase one of a two gigawatt Memorandum of Understanding that was signed in September 2009 and then reaffirmed through a Cooperation Framework Agreement in November of 2009.

And we believe that showing progress on this project will demonstrate tangible results from U.S-China cooperation on renewable energy, and that the China market--and fulfillment of this MOU should demonstrate that China's market is open to U.S. companies.

I think government efforts can best support U.S. energy opportunities in China by advocating for an open and transparent market that rewards high quality projects and continues to support commercial deployment in projects such as First Solar's Ordos project.

I think I'll just leave it at that because I'm way over. Thank you.

[The statement follows:]

Prepared Statement of Ms. Kathleen Weiss
Vice President, Government Affairs, First Solar
Perrysburg, Ohio

Vice Chairman Bartholomew, Commissioner Brookes, and members of the commission, thank you for the opportunity to discuss expanding the use of clean, affordable solar energy and related policy challenges both here in Ohio and in China.

First Solar Background

I am Kathleen Weiss, Vice President-Government Affairs of First Solar. First Solar is the world's largest photovoltaic (PV) solar module manufacturer. Our firm is North America's largest PV solar power plant developer, and the low cost PV manufacturer. Our mission to enable clean, affordable solar electricity is supported by a sustainable business strategy that leverages advanced technology and economies of scale to lower costs.

First Solar welcomes the opportunity to address the topic of today's hearing – The Challenge of China's Green Technology Policy and Ohio's Response. Our advanced technology thin film modules are the cornerstone for the rapid manufacturing scale-up, progress toward grid parity, and job creation that we have experienced. However, stable, long-term government policies accelerated our journey. In 2009, First Solar had revenues totaling $2.1 billion, an increase of $900 over 2008, and we were added to the S&P 500 Index.

Between 2005 and 2009, we scaled our annual solar module production from 20 megawatts to over 1,100 megawatts -- an increase of more than 50 times. During the same period, we increased employment to more than 4,500 people and invested over $1 billion in equipment and research. The ability to scale the business enabled a 70 percent cost reduction in our modules. For high irradiance solar projects, the installed cost is on a pathway toward grid parity with a U.S. installed cost between $0.12 and $0.15 per kilowatt-hour, including federal incentives.

Our associates take great pride in their work and the knowledge that based on 2009 capacity, First Solar's modules can generate enough electricity to power 160,000 houses and simultaneously avoids emissions of 30 million tons of CO2 over the 25-year life of the modules. Plans to increase our global solar module manufacturing capacity from 1,100 megawatts to 2,000 megawatts by 2011were announced earlier this year.

Market Growth Enables Jobs and Cost Reduction

The critical component of First Solar's success has been our game-changing thin-film technology, developed in the United States. Today, our growing Ohio operations directly employ over 1,000 associates and remain a nucleus for research and technology innovation. In a state with over 10 percent unemployment, our operations continue to expand and offer high-tech jobs. Our cutting edge research has attracted dozens of PhDs and engineers with advanced degrees who live and work in the greater Toledo area. Equally important is that our Perrysburg facility employs many former auto workers who possess manufacturing skills that are both specialized and transferable to solar manufacturing.

The decision to expand our Perrysburg campus was enabled by a package of incentives provided by the state and local government. The Strickland Administration has demonstrated its commitment to an energy agenda that will leverage the state's innovative spirit and world-class manufacturing infrastructure and prepare Ohio's economy to thrive in a low carbon economy. The Governor's initiatives include an Advanced Energy Portfolio Standard which requires that 25 percent of Ohio's electricity be produced from advanced energy technologies by 2025, along with investments in jobs and economic development. Earlier this month, Northwest Ohio was designated an official hub of solar energy research and innovation by the Governor.

The cornerstone of our technology adoption and cost reduction success has been due to growing and reliable solar markets overseas. In 2009, over 90% of our global production was sold outside of the United States. These markets have provided us the opportunity to scale and reduce costs, thus enabling an accelerated cycle of improvement that benefits the environment, local economies and the cost competitiveness of solar electricity.

It should come as no surprise that, although we expanded our Ohio plant last year, most of our plants are built outside of the United States. As a growing number of countries combine carbon emission reduction goals with renewable energy policy, the proximity to markets and low cost manufacturing will drive investments and manufacturing overseas unless policies here help drive market growth.

Germany remains an excellent example of how forward looking policy increased renewable energy use and created green jobs. Renewable energy consumption in Germany increased from 4% to 15% as a result of a renewable energy feed-in tariff that created growing, transparent, and predictable renewable markets. The German government reports that over 280,000 renewable energy jobs have been created since the feed-in-tariff was adopted and 53 billion tons of CO2 emissions have been avoided.

On June 8, 2010, First Solar announced our intent to expand our German manufacturing plant in Frankfurt an der Oder, increasing local production capacity and creating several hundred new jobs. The expansion would double the annual capacity of the Frankfurt (Oder) manufacturing plant to around 446 megawatts (MW) by the fourth quarter of 2011 from 223 MW today to serve a strong European customer base.

Germany's success has driven the adoption of similar support programs across most European countries and ongoing consideration of such programs in China and India. U.S. solar resources are significantly higher than those in Germany or other solar markets of significance. However without a growing and predictable domestic market and competitive incentive policies, the United States risks losing the global race for solar technology and associated green jobs and could be relegated to an importer of products developed and manufactured in other countries.

U.S. Policy Initiatives

The good news is that it is early in the industry's development path, and the outcome can still be influenced. Recent project financing, market development and manufacturing policies, alongside export promotion policies and activities, are an important first step for the United States to reenter the global race for solar technology and associated green jobs.

Specifically, the combination of maturing state Renewable Portfolio Standards and federal policies established under the 2009 American Recovery and Reinvestment Act (ARRA) mark an important inflection point in the development of the U.S. market. Several ARRA programs, in particular, are making a difference – The Treasury Grant Program, the DOE Loan Guarantee Program, the Section 48 C manufacturing investment tax credit, and the Interior Department's Fast Track initiative. These policies represent an important step toward helping to reestablish U.S. leadership in clean energy technology. Equally important will be ensuring access for these products and services to global markets.

1. **Extend Expiring Treasury Grant Program**

One of the solar industry's most significant constraints is efficient access to capital. The 2009 American Recovery and Reinvestment Act included a grant in lieu of the investment tax credit for solar generation, which could have a very positive impact on the U.S. solar market and related U.S. job creation.

The Section 1603 Treasury Grant Program provides direct payments to energy producers in place of tax credits. This was done to help compensate for the dwindling tax equity market and to provide a cash incentive at a time when the solar industry as a whole was not profitable.

A defining feature of the Treasury Grant Program is that it vastly expands the pool of investors who are attracted to the stable, long-term return on investment that a utility-scale solar power plant generates. The Grant Program also benefits the debt-side of solar financing by lowering the cost of debt at a time when financing continues to be tight.

First Solar joins others in our industry, small and large, to extend our thanks to Congress for establishing this program. However, the grant program will expire at the end of this year, just as it is critically needed to bring projects on line and attract investors for new development projects. It is vital that the grant program be extended though December 31, 2012 and that Congress act swiftly to do so. First Solar is also supportive of Senator Feinstein's legislation, the Renewable Energy Incentive Act, to extend and expand the Section 1603 grant program.

2. Extend and Streamline the Department of Energy Loan Guarantee Program

Approximately 85 percent of the power price received from a large-scale solar power plant goes to repay the capital invested to build the project. First Solar is the leading solar power plant developer in the U.S., with over 2,000 megawatts of projects under development with power purchase agreements in place. Due to the 2011 sunset date, permitting redundancy, and complexity of the program, the ultimate value of this program is extremely limited. The result is more expensive financing and higher-cost solar electricity.

The Department of Energy loan guarantee program can play a key role in supporting industry growth by reducing financing costs and fostering the development of robust private capital markets to finance large solar projects.

It is critical that:

- the program's lifespan be extended to 2016, making it coterminous with the investment tax credit, and synchronized to the long development timelines of the projects it is intended to support, and

- environmental permitting requirements and timelines are harmonized between state and federal oversight agencies.

3. Manufacturing Investment Tax Credit

The 2009 American Recovery and Reinvestment Act included a competitive tax credit capped at $2.3 billion in total tax expenditures for advanced energy manufacturing projects (new code Section 48C).

The 48C credit was oversubscribed, and like other ARRA programs, is due to sunset. President Obama has called on Congress to direct an additional $5 billion to the 48C program to support more domestic manufacturing of renewable energy equipment.

A decade ago, the U.S. made more than 40 percent of all solar panels. Since then other countries have supported clean tech manufacturing with various incentive policies. The result is that today our nation manufactures less than 10 percent and China has leap frogged us as the world's largest producer.

4. Address Issues of Land Use and Grid Transmission for Solar Inclusion

I want to recognize improvements in the regulatory processes to deploy solar on federal lands with greater speed, certainty and transparency without compromising the stewardship of our nation's precious resources. Based on First Solar's experience, we believe the MOU between the Department of the Interior and the State of California has fostered a sense of collaboration and commitment around advancing large-scale projects. However, the recently issued rental schedule for solar energy right-of-way authorizations on the public lands should be revisited. Charging royalties is typically done to recover for the taxpayer the value of the commodity being extracted and depleted. There is no energy resource or commodity being extracted or depleted by a solar power plant. At this stage in the development of the solar industry, policies should focus on reducing the cost of delivered energy.

As renewable energy grows, transmission becomes a serious constraint that must be addressed. The rules governing transmission siting and interconnection were designed decades ago and urgently need updating to accommodate the inclusion of renewable generation.

An Open and Transparent Market is Core Building Block

First Solar is committed to supporting the development of a healthy and sustainable solar industry in China and promoting positive U.S.-China energy relations. First Solar and the Ordos City Government of Inner Mongolia have been actively developing a 30 MW "Demonstration Project" (Phase 1 of the 2GW project) since signing a Memorandum of Understanding (MOU) in September 2009 and Cooperation Framework Agreement in November 2009. Showing progress on this project will demonstrate tangible results from U.S.-China cooperation on renewable energy and that the China market is open for U.S. companies.

Government efforts can best advance U.S. solar energy industry opportunities in China by advocating for an open and transparent market that rewards high quality projects and continued support for the commercial progress of projects, including First Solar's Ordos project. Our experience in U.S. and international energy markets demonstrates that an open and transparent market is the core building block of a healthy and sustainable solar industry. As China develops its solar market structure, the formation of an open and transparent market that rewards high quality products and reliable systems is critical.

Conclusion

First Solar believes that a strong U.S. solar industry is fundamental to our energy security and economic recovery. In fact, we know that solar energy creates more jobs per megawatt of energy than any other form of energy: renewable or fossil. The Federal government should provide a regulatory framework and transitional incentives of sufficient duration and impact to ensure that those jobs are created in the United States and that our nation remains at the forefront of technology leadership.

