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GREEN JOBS AND TRADE

HEARING

BEFORE THE

SUBCOMMITTEE ON GREEN JOBS AND THE NEW ECONOMY

OF THE

COMMITTEE ON
ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

ONE HUNDRED TWELFTH CONGRESS

FIRST SESSION

FEBRUARY 15, 2011

Printed for the use of the Committee on Environment and Public Works

Available via the World Wide Web: http://www.fdsys.gpo.gov

U.S. GOVERNMENT PRINTING OFFICE

85–226PDF WASHINGTON : 2014

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
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GREEN JOBS AND TRADE

TUESDAY, FEBRUARY 15, 2011

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON GREEN JOBS AND THE NEW ECONOMY,
Washington, DC.

The subcommittee met, pursuant to notice, at 2:45 p.m. in room 406, Dirksen Senate Office Building, Hon. Bernard Sanders (chairman of the subcommittee) presiding.

Present: Senators Sanders, Merkley, Inhofe and Boozman.

STATEMENT OF HON. BERNARD SANDERS, U.S. SENATOR FROM THE STATE OF VERMONT

Senator SANDERS. My apologies, as usual, there are eight things going on simultaneously.

There is going to be a vote in a couple of minutes. My understanding is that Senator Boozman is down on the floor. So what we will do is, we will do some opening remarks. We will probably end up breaking for a very few minutes for votes, then we will open up to the panel. This is a really important discussion, we will have time to get into our issues at some length. I thank all of you for coming.

So let me begin, if I might, with my opening remarks. Hopefully Senator Boozman will be here, we will break, and then we will do the panel.

The issue that we are dealing with today is of great significance. The President has indicated, and I agree with him, that when we look at the future of our economy and how we can address the fact that we have millions and millions of people who are unemployed, that real unemployment today, in my view, is probably closer to 16 percent than it is 9 percent, that one of the areas that he sees real economic growth is in is moving toward sustainable energy. I would hope that most Americans would agree that it makes no sense at all that in our country today, we are spending $350 billion a year importing oil from foreign countries. That makes no sense from an economic perspective.

I was in Saudi Arabia a few years ago, and trust me, the Saudi family is doing just fine. They do not need any more money from the American people. I think most Americans think it that would make a lot more sense, for a whole lot of reasons, for us to move to energy independence, to cut down on greenhouse gas emissions, deal with that very serious issue, and in the process, create over a period of years millions of good-paying jobs.

Some of you may have seen a piece that appeared in the *New York Times*, I think it was yesterday, and that is that, as a Nation, there are more and more products that we do not manufacture in this country. I think what most Americans are very alarmed about, when they go into a store and they try to buy something, it is increasingly difficult to buy something manufactured in the United States of America.

I was just recently dealing with the Smithsonian Museum of American History, where the busts of George Washington are made in China. Apparently we don't know how to make busts of George Washington.

Just recently, according to the *New York Times*, the iPhone and iPad are made in China. In fact, 80 percent of the toys and the shoes sold in the United States are made in China. Eighty-five percent of our bicycles are made in China. And 90 percent of U.S. furniture production has moved to China. China even makes half of our apple juice. Since September 11, 2001, over 100 million American flags sold in the United States were in fact manufactured in China.

So the issue that we are dealing with now is, what is not going to be made in China? Is in fact solar panels, wind turbines, or other important tools for sustainable energy, are those products, many of which were developed here in the United States, going to be manufactured in China? In my view, we can create good-paying jobs by investing in efficiency and sustainable energy, technologies that create more jobs per dollar than many other energy technologies.

Wind and solar, and here is an important point, are getting more and more competitive. Prices are going down. Businesses understand that they provide stable energy costs, compared to volatile fossil fuel prices. Nobody in this room knows what is going to be happening in the Middle East in coming months. But what we can be sure of is the more volatility and political struggle that takes place is going to lead, in all likelihood, to higher oil prices.

One example, which I think is an interesting example, of this country moving toward sustainable energy is that Wal-Mart, the largest employer in America, has ambitious efficiency and renewable energy goals and is adding solar to dozens of stores because, according to them, renewable energy "reduces price risks." The price of solar energy is not going to go up, unlike oil from the Middle East.

China understands the value of sustainable energy and is fighting as hard as they can to make sure they own this industry. If there is anything we are going to focus on today, I would hope that that would be it. In the process, they may well be violating WTO rules, as the United Steelworkers of America has pointed out.

China now makes half of the world's solar panels and has 7 of the top 10 solar manufacturers. This is a technology developed in the United States. We recently saw an example in Massachusetts where a major solar manufacturer is shutting down, moving to China. China controls nearly half of the $45 billion global market for wind and has surpassed the United States in wind generation capacity, with more than 41,000 megawatts. This is not an accident, and again, this s a point I hope we can discuss.

China understands that sustainable energy is critical for economic development and for a cleaner environment. As Secretary of Commerce, Gary Locke, said, "The Chinese are putting in almost $12 billion a month in the clean energy sector. That is an extraordinary sum of money. They are doing this because they really want to be the world's supplier of clean energy, and they recognize this will support millions of jobs." Gary Locke, Secretary of Commerce of the U.S. Government.

China spends nearly three times more than the United States to finance sustainable energy, meaning solar developers get loans at 2 percent in China, while in some cases they pay 14 percent in the United States.

The point here is to understand that China knows that investing in sustainable energy is good economic development. They create jobs doing it. Unfortunately, there are some in this country who do not appreciate that. We have strong opposition in terms of extending the Clean Energy Manufacturing Tax Credit that would support tens of thousands of jobs. We are hearing complaints about incentives for wind and solar, et cetera.

So I think what we want to talk about today is the relationship between investment and job creation and sustainable energy. What we also want to be talking about is what China is doing to lure American companies out of this country and into China, and how in fact they may be violating international trade agreements in the process.

So there is a lot to talk about. What we will is, when Senator Boozman comes, we will give him the mic. But I think while we have the gun, I am here, there are no votes yet, so why don't we begin—the votes have started? All right, let me do this then. The votes have started. Let's take a temporary break. We will be back in 5 minutes. Thank you very much for your indulgence.

[Recess.]

Senator SANDERS. Thank you all for your indulgence. I hope we can get down to work now.

It gives me pleasure now to introduce the Ranking Member, Senator Boozman, for his opening remarks.

STATEMENT OF HON. JOHN BOOZMAN, U.S. SENATOR FROM THE STATE OF ARKANSAS

Senator BOOZMAN. Thank you, Mr. Chairman.

First of all, I would like to ask unanimous consent to submit an updated copy of Dr. Montgomery's testimony for the record.

Senator SANDERS. Without objection, so ordered.

[The referenced information follows on page 32.]

Senator BOOZMAN. In the interest of time, I am going to forego, ask unanimous consent to have my statement put in the record, the full statement. But I do want to say that I am very excited about being the Ranking Member, serving on this subcommittee. I want to thank Senator Inhofe for allowing me to do that. Also, I am looking forward to working with the Chairman.

Someone has said that every day, every elected official needs to get up and think, how can we create jobs, how can we protect jobs, how can we protect savings and pension plans. That truly is the

name of the game, and I know that that is what this committee is all about. I look forward to, again, pushing that forward.

So to try and ingratiate myself with my Chairman and my Ranking Member, I yield back.

[The prepared statement of Senator Boozman follows:]

STATEMENT OF HON. JOHN BOOZMAN, U.S. SENATOR FROM THE STATE OF ARKANSAS

Mr. Chairman, during this period of high unemployment, sluggish growth, and economic hardship for many families, I believe today's hearing is very timely. I look forward to the testimony of our witnesses.

This is our first subcommittee hearing in the new Congress, and this is my first statement as subcommittee Ranking Member. So I would like to make a somewhat general statement before addressing the subject of today's hearing.

First, I look forward to working with Chairman Sanders, Ranking Member Inhofe, and all members of the Committee. We may not always agree, but I hope we can disagree without being disagreeable. I hope we will look for areas of mutual concern and conduct thorough oversight of policies that impact our economy and our environment.

Good policies will lead to net job creation, including the creation of so-called "Green Jobs." Bad policies may create some jobs, but they will lead to greater job losses in other areas. We must consider which policies actually work and which policies have severe, unintended, negative consequences. Congress should not rubber-stamp every policy that is labeled "Green." Heavy-handed government mandates and bureaucratic micro-management of the economy will not work. These policies amount to picking winners and losers. In most cases, there are far more losers than winners.

I believe in conservation, and common-sense policies to protect the environment, reduce pollution, and protect human health. I agree with Senator Inhofe's statement during a Hearing in the last Congress: our objective should be to "increase domestic energy supplies—including wind, solar, geothermal, as well as oil, gas, nuclear, and coal—to make energy cleaner, more affordable, more abundant, and more reliable."

We've seen and suffered the results of failed economic micro-management. The so-called "stimulus" package has increased America's deficit and debt to unimaginable levels, without creating the promised, permanent, private-sector jobs. "Green" mandates in Europe have destroyed jobs, limited economic growth, and pushed manufacturing to countries with weaker environmental standards. As a result, we see a weakened Europe and no net decrease in targeted emissions.

I agree with the written testimony from Mr. Cicio (Sis-E-O), which states: "the focus on 'green jobs' is too small and limiting for substantial economic and jobs growth. U.S. Policy should focus on supporting policies to reduce energy and regulatory costs and barriers to enhance the competitiveness of the 'entire' manufacturing sector."

There are a lot of steps we can take to make sure our companies—including companies in the green energy sector—are competitive. Let me give an example. In order to build hybrid cars, manufacture high-efficiency electric motors, or improve wind turbines, our entrepreneurs need access to certain rare earth elements. Our country should increase the mining and production of these elements from domestic sources, rather than depend on unreliable Chinese supplies. Some may be critical of mining, but our mines must remain operational to supply the raw materials that are vital to American manufacturing jobs, including "green jobs."

The high-tech production of materials for the wind and solar industries should occur in the United States. I support the efforts of these industries to make products and create jobs, including in Arkansas. But for these manufacturers to succeed, they must have access to affordable energy. "Green jobs" are susceptible to the same high energy costs and regulatory burdens that threaten to destroy other jobs in our country.

Dr. Montgomery, thank you for your written testimony. I appreciate your point that analysis of "green jobs" should be more than a "head-counting exercise." You explain that we must also weigh whether a particular policy translates into "overall losses in average household spending power, and into reductions in GDP, relative to what they would be if no such policy were in place." (Montgomery Testimony, p. 8) You do a brilliant job of highlighting that intentionally favoring an industry with lower labor productivity directly leads to lower wages. (p. 9) Finally, you make helpful contributions addressing the impact of investment diversion and the resulting impacts on productivity growth. (p. 11) I hope you will have an opportunity to expand upon these points during today's hearing.

Again, thank you Mr. Chairman for holding this timely hearing, and I look forward to hearing from our witnesses.

Senator SANDERS. Oh, you have ingratiated yourself immensely. This is wonderful.

Brief remarks from Senator Merkley.

STATEMENT OF HON. JEFF MERKLEY, U.S. SENATOR FROM THE STATE OF OREGON

Senator MERKLEY. Thank you, Mr. Chair. I am going to just withhold remarks. I am here because this is a very important topic, creating clean energy jobs in America.

Thank you.

Senator SANDERS. Thank you.

Senator Inhofe.

STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

Senator INHOFE. Well, I won't try to ingratiate myself.

Senator SANDERS. Too late for that.

[Laughter.]

Senator INHOFE. This is one that I wanted to attend with the new Ranking Member and new Chairman of this committee. I understand that our Chairman had started out with some of the things that are happening in China. I would like to suggest what is also happening in China is they are very aggressively going after every fossil fuel they can get their fingers on. They are currently cranking out still, last time I heard, some two coal-fired generators a week. We have this, for anyone who wants to get into China in any detail, I have on my Website my China report. So you are welcome to get into that.

I am concerned about this, and concerned, of course, about the green jobs. I will do the same thing, submit my statement for the record. But also, I had a chance to talk to Mr. Gerard before the meeting started, and he is very sensitive to it, and has documented a lot of the jobs that we have lost in some of these MACT programs, both Boiler MACT and Utility MACT. I see this as a real problem right now in this country, and I am spending quite a bit of my time on some of the over-regulation that is coming from the Environmental Protection Agency. We are going to try to do a better job.

I will yield back.

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

I want to welcome all the witnesses today, particularly Paul Cicio, Executive Director of the Industrial Energy Consumers of America, and David Montgomery of Charles River Associates. I look forward to your testimony.

Today's hearing is about "green jobs" and "trade", though I suspect we will hear some discussion of a "clean energy standard." This concept has a long pedigree, and it is now considered, at least by some, as the compromise approach in the wake of cap-and-trade legislation's demise. Some have asked me whether I support a clean energy standard. Of course, I readily respond by asking, among other things, "How do you define 'clean'?" and "What do you mean by 'standard'?"

Also, what is the motivation behind a national clean energy standard? Is it to reduce carbon emissions? If so, then, if you have a clean energy standard, what is the

need for EPA's greenhouse gas regulatory regime under the Clean Air Act? For that matter, what is the need for each and every component of EPA's aggressive regulatory regime designed to shut down coal-fired powerplants? It would seem to me that one couldn't begin to have a rational discussion of a clean energy standard unless all of these regulations are "on the table," so to speak.

When "standard" is mentioned, I think first of "mandate." Is that what proponents of a clean energy standard mean? I, for one, question the need for a new Federal energy mandate. If there is a mandate, what are the targets, what are the timetables? From what I've seen thus far, the targets and timetables proposed would bring about the same result as cap-and-trade: higher energy costs, fewer jobs, and lower productivity.

Now on to what is "clean." Wind, solar, and geothermal are generally considered clean. But I also believe, for example, that ultra-supercritical coal plants are clean: these plants can reduce sulfur dioxide and nitrogen oxides considerably relative to a traditional coal plant; and if you're concerned about CO_2, they emit almost 40 percent less. But we can't build these plants in good measure because activist groups are blocking their construction.

These are the same groups that call for clean energy, yet in the same breath ridicule clean coal as an oxy-moron; denounce hydropower because of dam construction; oppose emissions-free nuclear because of waste issues; worry that tidal energy harms marshes and mud flats; stop solar power because of concerns over endangered species; and block offshore wind farms because they are aesthetically distasteful. They also claim to support clean-burning natural gas, but want to stop domestic gas production.

In short, they have a rather cramped definition of "clean". What I am thinking of includes clean coal—and here I'm not talking about coal with carbon capture and sequestration, or CCS, a technology whose commercialization depends on the construction of a massive infrastructure of storage sites and pipelines that is orders of magnitude larger than what supports oil and gas production. Activist groups, through lawsuits and other forms of obstruction, will never allow it to be built.

Along with new modern coal plants, I want nuclear, natural gas, as well as the array of existing technologies that make up the rest of our energy economy. This ensemble is reasonable and also far broader and more congenial to energy security, jobs, a growing economy, and the environment than what we will hear about today.

Today we will hear about "green jobs" defined as those largely in the business of supporting wind and solar power industries. These jobs are part of the so-called "clean energy economy" envisioned by the Obama administration, in which government will supposedly transform the energy market by taxing the energy we use and then subsidizing technologies that can't stand on their own. This bureaucratic-driven energy market will, so the logic goes, reinvigorate America's global leadership in technological innovation.

But this is faulty logic, impaled on the sharp edge of experience. Consider Evergreen Solar, which at one time was all the rage in Massachusetts. Evergreen Solar was making the breakthrough technology that would supposedly transform the energy economy. State officials were so smitten that they forked over $60 million in taxpayer funds to build a plant in Devens, Massachusetts. But the plan, and the plant, failed. Michael El-Hillow, Evergreen Solar's chief executive, explained the plant's demise in stark terms: "While the United States and other Western industrial economies are beneficiaries of rapidly declining installation costs of solar energy, we expect the United States will continue to be at a disadvantage from a manufacturing standpoint." [Emphasis added]

What he means is that Evergreen's operating costs in the State were simply too high, even with the $60 million hand out. Evergreen Solar has shuttered the plant, has fired 800 workers, and is now moving the operation to China. As Massachusetts State Senator Jamie Eldridge asked, "Should Massachusetts State government offer massive subsidies to large corporations as part of its economic development strategy to create jobs for residents?"

I think we know the answer. But this is exactly what the Obama administration is proposing on a grander scale. Massive subsidies, more taxes, and more regulations—all imposed on the economy, on taxpayers, and all based on the fanciful notion that new jobs and industries will follow. Surely some will, but as David Montgomery, one of the Nation's foremost energy economists explained in his testimony, the Administration forgets or ignores the other side of the equation: those taxes, mandates, and subsidies will destroy jobs in other industries, raise energy prices, reduce wages, lower productivity, and displace investment. In short, we are worse off than when we started. Put another way, the Administration's "green economy" entails a net loss for America.

Regulations now being imposed by this Administration are making businesses here—including solar and wind manufacturing businesses—less competitive, unable to compete with those operating in China and India. Just take EPA's Boiler MACT rule, which affects thousands of industrial boilers. It puts nearly 800,000 jobs at risk in this country. According to the United Steel Workers Union, whose president is testifying today, "Tens of thousands of these jobs will be imperiled. In addition, many more tens of thousands of jobs in the supply chains and in the communities where these plants are located also will be at risk."

This is no way to make energy and environmental policy, let alone run a country. Let's put aside talk of "transformation"—the green economy as defined by the Administration is a failure. It's time to get back to basics: supporting and encouraging domestic energy production, onshore and offshore; removing tax and regulatory barriers to innovative clean energy technologies; and allowing all forms of clean energy to power the American economy. By the same token, we need to balance our regulatory policies so they protect the environment without sacrificing the jobs and businesses that make our economy grow and expand.

These are the essentials and we know they work; without them, America will lose ground to other nations, and the promise of a brighter future will be in doubt. It's time to turn the ship, and return course back to growth, production, innovation, and leadership.

Senator SANDERS. Thank you very much. Thank you, Senator Inhofe.

OK, let us begin with Leo Gerard. Mr. Gerard is the international president of the United Steelworkers of America. Thank you very much, and thank all of you very much for being here.

Mr. Gerard, if you want to begin.

STATEMENT OF LEO GERARD, INTERNATIONAL PRESIDENT, UNITED STEELWORKERS

Mr. GERARD. As was mentioned, I am the international president of the Steelworkers Union. To the Steelworkers Union, clean energy economy promises, we believe, robust economic growth for the Nation that understands the value of the thousands of good-paying jobs, family supporting jobs that can and should be created in this sector, if we are prepared to lead. If we as a Nation do not seize this opportunity to lead in this sector, I can assure you that Communist China or someone else will, to the detriment of our children and to the detriment of our environment.

Our Union has over 850,000 members who work hard every day making the products that have been the bedrock of our country's economic strength and security. But for our country to succeed in the global race to compete in the new clean energy economy, we must also ensure that these industries remain the foundation for the future. Our Union has long been one of the most active, if not the most active, organizations in America on the need to enforce our trade laws.

The Steelworkers Union understands that all the incentives, market forces and money in the world will not create the jobs that we need if predatory, illegal practices by our foreign competitors are left unchecked. Sadly, our Union often is forced to act virtually alone to push for enforcement of our trade laws, as many companies and other group fall victim to the intimidation that is part of these coordinated attacks on our industries and American companies, and in particular, on American workers.

In just such a case, Steelworkers filed a 301 petition, a 301 action under the agreement we have with China with the U.S. Trade Representative, seeking an investigation into the illegal practices by the Chinese government that distort trade and investment in

clean energy technology. Just a brief aside, I think in front of a committee just last week, USTR Ambassador Kirk pointed out that his agency doesn't have sufficient resources to do all of the investigations that need to be done on illegal trade. I wanted to make sure I mentioned that today.

