

Center for American Progress Action Fund



Written testimony for the Senate Committee on Environment and Public Works

Legislative Hearing on Clean Energy Jobs and American Power Act, S. 1733

October 29, 2009

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Introduction

Madam Chairman and members of the committee, thank you for inviting me to testify before you this afternoon. I am very pleased to have this time to share my thoughts on the Clean Energy Jobs and American Power Act, S. 1733, and its power to boost our economy's competitiveness.

The Senate global warming debate has focused on pollution limits and timetables, carbon markets and allocations. But we have lost sight of our principal objective: building a robust and prosperous clean energy economy. Moving beyond fossil fuel pollution will involve exciting work, new opportunities, new products and innovation, and stronger communities. Our current national discussion about constraints, limits, and the costs of transition overshadows the economic opportunity of clean energy investments. It is as if, on the cusp of the Internet and telecommunications revolution, debate centered only on the cost of digging trenches to lay fiber optic cable.

Many of our economic competitors see investments in clean energy technologies as key to their long-term sustainable economic growth. Germany, Spain, Japan, China, and even India are building the foundation for a prosperous low-carbon future. Many leaders in the American business community realize the competitive threat to the United States if we do not join other nations by investing in our clean-energy sector. Venture capitalist John Doerr and General Electric CEO Jeff Immelt warn, "There is still time for us to lead this global race, although that window is closing. We need low-carbon policies to exploit America's strengths—innovation and entrepreneurs."¹

To gain the lead in the clean-energy race—as we have done in other sectors—we need to reduce our global warming pollution as the Clean Energy Jobs and American Power Act

requires. The bill puts a price on carbon pollution that recognizes the harms and costs of global warming, and it would level the playing field between the prices of dirty and cleaner energy sources. The Clean Energy Jobs Act, combined with companion measures before the Senate, would create a clean-energy investment program that would cut greenhouse gas pollution, spur clean-energy technology innovation, create new jobs, and increase American energy independence.

The boost to American economic competitiveness from the Clean Energy Jobs bill costs relatively little, particularly when compared to its benefits. The Environmental Protection Agency analysis of S. 1733 found that the “likely impacts of S. 1733 would be similar to H.R. 2454,” the American Clean Energy and Security Act passed by the House on June 26.² The Environmental Protection Agency’s analysis of ACES found that the “average household consumption would be reduced by less than 1 percent in all years.” The EPA estimated that the overall average cost to households would be \$80 to \$111 annually—less than the cost of a postage stamp a day.

The EPA’s recent analysis reiterated an important finding from the Congressional Budget Office that the ACES bill would *benefit* the least well off in American society. “Lower-income households are on net better off than without the [pollution reduction] policy.” The EPA noted that another study of H.R. 2454 confirmed that:

“In 2015 the benefit of these allowance allocation approaches more than offset higher cost of goods and services resulting from the [pollution reduction] policy for households in the bottom two income deciles.”³

In other words, the Clean Energy Jobs bill would increase American competitiveness while helping those at the bottom of the income ladder.

In addition, there are several elements that are critical for making America more competitive that should be included in clean energy legislation:

- A declining limit on greenhouse gas pollution that achieves a 20 percent reduction by 2020 would boost investments in clean-energy technologies.
- Protection of tropical forests from destruction would prevent significant pollution at a very affordable price.
- An independent Clean Energy Deployment Administration would provide resources to commercialize to scale promising clean-energy technologies.
- A “Rebuild America” program to retrofit buildings to dramatically increase their efficiency would create jobs, save ratepayers money, and reduce pollution.
- Expanding demand for natural gas as a “bridge fuel” and adopting additional safeguards for gas production would help replace dirty coal and foreign oil.

In addition to domestic legislation, the United States should actively collaborate with the international community to accelerate the development and deployment of technologies in renewable energy, energy efficiency and carbon capture and storage. I will discuss each of these vital programs in my testimony.

Thanks to your leadership, Madam Chair, the Clean Energy Jobs and American Power Act includes several of these measures essential to building a comprehensive clean-energy investment package. *We strongly urge the members of the Senate Environment and Public Works Committee to vote for this bill.* Other important measures in legislation passed or pending before other Senate committees should be joined together before the full Senate debates this bill.

The United States needs to seize the clean-energy opportunity

The world is undergoing another industrial revolution. But this revolution isn't driven by the development of the steam engine or micro chip—it is a clean-energy revolution. Many of our economic competitors, such as China, Germany, and Japan, are racing to develop and manufacture the clean-energy technologies of the 21st century that the world demands as a response to scientists' pleadings to reduce the greenhouse gas pollution linked to global warming. As President Barack Obama noted, "The nation that leads the world in creating new sources of clean energy will be the nation that leads the 21st century global economy."⁴

The creation and production of these clean-energy technologies can create millions of so-called "green jobs." This term can sometimes be misleading because many of these job categories that will grow in a new green economy are familiar today, but in the future workers will produce and install different products. Examples include manufacturing, constructing, or installing clean-energy technologies, forging the steel for wind turbines, installing solar photovoltaic panels on roof tops, designing more fuel efficient cars, or retrofitting existing buildings for efficiency.

The clean-energy sector continues to show promise as an engine of job growth. Despite the terrible economy of the last two years, wind energy is the fastest-growing source of electricity. In 2008, nearly the same number of Americans were building or operating wind turbines as were digging in coal mines—85,000 Americans were employed in the wind industry,⁵ compared to nearly 87,000 coal miners.⁶ But comprehensive clean-energy legislation is essential to achieve the full potential of this opportunity.

The American Recovery and Reinvestment Act, PL 111-5, has \$70 billion in spending for clean-energy programs, including efficiency, renewable energy, advanced battery research, implementation of smart grid technologies, public transportation, and high-speed rail. It also has another \$20 billion in clean-energy tax incentives for wind farms, solar panels, plug-in hybrid electric vehicles, and other clean-energy technologies.