We thank the Commission for holding this hearing and offer our support to the Commission and Congress in crafting solutions to create jobs and reestablish America's leadership in solar manufacturing and deployment.

VICE CHAIRMAN BARTHOLOMEW: Thank you.
HEARING CO-CHAIR BROOKES: Thank you.
Mr. Noethlich.

STATEMENT OF MR. GREG NOETHLICH
CHIEF OPERATING OFFICERS, ELYRIA FOUNDRY
ELYRIA, OHIO

MR. NOETHLICH: Good afternoon, members of the Committee. My name is Greg Noethlich. I'm the Chief Operating Officer of Elyria/Hodge Foundries, and on behalf of the foundries and other manufacturing companies in Ohio, I'm honored to be here today.

I think you're lucky enough today on the panel to have two foundry representatives. Ross and I both are from the foundry world, and I think throughout my testimony you'll hear very similar themes about manufacturers and some of the things that we see as challenges as we compete with the Chinese manufacturers.

Elyria/Hodge Foundries have been in business for more than 105 years, a vital part of the northeastern Ohio and western Pennsylvania's economy. We're headquartered in Elyria, Ohio, and we have two facilities, one in Elyria and one in Greenville, Pennsylvania.

We are one of the leading producers of medium and large-sized gray and ductile iron castings. Our castings are primarily used in the energy market applications, natural gas compression, coal pulverizing, recently expanding into renewable energy into the wind turbine markets.

Other applications include refrigeration, air conditioning, mining, agriculture, transportation, power transmission so we're into a lot of the infrastructure of the United States and other countries, our components are.

We employ over 400 workers, and despite the tough economy, we continue to invest in our business and remain competitive in the global marketplace.

I would say the foundry industry is regarded as being one of the world's second-oldest industries. It forms really the backbone of the industrial society. We're using a lot of different manufacturing goods. Over the past couple of years, the iron and steel industries have been particularly hard hit due to the drop in demand from everything from automobiles to household appliances.

Hundreds of foundries continue to go out of business due to the unrelenting pressure for cheap imports, the departure of large manufacturers, and skyrocketing costs of raw materials.

Back in 2004, the president of the American Foundry Society stated that the industry was in deep trouble, and still is today.

I would say foundry industry leaders continue to try to solve the puzzle with China and how they can sell their products into the U.S. companies at two-thirds our price. Basically raw materials is about the

same. They buy the same pig iron as we do, but they have to boat it over for another $50 a ton, take it off, truck it to their foundries, melt it, put it back on a truck, ship it back, ship it back across to Long Beach, California, and then ship it into the customers, and we continuously hear about from our competitors or from customers that their pricing is much more competitive than ours.

And within the industry, there appears to be a growing consensus that to stay competitive and achieve the growth, the playing field has to change. Surely, domestic consumption no longer can be continued as their sole reliable source for sustainable long-term growth.

As part of the global competition, it's getting harder for foreign companies even to do business in China today. As most of you guys saw, Jeff Immelt has gone on record here recently to talk about GE doing business in China, and so that's not--that's to say that if they're having problems, imagine some of the smaller companies around the United States.

We are excited about the wind industry as a vehicle for growth though. There is an average of about 25 to 30 tons of ductile iron on every wind turbine, which is significant quantities, and as part of this market, we aren't looking for handouts as a company and special treatment. I think far too many times, for manufacturers, it gets in their veins that they just can't compete with China because of all these other things, and as an organization, we don't try to employ those.

We're going after a lot of different initiatives on the operations side to make us stronger and competitive. However, there are some things that I think that as government and manufacturing get together to come up with ideas, like 48C that has been mentioned in the past, that provides incentives for future growth.

The funding can be targeted towards facility expansion, modernization, and our foundries, our manufacturing base has been around for over a hundred years so we're tooled up to do other things than wind. So when they put a wind turbine plant over in China, they designed it for wind turbine or in Europe, they designed it for a wind turbine plant.

And we have to reinvest in that, and it's difficult. We're spending a lot of our capital--I was telling Ross at lunch today--on improving our environmental controls because of our EPA regulations instead of focusing the limited cap ex that we do have on retooling, improving automation so we can remain competitive. So anything we can do through grant money and the likes to help fund capital expense, expenditures for automation and expansion, it helps us because we're spending ours on other things right now.

It's important for us to ship the OEM turbines into our rail

structure. We've got a very good rail structure here. Having rail sidings at our foundries as well can help us be competitive. So as the money is available, it could be used there.

We also know China is going to install more turbines in the next five years than any other country, and until 2010, they are requiring the bulk of their components to be produced in China. This is going away, but the state-owned enterprises still have an advantage over there. The companies building wind farms continue to announce they're buying internal from Chinese.

So there are customs and import duties for us to ship into China higher than what it is for them to ship back into the United States. And I heard it earlier today, the ten to 15 percent increase in those duties makes it very difficult for us to compete there.

The increasing costs really hurts United States companies. I guess I go on to say that we've been around as an organization for over 100 years and recognized to be competitive in the global market.

We need to change as a company, but, as well, the government can help change and assist us in doing so, so that access to capital, negotiations with the Chinese government on reducing import taxes, and maybe taxing similarly on areas as the product comes into our soil, and conversely, this import tax could level the playing field on this landscape.

So I appreciate your attention this afternoon, and thank you very much.

[The statement follows:][4]

HEARING CO-CHAIR BROOKES: Thank you very much. Mr. Valente.

STATEMENT OF MR. PATRICK VALENTE
EXECUTIVE DIRECTOR, OHIO FUEL CELL COALITION
CLEVELAND, OHIO

MR. VALENTE: Thank you. Thank you, Mr. Brookes and members of the Commission, and thank you for allowing me to speak today.

Fuel cells have been called the "microchip of the hydrogen age," the key to abundant energy from a variety of domestic and renewable sources. The U.S. Department of Defense has identified fuel cells as a

[4] Click here to read the prepared statement of Mr. Greg Noethlich

critical technology whose development is vital to the nation's security.

The U.S. has the lead in fuel cells--in products, in intellectual property and in industrial capabilities, and retaining that lead will not be easy. There is a worldwide consensus on the strategic importance of fuel cells and their fuels and a race to commercialize fuel cell products and capture a share of the three million jobs that will come with commercialization.

The Ohio Fuel Cell Coalition and its sister organization, the U.S. Fuel Cell Council, supports the Obama administration's effort to increase the export of fuel cells and other renewable and efficient energy technology.

We also both urge the administration to support expansion of markets here at home. Governments around the world are investing heavily in fuel cell R&D and demonstration, providing market entry support and investing in fueling infrastructure for vehicles.

In return for access to these markets, the governments typically encourage U.S. firms to provide local assembly, manufacturing and/or intellectual property sharing, just as we do in the United States.

Our industry will be better able to compete in the world market if there is a strong program to help U.S. companies achieve commercial volumes and benefit from real world consumer experience, but our market support programs for fuel cells are not competitive today.

And I'll give you a couple of examples. Japan has a 20-year program to commercialize fuel cell vehicles. The current goal is two million vehicles and 1,000 hydrogen refueling stations by 2025. The industry believes vehicles will be fully cost competitive by 2025 and hydrogen sales will produce profits.

They believe this pace of deployment is necessary to achieve 80 percent reduction of CO2 from the vehicle sector by 2050, a goal shared by the industrial nations including the United States. Japan also has a ten-year plan to commercialize fuel cells for residential applications. The U.S. has no similar program.

Korea has a 20 to 30-year plan with the goal of supplying 20 percent of the global fuel cell market creating over 500,000 jobs. Milestones include 50 megawatts of fuel cell power generation by 2012, supported by a feed-in tariff, additionally, 10,000 residential units by 2012 and two million by 2020; with 1,000 cars beginning to be produced in 2012, increasing to 10,000 in 2015 and 100,000 in 2020. The U.S. has no similar program.

Many other countries in Europe and Asia, including China, have programs focusing on this industry. In the private sector, suppliers worldwide are attempting to gain market share in advance of full commercialization.

In general, U.S. fuel cells are welcome in emerging international markets, but the sales come with a price in terms of local assembly, manufacture and/or technology transfer. Increasingly, the U.S. program of support for fuel cell deployment will strengthen U.S. companies, create jobs at home and assure that American companies will remain competitive in this race to commercialize fuel cell and their fuels.

Additionally, federal interaction cooperation has been effective in educating federal agencies about the benefits of fuel cells and their suitability for federal projects. In recent years, however, high level cooperation appears to have declined.

A vital, active, interagency task force at the Assistant Secretary level will be of substantial help to the fuel cell industry.

Finally, a strong domestic industry serving a strong domestic market will keep the U.S. competitive in fuel cells.

If you'll look in the testimony, I excluded some of the remarks because of the timing.

HEARING CO-CHAIR BROOKES: Okay. Thank you.

MR. VALENTE: I want to continue to discuss the Ohio Fuel Cell Initiative.

HEARING CO-CHAIR BROOKES: Your entire statement will be submitted for the record.

MR. VALENTE: Okay. That's fine.

HEARING CO-CHAIR BROOKES: We appreciate you summarizing it.

MR. VALENTE: Yes, that's great. Thank you.

HEARING CO-CHAIR BROOKES: And that includes everybody.

MR. VALENTE: Yes, great. Thank you.

The Ohio Fuel Cell Coalition was formed in 2003 in support of Ohio's investment in fuel cell development encouraging the public/private investment and partnerships.

Since the Coalition's inception, the organization has grown to 75 members throughout Ohio and other parts of the United States, and in a few short years, Ohio has become a preeminent player in the country, and I would say it's in the top three.

Thanks to the significant investment by Ohio's Third Frontier Project, fuel cells today are being used commercially for stationary grid power, lift trucks, laptops, and a variety of other portable and stationary applications.

Additionally, this investment has leveraged more than 300 million of federal dollars to support fuel cells.

The state of Ohio offers the fuel cell industry unmatched growth potential. Ohio has the research and development strength, a great

supply chain. I always say there's not a fuel cell manufacturer in the United States that doesn't have an Ohio component in it, a skilled workforce and an enviable partnership with the state of Ohio and the fuel cell industry.

Because of these strengths, Ohio has attracted four fuel cell companies and projects to the state since 2005, including Rolls-Royce Fuel Cell Systems, who has their worldwide headquarters in Canton, Ohio; UltraCell, a fuel cell laptop manufacturer in Dayton; GrafTech, which is the old Union Carbide, in Parma; and Contained Energy.

The opportunities are limitless in Ohio, but without state and federal support, the competitive advantage in Ohio would evaporate. With an additional state and federal support, the following could happen:

UltraCell from Dayton could continue to grow and hire scores of new people to manufacture the fuel cell powered laptops both in the military and commercially.

