

### **Impact on Jobs through the Extension of the ARRA 1603 Cash Grant**

The American Recovery and Reinvestment Act's 1603 cash grant for the construction of renewable power plants stands as a policy success story over the past two years. However, this success is in jeopardy as the 1603 program sunsets after 2010, which is already having an effect on project pipelines. We estimate that the extension of the 1603 grant program can help to create or preserve over 100,000 "green" jobs.

### **Extension of the 1603 Grant and 48C Manufacturing Tax Credit Will Have Powerful Effect**

The 1603 grant program is effective policy in its own right, creating economic activity and jobs, and has the double effect of "underpinning" the economic activity that is created by the 48C manufacturing tax credit. The 1603 cash grant provides more certainty of renewable tax equity financing, giving developers the confidence to make large capital equipment purchases from the renewable manufacturing base. The 48C manufacturing tax credit is stimulating a US domestic supply response to meet this demand. Thus, by providing tax equity financing certainty, 1603 helps to ensure demand for the supply being created under the 48C program. We see the extensions of 1603 and 48C as a 1+1=3 proposition.

It is also worth noting that in the recently released "The Recovery Act: Transforming the American Economy through Innovation," the Administration has reiterated the view that the US is on a track to "doubling US renewable energy generation capacity and the US renewable manufacturing capacity by 2012." Meeting this goal would require approximately 12 GW of capacity additions in 2011, assuming 6 GW of wind is installed by the end of 2010. We would see this goal as difficult to achieve even with an extension of 1603, along with the extension of 48C, and virtually impossible without such timely extensions.

**With the above explanation of how the 1603 grant and the 48C manufacturing tax credit work together in the marketplace to create jobs, this paper goes on to explain how the 1603 grant is effective at mobilizing capital to project development in the United States.**

### **Success so far from the 1603 Cash Grant**

First introduced in The American Recovery and Reinvestment Act (ARRA) in 2008, the 1603 cash grant allowed project developers to convert the existing investment tax credit (ITC) and production tax credit (PTC) for renewable energy investments into direct cash grants worth up to 30 percent of a project's capital cost. Most project developers have insufficient taxable income to use the tax credits effectively, which in the past has been addressed by bringing in passive "tax equity" investors—mostly large financial institutions. However the financial crisis sharply cut these institutions' own taxable income and led to the demise of a number of prominent tax equity providers. That meant that tax equity was particularly scarce and therefore not effective in spurring construction in renewable energy projects such as wind and solar.

The 1603 grant program has been a notable success. Despite the recession, and because of the 1603 Program, wind power installations reached nearly 10 GW in 2009, exceeding the previous record of 8.3 GW set in 2008 by 20%. Solar PV installations also continued strong growth, reaching 429 MW in 2009, 38% above the 2008 total.

Recent work conducted by the Lawrence Berkeley National Laboratory (LBNL) and The National Renewable Energy Laboratory (NREL) have so far estimated that the 1603 cash grant could create approximately 143,000 jobs in the wind industry, both in direct and indirect terms.

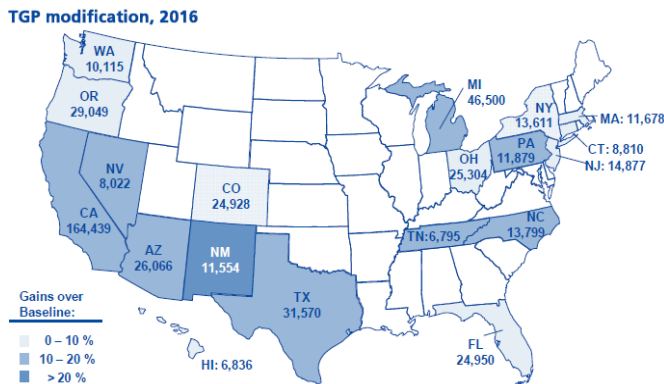
The Solar Industries Energy Association (SEIA) and International Solar (EUPD) [two renewable energy research institutes] have estimated that in the solar sector some 58,000 jobs will be created through the program so far out to 2016.