In October, the petition was accepted and an investigation was opened by USTR. It has now moved to the consultation phase with China and at the WTO on some other of these issues. This process may result in the formation of a dispute resolution panel if the agreement between the two countries is not reached.

This investigation has generated a lot of attention and is the target of much propaganda by our opponents who seek to confuse the issue by implying that the United States is targeting all Chinese clean energy polices, even those we also have here. That is completely false, completely untrue, and today I want to set the record straight.

This investigation is about five areas of illegal Chinese practices. They are: export restrictions of rare earth minerals; forced technology transfer; discrimination against foreign companies; prohibited export subsidies; and domestic subsidies designed to cause harm to China's trading partners. Each of these, Mr. Chairman, is a direct violation of international law and the commitments China made when it joined the WTO. Holding them accountable is not undue, nor is it unjust.

Still I too often read about how we are supposedly attacking China's renewable energy standard and how unfair this is, since the Steelworkers support the same thing in the United States. Or how we are trying to stop China from supporting alternatives, and alternative vehicles, such as high-speed rail, both of which we support in the United States. This is a deliberate distortion of the facts and is again untrue.

Does the United States support and encourage the development of clean energy? Certainly. But we do it WTO legal, and our hope is that the United States will continue to do so, and increase that investment in our domestic infrastructure. Does the United States restrict China's access to key raw materials? No, it does not. Does the United States pursue illegal export or domestic content subsidies? No, it does not.

Does the United States discriminate against foreign goods and companies? No, it does not. Does the United States force Chinese companies to transfer technology to American ones at the cost of doing business here? No, it does not. Does the United States grant such massive subsidies that they by design distort the entire world market? No, it does not. China does all of these.

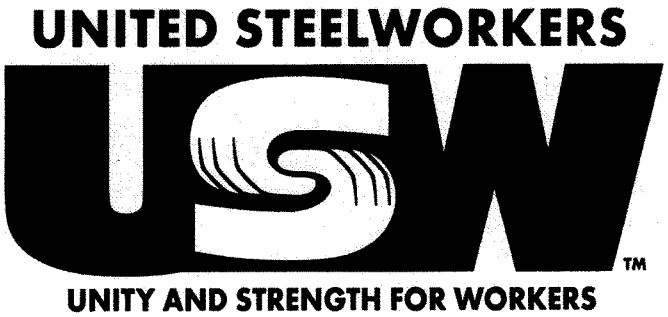
The investigation that we have initiated does not target positive and legal policies, only illegal ones that subvert our shared goal of robust clean energy development.

Mr. Chairman, thank you for holding this hearing. We look forward to working with you and this committee to ensure that American workers get the benefits of the clean energy economy. We know that this will be a huge undertaking, but we believe we can do it. President Obama is right: we do big things. This will be the biggest of our lifetime. It will be the biggest of our generation.

On behalf of the Steelworkers, I would like to say, we are ready to meet this challenge. But we can't meet it while our markets are being destroyed. We can't meet it while China, using them as the poster child, does what it does at the expense of our industries, at the expense of the R&D.

Let me just close with this. The modern wind turbine was invented and sophisticatedly created in Sandusky, OH. We cannot now build a wind turbine from start to finish with an American supply chain, and that is ashame. Thank you.

[The prepared statement of Mr. Gerard follows:]



Testimony of

Leo W. Gerard

International President
United Steelworkers

before the

Subcommittee on Green Jobs and the New Economy
Committee on Environment and Public Works
United States Senate

February 15, 2011

Good afternoon. On behalf of the 850,000 active members of the United Steelworkers (USW), I would like to thank Chairman Sanders and the subcommittee for holding this hearing on the effect of trade issues and trade policy on the development of the clean energy economy. I am Leo Gerard, the International President of the USW. The members of our union, the largest manufacturing union in North America, are hard at work every day making the products that both enable how we live today and also how we will move into the future.

USW has long embraced the potential for robust economic growth in America spurred by a commitment to the development of the clean energy economy. Thousands of good, family-supporting jobs can, should, and must be created in this sector if the global environment is to be preserved and if the United States is to secure its role as a clean energy leader.

For decades, USW has been a leader in the labor movement on both the protection of the environment and the development of clean energy. In 1990, we published "Our Children's World" stating our union's environmental policy and the need to address climate change, and in 2006 reaffirmed our union's commitment to environmental responsibility through the publication of "Securing Our Children's World."

USW's specialty is in working through collaborative partnerships with sometimes strange bedfellows to forge sensible, workable policy options. For example, USW is a founding member of the Blue-Green Alliance (BGA), a coalition of labor unions and environmental groups. BGA and its partners are striving to plan a new way forward for America through the promotion of policy solutions that spur growth and investment in clean energy technologies and products produced here in America. Similarly, last year USW formed a Partnership for Progress with the American Wind Energy Association (AWEA), to develop solutions to accomplish our shared goal of a thriving wind energy sector powered by turbines and components produced here in America by American workers.

Our union has also been one of the most active organizations in America with respect to enforcing our trade laws. USW understands that all the incentives, market forces, and money in the world will not create the jobs we need here in America if predatory and illegal trade policies by our foreign competitors are left unchecked. American trade laws and international treaties are designed to prevent the sort of market distortions that are sadly common. However, in order to be effective, they must be enforced with the vigor and consistency that the current economic situation requires.

Too often, USW is forced to act virtually alone to push for enforcement of these laws. Many companies and other groups fall victim to the intimidation that is part of these coordinated attacks on American companies and workers. It is regrettable that this is the case, but USW is able and proud to be the ones who stand up. We can take it. We are American workers, after all - but we can only take so much – one of the tragedies of US trade law is that relief can be given only after there is injury. And that "injury" takes the form of lost jobs, broken families and hollowed out small towns all across America. Instead of waiting for the damage to occur before acting, we need to look for proactive solutions to our jobs crisis.

Last September, USW filed a petition with the U.S. Trade Representative (USTR) seeking an investigation into an array of policies used by the Government of China to distort trade and investment in clean energy technologies. In October, the petition was accepted and an investigation was opened. USTR has now moved to the consultations phase with China at the World Trade Organization (WTO) on a subset of these issues, which may result in a request for the formation of a dispute settlement panel if consultations do not resolve matters. With regard to the remaining issues, USTR has committed to work with the USW and other stakeholders to further investigate the claims and hold China accountable for its practices.

These are not undue or unjust actions, as some opponents of the investigation would have you believe. They are the only way American workers will share in the promise of clean energy technology manufacturing. And they are, quite simply, the rules and standards that China agreed to when it joined the WTO and the international trading community

Of course, these false insinuations are just a few of many being spread by opponents of the investigation. Much is at stake – President Obama has indicated that the clean energy technology sector is key to our future. The Steelworkers' petition is the largest, in terms of trade volume, filed against a sector of the Chinese economy. Ultimately, hundreds of billions of dollars in goods and services are at stake.

The petition and the ensuing investigation have generated a lot of attention and commentary, much of it false and some of it deliberately so. I am glad to have the opportunity to tell the real story.

The petition and the investigation cover a wide range of practices in five broad areas:

1. **Export Restrictions on Rare Earth Materials and Other Key Raw Materials for Clean Energy:** The group of 17 minerals often referred to as "rare earths" are key raw materials for the production of a wide variety of high tech products, from cell phones to lasers. They are also key ingredients in most clean energy technology products, such as solar cells and hybrid car batteries. China dominates world production of rare earths, and is using that fact to restrict the growth of clean energy technologies in other countries. The restrictions China places on exports of rare earths force producers to shift production to China in order to avoid the cost disadvantages that arise from this severe restriction of exports. The result of this has been a stultifying effect on the development of clean energy industries all over the world, and an increase in the cost of all clean energy products unless they are produced in China.

   The rare earths issue is also instructive in seeing what China is doing in response to these charges. Shortly after the petition was filed, reports surfaced that China had placed an embargo on rare earth shipments to the U.S.[1] Eventually, shipments resumed but then word came that

[1] *See, e.g., China Said to Extend Rare Earths Embargo to West,* The New York Times (Oct. 19, 2010).

China was planning to reduce its export quotas of rare earths in 2011 and would increase its export tax on rare earths to almost double what it was before.[2] And just last week came reports that the Chinese government is stockpiling these minerals.[3] These are not the actions of acountry acting in good faith with the international community. These are not the actions of a country that pursues market-oriented policies. These are, rather, the actions of a country which is reacting to criticism of its predatory rare earths policy by doubling down and expanding that policy in an attempt to force the world to back down.

2. **Forced Technology Transfer:** As has been discussed, the goal of these policies is to force companies to shift production to China in order to access the Chinese market. Once there, foreign companies find that they are not permitted to do business unless they enter into a joint venture with a Chinese partner. The foreign company must then license its technology to the joint venture, which basically hands that technology to the Chinese partner as the cost of being able to do business in China.

3. **Discrimination Against Foreign Firms and Companies:** By requiring, for example, operators of Chinese wind and solar power plants to purchase Chinese-made equipment, China is giving unfair protection to Chinese producers and illegally shutting out foreign producers. This not only puts foreign companies at a disadvantage and requires them to move production to China if they want to access the Chinese electricity market, it subverts the competitive market for technology. The best technologies do not necessarily win in such a market, just the homegrown ones regardless of merit.

   This is very different from domestic sourcing rules like the "Buy America" laws the U.S. has or the "Buy China" laws that China has. Those laws and rules only cover government procurement, requiring that government spending for a public purpose give preference to domestically-produced products over imports. By contrast, the rules under investigation mandate preference by commercial entities. Government procurement domestic preferences are legal under WTO rules, but government mandates requiring commercial entities to show preference are not.

4. **Prohibited Subsidies Based on Export Performance and/or Local Content:** Similar to the discrimination against foreign firms, the Chinese government provides different levels of subsidies to producers of clean energy technologies conditioned on the use of Chinese components or specifically to enhance export performance. Both of these artificially undercut competitors in other markets, both in America and in third-party countries. These export subsidies are both illegal under WTO rules and are counterproductive in the development of a strong, functioning market for clean energy technology. We have already seen the deleterious effect of Chinese export subsidies in other areas. When export subsidies artificially drive the cost of products down low enough, those products will gain market share even if they are

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[2] *China to Tighten Limits on Rare Earth Exports,* The New York Times (Dec. 28, 2010).
[3] *China Moves to Strengthen Grip Over Supply of Rare-Earth Minerals,* The Wall Street Journal (Feb. 7, 2011).

substantively worse than other competitive products. This is how we end up with lead in children's toys and poisonous food.

5. **Domestic Subsidies That Cause Serious Prejudice to Trading Partners:** The deleterious effect of China's subsidies is not limited to its prohibited export and domestic content subsidies, however. The subsidies it grants to its clean technology producers are so massive that they distort trade and investment flows, hurting producers in other countries. Unlike the smart development domestic subsidies provided by the U.S. and other countries, Chinese domestic subsidies are predatory in nature and seek to leverage China's size to corner markets. For example, in 2009 China's subsidies to its solar industry kept production increases high at the same time the global financial crisis was leading to reduced growth in global energy use. The result of this was a glut in the market for solar cells that caused the price of them to crash. The price crash in solar cells, in turn, led several U.S. makers of solar cells to close down or move to China, where they could stay afloat thanks to the same Chinese subsidies that made their U.S. operations unsustainable.

Each of these is a violation of international law and China's WTO obligations. However, the tactic that the Chinese government is taking to respond to the President's investigation of these illegal practices is a deliberate attempt to confuse the issue. It is an attempt to conflate the laudable aspects of certain Chinese clean energy policies – of which there are several – with the identified illegal practices.

It is unquestionably the case that China has admirably moved in many ways to develop demand for clean energy in their country, which has the potential to have a positive impact on global carbon emissions. For example, China has a national renewable electricity standard (RES). This is an excellent policy option to encourage increased use of clean energy, and USW supports the development and adoption of an electricity standard in the United States. This could either take the form of an RES, as has been proposed in several USW-endorsed energy bills in recent years, or a Clean Electricity Standard (CES) as President Obama described in the State of the Union.

Still, it is untrue that this investigation seeks to penalize China for policies like its RES, feed-in tariffs, and support for alternative and hybrid vehicles and high-speed rail in public transportation programs (alt: support for new solar and wind installations that do not discriminate against imported goods) . These are positive policies that the U.S. would do well to adopt, since they are smart solutions that reduce emissions and spur investments in the technologies of tomorrow.

However, and this cannot be stressed enough, those policies are not part of this investigation.

That has not stopped opponents of the investigation from engaging in a huge propaganda campaign that seeks to confuse the issue by falsely suggesting that the investigation is into these good policies, not the illegal practices actually at issue. It seeks to create the premise that the investigation is attacking all Chinese clean energy development policies, even those that the U.S. also has in place.

This is, simply, false.

Does the United States subsidize and encourage the development of clean energy technology? Certainly, but it does so in a WTO-legal way and our hope is that the U.S. will continue its efforts and, in fact, increase that investment.

But does the United States restrict China's access to key raw materials? No, it does not.

Does the United States pursue WTO-prohibited export or domestic content subsidies? No, it does not.

Does the United States discriminate against foreign goods and companies? No, it does not.

Does the United States force Chinese companies to transfer technology to American companies as the cost of doing business here? No, it does not.

Does the United States grant such massive subsidies that it distorts the entire world market for these products? No, it does not.

We all share a common commitment to economic revitalization and the development of new technologies to create millions of new, good, desperately-needed jobs. Government encouragement and investment in clean energy technology – here and in China and all over the world – can help speed the development of this as quickly as possible to the benefit of everyone.

These practices by the Chinese government, however, are not positive investments. These are not designed to improve the efficiency and competitiveness of clean energy technologies. These policies are not about creating lower-price or higher-quality products at all. China's policies are designed simply to corner the market on clean energy based on country of origin, not quality or efficacy. They seek to subvert – not support – the development of a functioning, competitive, innovative, and robust global market in clean energy technology.

I hope that organizations like ours, policymakers, companies, and the American people can come together soon on an answer to the question of how America will meet its energy challenges. This answer, however, will clearly not be one silver bullet. Rather, it will come from a carefully constructed, sustainable, and rational suite of policies that maximize domestic energy production in as clean a manner as possible. Also, it will provide a clear timeline for the ramping-up of new clean energy technologies. And it will put the foremost emphasis on making sure that the domestic supply chain and manufacturing base for these technologies is encouraged and developed.

If we do this, the potential reward for America is almost limitless. If we put American workers in a position to succeed, they will succeed. I agree with the words of President Obama about the character

of America. We do big things, and this will be the biggest of our lifetimes. Our sleeves are rolled up, and it's time to go to work.

Thank you again, Mr. Chairman, for holding this hearing. The United Steelworkers and I look forward to working with you and the subcommittee to make the clean energy revolution the opportunity that we all hope it will turn out to be economically, environmentally and to increase the energy security of our nation for a brighter future.

Senator SANDERS. Thank you very much, Mr. Gerard.

Now we are going to hear from Mr. Cicio. Mr. Cicio has been the president of the Industrial Energy Consumers of America since its founding. In 2008, the chairman of the Commodity Futures Trading Commission, appointed Mr. Cicio to the newly created Energy Markets Advisory Committee, representing industrial energy consumers. Thank you very much for being with us today.

STATEMENT OF PAUL CICIO, PRESIDENT, INDUSTRIAL ENERGY CONSUMERS OF AMERICA

Mr. CICIO. Thank you, Mr. Chairman and Ranking Member Boozman. It is an honor to be here before you.

IECA, the Industrial Energy Consumers of America, is a manufacturing trade association. When I say manufacturing, no electric utilities are members, no oil, no gas, no coal. We are real manufacturers that produce products. Most of the products that we produce are energy-intensive. So the cost of energy is very important for our ability to compete in domestic and global markets.

Mr. Chairman, our country and the manufacturing sector are locked in fierce global competition. Both our country and U.S. manufacturing are not achieving the economic growth that we should. Make no mistake, U.S. manufacturing on many occasions is competing with governments, not just companies without government backing. In fact, we cannot take the manufacturing sector for granted. We must once again be a country that embraces manufacturing sectors with policies that foster capital investment, innovation and low-cost energy. I want to emphasize that low-cost energy and regulations that are cost-effective have certainty.

Renewable energy has an important role in our country but not through mandates and subsidies. For example, wind, unfortunately, the most economical of the renewable resources, is 80 percent more expensive than natural gas-fired power generation, according to the Energy Information Administration. These costs are passed on to us, and makes it more difficult for us to be competitive. Just a 1 cent per kilowatt hour increase in the price of electricity increases the price of electricity for all consumers in the country by $37.5 billion.

When viewing renewable energy job creation, policymakers have failed to look at net job impacts. What we mean by that is jobs created by renewable energy production minus the jobs lost in manufacturers like us because of the higher price of electricity. Mr. Chairman, there are, fortunately, more cost-effective ways to substantially improve the environment and create jobs that promote greater quantities of expensive renewable energy. For example, it is better to create jobs by saving energy with efficiency. Energy efficiency should always come before renewable energy, otherwise we are just needlessly increasing the cost of energy that we are wasting.

We are focused on driving energy efficiency through every sector of the economy, is what we should be doing. For example, buildings consume 40 percent of all the energy in the country, 70 percent of all the electricity. Common sense cost-effective things like fiberglass insulation, which by the way is energy-intensive, it is glass,

can save enormous amounts of energy. It is labor-intensive, by the way.

For the industrial sector, a better alternative, the Industrial Energy Consumers of America's sustainable manufacturing growth initiative. It is a series of policies that we have put together that will improve the competitiveness of the manufacturing sector through energy efficiency. It utilizes combined heat and power, recovery of waste heat recovery and buildings. We have modeled the economics of this study and it would create $3.2 million man-years in 10 years. It would reduce 10 percent of all U.S. greenhouse gas emissions. It would increase GDP by $389 billion, and increase private fixed investment by $407 billion.

So my point is that there are ways of increasing jobs, improving competitiveness in the country. Thank you.

[The prepared statement of Mr. Cicio follows:]

Testimony of
Paul N. Cicio
President
Industrial Energy Consumers of America

"Green Jobs and Trade"

Before the Subcommittee on Green Jobs and the New Economy
Senate Committee on Environment and Public Works
February 15, 2011

Chairman Sanders and Ranking Member Boozman, thank you for the opportunity to appear before you. My name is Paul Cicio and I am the President of the Industrial Energy Consumers of America (IECA).

IECA is a nonpartisan association of leading manufacturing companies with $800 billion in annual sales and with more than 750,000 employees nationwide. It is an organization created to promote the interests of manufacturing companies through advocacy, and collaboration for which the availability, use and cost of energy, power or feedstock play a significant role in their ability to compete in domestic and world markets. IECA membership represents a diverse set of industries including: plastics, cement, paper, food processing, brick, chemicals, fertilizer, insulation, steel, glass, industrial gases, pharmaceutical, aluminum and brewing.

Key points:

1. Renewable energy has an important role to play in our energy future but not thru mandates and subsidies that raise the price of electricity. For example, wind is the most economical and largest source of new renewable energy is 80 percent more costly than electricity generated using natural gas, according to the Energy Information Administration. Offshore wind is 130 percent more expensive. Neither number includes the additional cost of the 2.1 cents/kwh for the Production Tax Credit. Even at this high price, wind is by far the least expensive renewable energy among the choices of solar PV, solar thermal and geothermal. Electricity users pay twice, once through higher electricity prices and a second time through federal renewable energy subsidies. Even what may seem like a relatively small increase in the price of electricity can add up quickly. For example, a price increase of only one cent/kwh nationally would impose a $37.5 *billion* increase on U.S. consumers.

