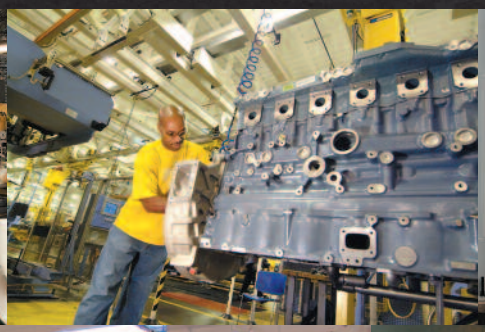
Winning the Race

How America Can Lead the Global Clean Energy Economy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About Apollo Alliance
The Apollo Alliance is a coalition of unlikely and diverse interests – including labor, business, environmental and community leaders – advancing a bold vision for the next American economy centered on clean energy and good jobs.
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Good Jobs First is a national policy resource center promoting accountability in economic development, smart growth for working families and the creation of good green jobs.
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Winning the Race: How America Can Lead the Global Clean Energy Economy

by the Apollo Alliance and Good Jobs First

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Acknowledgements
This report was written by Matthew Mayrl of the Apollo Alliance and Phil Mattera of Good Jobs First with contributions from Andrea Buffa and Elena Foshay. Special thanks to Cathy Calfo, Kate Gordon, Sam Haswell, Greg LeRoy, Michael Peck and Doug Rose, who offered advice, reviewed drafts and provided various other types of assistance with this project.

March 2010

INTRODUCTION

When U.S. Renewable Energy Group and Cielo Wind Power LP announced plans to construct a 600 megawatt wind farm in West Texas with China's Shenyang Power Group, the companies expected a positive public response. Their press release trumpeted the fact that the agreement marked the first time companies from China and the United States agreed to jointly develop a utility-scale wind power project.

But just days after the announcement, news surfaced that only 15 percent of the 2,800 jobs to be created by the project would be located in the U.S., despite the fact that the project was to be funded, in part, by the American Recovery and Reinvestment Act of 2009 (ARRA).[1] The rest of the jobs would be in China, where the wind turbines were to be manufactured.

The American public, labor union leaders, elected officials and U.S. renewable energy manufacturers were infuriated: Why were Recovery Act funds being used to create jobs overseas? In the race to capture the growth in the clean energy economy, why were American investments being used to create jobs manufacturing these systems in other countries?

In response to the outcry, U.S. Senator Chuck Schumer (D-NY) asked the Department of Energy to deny any Recovery Act funding for the wind farm. "I respectfully urge you to block Recovery Act funding to this project unless the majority of components are manufactured in the United States," Schumer wrote in a letter to Energy Secretary Steven Chu.

The controversy over the West Texas wind farm has long been out of the news headlines, but its reverberations continue to be felt throughout the clean energy world. Although the Obama administration has repeatedly expressed its desire for the U.S. to be a leader in clean energy manufacturing, the trend continues to move in the opposite direction. In his recent State of the Union speech, the president announced a goal of doubling U.S. exports within five years, saying "the more products we make and sell to other countries, the more jobs we support right here in America." But the reality is that the U.S. does not even have the capacity to meet its own demand for renewable energy systems and component parts. Approximately one-half of wind turbines in the U.S. and over two-thirds of the solar photovoltaic cells and modules used today are made overseas.[2]

One of the factors that exacerbated the public reaction over the West Texas wind farm's plans to use turbines manufactured in China was concern about the overall decline of the American manufacturing sector. During the last decade, some 5.7 million U.S. manufacturing jobs disappeared, many of them sent overseas. During the current recession alone, which began in December 2007, the U.S. lost more than two million manufacturing jobs.[3] The loss of these jobs is particularly concerning because manufacturing jobs tend to be good jobs, paying an average of $25,000 more per year than service sector jobs and providing benefits like health insurance. They have also traditionally provided a ticket into the middle class for the 68 percent of working Americans without four-year college degrees.[4]

Many Americans had hoped that the growth of the domestic clean energy economy would stem the tide of manufacturing job loss. As cities, states and the federal government enact measures to improve their energy efficiency and shift toward the use of renewable energy, it creates demand for products like solar panels, wind turbines, energy-efficient windows and electric car batteries. The Recovery Act went a long way toward increasing demand for clean energy products, with $110 billion in investments in areas like energy efficiency, renewable energy, smart grid technology, advanced batteries and high-speed rail.

