

United States renewable energy attractiveness indices

Issue content

IRS defines “beginning of construction”

The IRS recently released guidance defining the beginning of construction for purposes of the Section 45 renewable electricity production tax credit (PTC) and the Section 48 energy investment tax credit (ITC) after the American Taxpayer Relief Act of 2012 (ATRA) extended the eligibility deadline so that it now includes facilities in which construction begins before January 1, 2014.

Sequester cuts ARRA Section 1603 grant payments

The White House OMB informed Congress in a report on sequestration that Section 1603 grants for specified energy property in lieu of tax credits will be cut by 5.1%, a reduction of \$187 million. The Department of the Treasury has not issued any guidance explaining exactly how the cuts to refundable tax provisions will be achieved, but this will adversely affect companies that received loan amounts targeted to the expected grant amount.

Wind farm using temporary grid connection considered “placed in service”

The IRS has confirmed in a private letter ruling that for a wind turbine generator (WTG) to be placed in service, it need not interconnect to the grid through a permanent intertie but may utilize a temporary intertie.

Website

EY has a single location at <http://www.ey.com/USAAI> where you can go to get back issues of the USAI, country attractiveness indices and biofuel attractiveness indices.

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Overview of indices

The Ernst & Young LLP United States attractiveness indices (USAI) provide scores for state renewable energy markets, renewable energy infrastructures and their suitability for individual technologies. The indices provide scores out of 100 and are updated on a biannual basis.

The main indices (all renewables, long-term wind and long-term solar) are referred to as the “long-term indices.” The long-term indices are forward-looking and have a long-term outlook on the renewable energy industry. Thus, a state that has positive attributes (such as unexploited wind resources or attractive power pricing or tax climate) will score well even if that state currently has little installed capacity. Readers should refer to the guidance notes set out on page 17.

All renewables index

This index provides an overall score for all renewable energy technologies. It combines individual technology indices as follows:

- ▶ Long-term wind index - 45%
- ▶ Solar index - 45%
(comprising the residential solar index, commercial solar index and the large-scale index)
- ▶ Biomass index - 5%
- ▶ Geothermal index - 5%

Individual technology indices

These indices are derived from scoring:

- ▶ Technology-specific parameters (the technology factors), accounting for 65%
- ▶ General state-specific parameters (the renewables infrastructure index), accounting for 35%

Renewables infrastructure index

This index is an assessment by state of the general regulatory infrastructure for renewable energy. On a weighted basis, the index considers:

- ▶ Strength of Renewable Portfolio Standard (RPS) – 29%
- ▶ Planning and grid connection issues – 57%
- ▶ Access to finance – 14%

Technology factors

These provide resource-specific assessments for each state. Each of the technology indices considers, on a weighted basis, the following:

- ▶ Power offtake attractiveness – 32%
- ▶ Tax climate – 8%
- ▶ Grant/soft loan availability – 8%
- ▶ Market growth potential – 26%
- ▶ Current installed base – 8%
- ▶ Resource quality – 18%

Long-term solar index

These indices are derived from scoring:

- ▶ The large-scale (utility-scale projects) solar index – 66%
- ▶ The commercial (rooftop and ground-mount installations) solar index – 22%
- ▶ The residential solar index – 11%

Comments and suggestions

We welcome your comments or suggestions on any aspect of the indices. Tailor-made attractiveness surveys and market reports can be provided that take specific corporate objectives into account. Please contact Michael Bernier or Ben Snyderdacker with any comments and/or suggestions:

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Glossary

AWEA	American Wind Energy Assoc.	ITC	Investment tax credit	PTC	Production tax credit
CHP	combined heat and power	kWh	Kilowatt hour (1,000 Wh)	PV	Photovoltaic
DOE	Department of Energy	M&A	Mergers and acquisitions	REC	Renewable energy certificates
GC	Green certificate	MW	Megawatt (1,000 kW)	RPS	Renewable portfolio standard
GW	Gigawatt (1,000 MW)	MWh	Megawatt hour (1,000,000 Wh)	S-REC	Solar renewable energy certificate
IPO	Initial public offering	PE	Private equity	WREGIS	Western renewable energy Generation information system
IRR	Internal rate of return	PPA	Power purchase agreement		

US highlights

All renewables index

While this issue saw a little shakeup in positioning, the composition of the top 10 states in the all renewables index remained almost exactly the same. Maine did leapfrog a few states to move from 11th to 8th, while Arizona fell from 10th to 14th. Traditional powerhouses California and Texas maintained their spots at first and third on the strength of their solar and wind markets respectively. California finished first or second in every individual index except for wind, where it fell to fifth. Hawaii moved into the second overall spot following a strong year in solar installation, particularly on the smaller scale residential and non-residential sectors. Colorado finished fourth with a strong showing across the board while Nevada ranked fifth with strong solar and geothermal sectors.

Overall US investment in clean energy in 2012 was down significantly from the banner year in 2011, but still ahead of the annual investment seen from 2007 to 2010. Deployment continues to rise, and renewable accounted for close to 50% of added capacity in 2012. Solar saw large projects built in the utility market as increased popularity in smaller-scale distributed generation systems. Wind added a record 13,124 MW of capacity in 2012, including 8,380 MW in Q4 alone. Biomass and geothermal each saw slight upticks, adding 894 terawatt hours (TWh) of generation and 77 MW of capacity, respectively.

Long-term wind index

US wind installations topped 60,000 MW of total installed capacity after 3,124 MW were added in 2012. A record setting Q4 saw 8,380 MW installed as developers rushed to complete projects before the expiration of the PTC, which was ultimately extended. Texas holds the top spot in the long-term wind index after installing 1,826 MW of capacity in 2012 for a cumulative total of 12,212 MW. Although there was some jockeying for position, the same four states as last edition, – Colorado, Illinois, Iowa and California – round out the top five. With a strong RPS and favorable tax climate and power offtake attractiveness Hawaii, traditionally known for its solar resources, may be the biggest surprise this edition, ranking sixth.