After the Recovery Act became law in February, the Department of Energy and other federal agencies took the necessary time to establish rules for granting or loaning funds under these programs. The rules to provide assistance for wind projects were issued in July. Since then, the wind industry experienced significant growth. The American Wind Energy Association reports “the wind industry has seen over 1,600 MW (enough to serve the equivalent of 480,000 average households) of completed projects, and over 1,700 MW of construction starts. These projects equate to about \$6.5 billion in new investment.”⁷ Total U.S. operating wind power capacity prevents the generation of 57 million tons of carbon pollution annually, equivalent to removing 4 million cars from the road.

Only anecdotal data is available about ARRA job creation, but the Political Economy Research Institute at the University of Massachusetts used economic modeling to determine the clean-energy job creation impact of ARRA combined with the American Clean Energy and Security Act, H.R. 2454. This analysis project that the two measures:

“...can generate roughly \$150 billion per year in new clean-energy investments in the United States over the next decade. This estimated \$150 billion in new spending annually includes government funding but is notably dominated by private-sector investments...[This] can generate a net increase of about 1.7 million jobs.”

Although the net increase of 1.7 million jobs projection does not directly apply to the chairman’s mark, it shares many similar provisions with ACES. One could anticipate that the Senate and House energy bills would create a similar number of clean-energy jobs. Importantly, the Political Economy Research Institute analysis also found that “clean-energy investments generate roughly three times more jobs than an equivalent amount of money spent on carbon-based fuels.”⁸ Another joint study by the University of California, University of Illinois, and Yale University concluded that comprehensive energy and climate legislation would create up to 1.9 million new jobs in the United States.⁹

Another way to create jobs, save consumers money, cut global warming pollution, and keep America competitive would be a comprehensive program to make existing commercial, industrial, and residential buildings significantly more energy efficient. Buildings use 70 percent of all U.S. electricity, and generate 40 percent of total U.S. greenhouse gas pollution. Much of our housing and building stock is old, inefficient, and unnecessarily wasteful. While building codes and green building standards can slash energy use in new buildings, half of the buildings that will be standing in 30 years already dot our landscape.

A comprehensive building efficiency retrofit program using proven, existing efficiency techniques and technologies can cut energy use in buildings by up to 40 percent. Best of all, they can pay for themselves from the energy they save. “Rebuilding America,” an analysis by the Energy Future Coalition and the Center for American Progress, found that

a retrofit program could create 625,000 direct and indirect jobs.¹⁰ This would also reduce energy bills by billions of dollars annually.

Energy efficiency retrofits create good local construction jobs across the country at a time when well over a million construction workers sit idle in a sagging housing market. And demand for the manufactured products needed to retrofit buildings will result in jobs by revitalizing the manufacturing sector and contributing to sustainable, long-term economic growth. We strongly urge this committee to include a “Rebuilding America” energy efficiency retrofit program in the Senate’s clean energy bill.

The United States still leads the world in clean-energy innovation. Promising technologies include thin solar films that cheaply generate electricity, advanced biofuels from agriculture waste, and enhanced geothermal energy.¹¹ But despite these successful innovations, other nations are building and selling these products. For instance, China is the leading producer of solar PV cells even though the technology was invented and perfected in the United States. Between 1995 and 2005, the U.S. market share of PV cell production dropped from 45 percent to under 10 percent.¹²

The adoption of the Clean Energy Jobs Act would drive new investments in both innovation *and* manufacturing these and other clean-energy technologies. And reinvigorating our manufacturing sector will help drive further innovations.

Economic competitors are seizing the energy opportunity

Today we have an unparalleled opportunity to rebuild America’s economy and strengthen the middle class through investments in clean-energy technologies. We can create well-paying jobs even as we respond to pressing energy and environmental challenges.

While we continue to debate the costs and benefits of clean-energy legislation, other countries have already made major investments towards becoming low-carbon economies. Interestingly, a fair number of these countries are non-Annex I countries under the Kyoto Protocol. These are developing countries that are not required to make mandatory emissions cuts under the terms of the Kyoto Protocol, including China, India, and South Korea. Germany and Spain have also made clean-energy investments and are reaping the benefits.

China

Two months ago, I led a small American delegation to China that included Senator Tom Daschle, Ambassador Wendy Sherman, MIT Professor John Deutch, former Deputy Secretary of Defense Rudy deLeon, and SEIU President Andy Stern. Our group spent three full days speaking with some of the senior-most government officials, leading

academics, and members of the financial industry about a range of issues of utmost importance between our two countries.

These discussions made us realize that climate change and clean energy rank among the very top issues of importance to China's social and economic development challenges. China fully grasps the strategic economic opportunity that the clean-energy sector represents. As Li Keqiang, first vice premier of China and Premier Wen Jiabao's deputy, has publicly said on various occasions, the development of new energy sources represents an opportunity to stimulate consumption, increase investments, achieve stable export opportunities, and adjust China's energy structure, all while enhancing its international economic competitiveness.¹³

China is also diversifying into clean energy sources for energy security concerns. It already imports almost 50 percent of the oil it consumes, and for the first time in 2007, started to import coal. With China's consumption expected to grow from eight million barrels of oil a day currently to 20 million barrels of oil a day by 2030, its demand for global oil resources is bound to rise steadily and drive oil prices up.¹⁴ It has started to build a strategic oil reserve, encouraged its state-owned energy companies to invest in overseas energy assets, and sealed multibillion dollar oil and gas supply contracts with countries including Russia, Brazil, Iran and Venezuela.¹⁵ But Beijing knows that a reliance on fossil fuels is not a complete solution, and is thus making heavy investments in domestic sources of clean and renewable energy.

Over the past few years, China has quietly made significant investments into low-carbon infrastructure.¹⁶ Although reported numbers vary, allocations to clean energy and sustainable development account for 14.5 percent of China's \$586 billion economic stimulus in 2008, while the proportion is as high as 34 percent if supporting rail and grid infrastructure is included.

China is making steady progress to meet its goal to reduce energy consumption per unit of gross domestic product by 20 percent of 2005 levels by 2020. It has steadily grown its wind power industry as part of its long-term effort to increase its share of non-fossil fuel power to 15 percent of its overall energy mix by 2020. China's installed wind power capacity has doubled for each of the past four years, and this year it has launched major investment programs in solar photovoltaic installation to catalyze the domestic solar market.