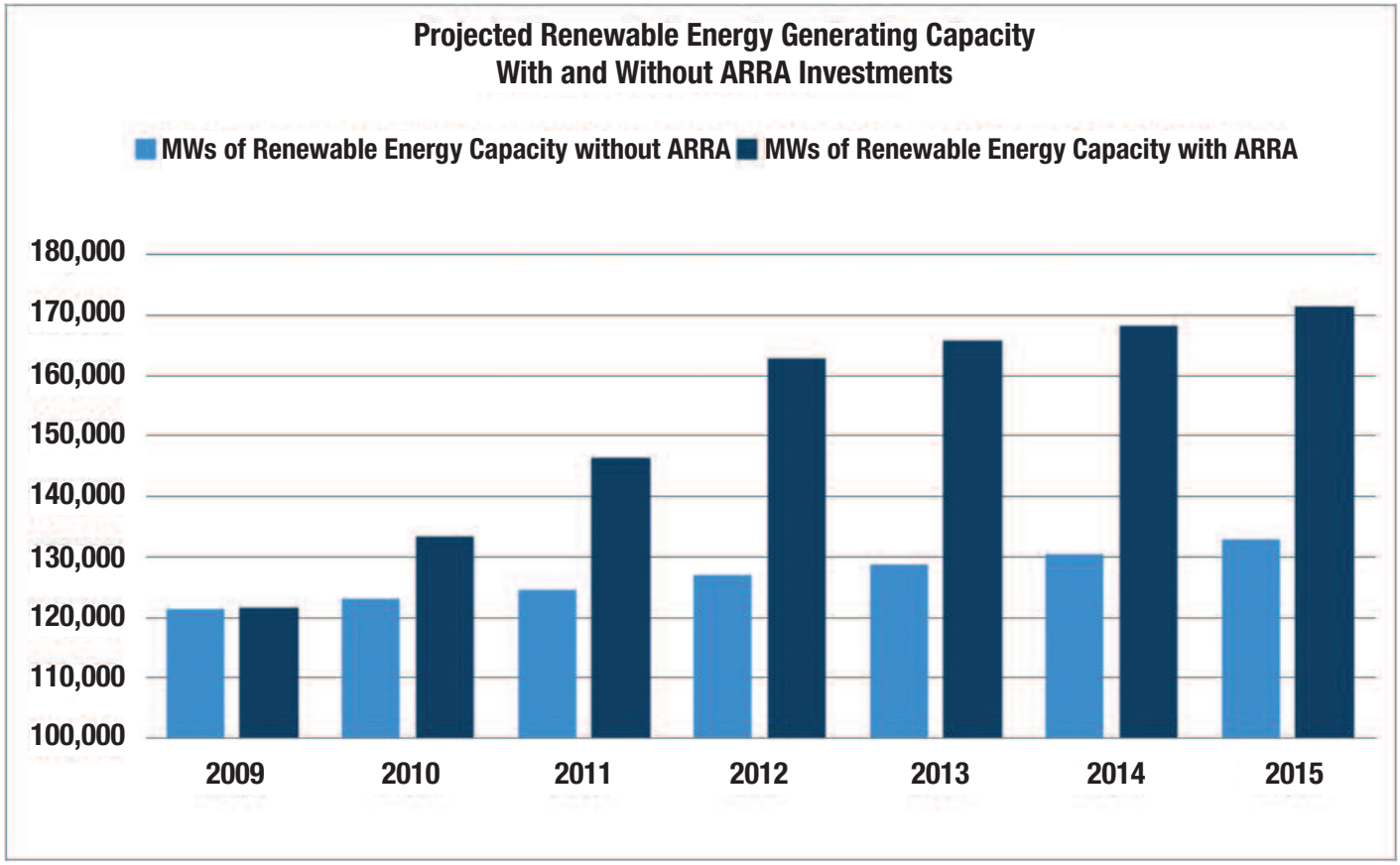
This increased demand could create large numbers of clean energy manufacturing jobs—more than will be created in green construction, operation and maintenance. According to a study by the Center for American Progress and the Political Economy Research Institute, between 20 and 47 percent of total jobs created by investments in renewable energy are manufacturing jobs.[5] Another study, by the Renewable Energy Policy Project, finds that 70 – 75 percent of the total labor required for a typical wind turbine or solar panel is in manufacturing the various component parts.[6]

The problem is that—unlike green construction, operation and maintenance jobs—much of the manufacture of clean energy systems can take place anywhere in the world. Indeed, clean energy manufacturing jobs are already going overseas, and have been for some time. The Apollo Alliance estimates that some 70 percent of America's renewable energy systems and components are manufactured abroad. If America continues to import 70 percent of the clean energy systems and component parts demanded by new investments in renewable energy, it stands to lose out on an estimated 100,000 clean energy manufacturing jobs between now and 2015, and potentially a quarter million manufacturing jobs by 2030. Apparently, the case of the controversial West Texas wind farm was not an aberration; it was typical for the renewable energy world.

If America continues to import 70 percent of the clean energy systems and component parts demanded by new investments in renewable energy, it stands to lose out on an estimated 100,000 manufacturing jobs between now and 2015, and potentially a quarter million manufacturing jobs by 2030.

This policy brief explores the progress being made to date in building a comprehensive U.S. clean energy economy that includes business growth and jobs not only in the installation, operation and maintenance of clean energy systems, but also in the manufacture of next-generation energy products and components that will be demanded worldwide. It includes original research on the wind and solar manufacturing companies that received support under the Recovery Act's Advanced Energy Manufacturing Tax Credit program to examine the direction of U.S. clean energy manufacturing.

These questions are of particular importance as the U.S. Senate considers a comprehensive clean energy and climate bill and grapples with jobs legislation to address the country's staggering unemployment rate. We hope this policy brief provides policymakers with ideas to help them use these pieces of legislation to promote a clean energy transition that—to the greatest extent possible—will create high-quality, domestic clean energy manufacturing jobs.