2. The high cost of operating in the US, including the higher electricity costs from renewable energy is contributing to job losses to the manufacturing sector and in existing green industry. When viewing renewable energy job creation, policy makers have failed to look at "net" job impacts. That is, jobs created by renewable energy production minus jobs lost from other manufacturing sectors because of higher electricity costs.

3. There are more cost effective ways to substantially improve the environment and create jobs than promoting greater quantities of expensive renewable energy.
For example, it is better to create jobs by saving energy with efficiency than by increasing the cost of energy with renewable energy. Energy efficiency should always come before renewable energy; otherwise, we are just needlessly increasing the amount of energy we are wasting.

An example of a better alternative is IECA's "Sustainable Manufacturing & Growth Initiative" (SMGI). SMGI is a set of policies to revitalize the manufacturing sector by increasing energy efficiency. The policies are designed to encourage companies to spend capital right away, in the US and create good paying jobs.

The University of Maryland modeling results indicate the SMGI will create 3.2 million job years in ten years, reduce 10 percent of US GHG emissions, increase GDP by $389 billion and result in $407 billion in private fixed investment.

4. It is important to change the definition of what is a green job. Green jobs are being defined as wind/solar type jobs. This definition ignores the market realities that a very significant number of product production processes and products that are "green" receive no recognition and do more to contribute to sustainable jobs and a clean environment than renewable energy.

5. Wind/solar is not a real market and does not provide sustainable jobs. Real markets are driven by real supply and demand. Today's renewable energy market exists primarily because of state or federal government mandates and subsidies. Otherwise demand and jobs would decrease substantially.

6. Lowering energy costs, barriers to investment, lowering regulatory costs and providing regulatory certainty to the broader manufacturing sector to increase jobs - should be the priority – not niche markets such as wind/solar type green jobs. Lowering the broader manufacturing industry's costs will potentially create a competitive sustainable low cost renewable energy industry.

7. So long as renewable energy remains substantially more expensive than conventional power generation, it should be utilized to serve customers who are in regions where it is too expensive to build transmission lines from conventional power plants. Instead, misguided policy makers are proposing enormously expensive long distance power transmission lines to access regions with high wind or solar potential. The high cost of new transmission makes renewable energy even more expensive.

8. All renewable electric generation and transmission costs are passed onto home owners, farmers and manufacturers. High costs of renewable energy do not impact an electric utility's profitability.

9. Essential ingredients to achieving the "new economy" (increased sustainable jobs and cleaner environment) are low relative costs, an environment conducive to long term capital investment, innovation and cost effective regulations with certainty.

Manufacturing is still on the ropes

Manufacturing continues to lose competitiveness as evidenced by recent trade data. The Commerce Department reported on February 11, 2011 that exports grew in 2010 by almost 17 percent – but imports rose 20 percent and pushed the annual trade deficit up to almost $498 billion, a 32.8 percent increase. The largest percent gain in a decade. The trade deficit with China for 2010 reached a high of $273 billion.

The priority should be revitalizing the broad-based manufacturing sector

Our country and the manufacturing sector are locked in global competition with other countries and their manufacturing facilities – and both are losing relative economic ground. Policy makers have taken US economic dominance and the manufacturing sector for granted for a long time and can no longer afford to do so. We must once again become a country that embraces the manufacturing sector with policies that foster capital investment, innovation, low cost energy and regulations that are cost effective and provide certainty.

The focus on "green jobs" is too small and limiting for substantial economic and jobs growth. US policy should focus on supporting policies to reduce energy and regulatory costs and barriers to enhance the competitiveness of the "entire" manufacturing sector. The US needs to be a place where companies want to invest – and today it is not. **Since 1996, manufacturing investment as a share of real GDP fell by 18 percent and is accelerating.** This is a clear indicator that relative to other countries in the world, the US has not been a good place to invest for a long time. Initiatives that support the entire manufacturing sector achieves more bang for the buck and put more people to work with sustainable jobs. If we improve the competitiveness of the manufacturing industry, improved competitiveness will occur in the wind/solar niche markets.

The US should advance policies that result in cleaner air and lower GHGs so long as such policy results in energy that is affordable, reliable and does not raise the cost of electricity and other energy sources. The problem with wind and solar type renewable energy is that it does not achieve any of those criteria despite a very long history of supply side subsidies and demand mandates. And, there is nothing in the horizon that appears to change its outlook. These are costly alternatives.

To compete in "green jobs and trade", we need a strong manufacturing sector to supply the basic needs of those industry sectors namely: steel, chemicals, glass, paper, rubber, cement, plastics, non-ferrous metals, etc. Essentially all of the products needed for the wind/solar sector and US economic growth are produced by these basic energy intensive product areas. This means that if energy and regulatory costs in the US are too high, domestically sourced materials for the wind and solar industries will have significant difficulty competing.

Green jobs, as defined as wind/solar is a misguided energy and public policy priority
The debate over green jobs, as defined by wind and solar type renewable energy resources, is misguided energy and public policy and fails to acknowledge real green industries, jobs and alternative solutions to a cleaner environment. Plus, we question that it is the right priority for job creation at this time when better opportunities exist.

US companies are not likely able to compete with government owned company competitors
The purpose of this hearing is to explore whether the United States is competing with other nations for green jobs. IECA's response is that yes, we are in competition with other "countries" and "non-US" companies. Heretofore, we are not doing very well and it is very uncertain that we will be able to compete in this area. US companies would be able to compete with other non-US companies (companies that are not state owned) but not with China and other countries with state owned operations. As long as China owns companies and subsidies them and retains a low cost labor force, US public companies will not likely succeed. We hope that there will continue to be some niches of materials or components that US companies are able to sell to Chinese green product providers as part of the value chain. Wind/solar markets, like many

other manufactured products that compete against subsidized state owned providers need fair and equitable trade policies.

It is important to change the definition of what is a green job
Green jobs are being defined as wind/solar type jobs. This definition ignores the market realities that a very significant number of product production processes and products that are "green" receive no recognition and do more to contribute to sustainable jobs and a clean environment than renewable energy. Importantly, these energy efficiency solutions are mostly made in the US. A win-win for jobs and the environment.

A small sampling includes:

- Processes like using combined heat and power that can produce electricity and energy with as high as 80 percent energy efficiency versus a base load electric utility generator at about 32 percent. Distributive generation also reduces transmission line losses.
- Waste heat recovery that is hot stack gases captured and used to produce power is as clean as renewable energy.
- Fiberglass insulation is a cost effective solution for buildings which consume over 40 percent of all US energy. According to the DOE, air sealing and adding insulation to DOE recommended levels can save up to 25 percent of energy costs in homes. Homes account for 20 percent of all direct and indirect electricity use and 20 percent of the GHGs. DOE estimates there are 60 + million homes that are under insulated. Insulating buildings is labor intensive.
- Plastics, aluminum and steel industries are providing light-weight but durable solutions that are used in the transportation sector to improve efficiency.
- The pulp and paper industry produces 65 percent of their electricity needs from renewable biomass.
- Industry practices of using recycled paper, steel, aluminum and glass saves significant quantities of energy annually.
- It is common place in manufacturing facilities to utilize any type of process gas from the manufacturing process as a source of energy in other parts of their facility. Energy is a cost and when it is economic to do so, energy efficiency is employed.

Wind/solar is not a real market and does not provide sustainable jobs
Real markets are driven by supply and demand. Unless state or federal governments set mandates and subsidies, no market would exist at all. Therefore, this is not a real market. If not for mandates and subsidies, this market would have substantial difficulties attracting capital - which does not bode well for sustainable jobs. Real markets provide real investment opportunities for long term jobs creation.

Another perspective is to compare wind/solar to a conventional power plant. Wind/solar field plant operations requires few jobs and mostly for maintenance while a conventional power plant has several full time good paying 24/7 jobs.

State Renewable Electricity Standards (RES)
The higher electricity costs from State imposed RESs are creating competitiveness threats to electric intensive manufacturing jobs. The dilemma is that higher electricity costs can result in manufacturers getting "priced out of market" and it opens the door to low cost subsidized products from places like China. This is another reason why manufacturing companies strongly support letting energy efficiency compete head to head with renewable energy as part of a State

RES. It is sound energy and public policy to let renewable energy compete directly with energy efficiency alternatives and let the low cost option win.

Existing and new regulations stymie capital investment and job creation
IECA companies are not opposed to cost effective regulations that have certainty. Unfortunately, the manufacturing sector is burdened with significant existing and proposed regulation that is slowing and sometimes stopping capital spending in plant expansions and in large energy efficiency projects. Regulations are contributing to a job-less recovery.

The very regulations and practices that are intended to improve the environment actually result in increased global emissions as industry leaves our country in favor of less stringent regulatory climate instead of continuing to operate in the US. The problems these regulations create often manifest themselves in the permitting process.

Everyone expresses concern about permitting and the impact these rules have on our ability to build industrial projects that create jobs and improve people's livelihoods. However, this is not a new problem. Over time, we have created a system that is comprised of endless reviews, hearings, allegations, lawsuits and continued modeling that has turned our permitting process into a slow, frustrating experience that has eliminated the certainty necessary for the allocation of business capital.

This process directly impacts manufacturing but has also impacted our energy costs as conventional low-cost electric generation plant construction projects are continually blocked. Because of the continual halting of permits for new, traditional sources of energy generation and constant promotion of expensive so call "green" energy, we as a nation are essentially pricing ourselves out of the industrial market.

EPA GHG regulation puts EPA in charge of industrial policy
A good example of how regulation is contributing to a job-less recovery is the new EPA GHG regulation that is viewed by manufacturing as putting the EPA in control of US industrial policy.

Under these regulations, the EPA has the ability to set deadlines as to:

- "when" capital must be spent on energy efficiency technology projects, even if the manufacturer says it is not economic to do so;
- "what" energy efficiency projects will be completed, even if it is inconsistent with the scope or timing of other manufacturing production plans or business strategies or priorities;
- "what technology" will be used, even if the manufacturer says the technology is not cost effective or desirable for the type or quality of products that the facility produces;
- what manufacturing "practices" will be used to operate the facility, taking decision making out of the hands of plant managers and into the hands of the EPA.

Thank you.

Senator SANDERS. Thank you very much, Mr. Cicio.

John Danner brings more than 20 years of leadership experience to Northern Power, and was previously president and CEO of Codon Devices, a privately held high-growth biotechnology company. He is from Barre, VT areas, is that correct, John?

Mr. DANNER. That is right, Senator.

Senator SANDERS. Thank you very much for being with us.

STATEMENT OF JOHN P. DANNER, PRESIDENT AND CEO, NORTHERN POWER SYSTEMS

Mr. DANNER. Thank you. Good afternoon.

Mr. Chairman and esteemed members of the subcommittee, thank you for the opportunity to share my perspectives on green job growth and trade with you today. My name is John Danner, I am the CEO of Northern Power Systems, a next generation wind turbine company based in the United States.

Today I would like to cover three topics, a quick background of Northern Power, the opportunity from our vantage point for policymakers to truly create jobs and move our Nation toward a renewable energy economy, and then third, specific actions that our Government can take to quickly and meaningfully accelerate job creation in this renewable sector.

So to begin, Northern Power Systems is the oldest continuously operated wind turbine company in the United States, founded in Vermont in 1974. Northern Power designs, manufactures and sells highly reliable, highly efficient wind turbines. Leveraging recent advances in computer technology and material science and electrical engineering, our company has developed state-of-the-art direct drive wind turbines. This technology is simpler, lighter, more efficient and more reliable than traditional wind turbines that use complex and high speed gear boxes.

The result is that Northern Power wind turbines deliver more power more of the time for lower cost, thus furthering lowering the already competitive cost of wind energy. The wind turbine industry has historically been dominated by European companies, although in recent years we have seen a surge of Chinese companies entering the global marketplace. In 2008, Northern Power Systems was acquired by private equity investors whose vision was to create an industry-leading American-made wind turbine company, based on Northern's cutting edge direct drive technology.

Since 2008, Northern has raised $113 million of private capital, opened three new locations, expanded our direct employee base from 78 to 160, and we now operate facilities in Vermont, Massachusetts, California and Michigan. We have sold wind turbines into 25 States and 6 countries. Last month we opened production operations for our new, state-of-the-art utility-scale wind turbine in what had been a vacant former automotive parts manufacturing plant in Saginaw, MI.

While we are proud of what we have accomplished to date, we are confident that as we grow Northern Power into a leader within the global wind turbine industry, we will create thousands, if not tens of thousands, of jobs. Northern Power is but one example of the potential that wind power represents to the U.S. economy.

Wind energy has the potential to simultaneously address the environment, energy security and of critical importance, job creation.

Wind power is the only source of renewable energy with both a ubiquitous fuel source and a very competitive cost. In fact, I would like to submit for the record a cost comparison which was done by Goldman Sachs, run in the *Wall Street Journal* of September 13, 2010. It takes a directly opposite view of the Energy Information Administration cost estimates discussed previously.

Simply stated, wind power is an economically viable path to substantially increase the amount of energy we generate from renewables. This has been evidenced by the fact that wind power was the leading type of new electrical generation capacity installed in both the United States and Europe in 2008 and 2009, before economic conditions caused a pull-back in 2010. In some States, like Iowa, wind power account for nearly 15 percent of the electricity today. So this can be done, and it can be done cost-effectively.

The result can be a staggeringly positive impact to our economy where we need it the most, in high quality engineering and manufacturing job creation. While Northern Power has created nearly 100 direct jobs in the last 2 years from our relatively modest perch, the wind industry overall employs 85,000 Americans today, 20,000 in manufacturing alone, suggesting a very substantial base from which to drive green job growth creation.

In order to tap the tremendous benefits of wind energy to our economy, I would recommend that the U.S. Government pursue three avenues. First, increase the support for Ex-Im and DOE programs. In order to compete with the aggressively supportive Asian governments, the U.S. Government should strengthen its support to the Export-Import Bank and the Department of Energy. Programs like Ex-Im Bank's export finance program are critical to allowing Northern Power to compete on a level playing field in the export arena.

Similarly, DOE initiatives, like the 1703 loan guarantee program are essential to helping American companies commercialize innovative new technologies, where our Asian competitors are oftentimes simply and directly funded by state-owned institutions.

Second, extend the production tax credit and section 1603 cash grant in lieu of investment tax credit programs until 2016. These programs help address the relative capital intensity involved with renewable energy projects and provide critically needed assistance in these difficult times when liquidity has not fully returned to our capital markets. In addition, other programs like the section 48(c) manufacturing tax credit and salary depreciation programs and the proposed Green Bank can all play pivotal roles in leveling the playing field.

Third and finally, most importantly, adopt a national renewable or clean energy standard. Establishing a firm set of national renewable energy standards will provide much-needed certainty to private capital markets and will greatly assist in investment capital formation for domestic manufacturing. This public policy initiative will bring the full power of private financial markets to bear on stimulating this tremendous opportunity for our economy.

In closing, I would like to restate that wind energy has the potential to simultaneously address the environment, energy security, and of great importance, job creation.

Thank you for allowing me to share with you the story of Northern Power Systems and our perspectives on how the U.S. Government can best capture the benefits of wind power for this great Nation of ours.

[The prepared statement of Mr. Danner follows:]

TESTIMONY OF

JOHN P. DANNER, PRESIDENT AND CEO

NORTHERN POWER SYSTEMS

Good afternoon. Mr. Chairman and esteemed members of the Sub-Committee, thank you for the opportunity to share my perspective on green jobs and trade with you today.

My name is John Danner and I am the CEO of Northern Power Systems, a next-generation wind turbine company based in the United States. Today, I would like to cover three topics:

a) A quick background of Northern Power and our track record with creation of green jobs, establishment of American manufacturing, and use of trade policy to drive US renewable energy exports;
b) The opportunity from our vantage point for policy-makers to create jobs and move our nation toward a renewable energy economy; and
c) Specific actions that our government can take to quickly and meaningfully accelerate green job creation and accelerate renewable energy exports.

To begin, Northern Power Systems is the oldest wind turbine company in the US, founded in Vermont in 1974. Northern Power designs, manufactures, and sells highly reliable, highly efficient wind turbines. Leveraging recent advances in computer technology, material science, and electrical engineering, our company has developed state-of-the-art direct-drive wind turbines. This technology is simpler, lighter, more efficient and more reliable than traditional wind turbines that use complex high-speed gearboxes. The result is that Northern Power's wind turbines deliver more power, more of the time, for lower cost, thus further lowering the already-competitive cost of wind energy.

The wind turbine industry has historically been dominated by European companies although recent years have seen a surge of Chinese companies entering the global marketplace.

In 2008, Northern Power Systems was acquired by private equity investors whose vision was to create an industry-leading American-made wind turbine company based on the company's cutting edge direct-drive technology. Since 2008, Northern has raised $113M in private capital, opened three new locations, and expanded our direct employee base from 78 to more than 160. We now operate facilities in Vermont, Massachusetts, California and Michigan and we have sold wind turbines in 25 states and six countries. Last month, we opened production

operations for our state-of-the-art utility-scale wind turbine in what had been a vacant former automotive parts manufacturing plant in Saginaw, Michigan. While we are proud of what we have accomplished to date, we are confident that as we grow Northern Power into a leader within the global wind turbine industry, we will create tens of thousands of jobs.

Northern Power is but one example of the potential that wind power represents to the US economy. Wind energy has the potential to simultaneously address the environment, energy security, and – of critical importance – job creation. Wind Power is the only source of renewable energy with both a ubiquitous fuel source and very competitive costs (please see levelized cost comparisons submitted in my written testimony). Simply stated, wind power is an economically viable path to substantially increasing the amount of energy we generate from renewables. This has been evidenced by the fact that wind power was the leading type of new electrical generation capacity installed in both the US and Europe in 2008 and 2009 (before economic conditions caused a pull-back in 2010). In some states, like Iowa, wind power accounts for nearly 15% of their electricity TODAY ... this can be done and it can be done cost-effectively. The result can be a staggeringly positive impact to our economy where we need it most - in high-quality engineering and manufacturing job creation. While Northern Power has created nearly 100 direct jobs in the last two years from our relatively modest perch, the wind industry overall employs more than 85,000 Americans today – and 20,000 in manufacturing alone - suggesting a very substantial base from which to drive green job growth.

In order to tap the tremendous benefits of wind energy to our economy, our environment, and our society, I would recommend that the US Government pursue three avenues:

1) Increase support for Ex-Im and DOE programs: In order to compete with aggressively supportive Asian governments, the US government should strengthen its support to the Export-Import Bank (Ex-Im) and the Department of Energy (DOE). Programs like Ex-Im's export finance program are critical to allowing Northern Power to compete on a level playing field in the export arena. Similarly, DOE initiatives like the 1703 loan guarantee program are essential to helping American companies commercialize innovative new technologies, where our Asian competitors are oftentimes simply and directly funded by state-owned institutions.
2) Extend the Production Tax Credit and Section 1603 Cash Grant in lieu of Investment Tax Credit Programs until 2016: These programs help address the relative capital intensity involved with renewable energy projects and provide critically needed assistance in these difficult times when liquidity has not fully returned to our capital markets. In addition, other programs like the Section 48C manufacturing tax credit,

accelerated depreciation programs, and the proposed Green Bank can all play pivotal roles in leveling the playing field.

3) Most importantly, adopt a National Renewable or Clean Energy Standard (RES/CES): Establishing a firm set of national renewable energy standards will provide much-needed certainty to private capital markets and will greatly assist in investment capital formation for domestic manufacturing. This public policy initiative will bring the power of private financial markets to bear on stimulating this tremendous opportunity for our economy.

In closing, I would like to restate that wind energy has the potential to simultaneously address the environment, energy security, and – of great importance – job creation. Thank you for allowing me to share with you the story of Northern Power Systems and our perspectives on how the US Government can best capture the benefits of wind power for this great nation of ours.

Senator SANDERS. Mr. Danner, thank you very much.