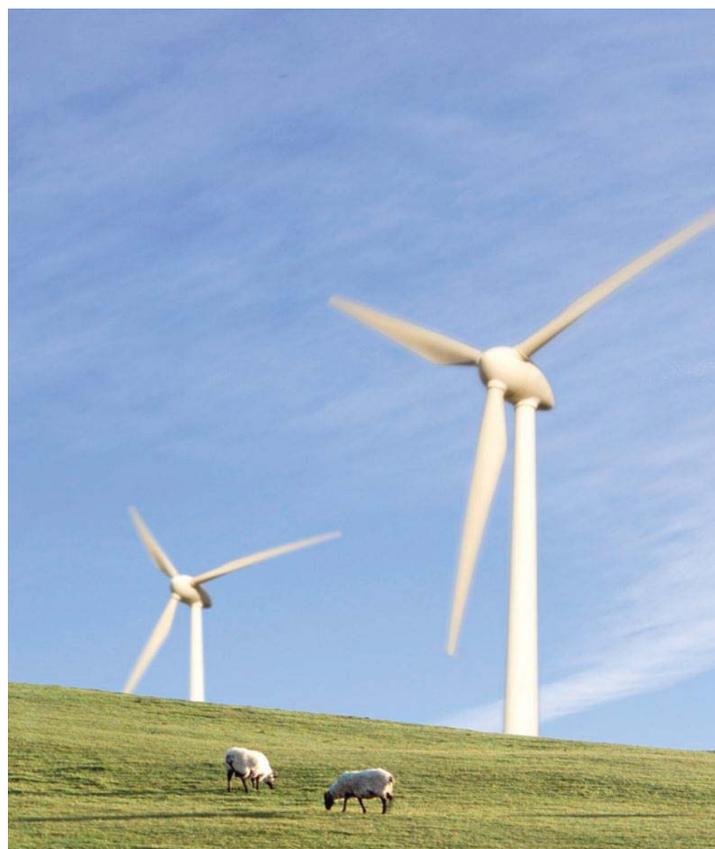
Long-term solar index

California continues to hold a commanding lead over all other states in the Long-Term Solar Index. Hawaii and Nevada, with strong solar resource quality, continue to hold the second and third spots, although they did flip positions in this edition. New Mexico and Colorado completed the top five, followed closely by two more southwestern states, Texas and Arizona.

While the southwest remains a strong market for utility-scale developments, smaller scale distributed generation projects are becoming increasingly popular in all geographic locations. The growth of these residential and non-residential systems has been and will continue to be one of the main drivers of the solar industry.

Biomass/geothermal indices

The biomass and geothermal indices are topped by California (2nd and 1st, respectively) and Maine (first and second, respectively). Growth in these industries has been modest, but the consistency of the power generation is starting to be recognized as a benefit when compared with the intermittency of wind and solar. Additionally, while most of the attention was given to wind, both biomass and geothermal energy projects stand to benefit from the one-year extension of the PTC.



IRS defines “beginning of construction” for the Renewable Electricity Production Tax Credit and Energy Investment Tax Credit

The Internal Revenue Service recently released Notice 2013-29, in which it offers guidance defining the beginning of construction for purposes of the Section 45 renewable electricity production tax credit (PTC) and the Section 48 energy investment tax credit (ITC). As established in the American Taxpayer Relief Act of 2012 (ATRA), the deadline for taxpayers to elect to receive the PTC or the ITC in lieu of the PTC was extended. To be eligible, taxpayers must begin construction of the facility before January 1, 2014. Taxpayers may establish that construction has begun by either starting “physical work of a significant nature” or meeting the safe harbor by paying or incurring 5% or more of the total cost of the facility. The Service will determine whether a taxpayer has begun construction of a facility before January 1, 2014, based on all of the relevant facts and circumstances. Furthermore, a taxpayer must maintain a continuous program of construction under either test.

Physical work of a significant nature

Notice 2013-29 states that physical work of a significant nature includes both on-site and off-site work performed either by the taxpayer or by another person under a binding written contract, provided the contract is entered into prior to the work taking place. Preliminary activities do not qualify as physical work of a significant nature.

For modular units manufactured off-site, construction begins when significant physical work begins at the off-site location. Work to produce property that is either in existing inventory or is normally held in inventory by a vendor is not included. If components are produced for multiple facilities, a reasonable method must be used to associate individual components with particular facilities.

The notice further states that a facility generally includes all components of property that are functionally interdependent. Additionally, multiple units located on the same site that will operate as a larger unit may be treated as a single unit of property for determining the beginning of construction and the date property is placed in service. All relevant facts and circumstances should be considered to determine whether multiple facilities are operated as part of a single project.

Only work performed on property that is considered an integral part of the activity performed by the facility may be considered for purposes of determining whether a taxpayer has begun construction of a facility. The notice further states that this includes property and roads integral to the production of electricity but does not include property used for electrical transmission, fencing or buildings.

Safe harbor

Notice 2013-29 includes a “safe harbor” that states that if 5% of the total cost of the property (excluding cost of land and preliminary activities) has been paid or incurred under Treas. Reg. Section 1.461-(a)(1) and (2), then construction of a facility will be considered as having begun, provided the taxpayer makes continuous efforts to advance toward completion of the facility. If property is manufactured, constructed or produced for the taxpayer by another person under a binding written contract, the costs incurred by the contractor are deemed incurred by the taxpayer when the contractor incurs those costs under Section 461.

If cost overruns cause the total cost of a project to so exceed the anticipated total cost that 5% was not actually paid or incurred as of January 1, 2014, the safe harbor will not be satisfied. If a single project is composed of multiple facilities, the safe harbor may be met for individual facilities as long as the total aggregate cost of those individual facilities is not more than 20 times greater than the amount the taxpayer paid or incurred before January 1, 2014.

Binding written contract

The IRS revised Notice 2013-29 to clarify the definition of “binding written contract” for purposes determining whether construction has begun. As originally released the notice stated that a contract is binding only if it is enforceable under local law against the taxpayer and does not limit damages to a specified amount. The revision provides that a contractual provision limiting damages to 5% or more of the total contract price will not be treated as limiting damages to a specified amount.

Implications

Notice 2013-29 effectively adopts the “beginning of construction” tests established by Treasury under the ARRA grant program. It provides both a “physical work of significant nature” test and a 5% safe harbor test, with qualifications and limitations similar to those of the Treasury Guidance. With the recent clarification of the “binding written contract” language, this now includes the American Recovery and Reinvestment Act of 2009 (ARRA) treatment of a 5% liquidated damages provision. However, the safe harbor in the notice does differ from the Treasury guidance in requiring continuous efforts to advance toward completion of the facility.

With specific reference to the safe harbor binding written contract provision, we note that, similar to the Section 1603 provisions, the “look through” contract goes only one level, to the person manufacturing, constructing or producing the property for the taxpayer under a binding written contract with the taxpayer. Property produced by a subcontractor does not count toward the taxpayer’s safe harbor.

Sequester cuts ARRA Section 1603 grant payments

The White House Office of Management and Budget informed Congress in a report on sequestration that Section 1603 grants for specified energy property in lieu of tax credits will be cut by 5.1%, a reduction of \$187 million. The Department of the Treasury has not issued any guidance explaining exactly how the cuts to refundable tax provisions will be achieved; it remains unclear whether the sequester reductions will apply only to Section 1603 grant claims submitted on or after March 1, 2013, or whether the cuts will apply to all grants paid on or after March 1.

The report sets forth the amounts and percentages by which budgetary resources will be reduced in various federal programs pursuant to the across-the-board spending cuts to non-exempt defense and nondefense spending programs required by the Budget Control Act of 2011.

In a letter posted on the website of the Solar Energy Industries Association, Richard L. Gregg, Fiscal Assistant Secretary of the Treasury, informed the association that all Section 1603 awards for the remainder of the fiscal year will be reduced by 8.7%. Applicants were warned not to adjust their claims to account for this reduction.