Source: Energy Information Administration

PROGRESS TOWARD U.S. CLEAN ENERGY ECONOMIC GROWTH

Investments in Weatherization, Transportation and Research

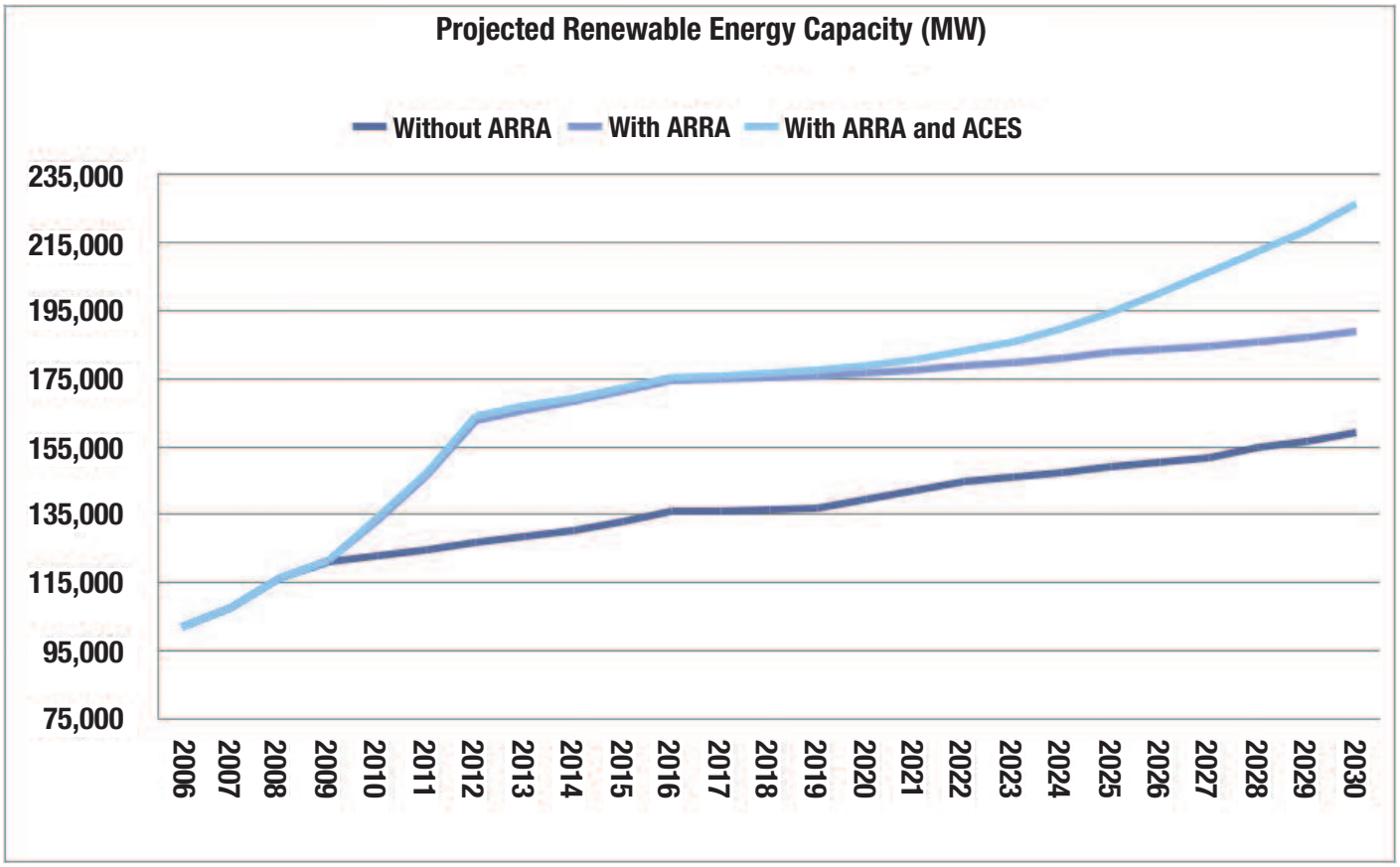
The American Recovery and Reinvestment Act (ARRA) made a $110 billion down payment on a clean energy economy, generating new demand for clean energy products and components, supporting research and development of advanced clean energy technologies, and investing in the domestic clean energy manufacturing sector. All together, Recovery Act funding represents the largest clean energy investment in U.S. history, nearly equaling *worldwide* clean energy investments in 2008.[7]

These investments have had a measurable impact on the clean energy economy. The Recovery Act invested more than $19 billion in energy efficiency, and funding for the Weatherization Assistance Program alone has been expanded to 20 times the pre-Recovery Act levels.[8] These investments have been critical in supporting innovative large-scale efficiency retrofit programs that have created or retained more than 26,600 jobs in the past year.[9] In addition, the Recovery Act invested more than $8 billion for transit projects, creating over 72,000 jobs.[10] As high-speed rail projects begin construction, states will add thousands of jobs in construction and other sectors. In Wisconsin, for example, a new high-speed rail line from Madison to Milwaukee is expected to create 11,500 job years of employment over the next five years, including more than 1,600 in manufacturing rail cars and components.[11]

In addition, the Recovery Act contained important investments in advanced technology research and development that support clean energy innovation, including initial support for the Advanced Research Projects Agency (ARPA-E), created by the 2007 energy bill. In its first round, the Department of Energy received roughly 3,600 applications for ARPA-E grants and gave out 37 awards totaling $151 million.[12] Smart Grid funding is modernizing the electricity grid, supporting the deployment of 18 million smart meters and 877 digital sensors in the U.S. transmission system.[13]

Spurring the Growth of Renewables

In addition to making the country more energy efficient, supporting the development of a stronger transportation system, and funding advanced research into new energy technologies, the Recovery Act also



Source: Energy Information Administration

contained aggressive support for the expansion of renewable energy, most notably by offering grants in lieu of tax credits to cover up to 30 percent of the cost of constructing a renewable energy facility. The Treasury Department has already awarded $2.3 billion in grants to more than 250 bio-mass, solar, wind and other renewable energy projects.[14]

Spurred in part by these Recovery Act investments, the United States is projected to add nearly 50,000 megawatts (MW) of new renewable energy between 2009 and 2015, expanding our renewable power generation capacity by over 40 percent in just six years.[15]