The rapid growth in renewable energy deployment in China has compelled its policymakers to revise their 2020 target for wind power from 30 gigawatts to 100 to 120 gigawatts, and for solar power from 1.8 gigawatts to 10 gigawatts. China also plans to make significant investments in nuclear energy—\$130 billion over the next 15 years. It plans to expand its nuclear capacity from 11 gigawatts to 40 gigawatts in 2020. China had nearly twice the amount of installed renewable energy capacity, excluding large hydro, compared to the United States by the end of 2008 (76 gigawatts versus 40 gigawatts).¹⁷

China is also an emerging world leader in ultra-high-voltage, or UHV transmission lines, with more than 100 domestic manufacturers and suppliers participating in the manufacturing and supply of UHV equipment. A transmission line from Shanxi to Hubei boasts the highest capacity in the world, and is able to transmit 1,000 kilovolts over 640 kilometers. The State Grid Corporation of China will invest \$44 billion through 2012 and \$88 billion through 2020 in building UHV transmission lines. China will unveil in the coming months plans to build an extensive smart grid by 2020.

As the world's largest auto market, China is serious about making the clean-energy vehicles of the future. They have slashed gasoline subsidies and increased taxes on cars with bigger engines while reducing taxes on smaller cars. They are spending \$2.9 billion on developing energy efficient vehicles. China wants to raise its annual production capacity of hybrid and all-electric cars and buses to 500,000 by the end of 2011. This would account for only 5 percent of total car sales, but is up from only 2,100 in 2008. Thirteen cities will roll out pilot subsidy programs for the purchase of "new energy vehicles," ranging from \$7,350 for small hybrid passenger cars to \$87,700 for large, fuel-cell-powered commercial buses. The subsidies will target public-sector purchases such as public transportation, sanitation, and postal services. The State Grid plans to deploy pilot networks of charging stations for electric cars in Beijing, Tianjin, and Shanghai, while Nissan-Renault plans to help establish a pilot charging infrastructure network in Wuhan.

China's emerging leadership in electric vehicles is based on its innovation in energy storage technology. The world's first mass-produced, plug-in hybrid is the F3DM, launched by China's BYD Auto last December. Just six years ago BYD Auto was only in the business of making batteries for mobile phones. The F3DM sells in China for approximately \$22,000, and the founder of BYD, Wang Chuanfu, is now China's richest person.¹⁸

During our delegation's visit to Beijing, we rode on a high-speed train to Tianjin, traveling 65 miles in just 30 minutes—less than half the time compared to conventional rail. This is part of the largest railway expansion in history. China plans to spend almost \$300 billion expanding its railway network from 78,000 km today to 120,000 km in 2020. Of this, 13,000 km will be high-speed rail. The 1,300 kilometer Beijing-Shanghai line is under construction and will reduce travel time between those destinations from 14 hours to 5 hours when it opens in 2013. This will attract an estimated 220,000 daily passengers and should dramatically reduce air travel between the metropolises.

What's more, China is poised to have the world's largest network for intracity urban rail transit. About 2,100 km of railway lines will be laid and operational by 2015 in 19 cities. Ten cities currently have 29 urban rail routes, totaling 778 km, and 14 cities are building 46 urban rail lines, which total 1,212 km.

Aside from infrastructure, China is also leading the way in manufacturing clean-energy technologies and products. It accounts for nearly 40 percent of the global production of solar photovoltaic panels. Historically, the vast majority of this production has been exported, but as described above, a push to develop the domestic solar market will mean

that more solar panels will stay in China to produce clean electricity for the benefit of its own people.

China's rapid wind power expansion has also created a vibrant wind power manufacturing sector. Where some five years ago there were virtually no domestic manufacturers of wind components, now there are as many as 70 to 100 companies, with Sinovel, now the seventh largest in the world, producing one thousand 1.5 MW turbines in 2008 and with a capacity to produce twice this quantity. Though the first priority of these companies is to satisfy the growing domestic market, they are starting to explore international markets.

China's program to increase renewable energy and efficiency will also lower its greenhouse gas pollution. *The Washington Post* noted that "last week, the Paris-based International Energy Agency said the efforts are starting to pay off...[and] lowered its estimate of future Chinese greenhouse gas emissions."¹⁹ China has also signaled for the first time that it intends to manage carbon emissions growth. Last month, President Hu Jintao announced that China will reduce its carbon emissions per unit of GDP by a "notable margin." How quickly such a deceleration leads to a peaking of China's total emissions depends on the specific carbon intensity targets, but senior Chinese officials have recently given public assurance of its desire to peak its carbon pollution "as early as possible."²⁰

All these actions send signals to the international business community. According to a recent report, the clean tech market in China alone has a potential to develop into a \$500 billion to \$1 trillion per year market by 2013.²¹ Enterprising American companies such as First Solar and American Superconductor have sensed the economic opportunity by investing directly in the Chinese clean energy market or, in the case of Duke Energy, partnering with Chinese companies to develop clean-energy projects here in the United States.

Make no mistake about it—China wants to lead the world in the development and production of clean-energy technologies for use at home and abroad. The United States should assume that China is in the clean-energy technology race to win.

India

The Indian government has established the Ministry of New and Renewable Energy, making it the only country in the world with a separate ministry charged with transitioning the country to an economy that significantly increases its use of clean and renewable energy sources. Nine percent of its installed power capacity consists of renewable sources, excluding hydropower, which accounts for another 25 percent. In time, other renewable sources will play a larger role. As part of India's renewable energy push, the Clinton Climate Initiative is helping the Indian state of Gujarat build the world's largest solar facility, totaling 3 gigawatts of installed solar power.²²

India is the world's fifth-largest installer of wind energy capacity, and Indian company Suzlon is one of the world's leading wind energy companies. The national government is seriously considering enacting a national renewable electricity standard of 20 percent by 2020, and at least a dozen progressive Indian states have already set their own requirements, ranging from 0.5 to 10 percent renewable energy.

India plans to adopt a comprehensive climate change action plan, which includes the following measures.