Crown Lift Truck or Crown Equipment from New Bremen, Ohio, will be the preeminent lift truck manufacturing company in the world.

GrafTech from Parma will continue to be a premier leader in developing cutting edge fuel cell components in Ohio and selling products worldwide.

Rolls Royce will establish its manufacturing operation in Canton, and have its technicians trained at Stark State College of Technology.

Many other companies from across the country will set up operations in Ohio to take advantage of this competitive advantage.

Fuel cells are clean and efficient in their use of energy and have a low carbon footprint.

We can envision a future where fuel cells are heating and cooling our homes, our offices, and our factories and in powering our electronics and having a significant impact on our transportation sector. Ohio is and will be playing a significant role in this new and emerging energy provider area.

Thank you.

[The statement follows:]

Prepared Statement of Mr. Patrick Valente
Executive Director, Ohio Fuel Cell Coalition
Cleveland, Ohio

Fuel cells are a family of technologies that make electricity and useful heat electrochemically, without combustion. Fuel cells are inherently efficient and are environmentally the cleanest energy technology that consumes fuel. Fuel cells are entering a variety of markets. Fuel cell power generation and combined heat and power systems are powering homes, commercial buildings and industrial facilities, utilizing domestic natural gas and a variety of renewable biofuels. Fuel cells are replacing batteries in industrial equipment,

and in military, consumer electronics and backup power markets. Fuel cells are supporting batteries in recreation and military markets and, along with hydrogen generators, provide stability and high quality power to the power grid in support of intermittent renewable power generation. Fuel cell passenger vehicles are on the road in the hundreds today and millions are expected within 10 to 15 years.

Fuel cells facilitate a transition to renewable energy generation and can provide a bridge between solar and wind power generation and carbon-free transportation. Fuel cells also can help revitalize the US electrochemical industry and reduce our dependence on foreign suppliers of rechargeable batteries for portable electronics, including cell phones, laptops and 2-way radios which are now a critical part of our modern society.

Fuel cells have been called the "microchip of the hydrogen age," the key to abundant energy from a variety of domestic and renewable sources. The US Department of Defense has identified fuel cells as a critical technology whose development is vital to the nation's security.

The US has the lead in fuel cells – in products, in intellectual property and in industrial capability. Retaining that lead will not be easy. There is a worldwide consensus on the strategic importance of fuel cells and their fuels and a race to commercialize fuel cell products and capture a share of the 3 million jobs that will come with commercialization.

The Ohio Fuel Cell Coalition and its sister organization the **US Fuel Cell Council** supports the Obama Administration's efforts to increase the export of fuel cells and other renewable and efficient energy technologies.

We both urge the Administration to support expansion of markets here at home. Governments around the world are investing heavily in fuel cell research, development and demonstration, providing market entry support and investing in fueling infrastructure for vehicles. In return for access to these markets, these governments typically encourage US firms to provide local assembly, manufacturing and/or intellectual property sharing, just as we do in the United States.

Our industry will be better able to compete in world markets if there is a strong program to help US companies achieve commercial volumes and benefit from real world consumer experience. But our market support programs for fuel cells are not competitive today.

Japan has a 20 year program to commercialize fuel cell vehicles; the current goal is 2 million vehicles and 1,000 hydrogen stations by 2015. The industry believes vehicles will be fully cost competitive by 2025 and hydrogen sales will produce profits. They believe this pace of deployment is necessary to achieve 80% reduction of CO2 from the vehicle sector by 2050, a goal shared by the industrial nations including the United States. Japan also has a 10 year plan to commercialize fuel cells for residential applications. **The United States has no similar programs.**

Korea has a 20 to 30 year plan with the goal of supplying 20% of the global fuel cell market, creating 560,000 jobs. Milestones include 50 MW of fuel cell power generation by 2012 (supported by a feed-in tariff of 15-18 cents/kwh); 10,000 residential units by 2012 and 2,000,000 by 2020 (90% federal/local cost share in 2010); and 1,000 cars per year beginning 2012, increasing to 10,000 in 2015 and 100,000 in 2020. **The United States has no similar programs.**

Germany has established a public company called NOW, to lead a 10-year, $2 billion effort that would double fuel cell vehicle fueling stations in Germany by 2012 and develop a business plan for 500 to 1000 stations by 2015 to support "several hundred thousand vehicles within a few years." Germany also is undertaking an extended field test of 800 residential fuel cells by 2015, involving 5 utilities and three

suppliers.

The United States has no similar programs.

Many other countries in Europe and Asia including **China** have programs focused on this industry. In the private sector, suppliers worldwide are attempting to gain market share in advance of full commercialization.

In general, US fuel cells are welcome in emerging international markets, but the sales come with a price in terms of local assembly, manufacture and/or
technology transfer. Increasing the US program of support for fuel cell deployment will strengthen US companies, create jobs at home and assure that American companies will remain competitive in the race to commercialize fuel cells and their fuels. Additionally, Federal interagency cooperation has been effective in educating federal agencies about the benefits of fuel cells and their suitability for federal purposes. In recent years, however, high-level cooperation appears to have declined. A vital, active interagency task force at the Assistant Secretary level would be of substantial help to the fuel cell industry.

Finally, a strong domestic industry serving a strong domestic market will keep the US competitive in fuel cells. On the technical level, the US Fuel Cell Council is a leader in a broad international effort to harmonize international regulation. Federal agencies can help by supporting industry's effort to establish uniform national and international safety standards and product standardization recommendations, to promptly adopt supportive, harmonized codes, standards and recommended practices when they are developed, and to educate code officials and state and local regulators in the U.S.

May I continue to discuss Ohio's Fuel Cell Initiative, the Ohio Fuel Cell Coalition (OFCC) was formed in 2003 in support of Ohio's investment in fuel cell development encouraging public/private investment and partnerships. The Coalition's mission is forming "a united group of industry, academic, and government leaders working collectively to strengthen Ohio's fuel cell industry and to accelerate the transformation of the industry to global leadership in fuel cell technology and application". We are located in Cleveland, Ohio with an office in Dublin, Ohio.

Since the Coalition's inception the organization has grown to 75 members and In a few short years Ohio has become one of the top three states in the country in fuel cell development.
Thanks to a significant investment by the Ohio Third Frontier Project, fuel cells today are being used commercially for stationary grid power, lift trucks, laptops and a variety of other portable and stationary applications. Additionally, this investment has leveraged more than $300 million of Federal dollars to support fuel cells.
The State of Ohio offers the fuel cell industry unmatched growth potential, Ohio has the R&D strengths, a great supply chain, a skilled work force and an enviable partnership with the State of Ohio and the Ohio fuel cell industry. Because of these strengths Ohio has attracted 4 fuel cell companies and projects to the State since 2005, including Rolls-Royce Fuel Cell Systems, UltraCell, GrafTech, and Contained Energy.
The opportunities are limitless in Ohio, but without State and Federal support the competitive advantage in Ohio would evaporate. With additional State and Federal Support the following will happen:

- UltraCell will continue to grow and hire scores of new people to manufacture the fuel cell powered laptops both in the military and commercially.
- Crown Equipment will be the pre-eminent Lift truck manufacturing company in the world.
- GrafTech from Parma will continue to be a premier leader in developing cutting edge fuel cell components in Ohio and selling products all over the world.
- Rolls Royce will establish its manufacturing operations in Canton Ohio and have its technicians trained at Stark State College of Technology.

- Many other companies from across the country will set up operations in Ohio to take advantage of Ohio's competitive advantage.

Fuel cells are clean and efficient in their use of energy and have a low carbon foot print.
We can envision a new future where fuel cells are heating and cooling our homes our offices and our factories and powering our electronics and having a significant impact on our transportation sector. Ohio is and will be playing a significant role in this new and emerging energy provider area.
Thank you Mr. Chairman and Committee Members

HEARING CO-CHAIR BROOKES: Thank you.
Mr. Bushman.

STATEMENT OF MR. J. ROSS BUSHMAN
PRESIDENT, CAST-FAB TECHNOLOGIES
CINCINNATI, OHIO

MR. BUSHMAN: Thank you to the Commission for the opportunity to be here today.

My name is Ross Bushman, President of Cast-Fab Technologies in Cincinnati. We're one of the largest foundry and fabrication shops in the United States. We've been pouring iron for over a hundred years, originally, under the ownership of Cincinnati Milacron, later purchased by the Bushman family in 1988. It's interesting to note, too, with respect to two foundry people on the panel here today, that seven signers of the Declaration of Independence were foundrymen as well.

We have grown from almost an exclusive producer of machine tool components to providing fabrication and castings to a multitude of industries, the wind energy industry being the most prominent.

Our operation is capable of pouring gray and ductile iron casting ranging from ten pounds up to 80,000 pounds. These castings are shipped all over the U.S. and are in components all over the world.

Our fabrication operation can also produce from light gauge sheet metal to fabrications up to 80,000 pounds, and we are an ISO 9001-2008 certified facility.

Wind energy has been a tremendous growth industry for Cast-Fab over the past several years. Our qualified workforce, rigid quality controls, and ability to meet the growing needs of the U.S. wind energy industry made us one of the leading suppliers in the U.S.

This continued until November of 2008. Starting at the end of 2008 and continuing through most of 2009, the market for fabricated and cast components dropped to virtually nothing.

The wind energy industry was hit particularly hard. It's interesting to note that the three biggest financiers of wind projects in

this country were AIG, Lehman Brothers, and Wachovia. I kid you not.

The well-documented declines of these institutions meant projects in the U.S. could not be financed. Almost every project was either put on hold or discontinued, and even the well-publicized wind plan by T. Boone Pickens was shelved.

As a result of the capital goods and the wind industry coming to a standstill, we had to make some very difficult decisions. In order to remain a viable entity, we had to cut a sizable percentage of our workforce. These were very difficult times for our facility as well as the majority of the foundries around the United States.

When the economic stimulus bill was passed, we were hopeful that the renewable energy incentives in the bill would spur investment in wind energy and help energize the foundry business.

Unfortunately, projects that were in the development pipeline at the time were exempted from some of the stimulus funds, and this delayed any funds being injected into manufacturing because everyone had to wait for projects to be developed.

While we wait for the impact of the economic stimulus bill, we continue to see evidence of foreign castings coming into the United States. Many of the machine shops and OEMs I visit in the U.S. are full of castings from China, castings that are sold below our manufacturing costs. As we struggle to protect Ohio jobs, these cheap foreign castings continue to pour into our customers' shops.

I did have the opportunity to hear Ms. Reichert-Kral in the earlier testimony, and while I don't doubt her sincerity, I can assure you that large components are being shipped in here on a regular basis, and it is cost-effective for them to do so. Also, as Mr. Noethlich said, as well.