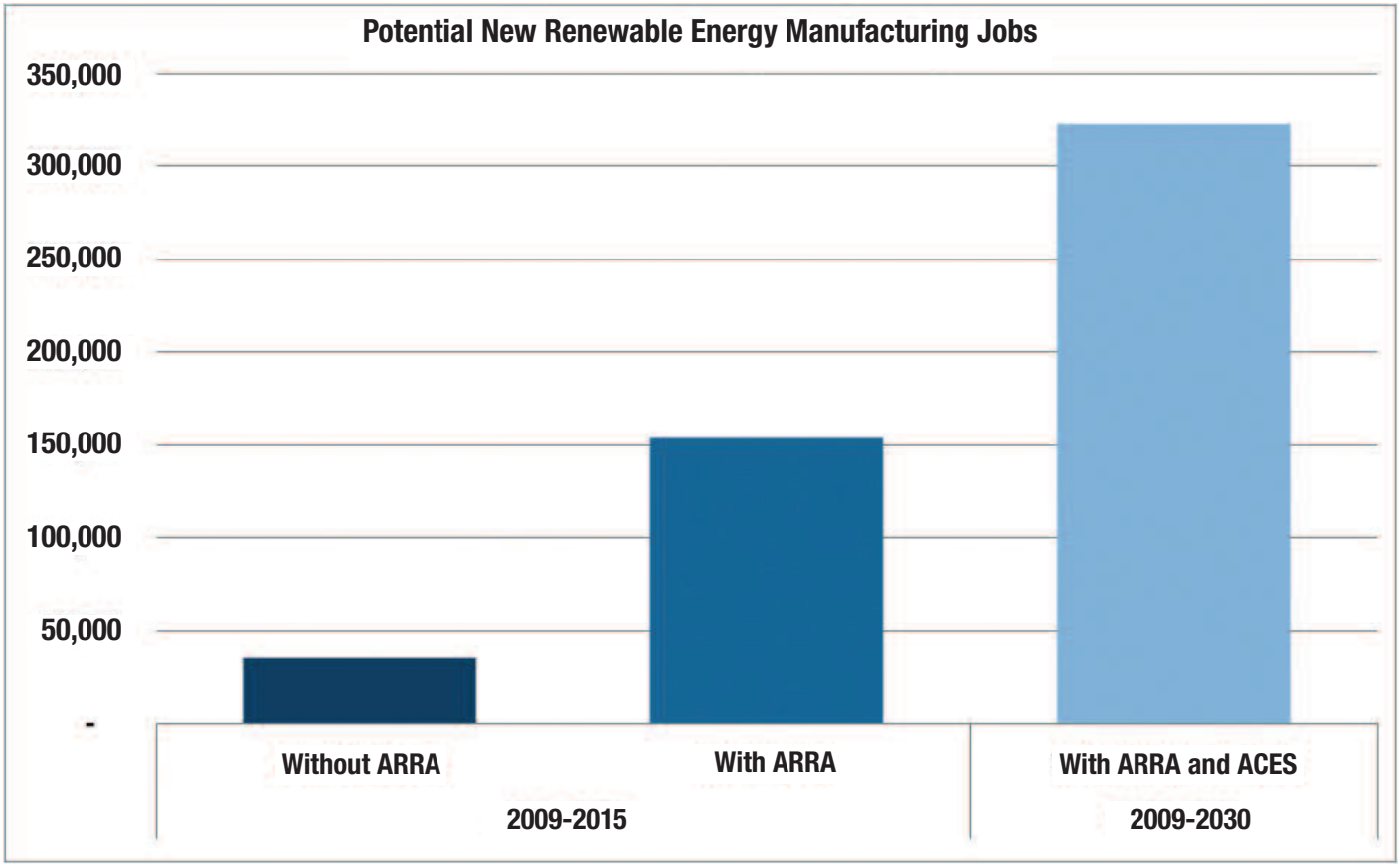
Investments and Opportunities in Clean Energy Manufacturing

In addition to the environmental benefits of transitioning to cleaner power sources, the expanded deployment of renewable power also has the potential to create a large number of jobs manufacturing these systems. Based on estimates developed by the Renewable Energy Policy Project (REPP), new renewable energy growth projected between 2009 and 2015 has the potential to support more than 150,000 jobs in clean energy manufacturing.[16]

This number would be far bigger if the country passed more policies that aggressively support the deployment of renewable energy. The Energy Information Administration estimates that under the American Clean Energy and Security (ACES) Act passed by the House of Representatives in June 2009, we would add 105,000 MW of new wind, solar, geothermal and biomass by 2030, an amount of renewable energy capacity that could support more than 320,000 new renewable energy manufacturing jobs.[17]

While ARRA funds have already created significant demand for clean energy products and components, only three Recovery Act initiatives are specifically directed toward expanding the U.S. manufacturing sector to become more efficient and capture the growth of the clean energy economy: the advanced battery and industrial efficiency grant programs and the Advanced Energy Manufacturing (48C) Tax Credit.

The Recovery Act invested $2 billion in building an advanced battery industry in the U.S., supporting 30 new advanced battery and electric drive manufacturing projects.[18] As a result, the United States will have the capacity to satisfy 20 percent of the global demand for advanced batteries, up from just 2 percent before the



Source: Apollo Alliance, Energy Information Administration, Renewable Energy Policy Project

Recovery Act investments.[19] The Recovery Act also invested $155 million in 41 industrial efficiency projects, including combined heat and power and waste recovery projects, which will help improve the competitiveness of some of the most energy-intensive manufacturers from around the country.[20]