Background

Section 1603 of the American Recovery and Reinvestment Act of 2009 created a program under which the Department of Treasury provides a cash grant to the owners of qualified renewable energy property that elect the grant as an alternative to the Section 48 investment tax credit (ITC) or the Section 45 production tax credit (PTC). The grant amount equals either the 30% or the 10% ITC for the relevant energy property. The energy property must be used in a trade or business or held for the production of income to qualify.

Implications

This will adversely affect companies that received loan amounts targeted to the expected grant amount. It is worth noting that there is limited flexibility on when to submit the grant request as it has to be within 60 days of the project being placed in service.



Market activity

General

2012 US investment in clean energy totaled \$44.2b in 2012, down from \$65.4b in 2011 but still up slightly from the annual investment seen in 2007 through 2010. However, deployment continues to rise, and the dollar figures do not necessarily represent the industry's true expansion, especially in light of rapidly falling prices for solar technologies. Including wind, solar, biomass, geothermal, waste heat and water sources, renewables accounted for a record 49% of added capacity in the US in 2012.

Solar added capacity across all segments of the market (residential, non-residential and utility) in 2012 and the US represented 11% of all global PV installations, its highest market share in at least 15 years. The utility market, which continues to be dominated by installations in the southwest of the US, completed 8 of the 10 largest domestic projects currently in operation. Commercial and residential distributed generation solar systems also continue to become increasingly popular. As prices drop and financing becomes more standardized this segment of the market seems to be poised for substantial expansion over the next few years.

In the federal arena the most significant recent occurrence was the extension of the production tax credit (PTC) for, among other sources, wind, geothermal and biomass as part of the fiscal cliff deal. This one-year extension includes a provision that allows projects that begin construction by the end of 2013 to qualify for the credit regardless of when they come online. Additionally, in August 2012, the President's *We Can't Wait* initiative expedited seven regionally significant solar and wind projects, totaling almost 5,000 MW in installed capacity. In March 2013, two of the projects, totaling 900 MW, received approval at the same time as another 200 MW wind project received approval to be built on federal lands in Nevada. Approval of up to four of the remaining *We Can't Wait* projects could come by the end of 2013.

Wind

Wind added 13,124 MW of capacity in 2012, surpassing the previous record of 10,000 MW installed in 2010 and representing approximately 41% of all new US generation capacity added, leading all technologies. In Q4 alone, 8,380 MW were installed as developers rushed to get their projects done before the expiration of the PTC which was ultimately extended. This made for the strongest single quarter in history. The top five states for new capacity in 2012 were Texas, California, Kansas, Oklahoma and Illinois, while the total wind power installed capacity leaders through Q4 2012 were Texas, California, Iowa, Illinois and Oregon. The cumulative total of wind capacity in the US now stands at over 60,000 MW.

The PTC was effectively given a one-year extension as part of the fiscal cliff negotiations. This will be a boon to the wind industry, particularly given recent drops in turbine costs. Past expirations of the PTC in 1999, 2001 and 2003 led to drop-offs in installations of between 73% and 93% the following year. The extension included a provision that allows projects begun by the end of the year to qualify for the credit regardless of when they come online.

Movement is also beginning to be seen on The Atlantic Wind Connection (AWC) project in the form of contractor selection. The AWC, an undersea transmission cable that will bring power from the Atlantic's wind farms to shore, is the first offshore backbone electricity transmission system proposed in the United States. The private-sector project will span approximately 350 miles from northern New Jersey to southern Virginia and be built in phases over a 10-year period. When complete, the AWC backbone will be able to connect up to 7,000 MW of offshore wind. AWC is led by independent transmission company Trans-Elect and sponsored by Google, Good Energies, Marubeni Corporation and the Belgian transmission company Elia.

The New Jersey Energy Link portion of the AWC will link energy resources and users in northern, central and southern New Jersey. The cable will span the length of New Jersey and when complete could carry 3,000 MW of electricity. The New Jersey Energy Link is expected to be built in three phases over a decade. The New Jersey Energy Link is expected to begin construction in 2016 and the first phase is set to be in service in 2019.

This is a sample of the main market activities in the renewables sector over the past quarter.

Sources

All information relating to market activity in the sector is obtained from publicly available sources.

Market activity (cont'd)

In January 2013, the AWC announced that it has selected major construction and design firm Bechtel as its engineering, procurement and construction (EPC) contractor and international power equipment supplier Alstom as its HVDC technical advisor for this first phase of the historic project.

Further bolstering the potential for Atlantic offshore wind are recent state developments. In late November 2012 the Massachusetts Department of Public Utilities (DPU) approved a power purchase agreement (PPA) between the utility NSTAR and the Cape Wind offshore wind project for 27.5% of Cape Wind's power. This comes approximately one year after the Massachusetts Supreme Judicial Court upheld the DPU's approval of Cape Wind's PPA with National Grid for 50% of Cape Wind's power. Furthermore, in early March 2013, the Maryland state legislature passed the Maryland Offshore Wind Energy Act of 2013, creating a "carve-out" in the state's RPS, mandating a certain percentage of the state's energy be generated by offshore wind beginning in 2017. Although these developments may have little impact on short-term offshore wind development, they are important starting pieces to the long-term sustainability of the industry.

Solar

In 2012 the US installed 3,313 MW of solar photovoltaic (PV) capacity, with 1,300 MW coming in Q4 alone, surpassing both annual and quarterly records. Even with falling costs the dollar value of the market size of the US solar industry grew 34% in 2012. The top five states for solar electric capacity installed in 2012 were California (becoming the first state to install over 1,000 MW in a single year), Arizona, New Jersey, Nevada and North Carolina, while the leaders in cumulative solar capacity installed through 2012 were California, Arizona, New Jersey, Nevada and Colorado. The cumulative total of solar PV in the US is now at 7,221 MW, with cumulative PV installations exceeding 300,000 individual units.

Third-party ownership or leasing of rooftop solar PV systems in the US accounted for more than 50% of the residential and commercial market in 2012. Average residential system prices dropped nearly 20% between Q4 2011 and Q4 2012, and industry experts expect this segment of the market to surge as third-party financing options spread throughout the country. San Francisco-based Renewable Energy Trust Capital is seeking an IRS ruling to open the real estate investment trust (REIT) structure to solar projects. If it succeeds, solar developers could essentially package residential and commercial solar deployments as properties that return low-risk cash annuity streams to investors. There are also bills in Congress to open master limited partnerships (MLPs) to renewable energy projects, including solar. In providing a low-risk, consistent revenue stream, distributed solar is becoming more attractive to large-scale investors.



Market activity (cont'd)

On the utility side, 2012 saw the installation of 1,781 MW and the completion of 8 of the 10 largest solar projects currently in operation. The project pipeline looks promising for the foreseeable future, with PPAs in place for 10.5 GW of capacity, 3.1 GW of which are currently under construction. However, utility procurement has slowed as utilities have begun to meet their RPS obligations, and we may begin to see some depletion in that pipeline.