**Table 1. Overview of potential job creation attributed to section 1603 Treasury Grant Program**

		Total potential job creation in the US	
		Wind <sup>1</sup> <i>Source: LBNL / NREL</i>	Solar (2010 - 2016 Cumulative) <sup>2</sup> <i>Source: EuPD / SEIA</i>
Construction/ manufacturing phase	Project development and onsite labor impacts	6,651	28,894
	Supply chain impacts (manufacturing)	67,282	
	Induced impacts <sup>3</sup>	59,296	
Operation phase	Onsite labor impacts	357	
	Local revenue and supply chain impacts	3,584	
	Induced impacts	6,029	
Sub-Total Jobs Impact		143,199	58,180
Total Jobs Impact		201,379	

Source: Wind – LBNL, AWEA, NREL; Solar EuPD, SEIA and GE.

**Map 1: New US employment in the solar sector by state as a result of Section 1603**



Source: EuPD, SEIA

Over the last few years, the wind industry has demonstrated the importance of steady demand for renewable energy technologies in creating a domestic supply chain and jobs. According to Lawrence Berkeley National Lab,

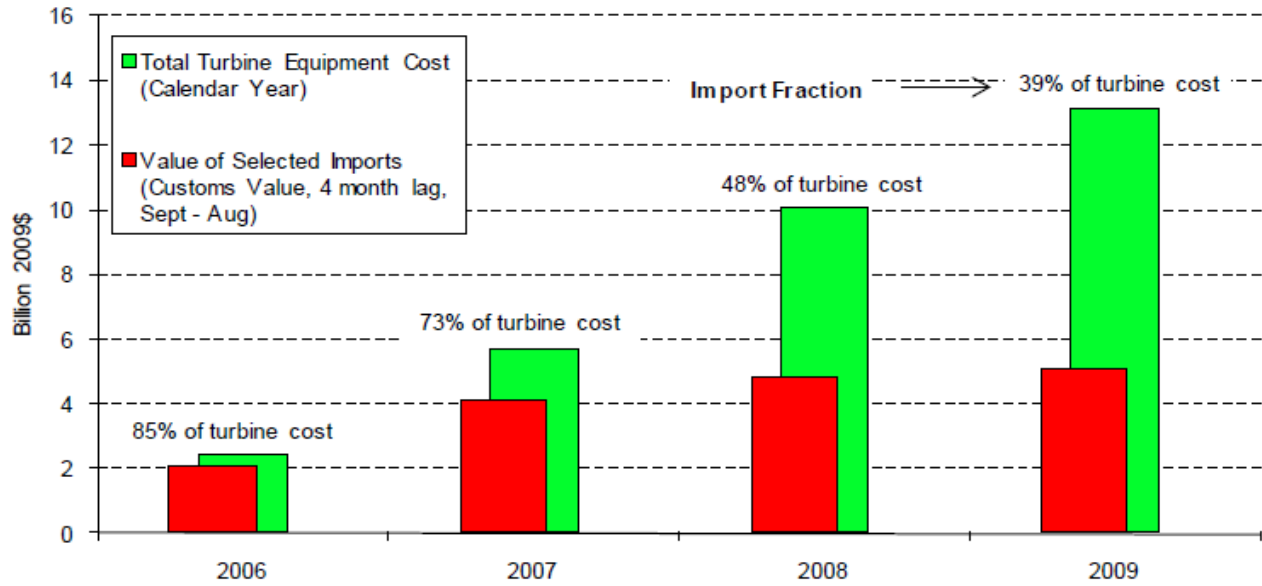
<sup>1</sup> Wind job analysis takes into account the following: 71 projects under Section 1603, of which 40 have been awarded and 31 are pending; Represents gross jobs rather than net, as it does not account for the fact that some jobs will be filled by workers who leave existing jobs; and assumes 60% overall US domestic content.

<sup>2</sup> Solar job analysis takes into account the following: assumes 2 year extension of 1603 through 2012; represents impact up through 2016; and represents workers in construction, manufacturing and installation, as well as workers in areas such as delivery.