David Montgomery is our next panelist. Prior to joining Charles River Associates, Dr. Montgomery held a number of senior positions in the U.S. Government. He was Assistant Director of the U.S. Congressional Budget Office and Deputy Assistant Secretary for Policy in the U.S. Department of Energy. Thanks very much for being with us, Dr. Montgomery.

STATEMENT OF W. DAVID MONTGOMERY, PH.D., VICE PRESIDENT, CHARLES RIVER ASSOCIATES

Mr. MONTGOMERY. Thank you, Mr. Chairman and members of the subcommittee. I am also honored by your invitation to appear today.

I am David Montgomery, vice president of Charles River Associates, as Chairman Sanders said.

I am an economist. I have been working on subjects like this one for most of the past 40 years. I will today be discussing my own opinions, which are not necessarily those of my employer or any of its clients.

I would like to concentrate, in these remarks, on a study of green jobs that was released week by Ceres, an institute at the University of Massachusetts referred to as PERI. I would like to use as an example of how studies in this genre have provided a biased and incomplete picture of the effects of regulations and of how jobs are created. I am quite critical of these studies.

First, the regulations at issue, any of the regulations we are discussing, whether they are environmental or clean energy standards, undeniably raise the cost of doing business. Tradeoffs have to be made between these economic costs and environmental benefits in designing laws and regulations and pretending that there is no cost involved doesn't help those deliberations at all.

Second, the PERI study and its like only reached their happy conclusions because they leave out of their calculations all the jobs that are lost in the rest of the economy because of the cost of regulation.

Third, even PERI's calculations of direct jobs are exaggerated, because they assume that 100 percent of the required new equipment will be manufactured in the United States. Testimony we have just heard demonstrates how wrong that assumption is.

Fourth, all of these green job studies that I have seen miss the fact that any increase in investment or Government spending will create jobs in a slack economy. Environmental regulation is a particularly costly way to promote job growth. Just a little bit of arithmetic applied to the PERI study shows that the new regulations on utilities that studied would cost over $300,000 for every direct job that they create. That is in an economy where the average wages and benefits for the average employee are about $50,000 a year.

Beyond these problems with the approach of the PERI study, its analysis suffers from a number of more technical deficiencies I would like to mention. First, jobs are simply not a meaningful indicator of economic impacts. Economists have made the point for a very long time that just requiring every utility to hire 100 or 1,000 workers to dig holes in the ground next to each utility pole and fill them up again would equally well and much more simply create

new jobs. You have to look at what the programs that are creating the jobs are actually doing and what they cost.

Second, the PERI study actually does not use a model of the U.S. economy. It simply uses numbers that are called multipliers that add to the direct jobs that they have calculated for producing pollution control and generating equipment, and an estimate of the additional jobs involved in supplying the materials that are used in that production. That is all they do. But if PERI had used any comprehensive model of the U.S. economy, it would have been forced to account for where its $200 billion of that investment was coming from. That tells a very different story.

When I used the same model electric power sector as PERI, and linked it to my company's broad model of the energy economy, I found exactly the opposite results from what PERI found. EPA's utility regulations would reduce, not increase, total macroeconomic investment. The reduction in investment that we estimate would be about $150 billion from 2010 to 2015. It is the same order of magnitude as what PERI was estimating, but the opposite sign. If I used PERI's multipliers, the result would be a net destruction of over a million jobs.

Now, I am not espousing either plus 1.5 million or minus 1 million jobs as a useful number. My point is that people would have had jobs doing something else if new environmental regulations were not put in place, and would be doing something that creates more wealth.

My third point is that PERI ignores important effects. With our broader model, we estimate that in 2015, wholesale electricity prices would increase by 1 to 3 percent, average worker compensation would fall by $100 to $150, output in employment in autos, heavy industry and energy-intensive sectors would fall by about 1 percent, and coal output and employment would shrink by 20 percent. These are the effects of regulations that force utilities to spend $200 billion on pollution control equipment and on replacing 40, 50, 60 gigawatts of coal-fired power.

Fourth, studies like PERI want U.S. policymakers to favor industries that employ more workers per dollar of output. This is nothing more than the old Luddite program to save jobs by breaking up productivity-enhancing machines. Our economy is driven and our workers are made better off through improving productivity for workers to capital investment.

Finally, I note that the logic of the PERI report also implies that the greater the unproductive investment cost by a regulation, the greater would be its impact on jobs. If that logic were really valid, rather than seeking cost-effective regulation, we should seek out the highest cost way to achieve environmental goals. The result is absurd, because the logic of this kind of economic analysis is nonsense.

I will end with a quote from a friend, Professor Richard Schmalensee at MIT, who is much more quotable than I am. He observed that, "As common sense suggests, we cannot regulate ourselves into prosperity."

Thank you for this opportunity to address the subcommittee.

[The prepared statement of Mr. Montgomery follows:]

Prepared Testimony of
W. David Montgomery, Ph.D.
before the
Committee on Environment and Public Works
Subcommittee on Green Jobs and the New Economy
United States Senate
Hearing on Green Jobs and Trade
February 15, 2011

Mr. Chairman and Members of the Subcommittee:

I am honored by your invitation to appear today to testify on the topic of environmental regulations and jobs. I am Vice President of Charles River Associates, and an economist by profession and training. I will start with a brief word about my qualifications. My work for over 40 years has addressed economic issues in energy and environmental policy, I have published many papers in peer-reviewed journals dealing with design and economic impacts of those policies, and I was honored by the Association of Environmental and Resource Economists with their 2004 award for a "publication of enduring quality." I taught environmental economics at the California Institute of Technology and economic theory at Caltech and Stanford University. My testimony today will address the issue of job creation by means of more stringent environmental regulations, clean energy standards, and other environmental or energy policies. I will use a study on EPA regulations that was released last week ("the PERI study")[1] as an example of how claims about "job creation" are based on an incomplete and distorted picture of the effects of regulation. My statements in this testimony represent my own opinions and conclusions and do not necessarily represent positions of my employer or any of its clients.

Key Points

I would like to emphasize five key points.

1. The serious debate in environmental policy is about how the costs of new regulations compare to their benefits, and how to design the regulations to minimize cost, uncertainty and disruption. Claims that regulations that raise the cost of doing business will create new jobs are, at best, a sideshow. Such claims only distract attention from the difficult tradeoffs that must be made between costs and benefits. "Green jobs" is not a subject that leading economists have usually taken seriously enough to criticize in professional journals.[2] I hope that this neglect will change because studies like the one that I address today command far more influence in the political sphere than they merit analytically.

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[1] J. Heintz et. al., New Jobs - Cleaner Air: Employment Effects Under Planned Changes to EPA's Air Pollution Rules, Ceres and PERI, February 2011.

[2] A notable exception is a profound critique by a former member of the Council of Economic Advisors and Dean of the Sloan School of Management at MIT, Richard Schmalensee, "The Costs of Environmental Protection," MIT-CEEPR 93-015WP, October 1993. The issues have not, unfortunately, changed much since then. See also a thorough and accurate critique by Morris, Bogart, Dorchak and Meiners, "Green Jobs Myths," University of Illinois Law and Economics Research Paper Series No. LE9-001

2. The experience of the past decade has proven that environmental standards or clean energy mandates will *not* create industries in the United States that will export clean technology to the rest of the world. To the contrary, the cost of such mandates is borne where they are imposed, but the equipment may well be produced by workers in other countries. For instance, in 2008 U.S. wind turbine imports were $2.5 billion and exports were $22 million; less than half the wind turbines installed in the U.S. in 2007 were manufactured by U.S. companies.[3] China is becoming the world's largest manufacturer of wind equipment,[4] and exporting that technology to the U.S. U.S. solar manufacturers, including some of the technologically advanced, are moving to China to manufacture the solar arrays.[5] German experience has been similar; its huge subsidies for wind energy largely drew electric power from Denmark where the generation capacity had already been installed. And now Vestas (Denmark's largest wind producer) recently closed all or most of its Danish manufacturing, despite the large EU demand for such technologies.

    - In contrast to these facts, PERI's calculations are critically dependent on the assumption that 100% of the equipment purchased with mandated investments will be manufactured in the United States.

3. The critical error, epitomized by PERI, and common to all the studies in the genre, is their failure to balance the jobs lost in the rest of the economy against those that may be gained as a result of the specific mandated investments..

    - The PERI study calculates jobs associated with newly mandated pollution control equipment and new generation units that prematurely replace existing generation forced to retire by the regulations. It ignores the increase in the cost of electricity caused by this policy and the effect of that higher cost on household real incomes, wages, productivity, investment in other sectors and economic growth.

Two decades ago, Harvard economists Dale Jorgenson and Peter Wilcoxen found that pollution control expenditures required by the Clean Air Act reduced total productivity-enhancing investment, raised costs to households and businesses, and reduced growth in labor productivity, wages and employment. Their study remains the classic example of how leading economists assess the economic impact of environmental regulation.[6] It found that regulation requires investments in pollution control equipment, or in replacing powerplants without producing more electricity. These investments use resources that would otherwise have added to the economy's capacity to produce more goods and services. Both the real income of consumers' and the rate of economic growth fall.

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[3] USITC, Wind Turbines: Industry and Trade Summary, Office of Industries, Publication ITS-02.

[4] "With their government-bestowed blessings, Chinese companies have flourished and now control almost half of the $45 billion global market for wind turbines. The biggest of those players are now taking aim at foreign markets, particularly the United States, where General Electric has long been the leader." Keith Bradsher, New York Times, Dec 14, 2010.

[5] Edward L. Glaeser: Why Green Energy Can't Power a Job Engine - NYTimes.com http://economix.blogs.nytimes.com/2011/01/18/why-green-energy-cant-power-a-job-engine/?ref=business

[6] Impact of Environmental Legislation on U.S. Economic Growth, Investment, and Capital Costs by Dale W. Jorgenson and Peter J. Wilcoxen (book chapter) March 1992

Productivity growth is reduced because the industries being penalized by higher energy and environmental costs were those with higher-than-average rates of technological progress and productivity improvement. The effect of Clean Air Act regulations was to shift investment into less dynamic industries, thus reducing the overall rate of technical progress and productivity improvement. And lower productivity growth means lower growth in income and wages. Overall Jorgenson and Wilcoxen find that a 2.6 % reduction in GDP in the 80s was due to environmental regulation, and a full 3% by 1995 when the Clean Air Act Amendments are fully phased in.

Of course, any final assessment must balance environmental gains against the loss of economic output. Mandates may enhance public health, lower property damage, or preserve aesthetic values. And these gains are the reasons to consider them. The fallacy arises when the mandated change in the pattern of investment is mistaken for a source of net gains in jobs and output.

4. Green job studies have averred that environmental regulations will help to bring the economy out of the recession; these claims are false. Some of the claims are explicit[7] and some are implicit.[8] They have been made about climate and clean energy policies as well as about air and water regulations). All such assertions rest on one or more basic fiscal policy mistakes.

    - First, they ignore the timing of proposed policies relative to the business cycle. One of the first principles of fiscal policy to counter recessions is to make sure that funds are expended quickly, and the most common political mistake is to authorize spending that will only hit its peak after the economy is well on the way to recovery. That mistake in timing means that the opportunity to help the economy out of the recession is missed, and that when spending does occur it fuels inflation and drives out other, more productive investments. New regulations on electric utilities fail this test. Even if the investments assumed by PERI did take place the expenditures would still largely be made after even pessimists think the economy will be well on the way to recovery. In that case, workers in the pollution control and electrical equipment industries will have to be drawn away from other jobs, just as the mandated investment will be drawn away from other areas where it would contribute to economic growth. The total result is no net job gain and an overall drag on the economy.

    - Second, even if the expenditures mandated by EPA regulations were timely, the benefits of economic stimulus cannot be attributed to those regulations rather than to . As PERI itself admitted in its 2009 report, about the same job benefits can be expected to come from any additional stimulus spending, so that job benefits do not differentiate between different kinds of spending -- except to the extent that spending on industries with low labor productivity will create more jobs than spending on industries with high labor productivity. This kind of job analysis is a sheer waste of time and resources, because every proposal for more expenditure

[7] Center for American Progress and PERI, 2009
[8] PERI report 2011.

can make identical claims. Regrettably I have contributed to that waste. When I was chief economist in the Office of the Secretary of Defense we regularly produced estimates of the direct and indirect jobs "created" by defense spending – and they were huge numbers. We didn't mention that about the same number of jobs would be "created" by spending the same amount of money on infrastructure or any number of other procurement programs, and that any differences due to assumptions about labor intensity were largely in the noise. We knew that economists justifying other procurement programs were doing the same, so that on balance we did no harm and made sure DoD was part of the game. Now we are hearing the same claims being made to justify regulatory programs, even though the whole discussion is a waste of time because it cannot justify one kind of spending over another. In a slack economy, any increase in spending will create some jobs. The challenge in thinking about fiscal stimulus is to put that additional spending into the areas that provide the greatest return to the economy overall, and on purely economic grounds that is not through regulations that raise costs of doing business.

- A lesson that does emerge from PERI's work is that using environmental regulations to promote job growth is at a very high cost per job. Taking PERI's total required expenditure on pollution control equipment and replacement generators and dividing by direct employment gives a result of $314,000 per direct job. That is an extraordinarily high price to pay to employ one person for a year, when the average employer cost across all occupations (wages plus benefits) was about $50,000 in 2010, with a high of about $100,000 for management and professional occupations and about $25,000 for service occupations. There are far more efficient ways to create opportunities than requiring U.S. businesses to bear a cost of $314,000 in investment to create one job.[9]

5. Government mandates to invest in industries or types of equipment that it deems to be 'green' amounts to nothing less than adopting a kind of industrial policy; such a course will neither speed recovery from the recession nor meet the challenges of long term growth.

    - If the policy concern is recovery from the recession, and in particular to induce businesses to invest their accumulated retained earnings, the model is what Kennedy did in 1962. He provided a temporary investment tax credit that is universally recognized as providing both economic stimulus and a significant increase in investment and the rate of productivity growth. He avoided picking winners as green jobs and green industry policies would do, and let private business do what they are best at – finding the most productive investments for the economy as a whole. Mandating investments in pollution control equipment and replacing existing generating capacity cannot possibly achieve economic benefits as large or as long lasting as that temporary investment tax credit did.

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[9] U.S. Bureau of Labor Statistics, Employer costs per hour worked for employee compensation and costs as a percent of total compensation: Private industry workers, by major occupational group and bargaining unit status, September 2011. http://www.bls.gov/news.release/ecec.t05.htm

- Once the economy recovers from the recession, we have to recognize that new environmental regulations can only impose net economic costs. Labor and capital employed in pollution control and replacing existing generation is not available for producing other goods and services in a fully employed economy. Although my colleagues and I are still in the process of modeling the impacts of impending EPA regulations, using a modeling system that is descended in the same line as the study I cited above, we have done enough studies of policies that increase the cost of power generation that I can use preliminary results to illuminate where and how EPA's new regulations will create losses throughout the economy that more than offset any gains for specific industries that receive new orders because of EPA regulations.

In the remainder of my testimony, I will discuss in more detail the errors and omissions in Ceres' green job estimates and preliminary estimates of economic impacts from an analysis of all the new EPA electric sector regulations that my colleagues and I now have underway.

Errors and omissions

The PERI study bases its calculations of direct and indirect jobs on unpublished data from CRA's NEEM model. These data were derived from a single scenario for air regulations that was commissioned by Exelon Corporation.[10] That scenario assumed low natural gas prices, perfectly functioning capacity markets and represented the effects of the CAIR regulations as proposed last year and the new proposed utility MACT. It did not address the impacts of other pending regulations affecting electric utilities, including full effects of the Clean Air Transport Rule (CATR),[11] water, coal ash, or carbon dioxide regulations. The combined effect of all these upcoming and uncertain regulations may create significant issues about electric system reliability not addressed in the Exelon report and even higher costs.

The study for Exelon claimed to incorporate provisions of CATR, but it in fact only represented impacts of the CAIR rule struck down by the courts, and in particular assumed that the trading program invalidated by the courts would still be implemented. Trading under CAIR would have greatly simplified the problem of maintaining reliability, making conclusions about reliability in the Exelon report suspect. The trading program would also produce a different distribution of pollution control retrofits across states, thus invalidating the conclusions of the PERI report about state-level impacts. Even with these qualifications, the treatment of reliability in the report was insufficient to properly identify potential system-level reliability concerns. That is, the report did not include the kind of power flow modeling and uncertainty analysis used in the electric power industry to identify risks of service interruptions that could be greatly increased by a massive replacement program.[12]

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[10] Ira Shavel and Barclay Gibbs, A Reliability Assessment of EPA's Proposed Air Transport Rule and Forthcoming Utility MACT, December 16, 2010. Footnote 1 states that "This report was prepared by Charles River Associates for Exelon Corporation."

[11] Only the CAIR rule was included in the study, mischaracterized as CATR.

[12] These risks were discussed extensively in hearings this year before the Colorado Public Utilities Commission on implementation of the Colorado Air Quality and Clean Jobs Act.

Additionally, the report was not designed to address the full range of potential impacts of EPA regulations. It did not discuss the cost of providing reliable electricity supply under the new regulations and its conclusions have not been tested under alternative assumptions. The report considered only one set of assumptions about highly uncertain factors, that include but are not limited to natural gas prices, performance of capacity markets, and discretionary actions by EPA. Without examining alternative scenarios to determine whether different assumptions would lead to different conclusions, it is impossible to support robust conclusion about the likelihood of adequate capacity or the magnitude of likely costs.

In this report, CRA's NEEM model concluded that there would be significant retirements of coal-fired powerplants that would otherwise have remained in service for several decades as a result of the CAIR and CAMR rule. Replacing 39,000 MW of prematurely retired capacity[13] and installing mandated pollution control equipment was estimated to involve about $200 billion in utility capital expenditures between 2010 and 2015.[14] PERI took these capital and (in a separate calculation) O&M expenditures, allocated them to purchases from specific industries, and then expanded the direct output and job effects to indirect jobs with a simple multiplier calculation.

Neither the report for Exelon nor PERI discuss the impact of this massive increase in capital expenditures on the credit ratings and cost of capital for utilities, which will translate directly into increased costs of electricity and may make achieving this level of expenditures by 2015 more difficult than they assume. Moreover, neither report mentions the rate increases that consumers will suffer as a result of these mandated expenditures by utilities, even though those rate impacts are reported in the standard output tables from the NEEM model. And since only the electric sector NEEM model was used, no account was taken of how these price increases will affect the rest of the economy, the standard of living of households facing increased costs of electricity and other goods and services, or the reduction in investment elsewhere in the economy as net investment is diverted from other industries into pollution control and generation equipment to replace prematurely retired powerplants.

Net versus direct jobs

Any study that estimates only the jobs created by a policy is grossly misleading. This is a well-known and common error in the kind of multiplier analysis based on input-output tables that was done by PERI. PERI's study tries to work around this truth by mentioning the loss of a small number of jobs associated with operation of retired coal-fired powerplants, though I do not see where those jobs were deducted from their direct job estimates. In any event, jobs in coal-fired powerplants are the smallest part of the story. Why PERI did not include the decline in coal production and coal mining employment that goes along with replacing coal-fired generation with other energy sources is a mystery. But this, too is only a small part of the story. The important story is that consumers will have less real income to spend, because of increases in the

[13] Shavel and Gibbs, p. 4.

[14] These numbers were not reported in the published Exelon report, but were cited by PERI. The PERI report describes annual job creation between 2010 and 2015, but it is highly unlikely, even if all their other invalid assumptions were correct, that the $200 billion investment would be expended evenly through 2011 and 2015. Since the rules are not yet final, orders are likely to be delayed and actual construction bunched up in the later years -- if indeed there is enough time to comply with the mandates by 2015 in any event.

cost of electricity and of all other goods that are produced by means of electricity. Worker productivity will rise more slowly, as investment is diverted away from productivity-enhancing investments, so that wages that employers can afford to pay will fall relative to what they otherwise would have been. Energy-intensive U.S. industries will lose market share to overseas industries not subject to these requirements, and will therefore shrink in size. These impacts will lead to job losses in all the rest of the economy, as the effects of more costly energy ripple through the economy.