A persisting key development of 2012 involves US trade disputes with China. Growth in manufacturing of solar components, specifically PV cells, has outpaced growth of demand, driving down prices to unsustainable levels. The US imposed tariffs on imported Chinese PV cells in order to protect domestic manufacturers from a flooded market. In turn China considered imposing retaliatory tariffs on US polysilicon imports. Analysts find such an act unlikely, as it would further squeeze Chinese manufacturers already suffering depressed PV cell pricing.

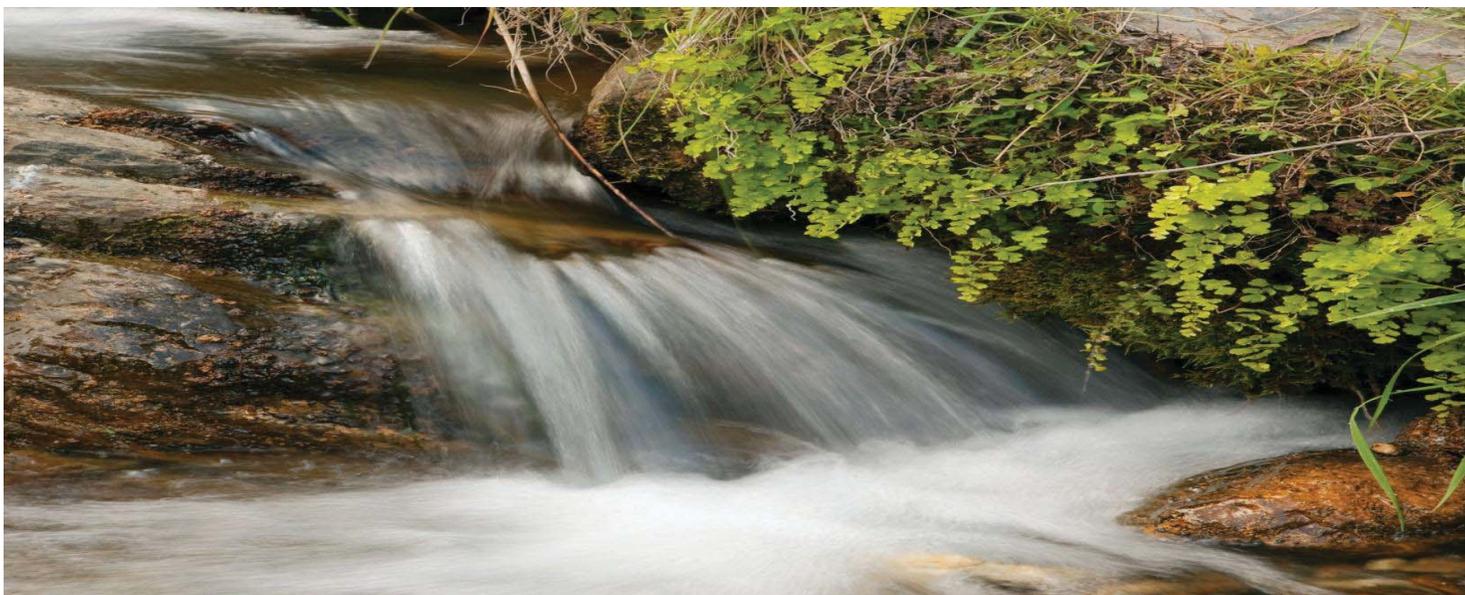
More recently, the federal government detailed the effects of the March 1 sequestration on the ARRA 1603 program. Every award made to a Section 1603 applicant on or after March 1, 2013, through September 30, 2013, will be reduced by 8.7%, irrespective of when the application was received by Treasury. However, awards made prior to March 1, 2013, will not be affected. The sequestration reduction rate will be applied until the end of the fiscal year (September 30, 2013), at which time the sequestration rate is subject to change.

Biomass/geothermal

Geothermal rebounded after slow years in 2010 and 2011 by adding 77 MW of capacity in 2012. Additionally, biomass generation increased from 56,671 terawatt hours (TWh) in 2011 to 57,565 TWh in 2012. While growth has been modest there is increased recognition of the complementary role these more consistent forms of energy can provide to the intermittency of wind and solar. Also, both technologies stand to benefit from the one-year extension of the PTC. The change in rules making any project that begins construction before January 1, 2014, eligible is particularly helpful given that many of these projects would be difficult to place in service by the end of 2013.

Two bills are currently before the Senate's Committee on Energy and Natural Resources that would promote US geothermal energy development and accelerate utilization of geothermal energy on a large scale. The Geothermal Exploration and Technology Act of 2013 (S. 362) seeks to promote mapping and development of US geothermal resources by establishing a direct loan program for high-risk geothermal exploration wells. The Geothermal Production Expansion Act of 2013 (S. 363) seeks to expand geothermal production by amending the competitive lease provisions of the Geothermal Steam Act of 1970. Both bills have been introduced in prior sessions of Congress but have yet to see action on the Senate floor.

The Department of the Interior's Inspector General reviewed the geothermal resource management of the Bureau of Land Management's (BLM) and found that the operational orders are outdated and that the BLM does not have a standardized geothermal inspection and enforcement program. The Inspector General recommended four updates to the BLM's policies and procedures that could increase the effectiveness of the production, development and delivery of geothermal energy on federal lands. It will be interesting to see whether these are implemented and to what effect.



All renewables index

August 2013

Rank	State	All renewables index	Long-term wind index	Long-term solar index*	Biomass Index	Geothermal index	Infrastructure index**
1	California	75	70	79	77	79	80
2	Hawaii	71	67	75	67	72	69
3	Texas	69	74	67	60	58	63
3	Colorado	69	71	68	54	67	64
5	Nevada	68	64	72	54	70	62
6	New Mexico	67	67	69	57	62	72
7	Illinois	66	71	60	65	68	73
8	Maine	64	65	60	80	73	84
8	New York	64	65	62	66	70	70
10	Massachusetts	63	64	63	63	60	68
10	Pennsylvania	63	67	58	64	71	72
10	Iowa	63	71	56	70	55	64
13	Maryland	62	60	63	61	66	68
14	Arizona	61	56	66	52	61	51
15	Michigan	60	62	57	68	60	70
16	Florida	59	55	63	63	58	59
16	Minnesota	59	65	53	64	54	56
16	North Carolina	59	59	59	62	54	66
16	Vermont	59	60	57	57	67	52
16	Oregon	59	65	50	71	66	68
16	New Jersey	59	57	62	53	58	60
16	Wisconsin	59	63	53	68	58	59
23	Utah	57	58	55	49	63	61
23	New Hampshire	57	58	53	65	67	51
25	Ohio	56	56	56	59	56	55

Source: Ernst & Young LLP analysis

Notes:

* Represents the index score for large, commercial and residential solar

** Combines with each set of technology factors to generate the individual technology indices

Long-term indices as of August 2013 (top 10)

Wind indices

Rank	State	Wind index
1	Texas	74
2	Colorado	71
2	Illinois	71
2	Iowa	71
5	California	70
6	Hawaii	67
6	Pennsylvania	67
6	New Mexico	67
9	Maine	65
9	Oregon	65

In this issue's long-term wind index, we see Texas move up to claim the top spot in the rankings with perennial strongholds Colorado, Illinois and Iowa tied for second. California drops to fifth. California's position does not represent a decline in its market as much as it does an improvement in other states; it's a credit to the growing US wind industry as a whole.