<sup>3</sup> Represents impact on other sectors of the economy.

between 2006 and 2009, the domestic content of wind turbines installed in the US rose from 15% to 60%. We attribute this shift to the stability of the PTC during this period, which created a steady demand for wind turbines in the US. The \$2.3 billion of 48C tax credits awarded in January 2010 as well as future awards may further increase domestic content if there is sufficient demand for these technologies.

**Graph 1: Wind Power Equipment Imports as a Fraction of Total Turbine Cost**



Source: LBNL and DOE

Hence, there is strong evidence of the success of the 1603 cash grant program, especially when combined with the 48C manufacturing tax credit.

**Outlook from 2011 – 100,000 jobs at risk**

The 1603 cash grant is scheduled to sunset in the year 2011 (as does the 48C manufacturing tax credit which has already been fully allocated). Work done by members of US PREF shows that the expiration will have a significant impact in the face of a continuing constraint in the tax equity market, set out in detail in the recently released paper “Prospective 2010-2012: Tax Equity Market Observations”<sup>4</sup> and “U.S. Renewable Energy Tax Equity Investment and the Treasury Cash Grant Program.”<sup>5</sup>

We have now looked at the impact that ending the cash grant would have on employment. In order to do this we first estimated what we considered to be the 2011 demand for renewables, in terms of MW’s financed each year, based on industry consensus data. From this starting point we applied current industry cost estimates to derive the total investment capital needed, and estimated the share likely to be financed as separate projects (as opposed to projects financed by their owners at the corporate level) based on historical trends. The likely

<sup>4</sup> US PREF, “Prospective 2010-2012: Tax Equity Market Observations (v1.2),” July 2010. <http://www.uspref.org/white-papers/>.

<sup>5</sup> US PREF, “U.S. Renewable Energy Tax Equity Investment and the Treasury Cash Grant Program (v2.1)” 2010. <http://www.uspref.org/white-papers/>.

capital structure of these projects, assuming the 1603 grant is not renewed, comes from US PREF members' experience as lender and investors in the renewable energy project market. The result of this analysis is a need for an estimated \$9 billion of "tax equity" commitments in 2011, as shown in Table 2:

**Table 2: Unconstrained 2011 Financing Estimates<sup>6</sup>**

	<u>Capacity financed (MW)</u>	<u>Project cost (\$/kW)</u>	<u>Total investment (\$ billion)</u>	<u>Share project financed</u>	<u>Capital needed (\$ billion)</u>	<u>Tax equity share of capital</u>	<u>Tax equity needed (\$ billion)</u>
Wind (i)	9,300	2,200	20.5	70%	14.3	50%	7.2
Solar PV	1,000	5,000	5.0	50%	2.5	25%	0.6
Solar thermal power	500	5,000	2.5	60%	1.5	25%	0.4
Biomass	250	4,000	1.0	90%	0.9	50%	0.5
Geothermal	250	4,000	1.0	100%	1.0	40%	0.4
<b>Total</b>	<b>11,300</b>		<b>30.0</b>		<b>20.2</b>		<b>9.0</b>

Source: US PREF member estimates.

Attracting \$9 B of tax equity capital per year will likely be very difficult given only \$6.1 B was raised in 2007, the industry's most prolific year, in a credit environment not likely to repeat itself soon. A June 2010 survey of all of the major renewable energy tax equity investors conducted by US PREF concluded that around \$3 billion per year of tax equity might be available in 2011 and 2012. Table 3 shows the potential renewable deployment with that constraint:

**Table 3: Constrained 2011 Financing Estimates<sup>7</sup>**

	<u>Capacity financed (MW)</u>	<u>Project cost (\$/kW)</u>	<u>Total investment (\$ billion)</u>	<u>Share project financed</u>	<u>Capital needed (\$ billion)</u>	<u>Tax equity share of capital</u>	<u>Tax equity needed (\$ billion)</u>	<u>Average Capacity factor</u>
Wind	4,500	2,200	9.9	50%	5.0	50%	2.5	35%
Solar PV	400	5,000	2.0	25%	0.5	25%	0.1	20%
Solar thermal power	250	5,000	1.3	0%	-	25%	-	25%
Biomass	100	4,000	0.4	90%	0.4	50%	0.2	80%
Geothermal	100	4,000	0.4	100%	0.4	40%	0.2	90%
<b>Total</b>	<b>5,350</b>		<b>14.0</b>		<b>6.2</b>		<b>2.9</b>	
<b>Delta</b>	<b>5,950</b>							

<sup>6</sup> Please see Appendix 1 for background.