I believe the "Buy American" provision of the stimulus bill is weak. If we are to have a clause concerning buying American, it needs to be strengthened and rigorously enforced. If we are going to spend taxpayers' monies to stimulate the economy, this money should not end up with foreign manufacturing plants or foreign component suppliers.

I think it's interesting to note, as well, that companies like Cast-Fab and Elyria/Hodge, we don't have our own product line itself. We don't make Coca-Cola or this pen. We're making our customers' designs and components for them. We'll typically have a pattern that we only sell to that customer so we are limited in some of what we can do, and there's a lot of companies and a lot of industries that are in that boat.

I would encourage committee members to read the report written by the Investigative Reporting Workshop at the American University's

School of Communication in Washington. This report documents that over $2 billion from the American Recovery and Investment Act was spent on the development of wind power.

This funding created enough wind energy to power 2.4 million homes in a year. Unfortunately, over 80 percent of the funding ended up in the hands of foreign manufacturing corporations. Russ Choma, who works for the workshop, was quoted as saying that "most of the jobs that were created (by the stimulus money) were overseas. According to our estimates, about 6,000 jobs have been created overseas and maybe a couple hundred have been created in the U.S."

When comparing the industrial policies of China with those of the United States, you see some striking differences.

Subsidized investments and electric rates, along with the manipulation of the value added tax for certain industries, play a large part in China's competitiveness. The hourly pay rate and benefits for workers between the two countries are well-documented and are a tremendous disadvantage to U.S. manufacturers.

In addition, the large and burdensome layers of governmental regulations that the U.S. manufacturers are forced to adhere to may be the largest deterrent to becoming more competitive.

During 2008 and 2009, we made some very painful and significant cuts in our workforce. Noted author Marcus Buckingham writes that the "number one job of a leader is to rally people to a better future." But it is very difficult to rally and motivate any workforce when they continually hear negative news about their industry and manufacturing in general.

I believe at times the media vilifies business and manufacturing as one that willingly harms its workforce and skirts regulations. The rhetoric from EPA and OSHA continues to grow more negative towards building a partnership with manufacturers. We continue to burden the industry with regulation that costs us tens of thousands of dollars and makes it hard to be competitive.

These regulatory burdens do not exist in China. So any help we can have to level that playing field would be a great benefit.

As U.S. foundries continue to spend valuable resources to adhere to these regulations, our foreign competition is using these resources to plan for the future, similar to what, probably a bit more eloquently, Mr. Noethlich said earlier.

To help stimulate our industry and promote some long-term growth, it is imperative that these incentives put in place by the stimulus bill are extended past the current three-year time frame. We need long-term incentives that produce long-term financial commitments. Prior to the stimulus bill, we had renewable one-year

incentive plans for wind, sometimes even passed retroactively, typically around presidential election years, every four years.

These starts and stops wrecked havoc in our customers' orders and our production hours to the shop as we had orders pushed out on a continual basis until it was passed on a retroactive basis.

I would like to see the federal government adopt the roadmap proposed by the Department of Energy that paves the way for the United States to generate 20 percent of its electric needs by the year 2030.

In addition, if stimulus money continues to be funneled into wind and renewable energy projects, these projects must have a requirement to "Buy American." We need to stop providing money to manufacturers that takes the profit and jobs overseas.

In order to compete against China in green technology and help other manufacturing sectors, foundries from around the U.S. need the help of the government. You have the power and the duty to help us promote by offering larger incentives, extending stimulus programs and helping us reduce regulations that burden our industry.

I think together we can keep money and jobs within our borders and help us compete once again as a world power.

Thank you.

[The statement follows:]

Prepared Statement of Mr. J. Ross Bushman
President, Cast-Fab Technologies
Cincinnati, Ohio

My name is Ross Bushman and I am President and owner of Cast-Fab Technologies located in Cincinnati, Ohio. Cast-Fab is one of the largest foundries and fabrication shops in the United States. Cincinnati Milacron was the original owner of the Cast-Fab facility, which was built in 1940 and was later purchased by the Bushman family in 1988. Cast-Fab is a Gray and Ductile Iron Foundry as well as a Sheet Metal and Structural Fabrication shop. The facility has over 500,000 square feet and during its peek the Milacron complex was the world's largest producer of machine tools.

Cast-Fab has grown from almost an exclusive producer of machine tool components to producing fabrication and casting to a multitude of industries including: Mining and Construction, Machine Tools, Plastic Injection Molding, Pumps and Valves, Electrical Components, HVAC and of course the Wind Energy Industry. Cast-Fab is the parent company of Security Systems Equipment (SSE) that provides products to the Banking Industry and Coldwell-Wilcox that is a provider to the Water and Waste Water Flow Control Industry.

Cast-Fab's Foundry Operation is capable of pouring Gray, Ductile and High Impact Iron ranging from 10 pounds to over 80,000 pounds. Cast-Fab is capable of making its own patterns from a wide range of materials as well as machining and painting the finished castings. These castings are shipped all over the U.S. as well as the world.

Click here to view the prepared statements of Mr. J. Ross Bushman

The Fabrication Operation is divided up into two divisions; light gauge sheet metal and heavy plate fabrication. We can produce anything from a small cabinet of light gauge sheet metal to an 80,000 pound welded component made from 2 inch steel plates. We have certified welders along with a quality control department. The entire facility is ISO 9001-2008 Certified and we have been ISO certified since 1993
Wind Energy has been a tremendous growth industry for Cast-Fab over the past several years. Our success is due to our unique ability to produce high quality Ductile Iron Castings that meet the stringent European Impact Grade Requirement that accompanies Wind Turbine works. Our qualified work force, rigid quality controls and ability to meet the growing needs in the Wind Energy Industry made Cast-Fab one of the leading suppliers in the U.S. This continued until November 2008.

Starting at the end of 2008 and continuing through most of 2009, the market for fabricated and cast components dropped to virtually nothing. The Wind Energy Industry was hit particularly hard. By far, the three (3) biggest financiers of Wind Projects were household names -- AIG, Lehman Brothers and Wachovia. The well-documented decline of these institutions meant projects in the U.S. could not be financed. Almost every project in the U.S. was either put on hold or discontinued. Even the well-publicized plan by T. Boone Pickens was shelved after taking delivery of just a few of the turbines he had on order.

As a result of the capital goods and the Wind Industry coming to a stand still, we had to make some very difficult decision at our facility. In order to remain a viable entity we had to cut a sizeable percentage of our work force. These were very difficult times for our facility as well as the majority of the foundries around the U.S.

When the Economic Stimulus Bill was passed we were hopeful that the Renewable Energy Incentives in the Bill would spur the investment in Wind Energy and help energize the Foundry business. Unfortunately, projects that were in the development pipeline at the time the Bill was enacted were exempt from the Stimulus Funds. All of the Wind Energy Projects had to go back to the development stage and start over. This delayed any funds being injected into manufacturing, as everyone had to wait for these projects to be developed and engineered.

While we wait for the impact of the Economic Stimulus Bill, we continue to see the evidence of foreign castings coming into the U.S. Many of the machine shops and OEM's I visit in the US are full of castings from China. These castings from China are sold to our customers below our costs to produce them by a significant margin. In these tough economic times as we struggle to protect Ohio jobs, while these cheap foreign castings continue to pour into our customers.

I believe that the "Buy American" provision of the Stimulus Bill is weak at best. If we are to have a clause concerning Buying American, it needs to be strengthened and rigorously enforced. If we are going to "spend" taxpayer's money to stimulate the economy, this money should not end up in foreign manufacturing plant or foreign component supplier. Instead this money should find it's way into American Corporations saving American Jobs.

I would encourage Committee Members to read the report written by the Investigative Reporting Workshop at the American University's School of Communication in Washington D.C. This report documents that over 2 Billion Dollars from the American Recovery and Investment Act was spend on the development of Wind Power. This funding created enough Wind Energy to power 2.4 million homes over a 12-month period. Unfortunately over 80% of the funding ended up in the hands of foreign manufacturing corporations. Russ Choma, who works for the Investigative Reporting Workshop was quoted as saying

"most of the jobs that were created (by the Stimulus Money) were overseas……According to our estimates, about 6,000 jobs have been created overseas, and maybe a couple of hundred have been created in the U.S."

When comparing the Industrial Policies of China with those of the United States you see some striking differences.

Subsidized investments and electric rates, along with the manipulation of the Value Added Tax (VAT) for certain industries play a large part in China's competitiveness. The hourly pay rate and benefits for workers between the two countries are well documented and are a tremendous disadvantage to U.S. manufactures trying to compete. In addition the large and burdensome layers of governmental regulations that U.S. manufactures are forced to adhere to may be the largest deterrent to becoming more competitive.

During 2008 and 2009 we made some very painful and significant cuts in our workforce. Noted author, Marcus Buckingham writes that the "#1 job of a leader is to rally their people to a better future" But it is very difficult to rally and motivate any workforce when they continually hear negative news about their industry. The media vilifies industry and business as one that willingly harms its workforce and skirts governmental regulations. The rhetoric from the EPA and OSHA continues to grow more negative towards building a partnership with manufacturers. We continue to burden our industry with over regulation that costs us tens of thousands of dollars and makes it hard to be competitive. These regulatory burdens do not exist in China. As U.S. Foundries spend valuable resources to adhere to these regulations, our foreign competition uses their resources to grow and plan for the future.

To help stimulate our industry and promote some long-term growth, it is imperative that the incentives put in place by the Stimulus Bill are extended past the current three-year time frame. Extending the time frame for incentives will encourage manufacturing to invest in the future and put money into building projects and infrastructure. We need long-term incentives that produce long-term financial commitments. Prior to the stimulus bill, we had renewable one-year incentive plans for wind, sometimes passed retroactively. These starts and stops wreak havoc on our customer's orders and our production hours.

I would also like to see the Federal Government adopt the Roadmap proposed by the Department of Energy that paves the way for the US to generate 20% of its electric needs by the year 2030. People from throughout the Wind Energy supply chain were part of the development process of the Roadmap.

In addition, if Stimulus money continues to be funneled into the Wind Industry for new projects, these projects must have a requirement to "Buy American". Stop providing money to manufactures that take profits and jobs overseas.

In order to compete against China in Green Technology and other manufacturing sectors, foundries from around the U.S. need the help of the Government. You have the power and the duty to help us be more competitive by offering larger incentives; extending stimulus programs and helping us reduce regulations that burden our industry. Keeping money and jobs within our borders will help us compete and once again be a world power.

PANEL III: Discussion, Questions and Answers

HEARING CO-CHAIR BROOKES: Thank you very much. Thank you, all, for your testimony, and now I think we'll move to questions.

Commissioner Mulloy.

COMMISSIONER MULLOY: Thank you, Mr. Chairman. This question will be directed to Ms. Weiss, and then other people can comment if they wish after she does.