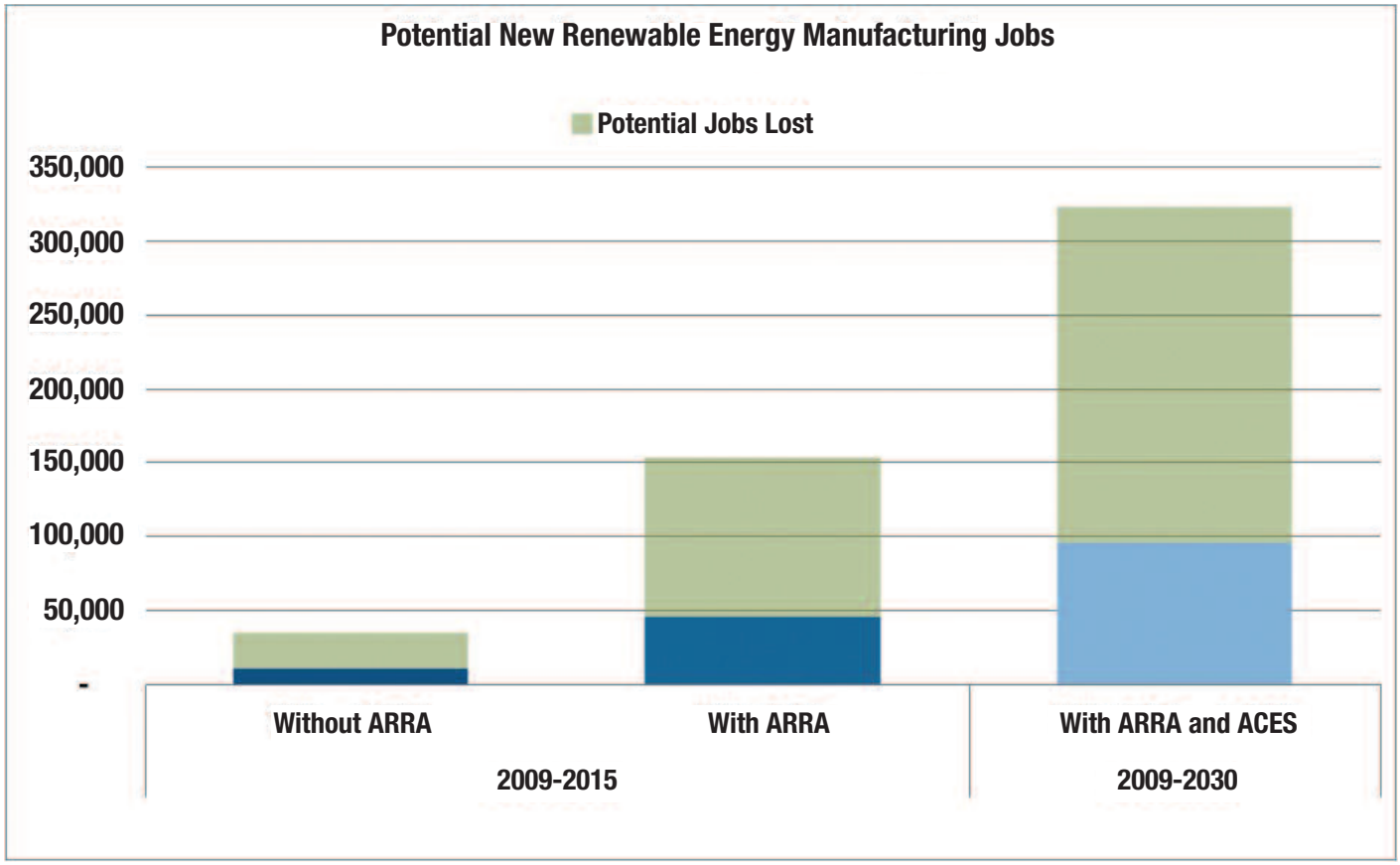
To support the clean energy manufacturing sector, the Recovery Act also created the Advanced Energy Manufacturing (48C) Tax Credit, a $2.3 billion program that provides a 30 percent tax credit for investment in advanced energy manufacturing facilities, including solar, wind and geothermal energy equipment; fuel cells, microturbines and batteries; electric cars; smart grid components; energy conservation technologies; and equipment that captures and sequesters carbon dioxide or reduces greenhouse gas emissions. The program has already benefited 183 projects and leveraged an additional $5.4 billion in private investment.[21]

But, the question remains: are these investments enough to recover the United States' lost market share in clean energy products?

Between 2004 and 2008, the United States' renewable energy trade deficit increased 1,400 percent (by over $5 billion), with wind energy systems and components alone accounting for a $2.6 billion trade deficit in 2008.[22] In 2009, the Apollo Alliance estimated that 70 percent of U.S. clean energy systems and their component parts were manufactured overseas.[23] Since then, America's competitive position as a clean energy manufacturer has only declined.[24]

Whether the United States can supply its own domestic clean energy markets, as well as those of the rest of the world, will profoundly affect our overall growth as the global renewable energy market expands to $325 billion within the next decade.[25] A report by the World Wildlife Fund (WWF) predicts that clean energy will be the world's largest industrial sector by 2020.[26] The WWF report found that, in terms of income from sales relative to gross domestic product (GDP), Denmark tops the global clean energy market with sales of its wind turbines and insulation, with Brazil just behind due to sales of bio-ethanol.

With such a large and growing market, an international race is on to see who can become the leader of the clean energy economy. In terms of clean energy investment, China is racing to the top. A combination of dramatic increases in domestic energy demand and significant government investment in clean energy manufacturing and deployment has made China a world leader in the



Source: Apollo Alliance, Energy Information Administration, Renewable Energy Policy Project

clean energy marketplace. An analysis by the Center for American Progress estimates that China is investing $12.6 million *every hour* in clean energy technology.[27] China has the largest alternative energy installed generating capacity in the world and is now the world's leading manufacturer of wind turbines and solar panels.[28] To attract clean energy firms to set up operations in China, national, regional and local governments are offering generous subsidies, including free land, low-cost financing, tax incentives, and research and development support.[29] Japan and South Korea are also making major investments in clean energy research and development. Combined, they invest more than four times as much as the United States.[30] And, established leaders such as Germany and Spain have paired national renewable energy and energy efficiency goals with strong feed-in tariff programs to support long-term investment and growth of the clean energy economy.[31] Countries are making these investments because of both immediate job creation benefits and long-term hopes of leading the clean energy race and dominating the 21st century marketplace.