Solar indices

Rank	State	Solar index
1	California	79
2	Hawaii	75
3	Nevada	72
4	New Mexico	69
5	Colorado	68
6	Texas	67
7	Arizona	66
8	Maryland	63
8	Florida	63
8	Massachusetts	63

In the long-term solar index California maintains a multi-point lead over all other states. Nevada and Hawaii flip-flopped positions, but both remain solidly in the top three position. Colorado moved up to round out the top five after a strong year of solar installations, particularly in the residential sector. Growth in smaller-scale, distributed generation projects is a trend that can be seen across many of the top performers in this issue.

Commentary: high-scoring states

California

Category	Ranking
All renewables index	1
Long-term wind index	5
Long-term solar index	1

California once again leads the nation in renewable energy, topping the solar and geothermal indices while finishing second and fifth in biomass and wind, respectively. The drop in wind ranking from first in the previous edition has less to do with California slowing down than other states catching up. For example, California has little in the way of tax, grant and loan programs for wind energy sources. This may not have hurt its ranking much in the past, but as more and more states implement such programs California now finds itself further behind the curve. California still benefits from some of the best wind, insolation, geothermal and biomass resources in the country. Additionally, offtake prices, generous state policies, and a favorable regulatory environment benefit renewable energy technologies under consideration for this study.

Texas remains the king of wind installed base, topping out at over 12 GW of installed capacity, but in 2012 California came close to catching it in new capacity installations (1,656 MW vs. 1,826 MW). A strong year propelled California past Iowa in terms of cumulative installed capacity, putting it solidly in second place.

California led the nation in solar PV installation in 2012 with 1,033 MW, becoming the first state to install over 1,000 MW in a single year. It finished first in residential and non-residential installations, while finishing second behind Arizona in utility installations. The Solar Energy Industries Association (SEIA) forecasts that California will remain the number one installer of residential and non-residential installations in 2013 while overtaking Arizona to claim the top spot in utility as well. California's residential market continues to be driven by the California Solar Initiative (CSI), a statewide solar rebate program for California consumers that are customers of the investor-owned utilities - Pacific Gas and Electric (PG&E), Southern California Edison (SCE), San Diego Gas & Electric (SDG&E).

The program has a total budget of \$2.167b and a goal to install nearly 2,000 MW of new solar generation capacity by 2016.

Utility-scale development has continued with the three Ivanpah Solar Electric Generating Systems units reaching 90%, 80% and 70% completion, respectively, at the end of February. Representing the nation's first large-scale solar power plant to be built on public land, and with a planned capacity of 392 MW, the system will be the largest solar facility in the world when complete later this year. Additionally, on March 13, 2013, the 750 MW McCoy Solar Energy Project and the 150 MW Desert Harvest Solar Farm, both located on public lands in Riverside County, received federal approval to move forward. This represents a continuing partnership between the state and federal governments that have aligned their permitting and environmental review processes to advance 5 GW of renewable energy on public lands, and over 15 GW statewide, since 2009. A partnership of this nature will only help further California's growth in the renewable sector moving forward.

Aside from an aggressive RPS and the CSI, California administers a number of programs geared toward growth in distributed generation, such as the renewable auction mechanism (RAM). This mechanism is a market-based procurement mechanism for large investor-owned utilities (IOU). The California Public Utilities Commission (CPUC) expects RAM, which operates like streamlined feed-in tariff, to complement the RPS program by reducing transaction costs and providing a procurement opportunity for smaller RPS-eligible projects (less than 20 MW). California also administers a more traditional feed-in tariff, which allows eligible customer-generators to enter into 10-, 15- or 20-year standard contracts with their utilities to sell the electricity produced by small renewable energy systems (less than 3 MW) at time-differentiated market-based prices.

Finally, California is working to ensure the long-term health of its renewable energy infrastructure through the Renewable Energy Transmission Initiative (RETI). RETI is designed to help California meet its renewable energy generation goals by identifying transmission projects needed to get this power to consumers, facilitate siting and permitting, and support future energy policy.

Commentary: high-scoring states (cont'd)

Hawaii

Category	Ranking
All renewables index	2
Long-term wind index	6
Long-term solar index	2

Hawaii jumped from seventh to second in this edition of the all renewables index, finishing in the top seven in all individual technology indices under consideration for this study, including second in solar and third in geothermal. With only a total of 206 MW of wind capacity installed Hawaii makes up ground by taking advantage of its quality solar resources. Hawaii moved up into the top 10 of solar PV installations in 2012, finishing seventh overall with 109 MW installed. It finished third in residential and 5th in non-residential installations, with SEIA predicting it could move into 2nd in the residential market in 2013.

Hawaii has an aggressive target of 70% “clean energy” by 2030. To meet this target Hawaii has an RPS goal of generating 40% of its energy from renewable sources and already gets a greater percentage of its electricity from solar than any other state. The remaining 30% will be accounted for through energy efficiency measures such as retrofitting residential and commercial buildings, strengthening new construction policies and building codes, and identifying non-building-related energy efficiency measures.

However, on March 14, 2013, the Hawaii House Committee on Energy and Environmental Protection moved a bill forward to amend Hawaii's wind and solar energy tax credits and cap them at an unspecified amount. Governor Neil Abercrombie has cited rising costs and potential abuse of the system as reasons to cut the amount of the credits, but details remain scarce. The bill still must pass through other committees before it becomes law, but it will be closely watched as it moves through the legislative process.

Texas

Category	Ranking
All renewables index	3
Long-term wind index	1
Long-term solar index	6

Texas retained the third position in this edition of the all renewables index while finishing first and sixth in the wind and solar indices, respectively. Texas continues to dominate the wind index after installing 1,826 MW in 2012 for a cumulative total of 12,212 MW, both highest in the country. In 2012 wind power accounted for 9.2% of total energy used in the Texas Interconnect Region, managed by the Electric Reliability Council of Texas (ERCOT), and on February 9, 2013 ERCOT reported that electricity generated by wind power represented 28% of the total supply across the state's main grid for a short time, setting a new ERCOT system record.

In 2005 a bill was passed directing the Public Utility Commission of Texas (PUC) to identify Competitive Renewable Energy Zones (CREZ) with optimal conditions for the economic development of wind power generation facilities. To help with Texas' well-known transmission issues, the PUC was then to designate transmission projects to be constructed to help make accessing this power feasible. The completed CREZ transmission projects are expected to be able to transmit up to 18,500 MW of wind power. As of January 2013 the estimated completion date for the last project in the CREZ Program is December 31, 2013. This expanded infrastructure should help the wind industry continue to flourish into the future.