A highly respected regional economist[15] has pointed out that proper use of such models requires that both the positive and negative impacts of a proposed policy must be addressed. He gives an example of how looking only at positive impacts biases the results to find that any government expenditure will create additional jobs. A study by KPMG found that expanding a Chicago convention center would create a net 6000 new permanent jobs. When an academic economist redid the study using all the same assumptions as KPMG except for taking account of jobs displaced by the expansion and increased local taxes to pay for the project, she found a net loss of 348 jobs. Mills points out that the most common mistake in these job studies is assuming that the project is paid for by money from outside the region where it is built. He comments that "the zero-sum character of outside money multipliers should be taken into account in federal spending programs" because payment for those projects comes from within the U.S. economy. PERI makes the same error by examining only industries that receive the orders for pollution control and new generating equipment and ignoring where the investment comes from and how other industries are affected.

Ignores likelihood of renewable energy equipment being sourced overseas

All of PERI's calculations assume that 100% of the investment mandated by new air regulations will be manufactured in the United States -- as will all of its components and raw materials. This assumption is manifestly incorrect, and the omission makes it likely that even PERI's calculations of direct jobs are grossly exaggerated. As discussed earlier, the U.S. has been importing a large share of its new wind turbine equipment, U.S. wind manufacturers are outnumbered in the global market, and U.S. solar industries are moving offshore, .

Jobs not a good measure of economic benefit

To be sure, by mandating the use of the newer, more expensive energy sources and pollution control systems, new air regulations would create some new jobs. The difficulty is that the number of these new "green jobs" must be offset by the number of other jobs that the regulations would destroy elsewhere in the economy. Calculating "net" jobs immediately leads into the problem of how "jobs" are counted. There are many different kinds of jobs, with different skills, working conditions, and most importantly pay. I have discussed how diverting workers into jobs that do not contribute to producing goods and services that people enjoy will simultaneously reduce the overall standard of living. It is also possible to play games with hours of work, as the French have led the way in doing. A French government seriously proposed to limit the work week for any individual to 32 hours in order to create 20% more jobs.

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[15] Edwin Mills, The Misuse of Regional Economic Models, Cato Journal, XII:1, 1993.

The entire job debate is further confused by the lack of a clear definition of a "green job." For example, how would one classify a job supporting coal-fired power with carbon capture, or nuclear generation? The indirect jobs contained in the PERI calculations include, for example, steel workers producing materials that go into pollution control equipment and turbines. But when a slab comes out of a steel mill, it could equally well be fabricated into a part for a scrubber or a part for a coal-fired boiler. So when investment switches from building new coal-fired powerplants to building scrubbers, some number of steel workers find themselves in "green jobs" even though no one is doing anything different in the mill. (And some lose their jobs because of higher energy costs and foreign competition.) Regardless of these definitional concerns, however, the fact remains that workers in aggregate will face lowered earnings potential under a policy that pulls investment away from expansion of capacity to produce final goods and services and raised energy costs. The net effect of lower productivity also ultimately translates into overall losses in average household spending power, and into reductions in GDP relative to what they would be if no such policy were in place. I turn to those cumulative macroeconomic effects in my final comments.

Talk of "jobs" diverts attention away from the important problem of how much workers earn to a largely irrelevant activity of counting heads. The question that we address in CRA's modeling of economic impacts is whether the balance of the many economic effects of EPA regulations is to increase or decrease total labor income in the United States, and the answer is that total labor income will decrease. The difference between our findings and PERI's estimates of large numbers of green jobs arises because the latter estimates are answering only half of the question about net jobs. Those who claim there will be a job-creating attribute to a policy such as new air regulations have asked whether it will require workers to build and install pollution controls and build and operate power plants that replace prematurely retired units. Of course it will, but the remaining question is what will happen to employment in other industries, some of which are directly targeted by the regulations – such as fossil fuels production – and some of which will shrink because consumers can no longer afford their full production.

Economic models can do a good job of determining whether total worker compensation will rise or fall; how this will be divided into "jobs" is conceptually vague and practically very uncertain. Therefore, in our macroeconomic studies of costs and benefits of environmental regulations we have decided to stop reporting jobs altogether, and rather report whether total wage payments have gone up or down. That total can fall because wages decline, the number of hours worked declines, or both. It is not possible to distinguish which would happen with any degree of precision.

If green jobs are lower-paying than the jobs they replace and require more labor per unit of output, that will just magnify the generally depressing effect of the environmental regulations on total labor income. Shifting expenditures to pollution controls and new generation might lead to two low-paid workers moving out of unemployment while one worker who was earning more than twice their wages became unemployed. Only if this were to be the predominant pattern of the impact of the policy could one argue that there would be a net increase in total jobs under the policy concomitant with the inevitable decrease in total payments to workers.

The Luddite Fallacy

There is another basic fallacy in chasing down which industry has the highest number of jobs per dollar of output, as in PERI's claims energy efficiency has 2.5 times as many jobs per dollar as oil and gas. I call it the Luddite fallacy, remembering the radicals during the early industrial revolution in England who went around smashing machines because of their belief that machines put laborers out of work. What we have learned over the ensuing two centuries is that capital deepening – increasing the amount of capital per worker – is a major driver of economic growth and of increasing productivity, and that having more output per worker is the reason that living standards of workers have risen so dramatically in the past 100 years. Indeed, we measure productivity increase as the rate of increase in output per worker.

Studies like those done by PERI conceal their glorification of low labor productivity by talking about favoring industries that employ more workers per dollar of output. But driving the economy toward industries with more workers per dollar of output is a choice to favor industries with lower labor productivity over industries with greater labor productivity. Reducing average labor productivity translates directly into lower output and slower economic growth, since the basic equation for economic growth is that growth in income is the product of the rate of increase in labor productivity times the rate of growth in the labor force. Moreover, since wages are set by the marginal productivity of labor, shifting to industries with lower labor productivity leads directly to lower wages. This is exactly the point made in rigorous fashion by Jorgenson and Wilcoxen.

Jobs are simply not a relevant measure of economic benefits. Indeed, the more workers it takes to produce something, the more it will cost and the less of it the nation will be able to afford. There is an opportunity cost to diverting the labor force to producing pollution control equipment and replacing useful electric powerplants. Labor is a scarce resource and diverting labor to less productive activities harms workers first, by causing wages to fall, and further limits what the economy overall can produce.

Reductio ad absurdum – the higher the cost, the greater the benefit

The simple multiplier model used by PERI assumes no change in relative prices and no opportunity cost of diverting capital and labor from other uses. The results of its calculations are very predictable and linear. If an investment of $200 billion creates about 1.5 million jobs, then an investment of $400 billion would create 3 million, and on and on. The multipliers used by PERI would extrapolate gains forever. If PERI had used estimates of investment based on studies that find environmental regulations will be even more costly, it would have illogically concluded that such costly regulations would be even more beneficial to jobs, and by extension to the economy.

From this it follows that if EPA were to tighten the screws even more than under its current proposals, the result would be far more jobs. If compliance with EPA rules, or the cost of renewable generation equipment, were to rise above levels assumed to derive the PERI investment number, job benefits would increase again. This is clearly an absurd result, but it is the inevitable consequence of using an unsuitable approach -- simple multiplier analysis -- to address economy-wide changes in prices, supply and demand. Of course, this is because PERI's calculations ignore the increasing losses imposed on the rest of the economy and the drag on energy-intensive industries like iron and steel whose jobs will be moving overseas as production

costs in the U.S. rise relative to competitors.

Preliminary estimates of the cost of new EPA regulations of electricity generation

For this testimony, I have used CRA's full MRN-NEEM modeling system to provide preliminary estimates of the full economic impacts of the full set of impending EPA regulations that would affect the electric power sector. Since I was only learned of this hearing last Thursday, I have not had time to incorporate the most up-to-date assumptions, to investigate alternative scenarios, or to give these results the full review that constitutes our normal practice. Therefore, I will talk only in round numbers and emphasize the nature and direction of impacts, which I am confident are correct and robust results. I will provide the committee with a full report on these findings after giving the model results a more thorough review and addressing scenarios that provide an appropriate range of uncertainty. Again, the results may change in detail but I am confident that they will be quite similar to the preliminary results I can discuss today.

The full MRN-NEEM modeling system incorporates the NEEM model used for Exelon, but it links that model to a full, state-of-the-art computable general equilibrium model of the U.S. economy.[16] The computable general equilibrium model represents the full interindustry structure of the U.S. economy, accounting for the output of .. industries, investment, consumption, wages and prices of all goods and services consumed by households. It is a dynamic model that traces out the growth of the U.S. economy from 2010 to 2050. Each industry is represented by a production function, that determines the amount of labor, capital and natural resources required to produce a unit of output. The model solves for supply, demand and prices in every market, and determines the amount of investment that will be forthcoming given household savings behavior and the prospective return on investment. The model also takes into account the opportunity cost of diverting labor and investment from one use to another.

The methodology used by PERI is based on no such model. Instead it uses a static "multiplier" to calculate the number of jobs in other industries required to support one job employed directly to produce and use pollution controls or new generating equipment. The PERI "model" is thus just a list of numbers, one for each industry. These multipliers have the following deficiencies, in comparison to a CGE model like MRN-NEEM.[17]

- They take into account none of the changes in the structure of the economy that will be induced by higher energy prices,
- They ignore the effects of higher electricity costs on the return on capital investment and willingness to invest
- They ignore welfare losses to consumers who are forced to consume less energy because

[16] This model has been described frequently in peer-reviewed publications, the most recent of which M Yuan, S Tuladhar, P Bernstein, L L Lane, W D Montgomery and Anne Smith, Policy Effectiveness in Energy Conservation and Emission Reduction is forthcoming in the Energy Journal.

[17] Other models of this type, that have produced qualitatively similar results to MRN-NEEM, include the Jorgenson-Wilcoxen model mentioned above and the Environmental Protection Agency's own ADAGE model. All these models would produce results qualitatively similar to those of CRA's model and the opposite of PERI's results.

of its higher price

- They completely ignore the opportunity cost of diverting labor and investment from one use to another.

Investment diversion and impacts on productivity growth

EPA's pending air regulations would divert resources now used to produce goods and services into the task of producing pollution control equipment and replacing existing powerplants. These mandates will raise electricity prices to consumers and businesses, leaving them less to spend on other goods and services causing decreases in demand for the quantities of goods and services produced by the economy. In addition, labor and capital are diverted to uses that do not produce economic output labor productivity will fall -- hours of work will remain the same or increase but the goods available for workers to consume will fall. Business activity is likely to contract relative to the levels that would have prevailed without policy-induced energy cost hikes. The demand for labor would weaken because employers would need to spend less on labor in order to supply the reduced amount of goods and services demanded by consumers. As a result, payments to labor are projected to decline relative to that which would have prevailed without the higher energy costs. This will be reflected in a combination of less employment, and lower wages for those workers not losing their job.

Impacts on electricity prices

Electricity prices will increase under the new EPA regulations, relative to what they would have been otherwise. Adding additional pollution control equipment and replacing fully depreciated powerplants will unquestionably drive up rates in jurisdictions with cost of service regulation, and higher costs of maintaining adequate capacity will drive prices up in deregulated generation markets as well.

The introduction to the recent PERI report implies that environmental regulations have no effect on prices by claiming that electricity prices have been stable in real terms since the CAA was introduced in 1970. This statement reveals clearly the errors that are propagated by failing to ask the question of what would have happened without those regulations. Prior to the Clean Air Act, electricity prices had been falling in real terms for decades, as improving generation technology and economies of scale drove costs down in real terms. The advent of environmental regulation in the 1970s reversed that trend, as described in Paul Joskow's justly famous analysis[18] and in the work of Jorgenson and Wilcoxen.

Competent analysis of the costs of regulation always involves constructing a reference case, without the policy to be analyzed, and comparing it to a case with identical assumptions except for the introduction of the policy. Results from such a comparison unambiguously and universally show that the policies analyzed by PERI increase electricity costs and rates.

Our preliminary analysis indicates that the full set of measures now proposed by EPA, including

[18] P. Joskow, Inflation and Environmental Concern: Change in the Process of Utility Price Regulation. Journal of Law and Economics, XVII:2, October 1974, pp. 291-327.

the Clean Air Transport Rule (CATR), utility MACT, water, and coal ash regulations could increase real (i.e. before inflation) wholesale electricity prices by 1 - 3% in 2015 and 3 - 5% in 2020, compared to what they are projected to be without the new regulations. Wholesale electricity prices would continue to increase through 2035, peaking in that year at 7 - 9% higher in real terms than they would be without the regulations. These are wholesale price impacts, and depending on how pollution control expenditures and retirement costs are treated in setting regulated retail rates the increases for retail customers in the early years could be larger.

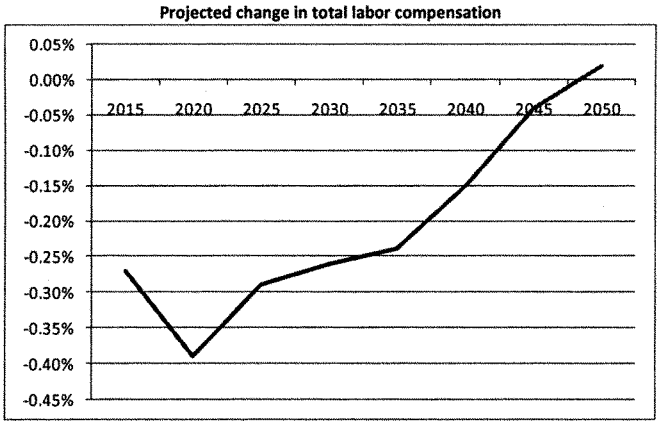
Competitiveness of U.S. industries

Jorgenson and Wilcoxen also found that electricity and primary metals were the industries most affected (negatively) by the Clean Air Act Amendments of 1990, and that primary metals were the third most affected by prior environmental regulations (behind electric utilities and coal mining).[19] They estimate that the effect of just the Clean Air Act Amendments of 1990 was to reduce output of the U.S. primary metals industry -- which includes iron and steel -- by about 3.5%, leading to a corresponding loss of jobs in the industry. This was the largest percentage impact on any industry, including electricity. Moreover, it is probably a gross underestimate of potential impacts of currently proposed regulations on the upstream iron and steel industry -- blast furnace and electric arc furnace operations. A CRA study of the effects of higher energy costs on the U.S. basic iron and steel industry highlighted how large the competitive effects of increases in electricity prices can be, when dealing with a homogeneous commodity like steel that is traded internationally. When we analyzed impacts on the entire iron and steel industry, as conventionally defined, we found impacts of a $40 carbon price to be about the same as the effects that Jorgenson and Wilcoxen attribute to environmental regulations through the Clean Air Act Amendments. But when we broke out the upstream iron and steel industry we found that over 40% of U.S. capacity would be forced to close immediately due to competition from overseas producers not subject to such cost increases.

Net effects on employment and wages

Because these estimated impacts are based on the general equilibrium requirement that total payments to labor must fall to the new, lower level that can be supported by the reduced overall productivity of the entire economy, *they are necessarily inclusive of all increases in so-called "green jobs" that will be created as a result of the proposed legislation.*

[19]D. Jorgenson and P. Wilcoxen, The Economic Impact of the Clean Air Act Amendments of 1990, The Energy Journal, Vol 14, No. 3, 1993

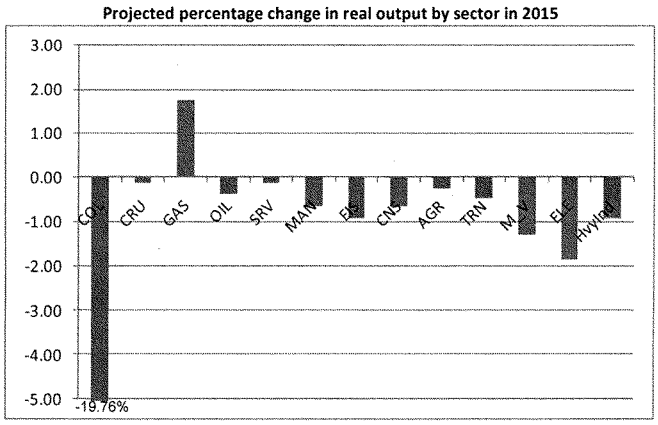


Source: CRA Model Results, 2011

We find that total labor compensation would fall by about .25% in 2015 under the cumulative impact of EPA regulations, higher electricity costs, reductions in industry competitiveness and lower worker productivity. This translates into a decline of between $100 and $150 in average worker compensation, which would rise to around $200 in lost compensation for the average worker in 2020. The slow recovery of wage income is due to a slowdown in productivity growth resulting from the diversion of investment to comply with tighter environmental regulations.

Competitiveness of U.S. industries

Employment impacts will also vary by industrial sector and will largely be proportional to sectoral output in the short run. The graph below shows the change in output by sector that would be caused by the new EPA regulations. Coal mining has the largest percentage loss in output and employment, followed by electricity, heavy industry, and energy intensive sectors. Despite the increase in investment, construction also falls. Coal mining declines as coal-fired powerplants are retired, and electric output falls as higher prices drive demand down. Auto manufacturing, heavy industry and energy-intensive industries are affected, as expected, as their competitiveness relative to other countries declines and demand for their products falls. Iron and steel output is hurt by all these developments.



Source: CRA Model Results, 2011

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Conclusion

I will conclude with a quote from Professor Schmalensee's excellent paper, "As common sense suggests, we cannot regulate ourselves to prosperity." Thank you for this opportunity to address the Subcommittee.

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[20]D. Jorgenson and P. Wilcoxen, The Economic Impact of the Clean Air Act Amendments of 1990, The Energy Journal, Vol 14, No. 3, 1993

Senator SANDERS. Dr. Montgomery, thank you very much.

Kate Gordon is the vice president for Energy Policy at the Center for American Progress. Ms. Gordon was the co-director, previously, of the National Power Alliance, where she still serves as senior policy advisor. Thanks very much for being with us, Ms. Gordon.

STATEMENT OF KATE GORDON, VICE PRESIDENT FOR ENERGY POLICY, THE CENTER FOR AMERICAN PROGRESS ACTION FUND

Ms. GORDON. Thank you, Mr. Chairman and Ranking Member Boozman, thank you for letting me testify before you today.

The issue of green jobs and trade is critical in light of the triple crisis America currently faces, the economic crisis that has left 14 million people unemployed, and the energy security crisis that leaves us vulnerable to every international incident and natural or man-made disaster, and the climate crisis that threatens the very planet we now live on.

In true American entrepreneurial spirit, we at The Center for American Progress Action Fund believe these crises bring opportunity, but only if the United States decides to get off the bench and join the green jobs race already being run by most of the other developed and developing countries in the world.

I want to begin by emphasizing that the phrase "green jobs" stands for much more than just the jobs themselves. It stands for a whole new set of industries and investments that will make us as a country more competitive and our economy more sustainable in the long term. We are in the process of switching our energy infrastructure over from capital-intensive, risky and often highly polluting energy sources to sustainable, clean and more efficient sources.

This is a transformation on the scale of the transition from horse-drawn carriages to engine-driven vehicles, from the transition of the Industrial Revolution or the more recent high-tech revolution. In each of these eras, we talked about economic transformation, competitiveness and job growth. We talked about the need to transition away from industries that were not sustainable, industries on the decline into industries of the future.