If America continues to import 70 percent of the clean energy systems and component parts demanded by new investments in renewable energy, it stands to lose out on an estimated 100,000 manufacturing jobs between now and 2015, and potentially a quarter million manufacturing jobs by 2030.[32]

These are opportunities we cannot afford to ignore: there are currently 17 unemployed persons for every job opening in durable goods manufacturing, compared to the national average of six persons for every job opening.[33]

AN ANALYSIS OF THE ADVANCED ENERGY MANUFACTURING TAX CREDIT

The Advanced Energy Manufacturing Tax Credit is one of the more promising initiatives launched by the federal government to encourage clean energy investment and employment in the United States. The program, also known as 48C because of its place in the Internal Revenue Code, provides a tax credit equal to 30 percent of the value of investments in new, expanded or re-equipped facilities that produce materials used for renewable energy generation and carbon dioxide capture and sequestration.[34] The projects must be located in the United States, and preference is given to those that do the most to create jobs, reduce air pollution and greenhouse gas emissions, and promote technological innovation.[35] In his FY2011 budget, President Obama proposed

expanding the initial $2.3 billion in credits authorized in the Recovery Act by an additional $5 billion.

On January 8, 2010, the Obama administration released a list of 183 projects in 43 states that had been approved for the initial round of credits.[36] We examined the list to see what it indicates about the direction of U.S. clean energy investment. In doing so, we focused on those projects involving wind and solar energy, the two forms of renewable energy predicted to expand the most by the Energy Information Administration within the next five years.[37]

The 48C recipient list includes 116 wind or solar projects that together account for $1.6 billion of the tax credits, representing 63 percent of the projects and 68 percent of the dollar value of the credits.

Given some of the pessimistic projections about the U.S. wind and solar sectors, it is reassuring that 83 of the 116 projects (72 percent) in those fields are being carried out by companies based in the United States (and in most cases with the bulk of their operations here). The remaining 33 projects involve U.S. units or subsidiaries of foreign-based corporations, which are using the credits to expand U.S. operations. Of the 90 unique parent companies involved in wind and solar projects (some companies have more than one project), 65 are U.S.-based, and 25 have foreign parents.[38]

The results are somewhat less encouraging when we look at the distribution in dollar terms. U.S.-based recipients account for only 59 percent of the total, reflecting the fact that the projects proposed by foreign-based companies tend to be larger in size and thus receive larger tax credits, which are calculated as a percentage of the intended investment. The average project involving a U.S.-based parent company is $11 million; for those with a foreign parent, the average is $20 million.

The difference is partly explained by the fact that the U.S.-based recipients include numerous small and medium-sized firms, while the foreign-owned recipients are more frequently linked to larger and more established parent companies in Western Europe and Japan that are pursuing larger investments. It is laudable for the federal government to be assisting clean energy start-ups and smaller firms, but it is unclear how well those companies will be able to compete with the major players from abroad.

To better understand the patterns of investment in clean energy manufacturing, we analyzed the 90 wind and solar parent companies in the program to learn about their investments apart from the 48C projects. Wind and solar are increasingly globalized industries, with research, development and manufacturing operations taking place all over the world. Companies based in Western Europe, the U.S., and China are all competing for factory investments in this international marketplace. It is thus not surprising that many of the 48C recipients are also engaged in production activities outside the United States. This is especially true for the foreign-based 48C companies. Most of them have plants in their home countries in Europe and Japan as well as in other developed countries. Some U.S.-based wind and solar firms have their own facilities in those countries.

Yet it turns out that quite a few of the 48C recipients also have manufacturing operations in low-wage nations such as China that are emerging as key competitors in the clean energy race, by virtue of both ambitious plans to scale up their use of renewable power and concerted strategies to attract clean energy manufacturers.

Of the 25 foreign-based companies involved in 48C projects, we found that 17 have either already set up wind or solar production operations in low-wage countries or have plans to do so in the near future. These include 13 companies with plants in China: Alstom, BP, Brevini Power Transmission, Führlander, Gamesa, Mitsubishi Heavy Industries, Moventas, Nordex, Siemens, Suntech Power, Vestas, Winergy, and Yingli Green Energy (Suntech and Yingli are based in China). There are three with plants in India (BP, Gamesa and Winergy); two in Mexico (Ingeteam and Mitsubishi Heavy Industries, the latter a joint venture with TPI Composites); two in the Czech Republic (Flabeg and Schott); one in Brazil (Alstom); and one in Singapore (Renewable Energy Corporation). Altogether, the 17 foreign-based corporations with operations in low-wage countries account for $406 million of the $1.6 billion in 48C tax credit dollars authorized for wind and solar production.

Among the 65 U.S.-based 48C recipients, six companies, accounting for $52 million in 48C credits, have made significant new expansions of clean energy manufacturing operations in low-wage countries:

- Advanced Energy Industries has a plant in China.
- Energy Conversion Devices (parent of United Solar Ovonic) has a plant in Mexico and a joint venture in China.

- First Solar has a plant in Malaysia.
- SunPower has plants in the Philippines and Malaysia and uses a Chinese subcontractor.
- Timken has a joint venture in China.
- TPI Composites has a plant in China and a joint venture in Mexico.

In total, the U.S. has awarded $458 million in advanced energy tax credits to 23 companies that are also investing money and creating jobs in low-wage countries. Some of this investment will help those companies meet the demand for wind and energy equipment in their host countries, especially China. This is parallel to what many foreign companies have done in the United States. Even before the creation of the 48C program, some of the most significant expansions of U.S. clean energy manufacturing came through investments made by foreign-owned firms. For instance, Gamesa, a Spanish wind turbine manufacturer, has invested more than $220 million in the U.S. and created over 1,000 good jobs at its manufacturing facilities in Pennsylvania, in part because of access to a skilled workforce from Pennsylvania's historic steel industry.[39]

The story of these companies provides a cautionary tale – that the U.S. share of the rapidly expanding clean energy market is far from guaranteed.

What's more problematic is when companies avoid production in developed countries such as the United States and concentrate their output for global markets in low-wage nations. This phenomenon is due at least in part to the fact that the U.S. has not adopted comprehensive clean energy growth policies, and our current economic policies perpetuate U.S. dependence on foreign production. Such a pattern threatens America's long-term energy independence and economic stability and facilitates companies' concentration of investment in clean technology manufacturing—and thus job creation—in low-wage nations.