Texas also has the most untapped solar potential in the country, more than twice that of any other state if all its usable land is included, but it continues to lag behind its southwestern neighbors in solar development. In 2012, Texas installed only 64 MW of solar PV, although that was the tenth most in the nation. That could change soon as ground was just broken on a project that will generate 400 MW of solar power by 2016, making it the largest municipal solar project in the US to date. Being developed through a public-private partnership between OCI Solar Power and CPS Energy, a municipal utility serving the greater San Antonio area, is projected to have its first phase, Alamo I, completed and generating 41 MW by the end of 2013.

Commentary: high-scoring states (cont'd)

Colorado

Category	Ranking
All renewables index	3
Long-term wind index	2
Long-term solar index	5

Colorado dropped from second to third in this edition of the all renewables index but finished second and fifth in the wind and solar indices, respectively. Colorado excels in the core quality of its resources, the incentives in place to spur recovery of those resources and its capability to tie those resources into the grid. Additionally, the state benefits from headquartering the US Department of Energy's primary national laboratory for renewable energy and energy efficiency research and development (NREL), numerous major manufacturing facilities and a vibrant cleantech industry. However, the manufacturing sector recently faced a few setbacks, with General Electric putting an 18-month pause on what was supposed to be the nation's largest solar panel manufacturing plant and Vestas Wind Systems cutting about 700 jobs in response to a drop in orders after the uncertainty surrounding the federal wind PTC extension. Last year saw Colorado finish in the top 10 in both wind and solar installations. The 496 MW of wind installed was good for tenth in the country and also put Colorado in the tenth position of cumulative wind installed with 2,301 MW. Colorado finished ninth in the country in solar PV installations with 70 MW, but fifth overall in residential PV installations. This may be attributable to Colorado's RPS, which requires IOUs to generate 30% of their power from renewable sources by 2020 but also contains provisions specifically encouraging smaller distributed generation projects.

Nevada

Category	Ranking
All renewables index	5
Long-term wind index	13
Long-term solar index	3

Nevada moved up from sixth position in 2012 to fifth in the all renewables index on the strength of its solar industry. Nevada's 2012 total installation of 198 MW of solar PV was the fourth most in the country, while its total utility-scale installation was the third most. SEIA predicts that after a strong year Nevada's utility-scale installation could be overtaken by North Carolina, New Jersey and Texas, bouncing it from its top three position.

However, in 2012 the state was tapped by the White House for two of seven fast-track proposal reviews as part of the We Can't Wait initiative. The first, the Moapa Solar Energy Center, would deploy 100 MW of PV and 100 MW of Concentrated Solar Power (CSP) on public land. The target date for completing federal review is December, 2013. Secondly, the Silver State South project would produce an estimated 350 MW of solar PV energy. Review for the Silver State South project should be complete by March 2013.

While Nevada's total installed wind capacity at the end of 2012 was a modest 152 MW, the industry should be receiving a boost as the 200 MW Searchlight Wind Energy project was recently approved by the Department of the Interior. The project would include 87 2.3 MW turbines installed 60 miles southeast of Las Vegas and would be constructed on public lands managed by the Bureau of Land Management.

Wind farm using temporary grid connection considered “placed in service” for Section 45 credit

In private letter ruling (PLR) 201311003, the Internal Revenue Service (IRS) ruled that a wind farm would be considered placed in service for purposes of the Section 45 electricity production tax credit (PTC) even though its permanent line to the grid was not complete.

The IRS provided an illustrative case, in which an LLC owns a wind farm that is under construction through two tiers of subsidiaries. The LLC in the provided example expects that by a certain date, physical construction and commissioning will be complete for all wind turbine generators (WTGs) individually, and each WTG will be synchronized to the power grid, resulting in issuance of a final commissioning certificate and all permits and licenses needed to operate for the project as a whole. Legal title and control over the project will have been conveyed to the LLC’s subsidiary. However, in the provided example a transmission line connecting the project with the completed switchyard is not expected to be complete by commissioning of the WTGs, necessitating the temporary interconnection to the power grid through an energized, tested temporary intertie. Thus, the electricity moves through a segment of an existing intertie from a previously completed wind farm that is connected to an existing substation. The temporary intertie in the example is meant to remain in place for an indefinite period until the permanent line is fully constructed.

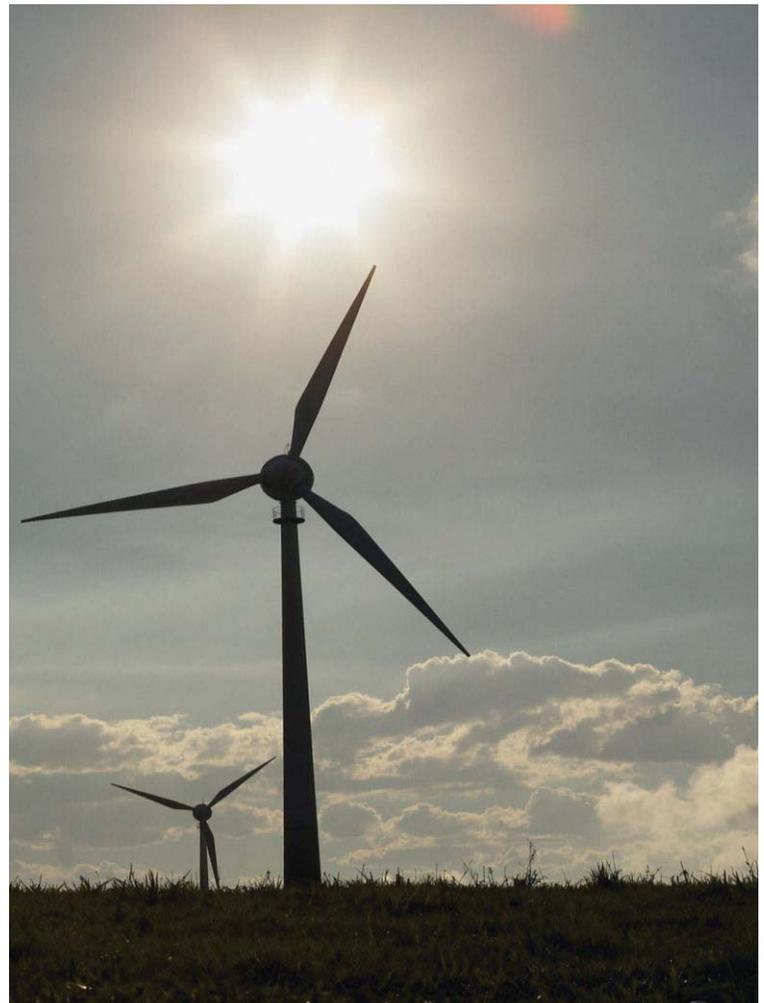
Section 45 does not define “placed in service,” but the term has been defined for purposes of depreciation and the investment tax credit. Several Tax Court cases and revenue rulings have addressed the issue, and the common factors for determining when a power plant is placed in service are:

- ▶ Approval of required licenses and permits
- ▶ Passage of control of the facility to taxpayer
- ▶ Completion of critical tests
- ▶ Commencement of daily or regular operations
- ▶ Synchronization into a power grid for generating electricity to produce income

Additionally, the IRS stated that a facility is placed in service for purposes of the wind energy credit when it would be placed in service for depreciation purposes, or when it is in a state of readiness and availability to produce and deliver electricity generated from wind energy. The Service noted that a facility does not have to achieve full design output to be placed in service as long as it is in the process of ramping up its production levels. Thus, the IRS stated that for purposes of Section 45 the project in the example provided would be considered placed in service on the date in which the turbines begin generating electricity, even though the permanent transmission line is not complete, as long as it delivers at least a “non-de minimis” redacted percentage of its capacity to market via the temporary intertie.