Mr. Andy Grove, who was the founder of Intel, made that into the great company, has a recent article in which he takes issue with Tom Friedman who talks about innovation and letting the other guy do the manufacturing. He says you got to innovate and manufacture to create wealth in your society.

Now, Applied Materials, according to Mr. Swezey, has moved its manufacturing to China of the solar equipment manufacturing because they say that the market is in China. But then Mr. Zindler tells us that most of the solar cells made in China are exported, I think much of them to the U.S.

Then Ms. Megan Reichert-Kral tells us that there's been money put by the University of Toledo, I think by the federal government, and by the state of Ohio into developing this new cell that your company is making. And you tell us there are, I think there are about a thousand jobs here in Ohio from that.

But you go on to tell us that 90 percent of your revenues are from abroad, and I think you're producing most of that stuff abroad from which you're getting 90 percent of your revenues because you talk about selling in Germany, but you have to make it in Germany to sell in Germany.

So here's what, I'm trying to understand, then, you're now negotiating something with China or Inner Mongolia. Are you planning on selling from here to China? Or making the stuff in China to sell in China?

Secondly, if you begin to make it in China, do you ever think they'll come a time when you'll make it all in China and then just sell back here?

MS. WEISS: I will try and take that in a couple of pieces.

COMMISSIONER MULLOY: Okay.

MS. WEISS: I think the first point that really you made in asking the question was just how dynamic a global industry solar has become in a relatively short period of time, and I think that's a good thing. So the technology that First Solar manufactures--it's a cad-tell thin-film--was originally the base research was done in collaboration between the Renewable Energy Lab and the University of Toledo, Ohio, and an innovator, and what First Solar did was when we came in as a venture capital firm and invested in that technology, figured out how to manufacture it in a scalable manufacturing.

So that's really the key to getting the costs down. You can do a

lot of things in the lab, but the trick is being patient enough and having enough capital to figure out how to commercially scale it in a way that you can bring the costs down. So that's what our company was able to do.

We've expanded here in Ohio three times. As was noted earlier, our second manufacturing facility was built in Germany, and that was directly in response to the fact that Germany was and remains the world's largest market, and then our subsequent manufacturing was placed in Malaysia to give us a global footprint.

The largest, the Euro Zone continues to be the largest market, and so even, I think it's this year and next year, the projection is about 60 percent of global sales will be made in the Euro Zone, and then the scale-up in capacity in China absolutely is, as others have said, seems to be feeding an export market.

I think what our view is that both the United States and China are in about the same position in terms of actually being a market where you can deploy these technologies, and that's pretty exciting because we really do need the market creation, and so what we're looking at now as a manufacturing investor is where is that market more likely to develop?

There are things going on in the U.S. that are very encouraging, but they are short-term, as others have noted; whereas, in China, it's sort of the same starting place, but perhaps you can have more confidence because of the political regime that it actually gets executed.

So we did sign a memorandum of understanding to deploy there, but we have not sited any manufacturing in China at this time. I think our view is let's see what really happens. Let's make sure that we actually do have access to that market, and then if we do have access to that market, it could make sense, like we've done in other markets, to invest in manufacturing there.

COMMISSIONER MULLOY: If I could just ask a follow-up. When I asked the person from the University of Toledo, she said that you have to follow the market. You make it in the market because it's expensive to ship because it's glass.

But I note that China is shipping a lot of that stuff here so how does that play; how can they do it? Where we have to invest in the other guy's market, the selling market, they can make it in China and ship it here. What's going on?

MS. WEISS: I refer to some statistics that I don't have in my head, but generally while some product is being shipped in the U.S., again, the U.S. is still a pretty tiny market so most of that, most of what China is making is ending up in Europe as well.

I think that there are cost competitive positions that some Chinese manufacturers have that enable them to ship it over here and be competitive. I think the earlier comment was right. Generally, folks who are manufacturing are going to want to be close to the markets where they're selling, and so what you're starting to see is some Chinese manufacturers announce smaller manufacturing plants here in the U.S., and I think that's a good thing for the U.S.

COMMISSIONER MULLOY: Anybody have any other comments on that question or series of questions? No? Okay. Thank you.

HEARING CO-CHAIR BROOKES: Thank you.

Mr. Wessel.

COMMISSIONER WESSEL: Thank you.

Ms. Weiss, if I could just clarify because I don't know that I understand completely. Did you say in response to Commissioner Mulloy's question that you're going to ship products from here for the Mongolia deployment or you're looking at creating a facility there?

MS. WEISS: I suspect that depending upon how our projects get built out, that initially we'll be supplying modules from our Malaysian operations.

COMMISSIONER WESSEL: Okay. So it won't be U.S. production under any scenario?

MS. WEISS: I mean I can't say. It doesn't make sense to me to ship that far.

COMMISSIONER WESSEL: Okay.

MS. WEISS: I think what we're excited about is the potential for growth in the U.S. market. I mean right now we're still shipping the vast majority of what we manufacture in Ohio to serve our European customers, and our investments in development companies, we've made three acquisitions in the last two years to try and get some of these large utility scale solar projects developed. You know, the hope is that we can serve the European market through our German manufacturing facility and keep some of those modules to deploy in projects here in the U.S.

HEARING CO-CHAIR BROOKES: Just to be clear, this is a project in Inner Mongolia in China.

COMMISSIONER WESSEL: Correct.

HEARING CO-CHAIR BROOKES: To differentiate from Mongolia. A couple of people have said Mongolia a couple of times; right? That's correct?

MS. WEISS: Yes.

HEARING CO-CHAIR BROOKES: This is Inner Mongolia in the PRC.

MS. WEISS: Yes.

COMMISSIONER WESSEL: Yes; correct.

HEARING CO-CHAIR BROOKES: As differentiated from the country of Mongolia next door. Okay.

COMMISSIONER WESSEL: Thank you. I stand corrected.

HEARING CO-CHAIR BROOKES: All right. Thanks.

COMMISSIONER WESSEL: Separately, as it relates to some of the facilities that China is talking about creating here, my understanding is those are assembly, not production, facilities; is that right? Meaning that some of the Chinese solar leaders have talked about the excess capacity they have in chips, and they're going to be sending the chips here, and we'll be assembling the panels.

I mean the Arizona project, as I understand, is a thousand workers potentially who will be screwing the panels together, but will not be making the high value-added product that chips are; is that right?

MS. WEISS: I'm not sure about all of the announcements, but you are correct. A number of the announcements that I've seen are assembly as opposed to sort of fully integrated manufacturing processes, and that's where there's a difference between more advanced technologies and traditional polysilicon where you can batch process, that you can split up those processes.

For First Solar's process, it's a continuous process, and so when we're making an investment in a manufacturing facility, it's a fairly significant investment.

COMMISSIONER WESSEL: Mr. Noethlich, as I recall, as part of your discussion, you referred to Jeff Immelt's comments regarding China's indigenous innovation policies and industrial policies and criticized them as being unfair to U.S. companies. But on the other hand, as I understand it, GE has essentially gone to China to produce all of its wind turbines and is not going to be sourcing anything from the U.S. market.

How do you square those comments? What should U.S. workers and, in fact, the business community, how should they read that when business leaders basically say it's all unfair, China is doing all of this, but, you know what, we're going to do it, too?

MR. NOETHLICH: Well, GE does have an assembly plant, turbine assembly plant--I think it's in South Carolina. Interestingly enough, about six weeks ago, GE--we've been in conversations with them over the years on parts for their turbines, and, yes, they do source in China for all their, most of their components. But recently we've started to hear some requests from them, and I don't know if it's tied into, they're getting nervous about what's happening there, but their purchasing groups have reached out to us and started to ask for

quotations.

COMMISSIONER WESSEL: And for those quotations, are they for supplies to the Chinese market--

MR. NOETHLICH: No.

COMMISSIONER WESSEL: --for here?

MR. NOETHLICH: For here.

COMMISSIONER WESSEL: And are they blades and collars? Are--

MR. NOETHLICH: What we would manufacture, like the gearboxes inside wind turbines are--

COMMISSIONER WESSEL: Right.

MR. NOETHLICH: --four pieces that you have to bolt together to make gearboxes. We would make parts for that. We would make the hub that the blades attach to, is made out of ductile iron, and then the whole base and then the cell is based out of ductile iron. There's a lot of other smaller components in the turbines.

COMMISSIONER WESSEL: Right.

MR. NOETHLICH: But those are the bases behind what we would supply.

COMMISSIONER WESSEL: Okay. But going back--

MR. NOETHLICH: So it would be large, 30,000 pound pieces.

COMMISSIONER WESSEL: Okay. Going back though to the global question.

MR. NOETHLICH: So I think globally, they do kind of speak out of both sides of their mouths. But at the same time, as Jeff was making those comments here recently, and I made the reference point to the buyers actually coming and reaching out to us and saying where are you guys today on your pricing, it maybe shows a propensity for them to start swinging the other way a little bit.

COMMISSIONER WESSEL: Okay.

MR. NOETHLICH: And changing some of their sourcing strategies.

COMMISSIONER WESSEL: Good.

MR. NOETHLICH: I think that in the wind turbine business, as people are putting the manufacturing plants up in the United States, that's going to be the key differentiator for me. You know, for the longest time, as we've installed turbines throughout the, in the United States over the years, there hasn't been a lot of turbines made here.

COMMISSIONER WESSEL: Right.

MR. NOETHLICH: Now, Vestas, as an example, they're going to start making turbines in Colorado. When that launches, you know, having sourcing here in the United States is going to be critical. So we're actively competing for that business with the European foundries

and Chinese foundries as well.

COMMISSIONER WESSEL: Is that true for Gamesa and some of the others as well?

MR. NOETHLICH: It's true for Gamesa. It's true for Siemens. Of course, they have their assembly now. Mitsubishi is an example. They're putting up in Arkansas a plant to make turbines so their sourcing is critical as well. And so I think, Ross, he said, the wind farms are getting money from the stimulus packages to develop, and then they're going to source people to put the turbines in there, and how that supply chain is interactive, I think, is important.

COMMISSIONER WESSEL: Have you had any discussions with Vestas or any of the other companies that are looking at doing some of this through foreign trade zones?

MR. NOETHLICH: No.

COMMISSIONER WESSEL: Okay. Let me ask a question about foundries, and I don't know the size of the limit. I think you said it was 80,000 pounds. We're looking as part of clean and green, we've been talking mostly about solar and wind, but many people view nuclear as part of that equation as well.

What are the capacities of the foundry industry to start supplying the nuclear industry? I know we haven't built a plant in 30 years, but we've just had one loan guarantee go through. We have, as I recall, 30 or more applications out there, and these containment vessels and much of the other equipment that goes into a reactor need foundries.

What's the capacity of the domestic industry? Have you had discussions about supplying them? Because as I understand it now, all of the equipment that would, all of the product that would come out of a foundry is being shipped from overseas for those nuclear plants.