- A market-based scheme for the trading of energy efficiency certificates that is worth an estimated \$15 billion
- New energy efficiency standards for home appliances and buildings
- The country's first-ever mandatory fuel economy standards for automobiles
- Construction of the world's largest installed solar photovoltaic capacity at 20 gigawatts by 2020, which is equivalent to the capacity of 20 new nuclear power plants

South Korea

South Korea is the first of the non-Annex I countries to publicly announce its intentions to cap carbon pollution by 2020. It will take one of three possible emissions control plans:

- One that results in an 8 percent increase from 2005 levels by 2020
- One that keeps pollution at 2005 levels
- A 4 percent cut in pollution below 2005 levels

South Korea is also considering a renewable electricity standard that would require renewable energy from wind, sun, and other sources to comprise at least 10 percent of the country's overall electricity by 2020, up from 2.5 percent in 2008.

South Korea allocated 79 percent of its \$38 billion economic stimulus package to clean energy, including programs for renewable energy technologies, energy efficient buildings, low-carbon vehicles, and water and waste management. It has adopted a separate "Five-Year Green Growth Plan" (2009 to 2013), under which \$83.6 billion, representing 2 percent of its GDP, will be spent on climate change and energy, sustainable transportation and developing green technologies. This five-year plan is expected to stimulate \$141 billion to \$160 billion in production and to create 1.56 million to 1.81 million jobs in clean-energy industries such as solar panel manufacturing and advanced battery production.

Germany

Germany is a global frontrunner in the clean-energy transformation. It has one of the most aggressive greenhouse gas emissions targets, even within the European Union. It announced earlier this year new targets that would lead up to a 40 percent reduction in greenhouse gas emissions by 2020 from 1990 levels.

It also has the world's largest installed capacity of solar photovoltaic panels and second-largest amount of wind power. Its total installed renewable energy capacity by the end of 2008 was 34 gigawatts, compared to 40 gigawatts of renewable capacity in the United States. The renewable energy sector is a major source of German exports. The country is home to Q-Cells—the world's largest solar company—and is second only to China in the production of solar PV panels.

The success of the German solar industry, despite relatively poor solar resources, is due to strong government financial support provided through feed-in-tariff policies. The tariff requires German electric utilities to buy all wind, solar, and other renewable power at a price per kilowatt-hour higher than that of power generated from coal, nuclear, or natural gas. This has sent strong market signals to renewable energy project developers and manufacturers. By 2010, Germany is expected to have 43 percent of the world's market share of installed solar PV.²³ The German renewable energy sector now employs 280,000 people, and this may grow to 500,000 by 2020.²⁴

Spain

Spain has one of the most aggressive programs to increase its productivity and create jobs through investments in clean-energy technologies and efficiency. It generates about one quarter of its electricity through renewable resources—about eight times more than the United States. Wind energy alone is able to supply up to 40 percent of Spain's energy needs during peak wind periods.²⁵ Luis Atienza, CEO of Red Electrica, noted that “Wind is no longer a marginal supplier for us.”²⁶

The Spanish government estimates that clean-energy jobs employ 200,000 people—twice as many as in 2000. In addition, Spain is heavily investing in energy efficiency, which could employ 800,000 construction workers.²⁷ *The Washington Post* reports that “through a combination of new laws and public and private investment, officials estimate that they can generate a million green jobs over the next decade.”

The United States can and must keep up

The United States was a worldwide leader in the development and production of clean-energy technologies, but we lost that lead in the 21st century. From 2001 to 2008, the United States did little to spur investments in clean-energy technologies. For instance, the American Wind Energy Association notes that “The renewable energy production tax

credit...is the primary federal incentive for wind energy and has been essential to the industry's growth."²⁸ Yet it was allowed to lapse in 2001 and 2003, disrupting plans to build wind facilities. This is just one example of neglect that enabled other nations to pull ahead of us in the race to develop and deploy clean energy technologies.

President Obama has ended this drought. He understands that clean-energy investments can drive economic recovery and long-term growth, and restore American economic competitiveness. Since he took office 10 months ago, the administration has proposed and adopted numerous policies to invest in clean-energy industries, create jobs, cut oil use, make America more energy independent, and reduce greenhouse gas pollution. The pollution reductions from motor vehicles mean that there will be fewer reductions required from power plants and other industrial sources to meet the goals of the Clean Energy Jobs Act.

President Obama and the 111th Congress' first big down payment on clean-energy jobs was in the American Recovery and Reinvestment Act, which *The New York Times* called "the biggest energy bill in history."²⁹ The act, which became law in February, includes \$91 billion in clean-energy spending and tax incentives.³⁰ ARRA will invest in:

- Renewable energy sources such as wind, solar, and geothermal energy
- Retrofitting government buildings and private homes to increase their efficiency
- Building public transit and high-speed rail
- Research on advanced batteries and other technologies
- Extending tax incentives for wind and solar energy, and adding new incentives for plug-in hybrid electric vehicles

On May 19, 2009, President Obama announced a plan to increase motor vehicle fuel economy standards from 25 miles per gallon today to 35.5 miles per gallon by model year 2016, a 40 percent improvement.³¹ Over the life of the program, this would save 1.8 billion barrels of oil, and reduce greenhouse gas pollution by 900 million metric tons. This effort had the support of the major auto companies, United Auto Workers, California, and other states that wanted to require greenhouse gas pollution reductions from cars.

President Obama also issued an executive order to reduce the federal government's energy use and greenhouse gas pollution. The order "builds on and expands the energy reduction and environmental requirements of Executive Order 13423 by making reductions of greenhouse gas emissions a priority of the federal government."³² This should lead to significant pollution reductions by 2020.

Just this week, the Department of Energy announced \$151 million in funding for 37 clean-energy innovation projects—including research in advanced batteries and biofuel-producing bacteria—under the Advanced Research Projects Agency-Energy, or ARPA-E program. ARPA-E's mission is to "develop nimble, creative, and inventive approaches to

transform the global energy landscape while advancing America’s technology leadership.” This would be the first round of funding under ARPA-E, which will receive a total of \$400 million under ARRA.³³

All of these actions can help the United States reinvigorate its clean-energy companies so that they can compete with firms from other nations. But American entrepreneurial efforts need additional support from economic incentives and price signals supplied by comprehensive clean-energy jobs and global warming pollution reduction policies.