We did not spend our time debating exactly how many jobs might be lost in, for instance, agriculture, if people moved to cities to work in factories in the Industrial Revolution, or how many blacksmiths might be out of work with the advent of the automobile. We saw these as transformative moments in American history, where we had the chance as a country to move forward toward a more advanced age defined by stronger industries, better infrastructure and a steadily growing middle class. In fact, in each of these revolutions, we saw workers applying current skills to new industries, blacksmiths, for instance, using welding expertise to become auto mechanics, the first auto mechanics, along with new workers, women especially, and immigrants, joining the work force for the first time and finding new opportunities in entering the middle class.

The green jobs revolution has the potential to move us into yet another stage of American leadership in the world, with the added

huge benefit of combating climate change that threatens not only this country but the entire planet. But the potential can only become reality with true political leadership and progressive action.

The global clean tech market is expected to expand to at least $2.3 trillion by 2020. America is not currently seriously competing for a piece of this pie. However, countries like China and Germany are now focusing on clean tech industries as a critical part of an economic growth strategy. As you mentioned, Secretary Locke reports that China invests almost $12 billion a month into its renewable energy sector. In contrast, we spend about $5 billion a year for all R&D in all energy sectors in the United States. China is also importantly investing in education and work force systems, and in their low-carbon transportation infrastructure.

Here at home, in contrast, we see current budget proposals that slash these very programs that have always underpinned America's innovative edge and that China is now investing in. Our decision not to invest in the green economy does come at a cost. Already we are seeing cutting edge solar power manufacturing companies close their doors, either permanently or to move to other countries with strong, dedicated clean energy markets. Iowa wind, you heard about earlier, Iowa wind manufacturers are seeing their orders decline with the lack of a strong Federal investment in growing demand in the clean tech sectors.

As GE Chairman Jeff Immelt has said, these countries with strong demand for renewable energy products will naturally pull companies into their borders, because innovation and supply chain strength gets developed where demand is the greatest. Investors are moving their funds as well. Leading global financier DeutscheBank decided to move almost $8 billion in clean energy investments out of the U.S. energy market when it became clear that we would not be putting a price on carbon in the 111th Congress.

All this points to me to a key question: do we want to be in the business of inventing the green technologies of the future, only to end up buying those back from countries that have successfully commercialized, manufactured and exported them? Do we want to be the world's great clean technology consumer while the rest of the world prospers? Is that the way truly to strengthen the American economy?

Luckily, there has been some leadership at the State and local level. So we have seen that investments in strong policy and consistency on green jobs does bring results. My written testimony goes into a great more detail on this, what we have seen, for instance, in jobs growth in the green sectors in California, in Michigan and in Ohio, for three examples. I also wanted to point out that these investments have not just created jobs, they have created new infrastructure. Sometimes we say, oh, a million dollars only creates X number of jobs, and the wind industry is about 5.7 jobs per million dollars of investment. We forget that we are also creating a wind farm when we put a million dollars of investment into wind. We are creating long-term infrastructure to move renewable energy into our market in a more sustainable and stable way.

Innovation and investment are essential building blocks of a strong U.S. economy, and there are several progressive proposals that we recommend Congress needs to take to heart to strengthen

the economy and move us forward into this global race. Those include the need for a strong national clean energy standard to create demand, finance policies that can move public and private capital to innovators and to manufacturers, modernizing the infrastructure to move these products to market, investing in our science and math education and work force training, prompting fair and strong international trade policies, and helping regions learn how to race to the top to get their most innovative ideas into the national sphere.

Thank you so much for letting me testify today. I really appreciate it.

[The prepared statement of Ms. Gordon follows:]

Testimony for the

U.S. Senate

Committee on Environment and Public Works

Subcommittee on Green Jobs and the New Economy

Hon. Bernard Sanders, Chair

2:30 p.m., February 15, 2011

on

"Green Jobs and Trade"

by

Kate Gordon

Vice President for Energy Policy

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Mr. Chairman and Members of the Committee, thank you for inviting me to testify before you today. The issue of green jobs and trade is critical in light of the triple crises America faces: an economic crisis that has left 14 million people unemployed; an energy security crisis that leaves us vulnerable to every international incident and natural or man-made disaster; and a climate crisis that threatens the very planet we live on. In true American entrepreneurial spirit, we at the Center for American Progress Action Fund believe that these crises bring enormous opportunity, but only if the United States decides to get off the bench and join the green jobs race already being run by most of the other developed countries in the world. I am glad to share my and the Center for American Progress Action Fund's perspective on green jobs and the global economy, and I look forward to your comments and questions.

In my testimony I will discuss the global clean energy marketplace, and specifically the work other countries are doing to become innovation leaders in the new green economy. As a contrast, I will point out where the U.S. has failed to pass policies and make investments in the "building blocks of innovation" that made us leaders in prior economic transformations, including our infrastructure, our workforce, our research and development capabilities, and our manufacturing sector. I will conclude by recommending several specific steps this Congress and administration can take to put America back on track to lead the clean tech revolution, just as we led the Industrial and high tech revolutions that came before. These recommendations include:

- Stabilizing the market for green technologies by passing a national Clean Energy Standard.
- Crafting finance policies to make more public and private capital available to innovators to invent, commercialize, and produce green technologies.
- Modernizing our basic infrastructure to allow businesses to more effectively collaborate and compete in domestic and international markets.
- Investing more in science and math education and in workforce training to ensure we have workers able to participate in the technology-driven economy of the present and future.
- Promoting international trade policies that ensure access to foreign markets, and the free flow of goods, services, knowledge, and capital across borders.
- Providing incentives, through competitions and other "race to the top" strategies, to lift up innovative energy solutions at the local, state, and regional level.

Green Jobs and the Green Economy

Amidst the Great Recession that swept the U.S. in 2007 and the high unemployment that we are still experiencing today, the set of industries and occupations often referred to as "green jobs" continues to hold the key to unlocking a better, stronger, clean energy economy for the country. And not only do these industries have the potential to employ many currently un- and underemployed workers across a range of skills and occupations; they can also help catapult the U.S. into a leadership position in one of the fastest growing sectors in today's economy.

I want to emphasize that the phrase "green jobs" stands for much more than the jobs themselves; it also stands for a whole new set of industries and investments that will make us more competitive and our economy more sustainable. We are currently in the process of switching our

entire energy infrastructure over from capital-intensive, risky, and often highly polluting energy sources to clean, labor intensive clean energy sources.

This is an economic transformation on the scale of the transition from horse-drawn carriages to engine-driven vehicles, or the Industrial Revolution, or the more recent high-tech revolution. In each of those eras, we talked about economic transformation, competitiveness, and overall job growth. We talked about the need to transition away from industries on the decline into the industries of the future. We did not sit around counting exactly how many jobs might be lost in agriculture if people moved to the cities to work in factories, or how many blacksmiths might be out of work with the advent of the automobile.

We saw these as transformative moments in American history, where we had the chance to move forward toward a more advanced age defined by stronger industries, better infrastructure, and a steadily growing middle class. And in fact, in each of these revolutions we saw workers applying current skills to new industries—blacksmiths using welding expertise to become auto mechanics, for example—along with new workers, especially women and immigrants, finding opportunities where before there had been none. Many of these workers ultimately enjoyed higher wages, longer-term job prospects, and a shot at the middle class as a result.

The move to a greener economy brings additional value in that it is focused on making the U.S. a more effective energy consumer, which ultimately will make us more productive and efficient. As we invent new renewable energy systems and energy efficiency improvements, we will apply these to our own businesses and industrial processes, making the U.S. economy run more smoothly with fewer dollars invested in energy consumption. Our energy bills will be lower and our productivity greater as a result. In this way, "greening the economy" will create benefits that go far beyond the individual sectors and occupations included in most definitions of "green jobs."

The green jobs revolution has the potential to move us into yet another stage of American leadership, with the huge added benefit of combating the climate change that threatens not only this country, but the entire planet. But the potential will only become reality through political leadership and progressive action.

Competing with Other Nations for Global Leadership: Is the U.S. Falling Behind?

The global clean-tech market is expected to expand to at least $2.3 trillion by 2020, and America must compete for a piece of this pie.[1] To compete in the global clean energy race, America must take a page from China's playbook and begin to invest in the building blocks of innovation, like education and worker training, research and manufacturing, and infrastructure—the same building blocks that brought America to global leadership in past economic transformations.

The World Economic Forum, in its monumental *Global Competitiveness Report 2010-2011*, underscores the importance of innovation as the basis for long-term economic growth:

> *Although substantial gains can be obtained by improving institutions, building infrastructure, reducing macroeconomic instability, or improving human capital, all these factors eventually seem to run into diminishing returns. The same is true for the efficiency of the labor, financial, and goods markets. In the long run, standards of living*

> *can be enhanced only by technological innovation. Innovation is particularly important for economies as they approach the frontiers of knowledge and the possibility of integrating and adapting exogenous, [or imported,] technologies tends to disappear.*[ii]

We are bound by the reality that to be competitive in the 21st Century global economy, we have to innovate. Across the globe, developed and developing countries are realizing what economists have known for years—that technological innovation, more than any other factor, fuels long-term economic competitiveness and growth, and that innovation in turn requires a robust and well-integrated foundation of education, research, and infrastructure.[iii]

Yet we are failing to take these lessons to heart.

In the United States, non-defense R&D spending as a percentage of all discretionary government spending has fallen from a high of 25 percent in the mid 1960's at the height of the Apollo space program, to between 12 and 13 percent since the early 1980s.[iv]

And investment in clean energy R&D is even further behind. Venture Capitalist John Doerr, an early investor in Google Inc. and other companies, worries that we are failing badly behind in the clean energy race because investments in R&D are completely inadequate to drive innovation and growth:

> *America spends only about $5 billion—about half a percent—per year on new energy R&D... Sadly, America spends more on potato chips than we do on our new energy R&D.*[v]

We have also fallen behind in providing investments for the stages of innovation beyond early-stage inventions. America still supports our national laboratories—though we will see whether the labs can emerge intact from the current budget battle—but we fall down on investing in turning these inventions into commercializable products that can in turn become part of an American export market. An essential element of innovation and competition is to nurture new technologies so that they can actually be built and commercialized. Many inventions require continued investment across the technology innovation cycle: from invention at the federal labs and publicly sponsored universities, to public-private partnerships aimed at commercializing and licensing new technologies, to technical assistance to make our manufacturers the most advanced and efficient in the world, and finally to deployment to bring these technologies to scale.

In particular, the link between innovation and manufacturing is an important one.

We all know that the U.S. manufacturing sector has experienced a long-term decline. The U.S. manufacturing capacity utilization rate hit a near all-time low of 65 percent last June. Overall, manufacturing now just makes up 12 percent of U.S. GDP, down from 28.3 percent at its high point in 1953.[vi] As American firms close their doors and investments increasingly flow to other countries, we need to amp up our game to remain competitive.[vii]

Some in Washington have intimated that the manufacturing sector is no longer necessary to American global leadership—that we can just as easily invent here and manufacture elsewhere without losing any competitive advantage. But research shows that the manufacturing sector, especially the advanced manufacturing industries that characterize clean tech manufacturing, is actually critical if America wants to stay innovative and globally competitive.

It turns out that it really does matter to our global leadership where our manufacturing jobs are located. According to Harvard economist Gary Pisano, when manufacturing moves overseas, America not only loses solid middle-class jobs and production prowess; we also lose the process innovation that comes from co-locating R&D, design, engineering and manufacturing. Pisano calls this combination of related skills and industries the "industrial commons": "In addition to undermining the ability of the U.S. to manufacture high tech products, the erosion of the industrial commons has seriously damaged the country's ability to invent new ones," he writes.[viii]

The upshot is that if we lose our ability to make things, we may well also lose our ability to invent them. Though it is difficult to measure the precise impact advanced manufacturing has on innovation, we know anecdotally that if we cede production on a process invented in the U.S., we may lose future iterations of innovation in that process.

Solar panels are one example: invented in the U.S. at Bell Labs in 1954, production of solar PV panels has moved largely overseas (China is currently the world's largest producer), and most new innovations in panel production, such as process improvements that make the panels far more powerful by altering their electrical properties, are happening outside the U.S.[ix] This is less true for non-panel innovations, such as the holographic solar applications pioneered by small start-ups in Arizona and New York, possibly because these new innovations are still cutting-edge and not yet in commercial production at any real scale. Once these technologies do scale up, however, they too may be produced and improved overseas.

One industry where the spatial relationship between manufacturing and innovation has actually been tracked and measured using empirical data is the optoelectronic industry (e.g. lasers, fiberoptic telecommunications). In a recent set of studies, Carnegie Mellon engineering professor Erica Fuchs used a combination of simulation modeling and empirical data to demonstrate the impact of offshoring production on technological innovation. What she found was that when optoelectronic firms offshored production of their original designs to, for instance, Asia, they tended to produce those initial designs cheaply and efficiently. However, when these firms then began work on new and improved designs, they tended to lose valuable time and knowledge if their operations were offshore. The firms she studied were faced with a choice: whether to offshore their production and save labor and materials costs—often the most efficient solution in the short-term—or to take a longer-term view, keep emerging design and production domestic, and push forward new technologies that might keep them more competitive in the long run.[x]

As Fuchs and others have pointed out, the workforce skills associated with these jobs are also at risk of moving overseas when advanced manufacturing migrates.[xi] That's a problem for the U.S. for two reasons. First, it means we lose manufacturing jobs here, which are some of the best jobs for middle-skill American workers—those who have a high school education but lack a four-year college degree. These workers make up fully two-thirds of America's workforce. They should not be left behind.

But it also means we lose actual skills, so that we are at risk of having to import workers into trades facing labor shortages due to the lack of trained, skilled workers in some critical industries. These range from engineering and science-based occupations, to trades such as machining, welding, and pipefitting. Maintaining this skill base in the U.S. is critical for our

future competitiveness, but it is also essential if we are to keep our lights on and electricity flowing through the transmission grid. Fully half of America's utility workforce is expected to retire in the next decade.[xii]

Other Nations Are Not Waiting Around for America to Act

America may be hesitant to throw itself into green jobs growth—the great economic engine of this century—but other countries are not. Countries such as China and Germany are now investing in many of the building blocks of innovation-driven economic growth that the United States has all but abandoned over the past several decades, and are focusing on clean tech industries as a critical part of their economic growth strategies. In a recent Center for American Progress report *Rising to the Challenge*, I and my co-authors argue that China in particular is actively and methodically building up the basic foundations for future economic growth while also ensuring a market for its current and future products and services at home and abroad.[xiii] Commerce Secretary Gary Locke reports that China invests almost $12 billion *monthly* into its renewable-energy sector: "They're doing this because they really want to be the world's supplier of clean energy and they recognize this will support millions of jobs."[xiv]

In 2008, China's gross national expenditure on research and development stood at roughly $66 billion, or about 1.5 percent of China's gross domestic product.[xv] This is the highest investment level among developing economies as a percent of their domestic economy and ranks China fourth in the world in overall R&D spending behind the United States, Japan and Germany.

Compounding this imbalance is that some of America's political leaders seem intent on crippling us before we have even fully entered the global green jobs race. Just this week, the House Republican caucus put out a proposed spending bill for the remainder of Fiscal Year 2011 that waves the yellow caution flag that these legislators want to slow down—if not outright halt—the promise of America's green jobs revolution and all the ensuing companies and jobs that would create. The proposed budget would slash clean-tech and energy investments by nearly 30 percent, devastating this growing but immature industry that struggled during the Great Recession.[xvi] It would also dramatically disinvest in the solar, wind, wave, geothermal and other renewable technologies that enabled the United States to get back in the clean energy race, and would cut funds to technical assistance to manufacturers and to job training programs working to prepare unemployed job seekers for the clean tech industries of the future.

The decision not to invest in the green economy comes at a cost. Already we have seen cutting-edge solar power manufacturing companies begin to close their doors, either permanently or to move to other countries with strong and dedicated clean energy markets. Evergreen Solar Inc., for example, recently announced plans to close its Massachusetts plant to put more funds into solar panel manufacturing in China. The company followed on the heels of SpectraWatt Inc. in New York and Solyndra Inc. in California closing some of their facilities. As General Electric Co.'s chairman and chief executive, Jeff Immelt, said at last year's ARPA-E summit, those countries with strong demand for renewable energy products will naturally pull these companies into their borders because "innovation and supply chain strength gets developed where the demand is the greatest."[xvii]

Similarly, wind manufacturers in Iowa, once a state leader in this industry, have begun to lay off workers as new orders fail to materialize. Leading global financier Deutsche Bank decided to

move billions of investment dollars out of the U.S. clean energy market, and into China and Europe as soon as it was clear there would be no comprehensive climate and energy legislation coming out of the 111th Congress. China and our other economic competitors in Asia, Europe, and emerging markets are not waiting for America to regroup.

All this points to one key question: Do we really want to be in the business of inventing the green technologies of the future, only to end up buying those technologies back from countries that have successfully commercialized, manufactured, and exported those technologies—and come up with successive waves of innovation that they can then also sell back to the U.S.? Do we want to be the world's great clean technology consumer, while the rest of the world prospers? Is this the way to strengthen the American economy?

A Lack of National Leadership, but Some Hope from America's Cities and States

Contrary to critics intent on maintaining the carbon-intensive, fossil-fuel dependent status quo, we know that investing in the green economy does produce results, and that these investments are critical if America is to get back on the path to global leadership.

The evidence is ample. The American Recovery and Reinvestment Act of 2009, the largest single domestic investment in clean energy in U.S. history, jumpstarted our economy, saving and creating millions of jobs and providing successful clean energy incentives to spur business investment and help consumers lower their electricity bills. The Council of Economic Advisors' recent quarterly report found that "the clean energy provisions of ARRA alone have already saved or created 63,000 jobs and are expected to create more than 700,000 by 2012."[xviii]

But ARRA funding is coming to an end, and businesses are beginning to worry that the U.S. will not make any further real commitment to moving America toward the green economic transformation already happening throughout the rest of the developed world.

Luckily our states and cities have surged ahead, and there is evidence at these sub-national levels of the great strides that our country can make when we harness our innovative and entrepreneurial spirit, along with our skilled workforce, to tackle the green jobs challenge. Because of these state and local efforts, such as Renewable Electricity Standards in place in 30 states, multiple building codes and energy efficiency investments, and creative "cluster-based" approaches combining research and development with regionally specific natural resources and competitive industries, the last decade has seen significant green jobs growth relative to the economy as a whole. A PEW Charitable Trusts study found that the number of green jobs in America grew about 2.5 times faster than job growth as a whole, growing 9.1 percent from 1998-2007.[xix]

California's green economy in particular has shown high returns on investment. In the recent report *Many Shades of Green,* by the California-based non-profit Next 10, researchers found using state employment data that from 2008 to 2009, California's 'core green economy' grew over three times faster than its traditional 'brown economy.' The report found that "between 1995-2008, green businesses increased 45 percent, and green jobs grew 36 percent while total jobs in the state grew only 13 percent."[xx] Green manufacturing jobs alone grew by 10 percent in 2009 in California. Partly as a result of this expansion, 24 percent of green jobs were in manufacturing in California as opposed to 11 percent for the economy as a whole. And in

November 2010, California voters overwhelmingly voted to continue growing this green economy, defeating the Big-Oil funded Proposition 23 which would have indefinitely stalled implementation of California's landmark Global Warming Solutions Act, A.B. 32.[xxi]

Michigan, too, is a striking example of how the clean energy economy can bring opportunity to one of the hardest hit regions of the U.S. In Michigan, total private employment dropped 5.4 percent from 2005-2008, while during the same period employment increased by 7.7 percent among 358 green-related firms counted in the study.[xxii] As Michigan continues to struggle with devastatingly high unemployment rates, the green jobs sector remains both a growing source of jobs and a bright spot on the horizon.