MR. BUSHMAN: I believe that is correct. They are coming from overseas. We have not been approached by anybody on the nuclear side, and both of us here today are job shop foundries.

COMMISSIONER WESSEL: Right.

MR. BUSHMAN: So we could certainly look to do those kinds of products. We would make our customers' designs for them, as I stated.

COMMISSIONER WESSEL: And are you large enough? Again, I don't know.

MR. BUSHMAN: We are operating today at probably 30 or 40 percent of demonstrated capacity, and I would say, when I say "demonstrated," physically, what we are able to demonstrate over a long period of time shipping out the door. So there is ample room to grow.

I know from our fabrication side of the business through some

strategic analysis here, probably as recently as a year ago, that there was only four nuclear certified fabrication shops still in existence in the United States at the time. Development may spur some people to get back into that as well.

COMMISSIONER WESSEL: And they're just basically doing repair and replacement parts, not anything new; right?

MR. BUSHMAN: Correct.

COMMISSIONER WESSEL: Right. But they could--since they're certified, they could?

MR. BUSHMAN: But as it grows, they certainly stand to be in line.

COMMISSIONER WESSEL: So we do have the domestic capacity? You may have to go through the certification, which I think is only a 12 to 18-month process. The lead time on these plants is seven years sometimes. So you can get certified if we put American tax dollars to work creating American jobs, you have the capability of putting people to work; is that right?

MR. BUSHMAN: Absolutely.

COMMISSIONER WESSEL: Okay. Thank you.

MR. NOETHLICH: The only other comment I would make, too, Commissioner, is that on the nuclear side, the waste containers that are now made--in Europe, they are made out of ductile iron, but in the United States, the specifications have not been specified for ductile iron, and because the sizes, we could make those and supply into the nuclear industry as well. Have been kind of touching the surface of where do we go with regulations to try to get that type of material approved to be a waste container, which would be a great advancement for the ductile iron side.

COMMISSIONER WESSEL: Well, we'd love to hear long-term the result. I know that Westinghouse, for example, had talked about changing from 13 to 11 inch plate because we don't make 13 inch plate here, that they were going to change to 11 to be able to use domestic because they understand we have a jobs crisis here.

The others need to understand the challenges we face so we'd be interested in what your industry is doing and whether Congress can help promote some more greater job growth.

MR. BUSHMAN: A quick side note, Commissioner, on that. Not to get too technical, but these wind castings that we're doing are heavy section ductile iron castings, and you got to be good, the quality control. Exactly what the nuclear cast industry is would as well. So if these were ever converted into castings.

COMMISSIONER WESSEL: Right. Understand. Thank you.

MR. BUSHMAN: Thank you.

HEARING CO-CHAIR BROOKES: Chairman Slane.

CHAIRMAN SLANE: My question is initially directed at the two foundry gentlemen here. It's fair to say that your industry has been devastated in the last decade.

MR. BUSHMAN: Yes.

CHAIRMAN SLANE: And what do you attribute the cause of the devastation?

MR. BUSHMAN: Well, at the end of the day, what every conversation with a customer starts and ends with--the price versus the overseas competition. Not sure what sometimes you can believe in talking to customers when you get factual basis, but, Mr. Noethlich talked about the supply chain there where things are coming, landed, even with the delivery, significantly cheaper than what we can supply.

Even when we were busy--GE was mentioned before--we were supplying probably ten to 15 percent of GE's gearbox needs and the balance was coming from China. When things got slow, immediately, we went to zero, and China was obviously reduced as well. So there's that significant of a cost difference there.

I think when you look at the hourly worker compared, the hourly rate, okay, we can deal with that on a one-to-one basis, but when you look at the extra cost or the cost that don't exist in China for keeping up with the regulations and the systems we're putting in place for environment, to keep up with the environmental regulations, are just, are costs and structures that don't exist in the Chinese foundries today. It adds a lot to it.

And probably getting back to Commissioner Mulloy's question on how they're able to ship--I think it was the glass issue--at the end of the day their manufacturing cost is that much lower or even with the shipping costs, they can get it here, and that makes sense for people to buy it from them.

MR. NOETHLICH: I think my comments are similar. I would also add that I believe part of it is that our customer base has moved production to China as well. So machine tool--we would make for machining centers, we would make components for those parts and big stamping presses. We would make components for the stamping, you know, the bolster plates. That may, those machines maybe are built now in China, and so they're sourced over there in China.

CHAIRMAN SLANE: So not only are you facing the competition from the casting and the foundries in China, but your customers have actually moved to China.

MR. NOETHLICH: Yes, the customers go over there.

CHAIRMAN SLANE: Are you both aware of the fact that the Chinese, under the trade laws, rebate their 17 percent VAT tax back to

all of those products being exported so that many Chinese manufacturers sell their product at cost, and receive as their profit margin the 17 percent VAT tax rebate? Are you both aware of that?

MR. BUSHMAN: Yes.

MR. NOETHLICH: I hadn't heard that specifically, but it doesn't surprise me.

CHAIRMAN SLANE: This morning what we heard was in order to sustain the industry that we've been talking about, green technology here, primarily wind and solar, in the United States, we need a long-term subsidy program that manufacturers, investors can count on. So some of the programs that we've talked about today have really been--some of the funding issues that the Department of Energy and others have is really pretty short term.

So what you would like to see is--I think all four of you talked about this--what you'd like to see is a long-term subsidy of the industry that investors and manufacturers could count on.

MR. BUSHMAN: Absolutely.

CHAIRMAN SLANE: And because it's not cost effective today without a subsidy?

MR. BUSHMAN: That's correct.

CHAIRMAN SLANE: So we're all in agreement on that?

MS. WEISS: I would just add from the solar industry's perspective, it really is important to be a viable long-term industry and sustainable, that you see a pathway to not relying on subsidies. So while I do agree that in the time period that it takes the industry to scale, to get to the point where we're competitive with traditional fossil fuels, and that means competitive and that the environmental externalities are internalized with some type of a carbon price, and you've got fair and across the board tax incentives, I think I noted earlier that most of the tax incentives for renewables are going to sunset, whereas, tax incentives for traditional fossil industries are permanent.

I think you do need a pathway towards not being a subsidized industry. So I just with that caveat, I agree with you though.

CHAIRMAN SLANE: Great. Thank you very much.

VICE CHAIRMAN BARTHOLOMEW: Again, there are so many things that I'm trying to put some different pieces together in my own head. Like Commissioner Mulloy, I've been struggling with this whole proximity issue. When it comes to things like supply chain, we know in the auto industry before the economic crash that auto parts manufacturers were under an enormous amount of pressure to move their production over to China to, as part of the supply chain for auto manufacturers. I'm talking now U.S.-based auto manufacturers that

were manufacturing in China.

And we also know that R&D has a tendency to follow manufacturing. People want to have their engineers on site; they want then to move the R&D. And we know that the Chinese government has identified sectors of the industry and throws a lot of subsidies of all sorts into the thing.

So I'm wondering if you are seeing or hearing--any of you--any pressure to move your own production to China, not on the competitive basis. Is GE, for example--I don't want to single them out--but I'm thinking of a company like GE--are they are producing for the Chinese market in China--trying to encourage, pressure, or whatever your industries to also open up facilities in China in order to keep things there?

MR. NOETHLICH: I guess I would say from the foundry side we don't see pressure from our customer base to do that. I've heard some of our customers ask us to manage the Chinese foundries for them, you know, so they would buy through us.

We would actually be almost like the middle man for them so they don't have to deal with the foundry because one of our machine tool customers said that we could buy all of their parts for the price of one of yours so if you guys can actually buy it from them, look at it, inspect it, provide the quality level, we can mark it up, and then ship it to us to get that type of pricing.

VICE CHAIRMAN BARTHOLOMEW: With your seal of approval on it or your company name on it?

MR. NOETHLICH: Well, we wouldn't have to put our name on it. They would be responsible if it was an issue. We would charge back. But they were looking for that type of arrangement. And so, I don't know if, Ross, you've heard of that same type of question and answer, but it's not unrealistic for them to broach those types of topics with us. So that's how we would see us. If we were going to do anything with Chinese manufacturing, that's what we would look at. That's what we would be forced to look at.

MR. BUSHMAN: We have been pushed for that scenario as well, and my concern is, as a business owner, is that only utilizes about 20 percent of our employees, and the other 80 percent of the shop are not going to have anything to do if we become the technical broker, if you will, of these castings.

And with respect to your earlier question, ma'am, on GE, they're not coming to us to ask us to go over there. They've developed the foundries over there.

VICE CHAIRMAN BARTHOLOMEW: So they're also not coming to you--

MR. BUSHMAN: Had the opportunity to develop--

VICE CHAIRMAN BARTHOLOMEW: --to ask you to produce anything for the pieces?

MR. BUSHMAN: No. No.

VICE CHAIRMAN BARTHOLOMEW: Okay. Mr. Valente, you touch a lot of different organizations with your Fuel Cell Coalition.

MR. VALENTE: Correct.

VICE CHAIRMAN BARTHOLOMEW: What do you see happening?

MR. VALENTE: I don't see that happening as far as any pressure to move product overseas. We, the industry is a little bit different, too, because it's emerging, and at the same time it's in the market, too, and the markets it's in today is in the stationary area, and there are some big players--UTC, FuelCell Energy--who have product in the market, and they're doing quite a bit of work in Ohio.

They are in this evolving stage where they're still working on the technology so they want to be close at hand working on the technology, and I am not hearing anything, any way, shape or form that they want to do that to that degree, and I do know some fuel cell companies that are taking some of their product and having them manufactured like a stack in Mexico, but not in China.

Also, one of the early markets is military, and military typically is U.S. companies that are working on military gen sets or back-up power or auxiliary power, and all of that, as far as my knowledge, is all being done in the United States.

One of our challenges, though, as we see--and we talked about the subsidy, too, and I think this is what makes alternative energy prosper, is the subsidy because without that subsidy in Europe or anywhere else, there wouldn't be any product being bought, and we don't have that same subsidy in the United States.

I gave examples of two countries, and I could have given another one in Germany too. They have an energy policy. Our energy policy is more, is more rhetorical, I would say. It's a little harsh, but I don't really think we have much of an energy policy, and they also, other countries have policies that are a portfolio approach, and we do not have a portfolio approach, I don't believe, in this country either.

And to get out of the mess we're in, we need a portfolio approach, and we need some type of subsidy.

VICE CHAIRMAN BARTHOLOMEW: Can I--and Ms. Weiss, I'd like to pull you into this conversation, too--take it to a slightly different place, though, because I keep hearing people use the word "subsidy," and perhaps I'm wrong, but it seems like there are two different kinds of subsidies that we're talking about here. There are

sort of subsidies to promote production for domestic consumption to deal, say, with the environmental issues that go on.