The clean-energy agenda is a competitiveness strategy for the United States

Retooling the energy systems that fuel our economy will involve rebuilding our nation’s infrastructure. We can create millions of middle-class jobs along the way, revitalize our manufacturing sector, increase American economic competitiveness, reduce our dependence on oil, and boost technological innovation.

Reducing global warming pollution will stimulate investment. Nobel Prize-winning economist Paul Krugman noted that steps to reduce global warming pollution would act as an economic stimulus.

“A commitment to greenhouse gas reduction would, in the short-to-medium run, have the same economic effects as a major technological innovation: It would give businesses a reason to invest in new equipment and facilities even in the face of excess capacity. And given the current state of the economy, that’s just what the doctor ordered.”³⁴

Clean-energy investments can also provide the opportunity for more broadly shared prosperity through better training, stronger local economies, and new career ladders into the middle class. Reducing greenhouse gas pollution is critical to solving global warming, but it is only one part of the work ahead. Capturing this economic opportunity is the central challenge of our current energy and climate policy debates. Clean energy investments are a strategic asset, and an opportunity to drive innovation broadly across the U.S. economy.

The three pillars of a clean-energy economy

In a recent report, “The Clean-Energy Investment Agenda,” the Center for American Progress identifies the three pillars of the clean-energy transformation: restoring markets, expanding financing, and rebuilding infrastructure.³⁵ Each of these pieces is distinct and essential to building a low-carbon economy, and each will require specific policy attention. Both the American Clean Energy and Security Act passed by the U.S. House of Representatives and the Clean Energy Jobs and American Power Act in the Senate contain numerous provisions that directly support each of these core pillars.

Restoring markets

The Clean Energy Jobs Act would create a price for carbon by imposing a declining limit on greenhouse gas pollution from major industrial sources. It would also require improved energy efficiency in buildings and create incentives to deploy low-carbon technologies. The effect of these and other similar elements would shift economic incentives toward low-carbon, high-efficiency technologies and practices. This would create and expand markets for low- and no-carbon fuels and technologies, from natural gas to energy efficient windows.

Expanding financing

Quite often, it is the initial seed of public funds that enables the launch of a vibrant new industry led by private investment. Given the myriad benefits and enormous economic development potential of the emerging clean-energy sector, these nascent technologies are clear candidates for similar kinds of public assistance.

The Clean Energy Jobs Act would provide funds for investments in renewable energy and energy efficiency, electric vehicles and other advanced vehicle technologies, research at “clean energy innovation centers,” and in carbon capture-and-storage technologies for power plants.

Both Germany and Canada have “green banks” that help emerging clean-energy technologies get the capital to become commercially viable. In Germany, KfW Bankengruppe, Europe’s largest promotional bank, has evolved to become a major financier of sustainable development projects around the world; in 2008, it funded more renewable projects in developing countries than the World Bank. In Canada, the not-for-profit foundation Sustainable Development Technology Canada (SDTC) operates two funds to assist new clean energy technologies through the development and demonstration process, helping reduce risk and attract private sector investors to drive commercial success.

We propose the creation of an independent Clean Energy Deployment Administration to accomplish this goal in the United States. It would be a publicly owned bank designed to open credit markets and motivate business to invest in clean-energy technologies. CEDA would work closely with private banks to provide loan guarantees, credit enhancements, and other financing tools to stimulate private-sector lending and investment in projects that cannot access commercial financing on economically feasible rates and terms.

Funding for CEDA would require an initial investment of \$10 billion, with additional capital of up to \$50 billion over five years. After that, it would cover its own operational costs through fees charged for its services. Initial capital of \$50 billion could enable CEDA to support up to \$500 billion in loans over 20 years. This, matched with equity investments, could ultimately translate into \$1 trillion worth of clean-energy investments.³⁶

Both ACES and the American Clean Energy Leadership Act (ACELA, S. 1462) would establish a Clean Energy Deployment Administration. While CAP supports those provisions, the need for stable capital to these new industries is so vital that we urge you to go beyond those provisions and establish a well capitalized independent CEDA as part of the clean-energy bill debated by the entire Senate.

Rebuilding infrastructure

Building the clean-energy economy and keeping America competitive in a globalized world will require major investments in revitalizing our energy infrastructure. Some key policies to rebuild this infrastructure are part of the Clean Energy Jobs Act, while others are not within the purview of the Senate Environment Committee. All of these measures should become part of the clean-energy bill considered by the entire Senate.

- **Build a cleaner transportation infrastructure:** The Clean Energy Jobs Act would fund transportation projects that reduce greenhouse gas pollution. It would also help American truckers make their vehicles more efficient and emit less pollution. The NAT GAS Act, S. 1408, would create incentives for heavy trucks, buses, and fleet vehicles to use natural gas rather than fuels made from oil—two-thirds of which comes from other nations—and we urge its inclusion in any final package.
- **Train people for the energy jobs of the future:** The Clean Energy Jobs Act would provide resources to train people for efficiency and renewable energy jobs. The bill would also help train future nuclear industry workers. We must also ensure that any allocation of federal funds to support this ramp up is accompanied by strong labor standards and community reinvestment strategies so that the fruits of investments in clean energy benefit all Americans.
- **Modernize the electricity grid:** The United States must resolve the gridlock over planning, siting, and cost allocation for new electricity transmission lines. The physical and cyber security of the grid must also be improved. The Clean Renewable Energy and Economic Development Act, S. 539, and ACELA would address these problems.
- **Help manufacturers build clean-energy products:** In the Senate, ACELA includes provisions on industrial efficiency. The Investments for Manufacturing Progress and Clean Technology Act, or IMPACT, currently before the Senate Commerce Committee, would provide low-cost loans to help manufacturers retool to produce clean-energy technologies. These provisions should be included in the energy and global warming bill before debate by the entire Senate.