In former Subcommittee member Senator Voinovich's state of Ohio, new Governor Kasich recently reversed his campaign promise to roll back the state's Renewable Energy Standard after multiple business leaders contacted him to tell him how important green industries have been in the Toledo area in particular. The city, which ranked in the bottom 10 by per capita income in 2000, has seen a renaissance as a hub for solar innovation and production. Over 6000 individuals are employed in these industries in Toledo today, and the city is home to several major solar panel exporters including First Solar and Xunlight. Building on its existing manufacturing infrastructure and workforce skills in glass and auto parts, both industries that were on the decline, as well as its world-class universities and strong economic development agencies, Toledo managed to turn itself into a serious player in the global solar marketplace.[xxiii] The city stands as a testament both to the promise of new clean tech industries to revitalize aging industrial cities, and to the innovative spirit of America's existing businesses and communities.

Preliminary research by the Apollo Alliance also highlights a promising advantage in inner-city areas in particular, where green jobs growth is rapidly outpacing overall job growth:

> "While the number of inner-city jobs in the largest U.S. cities has grown by a scant 1 percent overall during the past decade, new research from Apollo, the Initiative for a Competitive City (ICIC), and Green For All, suggests that *inner-city green jobs have grown by 11 percent*, more than 10 times the rate of job growth overall."[l]

Green jobs have seen faster rates of growth throughout the country than the rest of the job market, and we need them to move the country forward as the transformation to a clean energy economy takes shape.

And lest we forget, the policies and investments put in place by ARRA and multiple states and cities have not just created jobs today, they have created new low-carbon infrastructure that will help our nation become more energy independent, cleaner, and healthier well into the future. Every million dollars invested in building a wind farm creates 5.7 permanent, direct jobs, to be sure—but it also creates a wind farm that will be in place for at least thirty years.

Green Jobs Protect Americans' Health While Helping American Business

The case for green jobs is integrally related to the case for solid, predictable environmental regulation—something that is on the minds of many here in Washington as the Environmental Protection Agency goes to the mat to defend its current plans to curb pollution in a number of sectors. As you know, the EPA has recently come under attack from politicians and dirty energy

lobbyists, despite the trillions of dollars of health benefits it has generated since its creation.[xxiv] But the case for EPA authority goes far beyond the protection of public health and the environment, which Americans in great majority already support. New data shows that the EPA's soon-to-be-finalized regulations create green jobs while also creating the business certainty and environment that American businesses need to invest in America.

A new report by Ceres and the PERI Institute at the University of Massachusetts, Amherst, finds vast economic benefits from two Clean Air Act rules expected to be finalized in 2011: the Clean Air Transport Rule and the Utility Maximum Achievable Control Technology, otherwise known as Utility MACT. The report outlines the jobs impact of "investments in pollution controls, new plant construction, and the retirement of older, less efficient coal plants as the country transitions to a cleaner, modernized generation fleet under new EPA clean air standards." Key findings include:

- Total employment created by capital improvements over the next five years is estimated at 1.46 million jobs, or about 290,000 jobs on average in each of the next five years.
- Installing modern pollution controls and building new power plants creates a wide array of skilled, high-paying installation, construction, and professional jobs.[xxv]

The American auto industry provides a prime example of how well-crafted rules can translate directly into new green jobs and industries. A new fleet of fuel-efficient vehicles would put auto workers and many others back to work while reducing dangerous carbon pollution, enhancing America's energy security, and allowing the American auto sector to sell its new technologies on the global market.

The recent analysis *Driving Growth: How Clean Cars and Climate Policy Can Create Jobs*, conducted by the Center for American Progress, the United Auto Workers, and the Natural Resources Defense Council, found that strengthening automotive fuel efficiency standards through streamlined federal standards can spark the investment and innovation needed to reach new levels of efficiency while creating jobs. The analysis found that supplying the U.S. automobile market with more efficient cars could create up to 150,000 new jobs for U.S. workers by 2020 from improvements to fuel economy alone, all things being equal.[xxvi]

We need to let the EPA continue to do its job: creating green jobs, spurring innovation and investment, and strengthening the economy while protecting our health and the environment.

Harnessing the Green Economy to Enhance American Innovation and Competitiveness

Innovation and investment are the essential building blocks of a strong U.S. economy, but we are no longer doing what we should to continue generating the ideas, goods, and services for which America is so well known. Instead, we are spending our time squabbling while Rome burns, by ignoring our crumbling infrastructure, by disinvesting in our workers and students, by chopping away at research and development funds, and by failing to take the necessary steps to put America into the global race to lead the green economy.

These are some of the progressive proposals that Congress dearly needs to take to heart to strengthen our economy:

- Stabilize the market for green technologies by passing a national Clean Energy Standard, one that would set a target of 35 percent renewable and efficient energy by 2035, and a second target of up to 80 percent including a broader range of clean energy technologies.
- Craft finance policies to make more public and private capital available to innovators to invent, commercialize, and produce green technologies. These include policies such as the Clean Energy Deployment Administration, the 1603 cash grant program for renewable energy developers, and the 48C program for advanced manufacturing. Each of these received bipartisan support in the last Congress.
- Modernize our basic infrastructure to allow businesses to more effectively collaborate and compete in domestic and international markets
- Invest more in science and math education and workforce development to ensure we have workers able to participate in the technology- and advanced-manufacturing-driven economy of the present and future.
- Promote international trade policies that ensure access to foreign markets, and the free flow of goods, services, knowledge, and capital across borders
- Provide incentives, through competitions and other "race to the top" strategies, to help our most innovative cities, states, and regions develop private-public partnerships to harness their best institutions, workers, and minds and find solutions to tomorrow's energy challenges

The Center for American Progress has fleshed out many of these recommendations in a number of white papers and reports that are available on the CAP website at www.americanprogress.org. These include: *Helping America Win the Clean Energy Race*, *Rising to the Challenge*, *Cutting the Cost of Clean Energy*, *The Green Bank*, and *Rebuilding America*.

These steps would make great strides in boosting our national competitiveness and jobs growth in the short run and ensure our once-dominant position in science and technology, innovation and entrepreneurship, and job creation is not eclipsed by China in the 21st century. Government cannot do everything, but it can spur the private sector by ensuring a market for emerging technologies, and by creating incentives and evening the playing field for rising industries with great job potential. This will revitalize our entire economic engine and change how we are innovating new ideas, products, goods, and services.

Conclusion

We believe it is time that America fully join in the global green economic transformation. In fact, we want America to lead this transformation and to turn it into the great economic engine of future growth—much as we did during the Industrial and high tech revolutions. If we do not embrace a more sustainable growth strategy, we risk seeing jobs move overseas and our middle class decimated, even as we become more and more vulnerable to volatile energy and financial markets. If we do not lead in this green revolution, we risk becoming the great consumers of the 21st century, rather than its great innovators.

Investments in clean energy will do more than help some specific sectors add and maintain green jobs, though it has and certainly will continue to do so. Rather, by realigning America's thinking

toward a strong clean energy economy, we can strengthen the entire economy and ensure U.S. global competitiveness in decades to come.

President Obama reminded Congress during his State of the Union that the United States faces a real innovation challenge from China, Germany and other nations, much as it did in 1957 as the Soviet Union rocketed ahead of us in space exploration.

> *When the Soviets beat us into space with the launch of a satellite called Sputnik, we had no idea how we would beat them to the moon. The science wasn't even there yet. NASA didn't exist. But after investing in better research and education, we didn't just surpass the Soviets; we unleashed a wave of innovation that created new industries and millions of new jobs.*
>
> ***This is our generation's Sputnik moment.*** *Two years ago, I said that we needed to reach a level of research and development we haven't seen since the height of the Space Race. And in a few weeks, I will be sending a budget to Congress that helps us meet that goal. We'll invest in biomedical research, information technology, and especially clean energy technology—an investment that will strengthen our security, protect our planet, and create countless new jobs for our people.*[xxvii]

Our country needs a truly comprehensive clean energy investment agenda centered on groundbreaking policies and programs that reduce carbon emissions, increase public and private investments in clean and efficient energy technologies, and ensure broadly shared prosperity and sustainable economic growth. As President Obama said, this our Sputnik moment, and we must seize the opportunity it presents.

Thank you very much.

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Senator SANDERS. Thank you very much.

Let me first begin with Leo Gerard. Mr. Gerard, simply state, what do you see the potential in terms of the growth of green jobs in the United States if our country, as Ms. Gordon just indicated, is prepared to invest in research and development and if our trade policies are strong, so that countries like China do not break international law? Is there really an opportunity, in your judgment, for serious job growth?

Mr. GERARD. Absolutely. In fact, our Union for quite some time now has seen this as the pathway to economic revitalization and regrowth of our manufacturing sector.

Let me say, although my comments were about China's cheating, that isn't the only area that we have an interest in. We think that there needs to be an effort by the Congress to increase the allocation under Article 48(c), so that there can be more money to promote domestic manufacturing. We think there is tens of thousands, if not more, jobs in industrial retrofitting to make our industrial facilities more energy efficient. We will take carbon out of the air, we will make our industries more competitive and we will create jobs.

We think that this Congress needs to have the guts to stand up for domestic content regulation that is no different than what other major countries are doing, consistent with our international obligations. We think retrofitting public buildings, you think this building is energy efficient? We have windows that were probably put in in the 1940s. What could we do about that? If we had domestic content regulations.

So all of those things that we think the future is in enforcing and strengthening our trade laws. It is a longer answer to tell you that first, you have to have to lose jobs before you can win a trade case. You have to prove that the jobs have been lost. So we have to be down on our knees, begging for help, before we can get help in the industrial sector in this country. Whereas other countries can take action before that happens.

So we have to enforce and strengthen our trade laws, and we have to believe that we are going to advance industrial manufacturing again in this country.

Senator SANDERS. Thank you very much.

Let me ask Mr. Danner a question. Mr. Danner, in California just this past week, Southern California Edison announced that it had received bids for 250 megawatts of solar PV projects, all of which have contracted to provide power at less cost than an efficient natural gas plant. The American Wind Energy Association reports that wind is now providing electricity at 5 to 6 cents per kilowatt hour, competitive with coal and natural gas.

My question to you, in a general sense, is can sustainable energy compete with the more traditional forms of energy that we use in this country?

Mr. DANNER. Thank you, Senator. The answer is that it can. I think the date, especially when you look at the accurate data, which takes into account the capital costs, and the full costs, a metric called levelized cost that certainly Goldman Sachs used in the report that I entered into my testimony, suggests that that is exactly the case. In fact, that wind can be as low as 5 cents per kilowatt hour, as you mentioned, and that on a levelized cost basis, it

is competitive with all other forms, including natural gas, including coal and including nuclear.

So it is competitive today. The thing you need to keep in mind is that it is capital-intensive. So the cost dynamics are quite different. You put the capital in up front, and then, Senator, I believe as you mentioned in your opening comments, the fuel is virtually free. It is free for 20 years. In fact, we are designing our turbines for longer than that.

So not only is it beneficial right now on a levelized cost basis, but it locks those economics in for a long, long time, providing economic security.

Senator SANDERS. Thank you very much.

Let me ask Ms. Gordon a question. Speak a little bit more about your concerns about the future in terms of United States policy, in terms of investment and trade as opposed to China and Europe in supporting sustainable energies. How are we doing?

Ms. GORDON. Well, you know, we have gone through phases. We were leaders in this industry, we have been in the past. We invented the solar panel in the 1950s as part of the space race, greatly improved it after the oil crisis of the 1970s. Invented wind turbines, as you heard, here. We have been leaders in innovation in this area. We have not been leaders in commercialization and production, except for in the last couple of years. I would say that is the Recovery Act. We saw the largest single investment of domestic investment in clean energy research development and deployment in this country and in job training, leading to a surge, in 2009, the most wind turbines ever installed in the United States in a year.

However, with that money drying up, we have seen companies, we could each name companies that have closed their doors. We have seen companies struggle to maintain the orders that they need to keep manufactured parts on hand. We have seen many of these sectors just start to wonder what the long-term outlook is in the United States.

I think the next 2 years will be critical for us. We really need to see demand grow in this country with strong national policies. We have seen great stuff at the State and local level. We have to scale that up and do what every other country that is competing with us in this space, every country in Europe, China, India and Japan have done, and say, "Look, we need a national renewable or clean energy standard." Every one of them has that. We need a price on carbon. Nearly every one of them has that. We need sustainable policies to do production in these areas. We need an actual policy around clean energy. Every one of them has that.

My concern is, we are already seeing the beginning of the decline.

Senator SANDERS. OK, thank you very much.

Senator Boozman.

Senator BOOZMAN. Thank you very much. I enjoyed the testimony. It was very helpful, and I enjoyed reading it. I don't think that any of us here don't disagree that there is a place for green jobs. The key, though, is that it has to work. As we set policy, the numbers that were presented as far as the increased cost of electricity and increased cost of doing business and the loss of jobs is pretty staggering.

Mr. Danner, you run an efficient company that is doing a great job. But probably, are most of your components, the steel and things that you are getting to put that together, most of that comes from overseas, I would guess, if it is like every other company in America. You look around, you see where you get the best deal as you assemble. Would that be an accurate statement?

Mr. DANNER. Senator, it is not actually an accurate statement now. We do have a global supply chain, we work hard to have as much U.S. content as we can, specifically in a place like Michigan, where we have opened our facility in Saginaw. I believe as Ms. Gordon stated, Michigan has been fairly aggressive in their economic development on green jobs. We are working hard to give those supply chain companies a fair shot. If they can be competitive with wherever else, we will take them preferentially over, certainly, an overseas competitor. We will try to help create a local supply chain in Michigan, as an example. But it is difficult, as you mentioned.

Senator BOOZMAN. I am not being critical of you at all. You are in business to make a profit, and you deal with the cards that are being dealt. That is the problem we have throughout the United States. As a result, because of different things, increased energy costs, this and that, it is hard to compete.

Several of you mentioned, I think Mr. Cicio, Mr. Montgomery and Mr. Gerard mentioned about the onerous effects of increased regulation. Can you elaborate on that? I know some of the boiler things that are being talked about. Go ahead.

Mr. GERARD. I am happy to comment, because I did not make a comment about the cost of increased regulation. What I did comment on is China's increased cheating.

But let me say this: it is very difficult to develop a domestic supply chain when you don't have the national or State infrastructure that will help do that. Because you have to get the thing started. If we are looking at competing against Asian countries or European countries, they all have a manufacturing plan that is very, very rigid about their supply chain. I won't say that the Europeans cheat, they do it within the WTO rules. But I will say that China cheats totally.

Senator BOOZMAN. Does increased regulation, specifically the boiler regulations that are coming down the pike, does that help start the supply chain to help your guys?

Mr. GERARD. I think if the Boiler MACT regulations are done properly, they will increase efficiency and they will increase jobs. If they are done improperly, and let me just tell you this. Our Union has supported the Clean Air and Clean Water Acts when our steel companies were resisting it, saying it would put them out of business. We would have not had a coke industry in this country had we not had a Clean Air Act, because the pollution abatement issue saved the industry.

So done right, Mr. Boozman, it can lead to good jobs. Done wrong, it will cost jobs. We will oppose it being done wrong. We will support it being done right.

Senator BOOZMAN. I agree with that.

Mr. Cicio.

Mr. CICIO. Thank you, Senator. The industrial Boiler MACT is a really good example, because I have, all of my companies have boilers. Almost every manufacturer in the country of any size has a boiler. So it can have a huge impact on our ability to compete.

Particularly, in your State, there is a good example of the unintended consequences of doing regulations that are not appropriate, or effective, I should say. You have a rice miller, a company that processes rice, serves 8,000 farmers in Arkansas, that has a co-generation unit that is part of their operation. Co-generation is at least twice as energy-efficient as the local utility.

The Boiler MACT, industrial Boiler MACT, requires that that company meet a one part per million carbon monoxide level. They can't do it. It is impossible. So unless the EPA changes its proposed rules that we expect later this month, they will have to shut down this very energy-efficient co-generation unit and buy from the local utility, increasing emissions and damaging their competitiveness.

Senator BOOZMAN. Mr. Montgomery.

Mr. MONTGOMERY. Thank you, Senator. I would like to make two observations. One of them is that it really is necessary to look both at the direct jobs that are created by either a regulatory program to install pollution control equipment, or by a clean energy standard. You can see where people are out doing things in order to accomplish the requirements of that regulation.

But then it is necessary to look to the other side and ask, for example, in the regulations that I was looking at, which are the four or five different major regulatory programs that the U.S. EPA is proposing for electric utilities, what does that do to the cost of electricity, and what does that in turn do to potentially exactly the same companies that are getting hired to build the pollution controls?

I think the notion of the supply chain is a critically important one, because when we have looked at other policies that increase the cost of electricity, what we have found is that the upstream iron and steel industry is a particularly vulnerable part of the economy. That is, competitive effects on the U.S. economy really come from narrowly defined industries but ones which face global competition for a pretty homogeneous product. That is the U.S. steel industry.

So at the same time that we find people going out installing pollution controls, if that drives up the cost of electricity significantly, the blast furnaces and electric arc furnaces in the United States will no longer be what is supplying that steel.

Senator BOOZMAN. Thank you, Mr. Chairman.

Senator SANDERS. Thank you, Senator Boozman.

Senator Merkley.

Senator MERKLEY. Thank you, Mr. Chair. I wanted to jump in on this cost question, because we had kind of a conflict between Mr. Cicio's presentation, which says that wind is more expensive, solar is more expensive, and the chart, Mr. Danner, which you supplied us with the study from Goldman Sachs which says that when you reflect all costs and strip away all subsidies, wind is competitive with and even cheaper in some cases than natural gas combined cycle.

Mr. Cicio, in a short version, are we missing something here, or does Mr. Danner's Goldman Sachs study have a point?

Mr. CICIO. I can only account for what the Department of Energy, the Energy Information Administration has said, and it has all the complete details and I would be happy to provide you with the details that wind energy is 80 percent more expensive than natural gas-fired generation, and 130 percent, if it is offshore wind, it is 130 percent more costly. That does not include the additional 1.5 cents production tax credit.

Senator MERKLEY. Mr. Danner.

Mr. DANNER. As I mentioned, the levelized cost is a metric that was, as you mentioned, that analysis performed by Goldman Sachs and run in the *Wall Street Journal*. That does take into account all sources of cost, including capital costs.

What that would not reflect is if you throw coal into a fully depreciated 50-year-old plant, is that cheaper than a wind farm that needs to have the capital installed and thereby providing both free fuel and locked-in energy costs for 20 years.

The EIA study is, and there has been quite a bit written on this, it directly was in contrast to a Government Accountability Office report which was more in line with the Goldman Sachs report. There are other analyses which fall in line with the Goldman Sachs analysis.

One of the flaws in the EIA study was that it used the 2007 incentives. It compared those against 50 to 60 years of capacity that has been installed. So it fundamentally biased any new generation sources that were installed. That is my comment.

Senator MERKLEY. Thank you, Mr. Danner. I think the point you are making is that if you look at life cycle, then you are taking into account the fact that you are not giving the comparison free on one side, the established investment that you have already discounted, if you will, and yet charging the entire investment to the new entry by looking at the life cycle complete set of costs.

I think it is important we look at that type of comparison, so that we have an unbiased understanding of how these different sources work over the long term.

Mr. Cicio, I wanted to note that there is a program that we have had a lot of debate here about called Building Star. The idea is to use low-cost loans for energy-saving renovations. It has, there has been a variety of economic analyses that said this is the most bang for the buck in creating jobs, one, because our construction industry is under-employed, so it is available, and second of all, because the savings in the energy bills make a good share of the payments on the loans. Does that fit in with your vision for industry saving energy, investing in ways to save energy?

Mr. CICIO. Yes, it does. Any of those types of programs, in our view, including reasonable new standards for building codes, is moving in the right direction. As I said earlier, when you have 70 percent of all the electricity in the country used by buildings, that is a good target. We support that.