But then there is subsidies like much of what the Chinese government employs to subsidize production for export. That to my mind, I understand that subsidies are subsidies, but they have two very different kinds of ends involved in that.

So, Ms. Weiss, when I hear you saying that industries ultimately can't stay subsidized, what we're seeing with the Chinese government is a different kind of economic model, and I wonder if that really holds? These are state-owned enterprises, many of them, and will we actually see that they stopped subsidizing as they're continuing to promote production for export?

Do you think that their companies will stand on their own, and at what point? Do we have any domestic manufacturing companies left if that point happens?

I don't know that you have an answer to that, but I'm just finding as I'm thinking about it, I'm again struggling with the differentiation.

MS. WEISS: Yes, I would probably defer to the China experts on what China's appetite for subsidy is long term, but I guess when I think about the different approaches that different governments are taking, one of the things that does concern me, and is that--rightfully so--if a government is going to make an investment in a sector, they want a benefit to their people from it, and that's fair.

But if you look at the German example that folks point to over and over again in terms of the investment that the German rate payers, basically it wasn't a tax, it was basically a fee that all rate payers pay to enable their feed-in tariff. They certainly did it with the expectation that the German market would grow and benefit.

It has, but there were no restrictions. There were no trading restrictions, and the concern that we see developing now is as other nations are putting in similar programs, they're considering doing it with restrictions for domestic content requirements, and Canada, the city of Ontario, when they passed a feed-in tariff, they have included a domestic content requirement, which we're very concerned about because we're a big player in the Canadian market. That opportunity to play in the Canadian market may be seriously diminished, and that's a market that we would support through our Ohio manufacturing.

India is expected to put in a feed-in tariff, and they've indicated that they'd like to model their policies off of Ontario, and there's been a lot of discussion with the government of India about why that's not a good and not a healthy thing.

If ultimately China does add these new investments, whether it's their feed-in tariff once established, and one does find that European

or U.S. companies are not able to compete, that would obviously be very, very problematic.

VICE CHAIRMAN BARTHOLOMEW: Can I encourage you to take a look more obviously as you're looking at global markets, but at China because they do essentially have a domestic content requirement. They might call it different things.

Their whole concept of indigenous innovation and requiring tech transfer and all of that is a back door domestic content requirement, but the way they're doing government procurement, the wind turbines, the bidding on the wind turbines doesn't give a fair opportunity to people or to businesses from outside of China.

As I listen to this, what I find myself, again, very concerned about is unilateral disarmament on the part of the United States. So we've expressed concern to the Canadians that no domestic content requirement, and they might do it anyway. We express concern to the Indians, no domestic content requirement, and they might do it anyway.

The Chinese are doing it. What chance do our companies have if we don't have something similar on our side? Again, we'll call that a rhetorical question, but thank you.

HEARING CO-CHAIR BROOKES: Okay. Thank you.

Mr. Shea.

COMMISSIONER SHEA: Thank you all for being here.

I just want to direct my question, at least initially, to Mr. Bushman. You say in your testimony that the large and burdensome layers of governmental regulations that U.S. manufacturers are forced to adhere to may be the largest deterrent to becoming more competitive, and then you say that these regulatory burdens do not exist in China.

Could you just flesh those ideas out with some specific examples, if possible, and what percentage of your overall costs, could you estimate what percentage is the result of what you consider burdensome and unnecessary regulations, and could you just generally tell us about the business environment in Ohio?

MR. BUSHMAN: Where to begin? Probably with the environmental and the EPA regulations is probably the most striking difference, as well as some of the safety requirements, and we take our safety program very seriously, but I've sat in my conference room and had my customers show me pictures of castings being poured in China by a gentleman that was barefoot, versus when you look at what we have to do.

We literally sat in a meeting just the other day. Matter of fact, I was telling, telling Mr. Noethlich at lunch that there are some

requirements there for an iron pourer to wear cotton underwear as part of all the clothing. You know we're having meetings asking, “do we need check a person's underwear” to make sure they have cotton clothing because there was an instance where a foundry was cited because OSHA to see if they were wearing the underwear or not.

I don't mean to be facetious with the group, but that's the kind of things we're talking about at our meetings on how do we do that, and can you even do that, even though we're liable for it? Those kinds of discussions--

COMMISSIONER SHEA: You might run into another regulation.

MR. BUSHMAN: --are going on. Please?

COMMISSIONER SHEA: You might run into an EEO regulation.

MR. BUSHMAN: That's exactly what our discussion centered on. We had some pretty high level managers spending some time talking about this stuff where you don't have those issues over in China.

So with the emissions, we're very concerned with the proposed cap and trade legislation on what it would do. We don't have a lot of carbon-based emissions in a foundry. We're relatively clean even though it's not the most glamorous business in the world.

It will raise our energy rates significantly as those are passed on. In this region, as you all know, it's pretty heavily driven by coal, and that's going to raise the energy costs. That's going to make us that much more uncompetitive, and I'm not trying to put scare tactics in when I say that will drive more business overseas. It just clearly will when you look at it.

As to what percent of our costs, I don't know. I'd be throwing out a number that just would be crazy--

COMMISSIONER SHEA: Fair enough.

MR. BUSHMAN: --to come up here offhand. But when you--

COMMISSIONER SHEA: What's the Ohio business environment like? And, Mr. Noethlich, if you want to weigh in as well, I'd appreciate it.

MR. NOETHLICH: Yes, I think before we answer that question, just to kind of piggyback on some of the regulation pieces, and I said it in my statement a little bit, but I'll highlight it again. Of the cap ex, capital expenditures, that we've made at the foundry for over the last two years, $6 million worth has been predominantly for environmentally enhancing our foundry, dust collection, per se, whereas, we could be, we could be using that $6 million to automate the way we make the molds to make us more efficient, to design our foundry to be more competitively designed.

We are, in our business anyway, very manual intensive. We can't

automate high speed stuff. It's all people doing the work so people make the foundry go around with our castings are as big as this table or so or bigger. And so any incremental automation really does help us when we can put them in place, but they're very expensive because we have such big things we're moving.

So those regulations come with a cost and come with us investing in that to ensure that we're on top of the regulations that are here in the United States. Work boots, as an example, $75 per person per boots, we're required to supply. They don't, our competition in China doesn't have to have that level of detail.

So there are a lot of examples there. Our energy costs, like Ross said, it's our big--other than raw materials and labor, it's up there in the top three from a cost perspective at the foundry. So carbon, carbon, it's going to be a big thing for us.

And so business in Ohio, customers, one of our biggest customers is in Ohio in Mount Vernon. They're a national gas compression, Ariel Corporation, a machining and assembly of natural gas compressor equipment to move gas around, and they're out of Mount Vernon, Ohio. So--

COMMISSIONER SHEA: I'm talking about the business regulatory, tax environment.

MR. NOETHLICH: Oh.

COMMISSIONER SHEA: Is it a positive one for you both or?

MR. NOETHLICH: I just had an OSHA, OSHA citation, here a couple months ago that was announced in the media. It was in excess of $200,000. We're not proud of it. And certainly knew that we had some areas to fix, but, you know, I had to spend a lot of money paying the federal government for the fines as well as spending a lot of money to put our fixes in place. So it's all compounding and real. It's difficult. I'll say Ohio has experienced people because there is a lot of manufacturing here. That's for sure.

MR. BUSHMAN: We're still struggling. I think it was just announced Ohio was 47th or 48th most business friendly state. My area in Cincinnati was the machine tool capital of--

COMMISSIONER SHEA: 47 out of 50?

MR. BUSHMAN: I'm sorry. 47 or 48 out of 50. I can't remember.

HEARING CO-CHAIR BROOKES: So down near the bottom.

MR. BUSHMAN: Yes, as non-business friendly. But Cincinnati was the machine tool capital of the world there with Cincinnati Milacron for a long time. So the infrastructure is still there. So there are companies there. We're a lot smaller than maybe we were a few years ago, and other companies are a little smaller than we were a few

years ago. But the infrastructure is there.

And as Mr. Noethlich said, I would probably estimate 50 percent of our capital in the last two to three years is in keeping up with regulations instead of expanding capacity.

COMMISSIONER SHEA: 50 percent of your capital investment?

MR. BUSHMAN: Yes.

COMMISSIONER SHEA: Thank you.

HEARING CO-CHAIR BROOKES: Thank you.

I'm afraid we let Mr. Valente off a little too easy so I wanted to ask him a couple of questions, and then we may go to a second round, I think, if we have time.

If I got you right, you said that fuel cells are not currently economically feasible. So why should the government put money into fuel cells?

MR. VALENTE: Oh, no, I won't say they're economical--

HEARING CO-CHAIR BROOKES: Oh, okay.

MR. VALENTE: --they're not--that's not it at all, but when you're competing with other countries that subsidize their industry, and we're not doing the same here, we're going to lose the industry. It's as simple as that. Why manufacture in the United States when I can go overseas and do it? And that's the key, you know, and I think that's what I'd be concerned about more than anything else.

As an example, Germany invests $700 million a year in fuel cells. In a good day, we'll do 350 in the United States from the federal government. Double. And how many people live in Germany? 60 million, 70 million? In comparison. So are they trying to develop an industry here or we want to lose an industry?

HEARING CO-CHAIR BROOKES: Should we be developing this industry? Can you tell me how is this going to fit into alternative energy?

MR. VALENTE: We are developing--well, and I could give you a lot of examples.

HEARING CO-CHAIR BROOKES: Yes, please.

MR. VALENTE: Fuel cells can be used in anything that is powered by electricity. It could be--or a fuel. It could be automotive. It could be stationary. Heat and cool your home. It could be military. It could be electronics, and it could be automotive. It's across the whole portfolio of energy.

And there are companies that have product in the market, and they'll be continuing to have companies with product in the market, and they're actually getting to the point now where their costs are getting down so low they can compete against any other energy. It's not quite there yet.

Automotive, we're talking 2015. Honda, Toyota and General Motors have all said 2015 fuel cell cars. But there's no infrastructure. So what we're investing in plug-ins, hybrid plug-ins. There will be an investment there, but there is no infrastructure for hydrogen. California has an infrastructure for that. But the United States doesn't.

So are we going to lose that, too? It's a good question. I think it's a combination of things.

VICE CHAIRMAN BARTHOLOMEW: Can I ask a technical question?

MR. VALENTE: Yes, sure.

VICE CHAIRMAN BARTHOLOMEW: Out of ignorance here. I know with photovoltaic cells, you use an array of them on panels and things. Fuel cells, will they work that way or do you need multiple fuel cells depending on how much energy you need or--

MR. VALENTE: There are four or five different types of fuel cells, and I'll start at the one--and everybody thinks fuel cells, they think automobiles. Automobiles use something called a pound fuel cell which has to run on hydrogen. But then there's another fuel cell called a solid oxide, and that's a stationary fuel cell. Rolls Royce, UTC, FuelCell Energy, they can run on just about any fuel including natural gas.