Together, these policy pillars provide a comprehensive strategy for investing rapidly in the deployment of new technology, increasing opportunities for U.S. businesses, and expanding markets for American technology exports.

Fuelling the transition

U.S. natural gas can increase energy security, decrease oil use, and fuel the transition to a clean-energy economy. Natural gas is “by the far the cleanest burning” fossil fuel and produces slightly more than one-fifth of all U.S. energy.³⁷ Oil and coal combined comprise about two-thirds of all energy consumption, and their combustion produces substantially more global warming and other conventional pollution than natural gas.

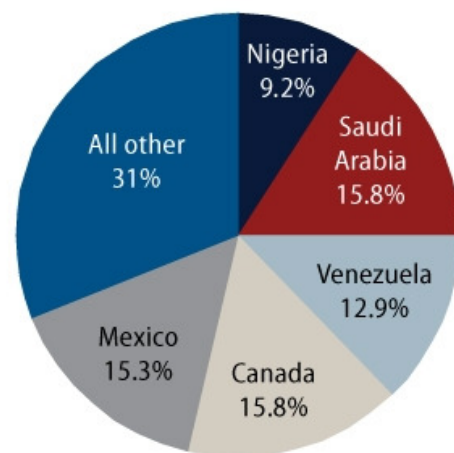
Combusting natural gas to power motor vehicles produces about one-third less global warming pollution compared to petroleum burned in cars, and reduces our reliance on foreign oil, which will only become more expensive as international demand rises sharply as a result of economic growth in China and other developing countries. When used for electricity generation, natural gas produces about half of the global warming pollution compared to coal. It should play a larger role in our energy mix and help reduce our oil use and greenhouse gas pollution given its domestic abundance and lower pollutant levels.

There is another obvious advantage to increasing the use of natural gas as the U.S. transitions away from fossil fuels. U.S. dependence on foreign oil transfers hundreds of billions of dollars that could be invested at home to hostile or unsavory regimes every year. Furthermore, our enormous appetite tightens global supply and demand dynamics, meaning countries like China might be more insistent on securing resources in problematic countries like Iran and Sudan than if the U.S. was actively investing in clean energy alternatives.

The recent development of technology that enables the affordable development of significant shale gas reserves in the lower 48 states could fundamentally alter the U.S. energy system and play a larger role in helping to more rapidly and cost-effectively speed our reduction in oil use and enhance our national security. The Energy Information Administration estimates that the United States has approximately 1,770 trillion cubic feet of technically recoverable gas, including 238 trillion cubic feet of proven reserves. At the current production rates, the Department of Energy believes that “the current recoverable resource estimate provides enough natural gas to supply the United States for the next 90 years.”

Using cleaner domestic natural gas will enhance our economic competitiveness. Since it is produced in the United States, higher gas demand will create more jobs, and using domestic gas in lieu of imported oil would reduce our trade imbalance, keeping energy

U.S crude import shares



Energy Information Administration, "Petroleum Navigator-U.S. Crude Oil Imports by Country of Origin," available at http://tonto.eia.doe.gov/dnav/pet/pet_move_impcus_a2_nus_epc0_im0_mbb1_a.htm (last accessed April 7, 2009).

dollars at home instead of exporting oil dollars overseas. Gas could also be the basis for development of new, clean-energy technologies such as wind-gas hybrid electricity plants, carbon capture and storage, and natural gas transportation fuels. Such low-carbon technologies would find a market overseas.

The Clean Energy Jobs and American Power Act has provisions that would expand the use of natural gas and boost U.S. competitiveness:

- The new greenhouse gas pollution standards for heavy-duty vehicles and engines, and nonroad engines, could increase demand for natural gas as a replacement fuel.
- The Clean Energy and Accelerated Emission Reduction Program would create incentives to use cleaner-burning gas for electricity generation.
- The advanced natural gas technologies program would support research and development of advanced technologies for carbon capture and storage from natural gas-fueled electric plants.

Other measures could be added to the bill that would enhance U.S. competitiveness by replacing coal or oil with cleaner burning domestic natural gas, such as:

- Establishing a \$14 per ton allowance floor price for carbon pollution in 2012 to level the playing field between old, dirty coal plants and newer, cleaner natural gas plants. The price should rise by 5 percent annually plus inflation from 2013 to 2017, and by 7 percent plus inflation after 2017.
- Changing the bill's international offset ratio from 5-4 to 3-2 as way of reducing offsets and benefiting gas.
- Including the NAT GAS Act, S. 1408, in the bill that the Senate will debate on the floor. It would create incentives to boost investments in heavy-duty vehicles powered by natural gas. This fuel has the potential to replace 100 percent of the petroleum used in heavy trucks.
- Converting urban vehicle fleets—including taxis, delivery vehicles, and municipal government fleets—to low-carbon fuels such as natural gas.

Some natural gas companies have proposed an incentive program to reward utilities that switch from coal to natural gas electricity generation. They have proposed a “bridge fuel credit” that would reward additional allowances to utilities that make this switch. In one version, fuel-switching utilities would receive new greenhouse gas pollution allowances that are above and beyond the pollution limits established by the Clean Energy Jobs Act. Adding such allowances for this purpose would increase the amount of pollution in the atmosphere, and undermine the overall pollution reduction goal of the bill. This would offset the benefit of switching from coal to gas. We would urge that you reject this approach, and instead provide any bridge fuel credits from the existing pool of allowances under the pollution limits, which would not increase overall pollution levels.

The recent closure of a Pennsylvania shale gas production site due to water contamination is also a reminder that increasing demand for shale gas is not without environmental risk. The bill should include additional protections for air, water, and climate from an increase in natural gas production. These measures should include:

- Conducting a comprehensive analysis of the impact of natural gas production on air, water, land, and global warming. Include a compilation of best practices and recommendations for new state and or federal safeguards.
- Requiring public disclosure on the release of toxic chemicals used during the production of natural gas.
- Restoring protection for groundwater from oil and gas production under the Safe Drinking Water Act.
- Requiring that shale gas producers meet the Natural Gas STAR program standards so that they capture and resell fugitive methane—a potent greenhouse gas—instead of releasing it into the atmosphere and exacerbate global warming. The Clean Energy Jobs Act only includes methane reduction as a voluntary offset.