<sup>7</sup> Note: wind and solar projects financed in 2011 assumed to be online 2011-12; CSP, biomass and geothermal projects assumed to be online 2013-14. Assumes US average of 0.792 tons/MWh per US EPA green power equivalency calculator, <http://www.epa.gov/greenpower/pubs/calculator.html>

Then using the NREL Jobs and Economic Development Impact (JEDI) models (used also by LBNL) we looked at the gap between the unconstrained scenario which would be supported by a 1603 cash grant extension, and the constrained tax equity outcome:

**Table 4: Estimated jobs impacted by 1603 cash grant extension**

	<b>Jobs impacted</b>
Wind	74,124
Solar PV	20,405
Solar Thermal	5,409
Biomass	2,080
Geothermal	2,050
<b>Total</b>	<b>104,068</b>

Source: US PREF member estimates using NREL Jedi models

A key assumption is how much of the manufacturing is done onshore. While domestic manufacturing may grow in the future (possibly assisted by the expansion of the 48C manufacturing tax credit), we assumed that the level of domestic production would not change substantially in the near term. US manufacturing of wind turbines and their components has been increasing, Lawrence Berkeley National Lab estimates that imports represented 39% of the value of wind turbines installed in the US in 2009, down from 85% in 2006. (Source: 2009 Wind Technologies Market Report, R. Wiser and m. Bollinger, LBNL, August 2010.) Our analysis assumed that 50% of the value of wind turbines financed would be imported. The US is a small producer of solar modules, with a 7% share of the global market. (Source: U.S. Solar Industry Year in Review, Solar Energy Industry Association, May 2010.) Our analysis assumed that none of the solar modules, inverters, or other materials or equipment were manufactured domestically.

On this basis US PREF estimated around 104,000 jobs are forgone by not extending the 1603 cash grant through 2011 and on in to the future, where even more jobs would be created. And, as explained above, the extension of the 1603 cash grant would make more successful any extension of the 48C manufacturing tax credit in terms of job growth.

**Appendix 1**

<b>Forecasts of Annual US Wind Capacity Additions (MW)</b>			
	<u>2010</u>	<u>2011</u>	<u>2012</u>
EIA	7,310	10,200	10,330
BTM Consult	8,000	10,000	15,000
IHS EER	7,130	9,830	9,340
Bloomberg NEF	7,390	8,535	8,610
Macquarie	7,500	8,100	8,700
UBS	6,950	9,380	10,780
AWEA	5500-7500		
	7,400	9,300	10,500

Source: LBNL Wind Technologies Market Report 2009, issued 2010

**Primary Authors:** *Steven Taub, Senior Vice President, Investment Strategy-Renewables, GE Energy Financial Services; Mark Fulton, Global Head of Climate Change Investment Research, DB Climate Change Advisors. Additional input provided by US PREF members.*

#### **ABOUT US PREF**

The objective of the US Partnership for Renewable Energy Finance (US PREF) is to unlock private capital flows to new, large-scale and distributed renewable energy projects in the United States. To achieve this objective, a balanced and credible group of highly experienced renewable energy financiers from financial institutions, investors, professional services firms, utilities and others, working with leading non-government organizations, have convened as US PREF. US PREF, founded in 2009 with support from the consulting firm Green Order, is a program of the American Council On Renewable Energy (ACORE), a Washington, DC - based 501 (c)(3) non-profit organization whose mission is to bring renewable energy into the mainstream of the US economy and lifestyle through research, education, convening, and communications.