It all depends on the fuel cell. I think that's the best way to look at it. Fuel cells is an electrochemical reaction that produces electricity basically.

VICE CHAIRMAN BARTHOLOMEW: And can you give me some sense of the size of these things?

MR. VALENTE: Well, it depends on--

VICE CHAIRMAN BARTHOLOMEW: Sorry. I'm just trying to understand.

CHAIRMAN SLANE: We're not going to take her to the next hearing.

[Laughter.]

MR. VALENTE: For a laptop, as an example, there's a company in Dayton, Ohio called UltraCell that does fuel cell powered laptops for the military. It's about that big. But it lowers the weight that the foot soldier carries around by about 12 pounds.

Stationary fuel cell--one megawatt is probably as long as that table and probably comes out to here. Now that's enough for 1,000 homes. So it depends on the size. An automobile, I've driven a fuel cell powered Honda in California. You wouldn't know it wasn't any other vehicle. Looks like any other vehicle until you get in it and drive it. And then it's totally quiet. It's like an electric vehicle, and it's a lot faster too, and it gets 62 miles per gallon. So there's the

differences.

The beauty of fuel cells, and we all got to remember this here, they absolutely do not pollute. What comes out of the tailpipe of a car is water vapor.

VICE CHAIRMAN BARTHOLOMEW: Okay.

MR. VALENTE: And when you plug in a plug-in hybrid in the grid, you've got a coal-fired car.

VICE CHAIRMAN BARTHOLOMEW: Thank you.

HEARING CO-CHAIR BROOKES: Yes, I have another question on this. Is this industry at all affected by or are rare earth elements involved at all in this industry? You may have heard me ask this before in the previous panel.

MR. VALENTE: Yes.

HEARING CO-CHAIR BROOKES: Concerns about Chinese.

MR. VALENTE: It's actually the element that's probably most affected for fuel cells is platinum. All right.

HEARING CO-CHAIR BROOKES: Okay.

MR. VALENTE: Because they use platinum as a catalyst to turn the hydrogen into anode and cathode, and I think that's the main, but otherwise than that--

HEARING CO-CHAIR BROOKES: I don't think platinum is a rare earth element though.

MR. VALENTE: No, well, it's still--

HEARING CO-CHAIR BROOKES: It may be a strategic metal, but I don't think it's part of the--

MR. VALENTE: It's a strategic metal. It's not a rare earth element.

HEARING CO-CHAIR BROOKES: So there's nothing that you're aware of that's involved in that?

MR. VALENTE: No.

HEARING CO-CHAIR BROOKES: Okay. Good. Mr. Mulloy.

COMMISSIONER MULLOY: Thank you, Mr. Chairman, and again thank you to the panel for coming here and having this discussion with us.

One of our earlier witnesses, Mr. Wong, from the Center for American Progress, said this:

"The claims by U.S. companies that China is unfairly shutting them out through market barriers, however legitimate, is ultimately a distraction to the more fundamental question that we should have at home: why haven't we gotten our own house in order?"

I personally think part of getting our own house in order is dealing with the trade problem and dealing with the China trade problem as a part of the trade problem. I don't think we can get our

house in order at home without dealing with some of these other problems that are decimating domestic industries, which are the wealth-producing part of the American economy.

So that's my take on it, and so one of the things that didn't come up very much at all today, which I think is pretty important, is the whole exchange rate issue. If the China currency is 40 percent undervalued, that's like giving Chinese exports, as Mr. Bernanke, our Federal Reserve Board Chairman, said in a speech, the underpriced currency acts as an export subsidy.

If you've got a currency 40 percent undervalued, you're giving an export subsidy to your people. Very difficult for an American company to compete against that kind of subsidy coming from China.

Do you all agree with that?

MR. VALENTE: Yes. I would like to make one comment. I definitely would agree with that, and I'll take it to another level. As long as the Chinese government is holding our Treasury notes to the large degree they're doing, I think we're afraid to make a motion on anything.

COMMISSIONER MULLOY: Yes, if I can just come back to that. The reason they have so many dollars is because we've run a massive trade deficit year after year.

MR. VALENTE: Absolutely.

COMMISSIONER MULLOY: They accumulate the dollars as part of their currency management program. So do you all agree that the 40 percent currency is a competitive problem for United States?

MR. VALENTE: Absolutely.

MR. BUSHMAN: Absolutely.

COMMISSIONER MULLOY: Do you agree? All right. So I think we've got to deal with that as part of whatever we're going to do about saving our domestic industries. We've got to deal with the China problem.

There was another witness in the first panel, Mr. Zindler. He comes in here and he tells us--one of our witnesses said, well, the World Cup had Yingli Solar, and we had McDonald's. Well, it wasn't "we." McDonald's had McDonald's, but China had Yingli Solar, and it tells us that Yingli Solar secured a massive $5.3 billion loan from the China Development Bank. That alone could help double the world's manufacturing supply of photovoltaic modules in just the next few years.

Now, if you're trying to compete with that kind of a subsidy given to the Chinese manufacturers, is that pretty tough to do, Ms. Weiss?

MS. WEISS: Well, definitely, we'd like to see the U.S.

government doing more to help its companies. That was only one of three loan credit facilities that I'm aware of. Others were actually even higher than that. I think one was as high as $12 billion.

So certainly as the industry, solar industry, starts to mature, and your, some of your weaker players or high cost players shake out, which all the analysts say will certainly happen in the next couple of years, and you've got now two or three, whatever the number ends up being, two or three German companies, two or three U.S. companies, and two or three China companies, and certain firms are getting very specific benefits in the form of credit facilities that might not be available to the U.S.

Like I said earlier, our loan guarantee program is set to sunset at the end of next year. That puts us at a distinct competitive disadvantage.

COMMISSIONER MULLOY: Yes. I know. Mr. Noethlich, you quote my friend Tim Brown in your testimony about how can they do this? Well, of course, the underpriced currency, the subsidy they gave to domestic companies; there are a lot of things that they're doing.

MR. NOETHLICH: Sure.

COMMISSIONER MULLOY: To make all this happen.

MR. NOETHLICH: Yes.

COMMISSIONER MULLOY: I want to ask, Ms. Weiss, just one final question. Ms. Reichert-Kral testified earlier that the type of cell that you make, when they put out government contracts, does not get--they apparently put some criteria in the government contract, and they're specifying the other kind of fuel cell rather than the kind of solar cell you make.

Do you know whether that's true or is that an issue that you have identified as something you would want the government--

MS. WEISS: The Chinese government or the U.S. government?

COMMISSIONER MULLOY: No, the American government. Say when it puts out a contract for a solar. Are you making--

MS. WEISS: Yes. I'm not sure. I'd have to go back and look at her testimony to better understand exactly the context of what she was saying. I'm not aware of any competitive disadvantages with, you know, selling in the U.S. marketplace with thin-film versus traditional PV.

If it was in regards to the ARRA funding, I know that there are government schedules, and to my knowledge, if you sign up and put your product on the government schedule and you meet the criteria, you know, you'd be able to sell that way. If you would check that because if it an issue, we'd love to know about it. Thank you.

CHAIRMAN SLANE: Pat, I think it was solar panels. It was

silicon versus glass, and she was saying that they specify silicon, and they don't make that in the United States. So that's why it had to come from China, as I recall.

COMMISSIONER MULLOY: I think that's something we can check out. But thank you very much.

HEARING CO-CHAIR BROOKES: Last question to Commissioner Wessel.

COMMISSIONER WESSEL: Thank you.

Mr. Noethlich, you had me until the boots. And I'd like to just pursue that issue for a minute because, quite frankly, I don't think we're terribly interested--we, being the country, in going back and having barefoot workers in your foundries, and I know you didn't mean that.

I think the challenge we face, and what you and many other business people can be helpful to not only this Commission but other government entities and personnel, is to express these concerns more regularly.

We're all frustrated by this. And not to say that regulations don't create some barriers, but the fact is if you look at China's environmental regulations, in many areas, they're actually quite good. The only problem is they're not enforced, and that provides a competitive disadvantage for you.

Something that actually is actionable under our trade laws, if industry would get together and with their unions or with their communities, their governors, whatever, and do something about that, as I recall--and I understand some of the frustration your industry has had--as I recall, you brought a ductile iron trade case--what--two or three years ago, was it--the industry--in terms of Chinese. And the government declined to support the industry after the ITC had found in your favor.

How do you view the trade laws? Do you think they're helping you or not? Do you think it's that they're not robust enough? Do you think it's the government is not, doesn't have enough information? Doesn't want to take on other countries? China or anyone else?

Is it irrelevant to you because you got to run a business everyday, and you just can't spend your time worrying about what's happening elsewhere? All of the above?

MR. NOETHLICH: Yes, I think there's a lot there. I think that, first and foremost, on the regulation side, you know, it's a double-edge sword because I believe that our workers should be safe. That the straw hat is in--

COMMISSIONER WESSEL: I don't question that. I agree.

MR. NOETHLICH: So, in some regards I talk out of both sides

of my mouth on that. Do I think that the trade--I don't think the trade laws have been set up, especially on industries that China has targeted, to help us and to be an advantage toward--or to even be a level playing field.

So whether the U.S. government can do more in negotiating with the Chinese government to have a mutual type of relationship on that, whether it's the government can help on, when we're using stimulus money to invest in the United States infrastructure, that we do use some American based.

I think it was brought up earlier today about that. We should have some protection on our funds and where it's being funneled through and how it trickles down through our economy. So we do think about it quite a bit as a leadership team at the foundry.

And it is important for us to stay on the forefront of that. I've been to the statehouse twice already talking about 48C with Senator Brown so we are active in continuing to get our message out and to talk about where we could use assistance in our issues.

And I think, again, the government-business coalition, I think that's important to helping keep our company competitive.

COMMISSIONER WESSEL: Any other witnesses? Thank you. Thank you.

VICE CHAIRMAN BARTHOLOMEW: Thank you very much to all of our witnesses on this panel and to all of our witnesses throughout the day. It's very helpful to us in understanding how policies play out on the ground to come out and do field hearings. So we really appreciate your participation.

I also want to thank and acknowledge the staff of the Commission who worked on this hearing: Paul Magnusson, Nargiza Salidjanova, M.L. Faunce, and the newest member of our staff, Dan Neumann.

People will be back in touch with you with copies of your transcripts, and we will be very interested in continuing the conversation with all of you. So thank you very much.

MS. WEISS: Thank you.

VICE CHAIRMAN BARTHOLOMEW: We're at this point going to have an open mike. It's my understanding that nobody has signed up to do that, and so I think with that, we will close the hearing, and we look forward to further contact.

Thanks, everybody.

HEARING CO-CHAIR BROOKES: Thank you.

[Whereupon, at 3:15 p.m., the hearing was adjourned.]