International cooperation on clean-energy is essential to reduce global warming and increase economic competitiveness

In 2007, the Nobel Prize-winning United Nations Intergovernmental Panel on Climate Change issued a series of groundbreaking reports on the consequences of global warming. The reports led to the conclusion that the increase in temperature due to greenhouse gas pollution should be no greater than 2 degrees centigrade by 2050. This translates to an atmospheric greenhouse gas emission level of no more than 450 parts per million, up from 395 parts per million today. To achieve these goals developed countries must reduce their emissions by at least 80 percent by 2050, and developing countries must also make significant reductions.

Since the IPCC report a flood of scientific evidence suggests that the predicted impacts of global warming—including temperature rise, ice caps melting, and drought—are occurring ahead of the projected schedule. Nations around the world, including those long resistant to global warming pollution reductions, have reversed course and now support steps to cut pollution. The G-8 nations agreed at their July 2009 meeting that “the scientific view that the increase in global average temperature above pre-industrial levels ought not to exceed 2 degrees C.”

At the same time, there is great concern in the United States and among other developed nations that the cost of greenhouse gas pollution reductions would make their manufacturers less competitive with rivals from the developing world. This is a legitimate concern, but there are very cost-effective ways to address it.

The best way to address competitiveness concerns is a strong global climate agreement

Unfortunately, some have tried to frame the competitiveness and clean-energy debate by assuming that American industry and businesses cannot rise to the challenge posed by a clean-energy economy. They argue that if the United States moves ahead with reductions in global warming pollution it would raise prices of domestic goods and put the United States at an economic disadvantage compared to countries that do not undertake such efforts. Their preferred solution is to continue business as usual, as the United States falls behind in the race to build and sell the clean-energy technologies of the future.

A better way exists to make sure American companies remain competitive with those from nations that refuse to reduce their greenhouse gas pollution. A binding international agreement with all major emitting nations contributing to reductions in greenhouse gas pollution and cooperating on mitigation, adaptation, and technology cooperation is the most effective way to address U.S. competitiveness.

A multilateral agreement will discourage unilateral actions, reduce trade tensions in key overseas markets, and be regarded favorably as consistent with World Trade Organization rules and obligations. The United States should provide financial and technological assistance to the least developed nations for global warming mitigation and adaptation measures and induce major developing countries to commit to global climate action.

Such an arrangement was agreed to under the Bali Action Plan of 2007 by the members of the United Nations Framework Convention on Climate Change, including the United States. Both S. 1733 and H.R. 2454 include measures to implement such a plan. They would allocate allowances under the pollution reduction and investment scheme for investments in clean technologies by developing nations, as well as adaptation assistance and tropical forest conservation. These allocations—2 percent to clean technology and adaptation and 5 percent to tropical forests—are critical to the achievement of cost-effective pollution reductions.

The Clean Energy Jobs Act maintains competition for energy-intensive industries

Many manufacturers in energy-intensive, trade-sensitive industries are very concerned about the impact of a global warming reduction program on their ability to compete with foreign firms from nations without such a system. This includes companies in the steel, cement, paper, chemical, glass and other similar industries. The Clean Energy Jobs Act would provide companies in these and other similar industries with free allowances under the carbon pollution reduction program to cover increased costs incurred for reducing greenhouse gas pollution. This assistance would ensure that energy-intensive, trade-sensitive firms would remain competitive.

Tropical forest conservation is an important global carbon abatement strategy

Tropical forest conservation is essential to reducing greenhouse gas pollution and the impacts of global warming. Deforestation accounts for 17 percent of global warming pollution—more than all the world’s cars, trucks, planes, trains, and ships’ pollution combined.

Along with Senator Lincoln Chafee, I co-chaired the bipartisan Commission on Climate and Tropical Forests, which just released its report “Protecting the Climate Forests: Why Reducing Tropical Deforestation Is in America’s Vital National Interest.”³⁸ The Commission strongly urged that “U.S. policymakers and the international community move rapidly to scale up a global effort to protect tropical forests as the most cost-effective way to achieve fast, large-scale reductions in CO₂ emissions.” Michael G. Morris, Chairman, President, and CEO of American Electric Power, the largest electric utility in the United States, said tropical forest conservation “is one of the most effective and inexpensive tool[s] for addressing climate change, and provides an excellent way to mitigate the costs of other climate solutions.”

Many developing nations, including Brazil and Indonesia, which together account for 50 percent of global deforestation, are eager to partner with the United States to protect their climate forests. Brazil has established a goal of reducing emissions from the Amazon by 80 percent by 2020 and is already making impressive progress in that direction, including robust monitoring and verification systems. Indonesia is moving in a similar direction. These efforts could be focused, honed, and replicated globally.

Protecting climate forests is as much an economic imperative as it is a climate one. By including tropical forests in U.S. climate policies, the United States can cut in half future clean-up costs facing American companies. This would save the United States \$50 billion by 2020 compared with the costs of domestic action.

The report found that this would require public investments of \$1 billion by 2012, and growing to \$5 billion public and \$9 billion private investments by 2020. The Clean Energy Jobs Act reflects these recommendations because it provides significant resources for tropical forest protection – 5 percent of pollution allowances. The Senate Environment Committee estimates that “by 2020, this program will achieve additional emission reductions equivalent to 10% of U.S. emissions in 2005.”³⁹

International collaboration will accelerate the transformation to a clean-energy economy

The clean-energy race is not a zero-sum game. The energy sector is the world's biggest industry, providing enormous investment and employment opportunities. According to the International Energy Agency, some \$26 trillion in energy infrastructure investments will be needed from now until 2030 to meet projected global energy demand.⁴⁰ Because of the climate challenge's urgency and the sheer scale of the transformation of our energy structure necessary to meet it, it is important that the United States collaborate with other nations to develop low-carbon technologies.