While companies often do not divulge which markets a particular plant is meant to serve, what information is available indicates that at least some of the companies on the 48C list appear to be putting their primary emphasis on expanding production operations in low-wage countries.

Examples of where this is occuring include:

Advanced Energy Industries Inc. (based in Colorado; received $1.2 million in 48C credits). In its most recent 10-K annual report, the company states: "The majority of our manufacturing is performed in Shenzhen, China, where we produce our high-volume products. The remainder of our manufacturing locations, in Fort Collins, Colorado; Hachioji, Japan; and Vancouver, Washington, perform low-volume manufacturing, service and support."[40]

BP Solar unit of BP PLC (based in London; received $11.7 million in 48C credits). In March 2009, BP Solar announced plans to phase out its solar module assembly operation in Frederick, Maryland, resulting in the elimination of 140 jobs.[41] This was part of a cost-cutting effort that also included the elimination of assembly operations in Spain. Apparently not affected by the downsizing were BP Solar's key production facilities in China and India.[42]

First Solar Inc. (based in Arizona; received $16.3 million in 48C credits). In December 2009, the company announced plans for the addition of eight production lines for its solar module manufacturing operation in Kalim, Malaysia.[43] The Malaysian operation was already more than 10 times the size (in square footage) of First Solar's original plant in Perrysburg, Ohio.[44]

SunPower Corporation (based in California; received $10.8 million in 48C credits). Although 90 percent of SunPower's sales come from the United States and Europe, it has been doing nearly all of its manufacturing in Asia. It produces solar cells at two facilities in the Philippines and is developing a third solar cell manufacturing facility in Malaysia. Almost all of its solar cells are combined into solar panels at the company's solar panel assembly facility in the Philippines. Other solar panels are manufactured for the company by a third-party subcontractor in China.[45]

Suntech Power Holdings Co. Ltd. (based in China; received $2.1 million in 48C credits). As one would expect, this Chinese company does most of its manufacturing in China and intends to go on doing so. In a filing with the U.S. Securities and Exchange

Commission, Suntech states that its approach is "to take advantage of our location in China, where the costs of skilled labor, engineering and technical resources, as well as land, production equipment, facilities and utilities, tend to be lower than those in developed countries."[46]

The story of these companies provides a cautionary tale – that the U.S. share of the rapidly expanding clean energy market is far from guaranteed. While the 48C credits are likely leading these companies to pay more attention to U.S. production, it is also possible that their American manufacturing activities are little more than fig leaves meant to hide the fact that they are mainly relying on offshore low-wage activities.

There is thus a risk that they will follow in the footsteps of Evergreen Solar, which is not on the 48C list but which received $44 million in state subsidies for its plant in Devens, Massachusetts.[47] In November 2009, Evergreen Solar announced that, because of the falling price of solar panels, it had become "very difficult for manufacturers located in high-cost regions to remain price competitive." Lured by incentives that will pay for approximately two-thirds of the cost of its new facility, Evergreen announced in October that it would transfer its solar panel assembly operations from Devens to a plant in China.[48]

There's no denying the fact that clean energy is becoming a globalized industry. In fact, it is desirable to see production operations spring up around the world to serve what will hopefully be robust demand for wind and solar components in all countries. But the reality of globalization is no excuse for letting the U.S. lose out on the growth of clean energy manufacturing. The United States has some of the most skilled workers in the world, a competitive advantage which has been realized by some global leaders in clean energy markets such as Ingeteam, a Spanish wind turbine component manufacturer which recently announced a new factory in Milwaukee, Wisconsin, in part because of the presence of a workforce skilled in electric motor manufacturing.[49]

In the following section we offer recommendations for how to build a strong domestic renewable energy manufacturing sector that will benefit American workers and the U.S. economy.

THE NEED FOR A COMPREHENSIVE CLEAN ENERGY ECONOMIC DEVELOPMENT STRATEGY

The Recovery Act went a long way toward building the U.S. clean energy economy, through $110 billion in investments in areas like energy efficiency, renewable energy, smart grid technology, advanced batteries and high-speed rail. On top of these investments, the FY 2011 budget includes several immediate investments that will move the United States toward a clean energy future. Among other programs, the Department of Energy plans to invest $325 million in energy-efficient vehicle technology; $300 million in the Advanced Research Projects Agency (ARPA-E); $700 million in research, development and deployment of renewable energy; and $715 million in building and industrial efficiency and weatherization. And because the Advanced Energy Manufacturing Tax Credit (48C) program proved wildly popular–more than 500 applications were received for projects totaling more than $8 billion–the administration plans to expand it by $5 billion.

Additionally, the Federal Transit Administration plans to invest more than $5 billion in capital and operating assistance to expand public transit through Urbanized and Rural Area formula grants; $1.8 billion in New Starts capital assistance; $360 million in greenhouse gas reduction programs; $30 million in the research and development of alternative- and clean-fuel technologies; and $1 billion in high-speed rail.[50]

These investments are crucial components to remaining a competitor in the global clean energy race. The Obama administration estimates that combined clean energy investments from existing programs plus those leveraged by the Recovery Act could total $240 billion.[51] Among other benefits, these investments will help build three electric vehicle manufacturing facilities, 30 advanced battery manufacturing facilities, and 19 advanced biofuel refineries; install 26 million smart meters; and retrofit at least one million homes. The administration also reports that Recovery Act investments in energy, advanced manufacturing and the smart grid have already created an estimated 826,000 clean energy jobs.[52] Recovery Act investments in manufacturing through industrial efficiency grants, Advanced Energy Manufacturing Tax Credits and loans for advanced battery development will create more than 30,000 high-quality clean energy manufacturing jobs.