Senator MERKLEY. Great. Mr. Gerard, I wanted to turn to your noting a variety of unfair trade practices that are exercised by China. Indeed, we seem to have tolerated enormous numbers of strategies without responding. Even when we push and one gets

changed, it seems like something else changes a few months later on some other piece of it.

Do we have the appropriate tools in terms of the trade laws or the staff at the U.S. Trade Representative, or access to evidence, et cetera, to be able to actually enforce fairness in international trade?

Mr. GERARD. My experience, that now goes 15 years, is that USTR, even when they are willing are understaffed or underbudgeted to enforce our trade laws, aggressively and quickly. The second part of your question about whether the laws are effective, I can state, I can try to do it quickly, I can give you an example of a case that we filed 4 years ago on coded free-sheet paper. We succeeded in providing that China cheats and that they had violated the rules. But we couldn't get an enforcement of the remedy, because we haven't been able to prove that we had been injured sufficiently.

We filed the exact same case 3 years later with basically the same set of facts and we won. Do you know why? We lost 7,000 jobs in that 3-year period. So the question about, are trade laws effective, no, they are not. Can they be enforced? They can be enforced. Does USTR need more support? Absolutely.

Senator MERKLEY. Thank you very much, Mr. Gerard.

Senator Inhofe, I believe it is your turn.

Senator INHOFE. Thank you very much.

First of all, let me get back to Mr. Gerard. You and I have talked before, and we have been concerned about some of the over-regulations. We hear an awful lot about China and what they are doing. One of the problems that we have in this country to make us noncompetitive, relative to China and some of the other countries, India, is that they are not regulated the way we are. I think you were pretty outspoken on the Boiler MACT. I think your statement was that this thing is going to end up costing us, that is you, Steelworkers, tens of thousands of jobs direct and then tens of thousands of jobs in support industries.

I would just think it is natural that higher energy costs will have a negative effect on the steel industry's ability to compete globally. You agree with that, don't you?

Mr. GERARD. I think, with all due respect, Mr. Inhofe, you are putting a lot of words in my mouth that I am not sure I said.

Senator INHOFE. Let me use the quotes, then, I am sorry.

Mr. GERARD. Use it exactly, then.

Senator INHOFE. I will. "Imperil tens of thousands of jobs, that many more tens of thousands of jobs in the supply chains and in the communities where these plants are located also will be at risk."

Mr. GERARD. Exactly, that is what I said. What I was referring to is that at that point in time, there was improper application. In fact, we were looking at taxing. If my memory is right, we were looking at taxing those companies that created co-generation out of their boilers. That they would have to buy energy off the grid when they were already producing 70 percent of their energy themselves.

Now, having said that, let me come back to the other comment you made about China. You are right, China does not enforce its environmental regulations, as lousy as they are. That doesn't mean

that we shouldn't have the proper environmental regulations. I will take you back——

Senator INHOFE. I am sorry, you are using almost all my time, and after we are through, if the Chairman would allow me——

Mr. GERARD. I would just like to finish this one sentence, that says, we refuse to be the buffer between positive pollution control activity by the community and resistance by the industry. While the security of our jobs is not the price that we are willing to pay for aggressive abatement activity, the ruination of our health may well be the risk which will be taken by lack of action.

That was said by our Union in 1969, and that has been our position all since that time.

Senator INHOFE. But the current position, imperiling tens of thousands of jobs on Boiler MACT, that is what I am referring to, that is all.

Mr. Cicio, I think just putting a price on carbon in terms of, it is kind of a euphemism for cap-and-trade and carbon regulations, would that make your members more competitive against firms that operate in China or in India and other places?

Mr. CICIO. No, it would damage our competitiveness, most certainly. It would be an additional cost. It is the equivalent of higher energy costs. That is going to make us less competitive domestically, and increase our inability to compete overseas.

Senator INHOFE. Do you think that would also make us less competitive when it comes to buying wind generation, solar panels?

Mr. CICIO. Most certainly. As a matter of fact, what are the materials that it takes to produce a wind generator? You need steel, you need aluminum, you need plastics, you need cement. Every one of those is very energy-intensive raw materials. If the cost of energy goes up, or if we in manufacturing have higher cost of regulation, it increases the cost, it all shows up in the cost of those products and makes it harder for people like Mr. Danner to be competitive.

Senator INHOFE. One of the frustrations I have, and Ms. Gordon, I appreciate your testimony very much, but it is nice, you look in the future at all the beautiful green jobs and these things, and that is good. Here is the problem, though. We in this country, and this wasn't true a year ago, but now it is, we have more recoverable reserves in coal, oil and gas of any of the nations in the world right now. Our problem is, our politicians won't let us, we are the only country that can't exploit our own resources.

Now, take shale in the gas. We are looking right now at enough that we would have the reserves to run this country on natural gas for 110 years. My question is this. I go back to my State of Oklahoma, and people are pretty logical there, and Dr. Montgomery, they say, wait a minute, they don't like oil, they don't like gas, they don't like nuclear. How do you run this machine called America in the meantime, until technology and all that comes in, if it ever does come in? Give me a good answer to tell them.

Also, I would like to have you elaborate a little bit more on this PERI thing. I felt you kind of inadvertently cutoff in terms of that particular, the PERI model that you were talking about.

Mr. MONTGOMERY. Thank you, Senator.

First, yes, we need to find a balance of energy resources. I am very concerned, especially, about gas shales, and exactly what you are pointing out. I spent a lot of time debating with other energy economist and talking to clients about the expectation that natural gas will be $3 or $4, maybe $5 or $6 per million Btu forever, because we could produce that out of the gas shales. The only way we will be able to do it is if access to the resources, if regulations on tracking and concerns about water are dealt with in a rational way by regulators. But that could easily be shut off to us.

Senator INHOFE. A good case would be the hydraulic fracturing that is under attack at all the time.

Mr. MONTGOMERY. Exactly.

Senator INHOFE. Without that, you can't get the close formations.

Mr. MONTGOMERY. You can't produce the gas from shales without that. If you can't produce the gas from shales, we are back in the world we thought we were in 3 or 4 years ago, of $10, $12, $14 gas. All of these costs work their way through the economy.

In the long run, we are probably going to manage to employ all of the American workers, but we will be employing them at a much lower standard of living if we are forced to pay much higher costs for energy, because that simply means our capital and our labor that is going into producing very costly energy isn't available for producing the things that people really want. It takes twice as many workers and twice as much capital to produce a million cubic feet of gas. Then they are not going to be out there producing television sets or health care or other things that other people really want to have.

Mr. GERARD. They are not producing television sets now.

Mr. MONTGOMERY. They are not going to be producing anything that we manufacture in the United States.

On the PERI study, where I was ending up on that really was that the critical problem is that it is very one-sided. All the calculations of green jobs are very one-sided. They talk about who it is that is being employed doing particular things. They don't look at what is happening in all the rest of the economy. You have to take a comprehensive view, and the comprehensive view ends up focusing first on what we need to talk about, which is, what is it costing in terms of labor and materials and capital investment to achieve the changes that these regulatory programs are demanding.

I guess I would end up with the notion that is not Government that creates jobs. Jobs, sustainable, productive jobs, are in American business. Business will create those jobs. What all these policies that are being debated are doing are simply asking, will the jobs be in the industries that are most productive, or will it be in the jobs be in industries that Government programs are favoring and pushing, whether they are the most productive or not.

Senator INHOFE. Thank you, Dr. Montgomery.

Thank you, Mr. Chairman.

Senator SANDERS. Thank you.

I would like to continue the discussion. Are you guys up for it? Jim, more questions?

Senator INHOFE. No, I don't have any more.

Senator SANDERS. Let me just begin.

Mr. GERARD. Senator?

Senator SANDERS. Yes.

Mr. GERARD. Could I just make one brief point? One of the previous speakers made some comment about the American steel industry not being able to compete. We are called the Steelworkers, I want to set that straight.

The fact of the matter is that we could produce a ton of steel in America, any one of our North American steel producers. We could land it in China cheaper than they could produce it in China, even by their cheating. But we are not allowed to do that. We can't penetrate that market.

So this illusion and delusion that somehow American industry can't compete, we can if we have a level playing field.

Let me make this point also. There is 200 tons of steel in a small wind turbine. If we had domestic content regulations no different than China has for our domestic consumption, not for export, but for domestic consumption, we would create a domestic supply chain for the wind industry. We would be able to retrofit industrial facilities. We would be able to retrofit buildings, and we would put thousands of people back to work. As long as this Congress, this House of Representatives and this Senate, aren't prepared to stand up for American jobs, we will keep getting our butt kicked by the cheaters in China.

Senator SANDERS. That takes me to my next question. Mr. Danner, as an American company producing advanced wind technology here in the United States, in Vermont, Michigan and other States, what pressures are you under from competitors in China, and how can our Government create the right policies to attract and retain wind manufacturers here in the United States? Do you agree with what Mr. Gerard has said?

Mr. DANNER. Yes, thank you, Senator, and I do. Mr. Gerard made some very salient points.

Right now, as a business person who is doing global business, if you look at the China wind industry, it cannot be ignored. In 2008, China installed about one half of the megawatts of wind that the United States did. In 2010, 24 months later, they installed more wind than the United States did. So it is an exploding marketplace.

As a businessperson, we need to figure out how to sell our wind turbines and our technology into China. Because I don't think we should only focus our discussion on how do we protect our home markets.

Senator SANDERS. Let me ask you this. Do you have a level playing field in being able to do that?

Mr. DANNER. It has been proven time and time again that no foreign company can go into China directly and sell the wind turbines the way the Chinese companies can come in here. So we are forced to partner in with a Chinese company to get our technology into China for use in the Chinese marketplaces.

On the contrary, we are facing Chinese-made turbines directly in Indiana, Illinois and in Iowa, and I fear in Michigan. So it is absolutely not a level playing field. As I look to export, I have given up on the notion that Northern can go into China and sell.

Senator SANDERS. You have given up on the Chinese market?

Mr. DANNER. Well, Senator, to be clear, I have given up that we can do it the way that they do it here. We will simply have to partner into that explosive marketplace. We have come to accept that.

Again, in Europe, which is a different situation altogether, I would love to buy U.S.-made steel in our better wind turbines and export them to Europe with Ex-Im Bank financing and be competitive against the Chinese. That can be done. But the Chinese do need to be held to WTO rules, and the U.S. Export-Import Bank needs to be absolutely aggressive in helping us compete.

On our home turf here, just one last point that I believe Mr. Gerard alluded to earlier, which is a powerful point, which is, in the United States, there are no home content provisions at all. Ontario, Canada, they have a very strong home content provision for their feed-in tariffs. I am competing literally today in the State of Michigan for a request for proposal that their renewable energy standard in Michigan, which is a great public policy to drive their wind consumption up, is creating a bid. I am competing against European turbines. There is absolutely no benefit I have at all for building them in Saginaw, MI.

So it is a complete level playing field for our home markets in a material way. Yet when we go overseas, especially into China, it is anything but a level playing field.

Senator SANDERS. Let me ask Ms. Gordon a question. I think it was Dr. Montgomery earlier who was referring to a study done. A lot of studies say a lot of things. There are studies funded, as you know, by the oil industry, by the coal industry, by people anonymously who represent those interests. Can you take a moment and share with us your views about some of the studies that have been conducted by these folks, and why some conservative group are so intent on undermining the notion that green jobs are good for America?

Ms. GORDON. Sure. There have been a lot of studies, as you know, the Spanish study a couple of years ago was pretty well-known and pretty well debunked. Then there have been a couple of recent studies. Many of these, I can't say all, we haven't looked into all of them, many of them have been funded by institutions that were essentially funded by the oil industry. So there is a fairly clear relationship between the content of the study, the funder and the content of the study.

But more to the point, these studies tend to focus on a couple of specific points. One of them is this theory that investments in new industries like green industries just move jobs from one place to another. You are not creating new jobs, you are not investing over here, instead, you are investing over here. I think there are a couple important things on that.

First, those arguments work best when you are dealing with an economy that is at full capacity. If everyone were employed and if all capital were moving in the economy, it is in fact true that somebody would probably have to move from a job over here to a job over here, when an investment was made. Our economy is nowhere near full capacity. We have a terrible unemployment problem, we have a lot of capital, we hear this from businesses all the time, that is tied up right now because of a lack of certainty in the marketplace, a lack of certainty there will be demand for these products,

a lack of certainty of regulation and exactly how that will play out. So we don't have full capacity.

Another point of that is that in the case DeutscheBank, I brought up earlier, DeutscheBank did move dollars from one place to another because of investments. They moved them from the United States to China because of investments. So we have a global financial marketplace. We are not just moving dollars within the United States, we are moving them much bigger. That is one of the major points that these studies make.

I just wanted to take 1 second, if I can, to make a point about regulation. Because one of the studies we have talked about a lot is on regulation. There are some good examples, actually, of job creation from regulation. Just pointing to the China example, I was there last April visiting a company called Kota Automotive, which has partnered with Lee Shin Battery in China. American car company, California car company, making electric cars with Chinese batteries.

But they are using two things that they are importing from the United States to China. One, electric drive trains, which were developed here in part because of fuel efficiency standards that really drove our auto industry to become more innovative. Two, they are importing the steel bar between the passenger front and back of the car, because out safety standards, if you want to sell in the United States, you have to have the right kind of steel for that bar, so that it doesn't crumple on impact.

Those are two examples of regulation actually creating jobs in exports.

Senator SANDERS. Thank you very much.

Senator Boozman.

Senator BOOZMAN. I agree, I think that we are not saying, certainly I am not saying that there shouldn't be any regulation. But it does have to be right, as we set these policies. You mentioned just now that one of the things that is keeping people sitting by the side, they don't know what the cost of regulation is going to be. We have had lots of examples, whatever industry you are in right now, of overreaching regulation. It does drive up costs.

I agree with you, Mr. Gerard, while I think the whole panel would agree, in the sense that we need to have our trading partners, they need to be responsible. We need to have fair trade.

One of the things I have seen, and you mentioned, we can compete. But where I see as I go through factories now, and I really think it is important that we get out and go through factories. I was on the school board for 7 years, I think they need to go out. Because there are two things that I am amazed it. I see these big old factories and there is nobody in them. It just does not take very many people, because we are mechanizing, as we have these pressures with increased regulation, increased energy costs and things like that, the reaction is, it doesn't matter what business you are in, whether you are running a Senate office or you are running your business, the cost is on personnel.

So what we are doing is getting rid of personnel, we are mechanizing and moving in that direction. That is a bad situation.

The other thing is, I am always amazed that, when I was growing up, the person on the line doesn't exist any more. That person

now is using a computer, they are very savvy. We need to be educating people in that regard.

Yes, sir.

Mr. GERARD. Let me just say, I am not sure I heard you right, but we are the dominant manufacturing union in the country. We are in tire and rubber, paper, oil and gas.

Senator BOOZMAN. Your tire guys were in the other day.

Mr. GERARD. I am sorry.

Senator BOOZMAN. I said, I visited with your tire guys the other day, Cooper Tire, they are great.

Mr. GERARD. Yes. By the way, Cooper Tire is expanding because we had a 421 case against China that Cooper Tire was afraid to support, because the Chinese were threatening them. But that is a different hearing.

The reality of what you said is, I think, is that the cost of labor and regulation is a factor. The most important thing in most of our industries is the cost of capital and access to markets other than our own. When you say that you support us in our effort, there is now a bill introduced in the Senate that you ought to support on Chinese currency manipulation.

Senator BOOZMAN. I voted for it in the House.

Mr. GERARD. Great. It is part of our 301 petition.

Senator BOOZMAN. Well, like I said, I voted for it in the House. I don't disagree with you, that is part of it. That is a pressure.

Mr. GERARD. Senator, when we can create a ton of paper or a tire, or a ton of steel cheaper and more efficiency under our rules with your concerns about regulation, cheaper than they can in China, yet we can't penetrate their market, and with all the things we have proven under 421 cases, under 201 cases, we have proven nine times in 2 years that China cheats. This Congress, the past one and this one, are dragging their feet on doing anything about it. As you do that, we have lost 53,000 factories in the last 10 years.

Senator BOOZMAN. One of the first things I did as a new Senator was go to my big paper mill in Pine Bluff, AR.

Mr. GERARD. Did you get any votes from our members there?

Senator BOOZMAN. Again, they tell me that under the new Boiler MACT, they get killed in regard to having to retrofit.

Mr. GERARD. Did they tell you that with the black liquor that we got them that we saved the mill?

Senator BOOZMAN. Well, that is a great story. That is good. So like I said, I am not fighting.

Mr. GERARD. Neither am I.

Senator BOOZMAN. These are all pieces of the puzzle that really are important. The purpose of this committee, we are trying to set policy and advise policy on these things. But they really do work together. Thank you.

Yes, sir.

Mr. MONTGOMERY. Thank you, Senator. I would like to respond to something I think was an attack on myself. I think that I have indicated that I think green jobs, in my testimony, are a diversion from the serious questions we need to ask about costs and benefits, environmental regulations. They miss the point.

But that is not the worst thing I think has happened to these regulations. The worst thing is the name-calling and the tendency to recommend to policymakers that they should make up their minds about what a witness says based on who they might have done their work for.

I think that has truly damaged your ability to hear good analysis and process it. The fact is, I have worked on this subject for 40 years. I have worked on these issues in the Government, as an academic and now as a consultant. I have done exactly the same analysis in all of those positions for every client.

Right now, my clients value my work because I will tell them exactly what my opinion is. It is based on analysis. I will debate the analysis for anyone, and I won't change it no matter what you pay me. The only place I was ever ordered to change my analysis or to do something to support what my bosses wanted was of course in the Government.

The second point is about, now let me get back to jobs, and the notion that in the long run we are fully employed, but we have to adopt policies now in order to get ourselves out of the recession.

Fiscal policy is a very important part of economic science. If you listen to people like Barry Bosworth and other strong economists who have worked in Democratic Administrations for many years, they will tell you what are effective fiscal policies for creating jobs. They will also agree environmental regulations are probably not those policies, and long-term plans for changing the nature of the electric power industry aren't, either.

You can see this in the green jobs studies. There was one that was put out by PERI in 2007, which was talking about long-term job creation from long-term environmental projects that were going to take a long time to be spent out a build. Then when the recession came along, they relabeled exactly the same study to point to, to talk about how you were getting fiscal stimulus from these same two things.

You can't have both at the same time. The timing of expenditures is very important. By the time the expenditures we are looking at for many of these green policies start hitting the economy, we are going to be worry about inflation and overhearing the economy.

Let me stop on that one. I think actually Kate made a very good point. The United States has technical barriers to trade too that is very hard for foreign manufacturers to produce things that can meet U.S. regulations for the auto industry, and that is why we don't import a lot of cool cars from other countries.

Senator BOOZMAN. Mr. Cicio, I need to yield back to the Chairman. He is going to rap me with the gavel in a second.

Mr. CICIO. Mr. Chairman, can I have 15 seconds?

Senator SANDERS. Fifteen seconds.

Mr. CICIO. The key is the capital investment. But we have impediments to capital investment. We in the United States invented environmental regulation and it cleaned up a lot of things. But we now have such a heavy burden of cost because of those regulations and what they have evolved to, you can't even permit a plant where you have a 2- or 3-year delay. Then companies give up. Or you have non-attainment areas that people don't even think about

building there, because you know you are not going to get the permit.

We need to reinvent our environmental regulations to bring these down to being cost-effective, so that we can attract the capital, that we have the certainty and create jobs.

Senator SANDERS. With that, I thought this was an excellent discussion, and I want to thank all of the panelists for their participation. We look forward to working with all of you.

Thank you very much.

[Whereupon, at 4:20 p.m., the committee was adjourned.]