Implications

The IRS has confirmed that for a WTG to be placed in service, it need not interconnect to the grid through a permanent intertie but may utilize a temporary intertie. (Note that this still requires synchronization to the grid.) In addition, the IRS has confirmed that the WTG need not operate at full capacity but may operate at a more than de minimis level based not on its own capacity or that of the temporary intertie but on the combined capacity of all WTGs connected to the temporary intertie.



Excerpt: Country attractiveness indices (CAI)

February 2013

Rank ¹	Country	All renewables	Wind index	Onshore wind	Offshore wind	Solar index	Solar PV	Solar CSP	Biomass/ other	Geo-thermal	Infra-structure ²
1	(1) China	70.1	76	78	69	65	67	47	59	50	73
2	(2) Germany	65.6	68	65	80	61	70	0	68	58	72
3	(3) US ³	64.9	63	65	56	70	69	73	61	67	58
4	(4) India	61.8	61	66	39	65	67	52	59	43	60
5	(5) France	57.3	59	60	56	55	59	30	58	35	59
6	(6) UK	54.7	62	59	78	42	48	0	57	35	64
7	(8) Japan	53.2	51	53	45	61	65	29	43	49	59
8	(7) Canada	53.1	62	66	45	40	45	0	50	35	64
9	(9) Italy	52.4	53	54	45	53	55	37	49	57	44
10	(11) Australia	51.0	50	53	39	54	54	54	44	58	52
11	(10) Brazil	50.5	52	55	40	48	50	33	54	24	51
12	(12) Sweden	49.5	55	55	54	38	43	0	58	36	57
13	(13) Romania	48.6	54	57	39	41	46	0	45	42	48
14	(14) Poland	48.1	55	57	44	40	45	0	45	23	49
15	(15) South Korea	47.5	48	47	54	49	52	30	41	37	47
16	(17) South Africa	47.4	51	55	37	45	44	52	37	35	53
17	(16) Spain	46.2	44	47	35	51	51	55	43	26	37
18	(18) Belgium	45.2	51	50	58	38	43	0	40	28	52
19	(19) Portugal	44.6	46	48	35	46	47	36	38	26	39
20	(21) Mexico	44.2	45	46	40	44	44	41	39	55	41
21	(23) Ireland	43.4	53	54	52	27	31	0	44	24	51
22	(20) Greece	43.3	44	47	33	46	48	33	34	25	32
23	(25) Morocco	42.9	41	44	26	50	49	57	38	21	43
24	(22) Denmark	42.8	47	45	57	35	40	0	46	33	52
24	(24) Netherlands	42.8	49	49	47	36	41	0	37	21	42
26	(26) Turkey	41.8	43	45	33	42	43	29	36	42	39
27	(27) Norway	40.4	48	49	45	26	30	0	45	31	52
28	(28) Taiwan	40.3	43	44	38	37	42	0	37	38	43
29	(29) Egypt	40.0	42	45	32	39	38	45	35	24	33
30	(29) Finland	39.8	46	48	39	25	28	0	54	26	47
31	(29) Ukraine	39.7	39	41	27	40	46	0	46	32	41
31	(32) New Zealand	39.7	47	50	37	27	31	0	34	52	47
33	(33) Austria	39.0	33	40	0	45	52	0	51	34	53
34	(34) Tunisia	36.7	36	38	27	44	43	47	20	27	40
35	(35) UAE	36.6	35	37	22	48	47	50	18	18	44
36	(38) Chile	36.5	38	41	24	37	38	31	29	38	43
37	(36) Israel	36.4	33	38	14	45	46	39	27	29	39
37	(37) Saudi Arabia	36.4	38	40	27	48	48	49	0	0	49
39	(40) Argentina	35.5	38	41	22	33	35	17	32	27	34
40	(39) Bulgaria	35.2	35	38	23	35	40	0	35	34	39

Source: EY analysis

Notes:

1. Ranking in previous issue is shown in brackets.
2. Combines with each set of technology factors to produce the individual technology indices.
3. This indicates US states with renewable portfolio standard (RPS) and favorable renewable energy regimes.



Canada

In mid-December 2012, Canada officially became the first country to withdraw from the international Kyoto Protocol climate change agreement, reflecting government sentiments and years of intense lobbying from major industrial polluters. The Government has pointed to the fact that the US and China – the world's two largest carbon emitters – have never signed to support its repudiation of the treaty, which it announced in December 2011.

Some groups have expressed anger or confusion at the presence of Canada – albeit adopting a relatively low profile – at the UN Climate Change Conference in Doha, negotiating to weaken the second Kyoto, when it will not be participating.

Recent transactions indicate that the Canadian renewable energy sector remains attractive in the global market. The acquisition by Mitsui & Co. of a 30% stake in GDF Suez's wind and solar power projects in Canada, has resulted in more than CA\$795m (US\$773m)* of funding from Japanese banks to support the projects. A further 30% stake in the 640MW portfolio was sold to Montreal-based Fiera Axium Infrastructure Inc.

Ontario

In Canada's most populous province a recent ruling by the WTO which deemed Ontario's local content rules to be in breach of its regulations, following complaints by the EU and Japan. The WTO panel report concluded that the province's FIT program undermines competition because it favors domestic products through an obligation to use locally manufactured technology. Canada has subsequently notified the World Trade Organization that it will be appealing the December ruling.

Ontario saw further legislative developments with the final FIT 2.0 rules being announced. The market responded to a recent small FIT application window, which sought to procure 200MW of projects and attracted 826MW of new and resubmitted projects.

While FIT 1.0 project development continues, the future Ontario market offers stakeholders an uncertain future. This issue did see strong solar sector M&A activity, with Canadian Solar Inc. acquiring SkyPower Limited's portfolio of 16 solar PV projects totaling 190MW-200MW of capacity. The transaction price was around CA\$185m (US\$180m), payable at certain milestones.

Recurrent Energy LLC, the US unit of Sharp Corporation, sold a majority stake in nine of its solar PV projects to Mitsubishi Corp. and Osaka Gas Co. Mitsubishi and Osaka Gas each bought 45% of Recurrent's Smiths Falls I-VI and Waubaushene III-V projects. Recurrent will own the remaining 10%. The projects total about 100MW in capacity, or half of Recurrent's Ontario-based contracted capacity, and are expected to be completed in 2013.