But alone, these investments are not enough. Other countries are moving more aggressively to expand their domestic production of renewable energy and become more energy efficient, and are tying these investments directly to strategies which ensure that they establish a strong base of clean energy manufacturing capacity. For example, China has targeted an expansion of wind-power capacity from 5,600 MW in 2008 to 100,000 MW by 2020, while simultaneously increasing its domestic content requirements for wind-farm developments (from 40 percent in 1996 to 70 percent since 2004).[53]

The United States needs a comprehensive set of policies to ensure that we are not just a consumer of clean energy products, but also a leading global producer of clean energy systems and components. Clean energy is a fully globalized industry, and it is desirable to see production operations spring up around the world to serve what will hopefully be robust demand for wind and solar components in all countries. But the reality of globalization is no excuse for letting the U.S. lose out on the growth of clean energy manufacturing.

The following recommendations address a number of policies that, if enacted, would improve the prospects for a thriving and competitive U.S. clean energy manufacturing sector and benefit U.S. workers and firms alike.

- The U.S. should pass comprehensive clean energy and climate legislation, sending a signal to clean energy businesses that there is a long-term domestic commitment to cleaner technologies. Such measures should create substantial and long-term demand for clean energy products and might include putting a price on carbon or adopting a strengthened national renewable energy standard, as well as implementing national building and appliance energy efficiency standards and increasing support for public transit, among others. The U.S. House of Representatives has already passed a comprehensive clean energy and climate bill, the American Clean Energy and Security (ACES) Act, and the Senate should quickly follow suit. The Center for American Progress and the Political Economy Research Institute estimated that sustained investments from ARRA, combined with new clean energy investments from ACES, would generate a net increase of 1.7 million jobs over the next 10 years and reduce unemployment by at least one percentage point.[54]

- To ensure that American manufacturers have the resources needed to capture market share in the clean energy systems and component parts industries and can compete in the global marketplace, direct financial assistance should be provided to clean energy manufacturers along the lines of the proposed Investments for Manufacturing Progress and Clean Technology (IMPACT) Act. The IMPACT Act, introduced by U.S. Senator Sherrod Brown (D-OH), would provide $30 billion to establish state-administered revolving loan funds to assist small and medium-sized manufacturers retool to produce clean energy component parts and become more energy efficient. It would also increase long-term funding for the Hollings Manufacturing Extension Partnership program to help manufacturers diversify to clean energy markets and adopt innovative, energy-efficient manufacturing technologies.

- The Advanced Energy Manufacturing Tax Credit should be expanded by $5 billion, as has been proposed by the Obama administration for the FY2011 budget. However, provisions should be added to the program to ensure that companies that receive the tax credit and then move the operations for which they received government support abroad are required to pay back this government subsidy, if the operations are relocated within some reasonable period of time. Such "clawback" provisions might not prevent offshoring but would at least enable taxpayers to recoup what they invested in those operations.

- To maintain its competitive position, the U.S. must invest in creating a well-trained workforce that meets the needs of U.S. clean energy manufacturers. More than 1.6 million U.S. manufacturing workers are nearing retirement age, while more than half of working adults lack the basic literacy, English or math skills necessary to find jobs in the clean energy economy.[55] Investment in training as outlined in the Green Jobs Act, passed in the 2007 energy bill, will provide needed support for training programs and partnerships that prepare skilled workers for manufacturing and other jobs in the clean energy economy. Through an initial investment of $750 million in training for green jobs (including advanced manufacturing jobs), the Recovery Act facilitated the creation of innovative labor market research and training partnerships. With continued and expanded support, these programs can offer new opportunities to thousands of unemployed and underemployed individuals.

Appendix:

KEY INVESTMENTS IN THE AMERICAN RECOVERY AND REINVESTMENT ACT

Energy Efficiency

- $3.2 billion for the Energy Efficiency and Conservation Block Grant Program, authorized by the 2007 energy bill but never previously funded
- $3.1 billion for the State Energy Program
- $5 billion for the Weatherization Assistance Program – twenty times the 2009 program budget
- $4 billion to HUD for public housing building repair and modernization, including critical safety repairs and energy efficiency upgrades
- $2.25 billion for a new program to upgrade HUD sponsored low-income housing to increase energy efficiency, including new insulation, windows, and furnaces
- $2.25 billion to the HOME Program to help local communities build and rehabilitate low-income housing using green technologies
- 30 percent tax credit for materials to increase energy efficiency in existing homes

Renewable Energy

- At least $3 billion in grants in lieu of tax credits to cover 30 percent of renewable energy project costs
- $6 billion in renewable energy loan guarantees to support around $60 billion in renewable energy projects
- $1.6 billion in Clean Renewable Energy Bonds to support the construction of renewable energy facilities

Alternative-Fuel Vehicles and Public Transit

- $8.4 billion for transit capital investments
- $9.3 billion for rail projects, including increased support for Amtrak and $8 billion in grants to develop high-speed intercity rail corridors
- $300 million to help states and cities purchase alternative-fuel transit vehicles
- $300 million to replace older fleet vehicles owned by the federal government with alternative fuel automobiles
- $400 million for grants to state and local governments for projects to develop infrastructure that supports widespread use of Plug-in Hybrid Electric Vehicles

Advanced Technology Research, Development, and Deployment

- $400 million for the Advanced Research Projects Agency (ARPA-E)
- $1.6 billion to DOE for research in the basic energy sciences
- $2.5 billion to DOE for energy efficiency and renewable energy research and development
- $11 billion for grid upgrades and deployment of Smart Grid technologies
- $3.4 billion for Carbon Capture and Storage demonstration projects

Manufacturing

- $2 billion for advanced battery manufacturing
- $2.3 billion to create the Advanced Energy Manufacturing (48C) Tax Credit
- $155 million in grants to support investment in Combined Heat and Power and other industrial energy efficiency technologies

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The Apollo Alliance is a coalition of unlikely and diverse interests – including labor, business, environmental, and community leaders – advancing a bold vision for the next American economy centered on clean energy and good jobs.

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