Although it may seem counterintuitive, technology collaboration is a competitiveness strategy in and of itself because it spurs innovation and accelerates the deployment and diffusion of such technologies. International clean-energy cooperation is essential for a prosperous clean-energy economy because it results in tangible benefits in innovation, investment, and job creation above and beyond what the United States could accomplish with a "go-it-alone" approach.

Moreover, cooperation with developing nations on clean-energy technology development projects helps the United States begin to fulfill the mandate of the Bali Action Plan to provide international technological and financial support to help developing countries commit to a global climate deal, thus contributing to a level economic playing field.

While there are many potential international partners in clean-energy cooperation, China is one of the most obvious candidates. China and the United States are the two largest annual emitters of greenhouse gas pollution, and together account for more than 40 percent of the world's share. They have a mutual imperative to transition to a clean-energy economy.

Since both nations face national security challenges from their reliance on foreign oil, the development of clean, domestic, and renewable energy sources should be a priority for both. Furthermore, the United States and China's continued reliance on coal-fired power for electricity generation—50 percent and 80 percent, respectively—must be addressed to limit the threat posed by global warming.

The U.S.-China Clean Energy Research Center created in July provides an ideal platform to initiate these collaborations. The joint research center has identified three focal points for research—building energy efficiency, producing cleaner vehicles, and developing advanced coal plants, which includes those that employ carbon capture-and-storage (CCS) technology. To support this effort, the Center for American Progress, in collaboration with the Asia Society Center on U.S.-China Relations, developed a roadmap for Sino-American cooperation on CCS research, development, and deployment.⁴¹ These recommendations will be released on November 4.

CCS offers potential for achieving significant reductions in global greenhouse gas pollution from coal-fired power plants. It should be part of a portfolio that includes dramatic gains in efficiency and renewable electricity. But before we commit ourselves to this technological pathway, it is critical to conduct more CCS demonstration projects to

generate accurate cost and environmental safety assessments, develop accepted practices and standards for sequestration, and establish a market for private sector investment. Our upcoming proposal identifies opportunities for immediate collaboration that will produce quick results, while simultaneously focusing on the longer-term goals of retrofitting existing plants and developing financing infrastructure.

First, the proposal lays out a blueprint for rapid cooperation on large demonstrations of geological sequestration of pure CO₂ streams that exist today in China. It has installed over 100 coal gasifiers that produce pure or “pre-captured” CO₂ streams that currently vent into the atmosphere from a variety of heavy industrial plants, such as chemical and cement facilities. We recommend a set of large projects at multiple sites within China with substantial U.S. contributions in know-how, equipment, and science.

Such collaborations could serve as templates to test various sequestration technologies, which we will eventually want to deploy in the United States and elsewhere, and to build regulatory and financial infrastructures at less cost than would be possible with unilateral development in the U.S. We estimate \$50 million to \$100 million for each project with a U.S. contribution of \$20 million to \$30 million. Such a project is highly likely to succeed. It would provide assistance to the Chinese in an area where they lack capacity and open a new market to U.S. suppliers, as well as offer confidence for future cooperation in this and other areas.

The CAP-Asia Society Center proposal also provides a framework for undertaking collaborative research, development, and demonstration of CCS technology (such as post-combustion capture) to retrofit existing coal-fired plants over short-, medium-, and long-term time periods. This process would identify plants in both countries for large-scale retrofit demonstrations and establish commitments for doing so. It would also test new technologies that improve effectiveness and lower costs, along with outlining a long-term strategy for retrofitting coal-fired power plants in both the United States and China that respects the political, industrial, and financial systems of each.

Retrofitting older coal-fired plants would significantly reduce global pollution if the technology can be demonstrated and is cost effective. Most public CCS investments in the United States, such as the Futuregen project, are aimed at building new integrated “pre-combustion” plants. But even if this technology succeeds, it will not reduce emissions at the hundreds of older coal-fired power plants that are profitable and unlikely to shut down any time soon. Reducing emissions from these older plants is essential to avoiding a global rise in temperature of more than 2 degrees Celsius.

Additionally, the CAP-Asia Society Center report discusses the creation of a global capital fund designed to distribute funds to companies that innovate or invest in CCS, and develop public financing mechanisms—price guarantees or other market value substitutions—such as those proposed in the American Clean Energy and Security Act and Clean Energy Jobs Act to provide guaranteed returns in the short term.

Both the United States and China stand to gain more through collaboration than through independent pursuit of CCS technology. By conducting sequestration projects in China instead of the United States, both sides benefit from lower costs and faster execution. The experience gained through cooperation with China will accelerate the deployment of CCS facilities in the United States, with benefits to job growth, utility and energy companies, and technology firms.

We estimate that cooperation with China on this suite of programs could accelerate large-scale deployment of CCS technology in the United States by 5 to 10 years. Our initial assessment is that this could result in billions of dollars in savings if we can accelerate full-scale deployment of CCS before the anticipated mass commercialization by 2030. Just as importantly, in a few years, nearly 10 million tons of CO₂ that would otherwise have entered the atmosphere will instead be stored permanently.

Americans want congressional action to maximize clean-energy investments

Poll after poll demonstrates that Americans want energy policy reform. They understand that investments in clean energy would create jobs. The House of Representatives responded to this desire with the passage of the American Clean Energy and Security Act. It would increase renewable energy and efficiency and reduce global warming pollution.

This bill was also supported by many energy companies and associations, including American Electric Power, Duke Energy, the Edison Electric Institute, Exelon, Pacific Gas & Electric, PNM, and others. Many unions supported ACES too, including the AFL-CIO, United Steelworkers, and others. These companies and unions understand that global warming pollution reductions would spur investment in clean-energy technologies, create jobs, and help restore American clean-energy leadership.

The Clean Energy Jobs and American Power Act would also help unleash billions of dollars of private investment in the development and deployment of wind and solar energy, advanced vehicle batteries, and other clean-energy technologies that will power the world in the 21st century.

Now is the time for the Senate to help launch the rejuvenation of the American economy, beginning with this committee. I strongly urge this committee to pass the Clean Energy Jobs and American Power Act, sponsored by Senators John Kerry (D-MA) and Barbara Boxer (D-CA). America's economic future depends on you.

Thank you.

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