* Conversions based on exchange rate on July 26, 2013

Quebec

Former Quebec Premier Jean Charest announced a call for tenders seeking an additional 700 MW of new wind generation. In response to the announcement, Innergex Renewable Energy and the Mi'gmawei Mawiomi, being a representative organization for three Mi'gmaq communities in Quebec, announced a partnership for the development of a 150 MW wind farm in the Gaspé Peninsula. Q4 also saw the country's largest wind farm, the 211.5MW Gros-Morne project developed by a joint venture of TransCanada Corp. and Innergex Renewable Energy Inc., come online in eastern Quebec.

Also in the Quebec wind sector, Montreal-based wind farm developer Eolectric has succeeded in attracting Fiera Axium, a locally based infrastructure fund, to invest for a 49% share in Eolectric's 101.2MW Vents du Kempt project. This deal established a framework for future projects, allowing Fiera Axium to invest in future projects as certain milestones are reached.

Maritime provinces

Renewable energy in Nova Scotia continues to grow with new project contracts being released. Since Issue 2, one new tidal project and 14 new wind projects have been awarded a contract. The 54 approved projects remain heavily skewed toward wind energy (89%), with tidal and biomass at 9% and 2%, respectively.

Prairie provinces

Manitoba Hydro is poised to spend CA\$18b (US\$17.5b) on new dams and transmission lines over the next decade. The announcement has led to the creation of a CA\$30m (US\$29m) Energy Jobs Loan Fund to help Manitoba companies bid successfully on local and international renewable energy projects. The loan fund is intended to ensure that Manitoba businesses can take full advantage of the economic opportunities that will come with the biggest expansion of Manitoba Hydro in decades.

Alberta

The Alberta Utilities Commission has approved the construction and operation of Joss Wind Power Inc.'s 34-turbine, 78.2MW Hand Hills Wind Power project near Delia, Alberta. The current PPA market in Alberta makes this an impressive milestone for Joss Wind Power. The project is expected to employ 101 Siemens SWT 2.3MW turbines.

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Commentary: guidance notes

Long-term index

As stated on page 1, the individual technology indices, which combine to generate the all renewables index, are made up as follows:

- ▶ Renewables infrastructure index – 35%
- ▶ Technology factors – 65%

These guidance notes provide further details on the renewables infrastructure index and the technology factors.

Renewables infrastructure index

The renewables infrastructure index is an assessment by state of the general regulatory infrastructure for renewable energy. On a weighted basis, the index considers:

- ▶ Strength of RPS (29%) - States with RPS were ranked based upon the immediacy of the target deadlines, the amount of renewable energy that needs to be developed to meet the target, penalties if the target is missed and the presence of a compliance-based renewable energy credit market.
- ▶ Planning and grid connection issues (57%) – Favorable planning environments (low failure rates and easy-to-navigate approval/permitting processes) are scored highly. Grid connection scoring is based on the ease of obtaining a grid connection in a cost-effective manner. The score also takes into account the degree of grid saturation for intermittent technologies.
- ▶ Access to finance (14%) – A market with a mature renewable energy financing environment, characterized by cheap access to equity and good lending terms, will score higher.

This generic renewables infrastructure index is combined with each set of technology factors to provide the individual technology indices.

Technology factors

These comprise six indices providing resource-specific assessments for each state, namely:

1. Onshore wind index
2. Large-scale solar index
3. Commercial solar index
4. Residential solar index
5. Geothermal index
6. Biomass and other resources index

Each of the technology indices considers, on a weighted basis, the following factors:

1. Power offtake attractiveness (32%) - The price received (including proceeds from REC sales and other major incentive programs such as state production tax credits) per kWh of electricity generated.
2. Tax climate (8%) – Favorable, high-scoring tax climates that stimulate renewable energy generation can exist in a variety of forms and/or structures. Typical incentives and structures are direct renewable energy tax breaks, sales tax abatements for equipment, real estate tax abatements and accelerated tax depreciation on renewable energy assets.
3. Grant or soft loan availability (8%) – Grants can be available at local and/or regional levels and typically tend to be more prevalent in immature markets or technologies. Soft loans have historically been used for renewable energy technologies to kick-start the industry. High scores are achieved through an array of meaningful grants and soft loans.
4. Market growth potential (26%) – This category takes a holistic approach to estimating a state's projected growth levels. The market growth potential takes into account information contained in other categories, as well as information gathered but not included in one of the other categories.
5. Current installed base (8%) – High installed bases demonstrate that the state has an established infrastructure and supply chain in place, which will facilitate continued growth. High installed bases are also indicative of the acceptance for such projects, and the lack of public support can make planning and gaining approvals more difficult.
6. Resource quality (18%) – This measures the quality of resources available; for example, wind speeds and solar intensity are indicators of resource quality.

For more details on the USAI and previous issues, please visit <http://www.ey.com/USAI>

EY renewable energy services

Team overview

Tax Credit Investment Advisory Services

With a dedicated 15-member team of advisors focused solely on tax credit monetization, Ernst & Young LLP's Tax Credit Investment Advisory Services (TCIAS) helps take advantage of the opportunities and address the risks associated with renewable energy activity.

Members of the group, supported by a network of experienced professionals from our offices worldwide, provide advice and services in the following areas:

- ▶ Tax credit monetization
- ▶ Financial modeling
- ▶ Strategic planning
- ▶ Transaction structuring
- ▶ Investment due diligence

In addition to TCIAS, our Business Tax Services group provides a wide variety of tax advisory services to the renewable energy industry. Among these are:

Renewable energy group

Ernst & Young's Renewable Energy Group authors both the renewable energy country attractiveness indices and the biofuels indices. Members of the group provide advice in the following areas:

- ▶ Financial advisory and valuation
- ▶ Asset valuation
- ▶ Transaction support
- ▶ Financial modeling and structuring
- ▶ Finance raising
- ▶ PPA tendering

For more information on the Renewable Energy Group, go to <http://www.ey.com/GL/en/Industries/Power---Utilities/Renewable-Energy-Overview>

Strategic growth markets

Ernst & Young LLP is at the forefront of issues affecting America's best high-growth companies. Our vast experience advising these companies sustains our dominant competitive position in key markets, including our Assurance and Advisory services' share of the Russell 2000®, *Forbes'* largest private companies and the number of companies we assist in going public. We are also the leader in convening the experts who shape the business climate, and advising policy makers on the issues affecting these companies.

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Ernst & Young LLP can help clients move towards sustainability in their building projects, including helping to achieve LEED certification and providing the documentation for immediate deductions of energy-efficient equipment in commercial buildings.

Washington Council Ernst & Young (WCEY)

WCEY is a legislative and regulatory advocacy group within Ernst & Young LLP that represents clients on a wide range of energy and energy tax issues. In the energy sector, WCEY represents a wide variety of renewable energy technologies and trade associations, including solar, hydropower, open-loop biomass, closed-loop biomass, biodiesel, renewable diesel and cellulosic biomass alcohol.

Business incentives and credit services

Ernst & Young LLP assists clients who are relocating, expanding or conducting research and experimentation activities. We help clients utilize economic development incentives offered by US state and local governments, including cash grants, tax credits, exemptions, abatements, loans and utility subsidies. For further information on our services, and for future copies of the indices, please contact Michael Bernier or Ben Snyder.

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