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No. 2017/020

June 27, 2017

TO COUNTY ASSESSORS AND INTERESTED PARTIES:

NOTICE OF BOARD ACTION

GUIDELINES FOR THE ASSESSMENT OF WIND ENERGY PROPERTIES

On June 20, 2017, the California State Board of Equalization (Board) approved the enclosed *Guidelines for the Assessment of Wind Energy Properties (Guidelines)*.

After receiving inquiries from county assessors' staff and industry representatives regarding the assessment of wind facilities, the Wind Energy Working Group was formed. The working group consisted of staff from three county assessors' offices, representatives from three energy-related companies, and Board staff. The working group also drafted the *Wind Generation Property Statement* which was adopted by the Board on July 17, 2014.

The enclosed *Guidelines* represent a collaborative effort of the working group. The *Guidelines* are posted on the Board's website at www.boe.ca.gov/proptaxes/guideproc.htm. We hope that this information proves useful and promotes uniformity in the assessment of wind energy facilities.

If you have questions regarding these *Guidelines*, please contact the County-Assessed Properties Division at 1-916-274-3350.

Sincerely,

/s/ Sherrie Kinkle for

Dean R. Kinnee
Deputy Director
Property Tax Department

DRK:sk
Enclosure

**GUIDELINES FOR
THE ASSESSMENT OF
WIND ENERGY PROPERTIES**

JUNE 2017

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GUIDELINES FOR THE ASSESSMENT OF WIND ENERGY PROPERTIES

INTRODUCTION

The guidance set forth in this paper is the product of a collaborative effort by county assessors, industry, and the California State Board of Equalization (BOE) staff. The objective of this publication is to provide assessors' staff, assessment appeals board members, taxpayer representatives, and others with the guidelines necessary to make equitable assessments of wind energy properties in California. These guidelines provide definitions and discussion on approaches to value and topics relevant to the valuation of wind energy properties, including discussions on federal tax incentives, power purchase agreements, and California's Renewable Portfolio Standard.

DEFINITIONS

WIND TURBINE

The website of The American Wind Energy Association (AWEA) provides the following description of a typical wind turbine:¹

Most commonly, wind turbines consist of a steel tubular tower, up to 325 feet, which supports both a "hub" securing the wind turbine blades and the "nacelle" which houses the turbine's shaft, gearbox, generator and controls. [See Figure 1, to follow.] A wind turbine is equipped with wind assessment equipment and will automatically rotate into the face of the wind, and angle or "pitch" its blades to optimize energy capture.

WIND ENERGY PROPERTIES

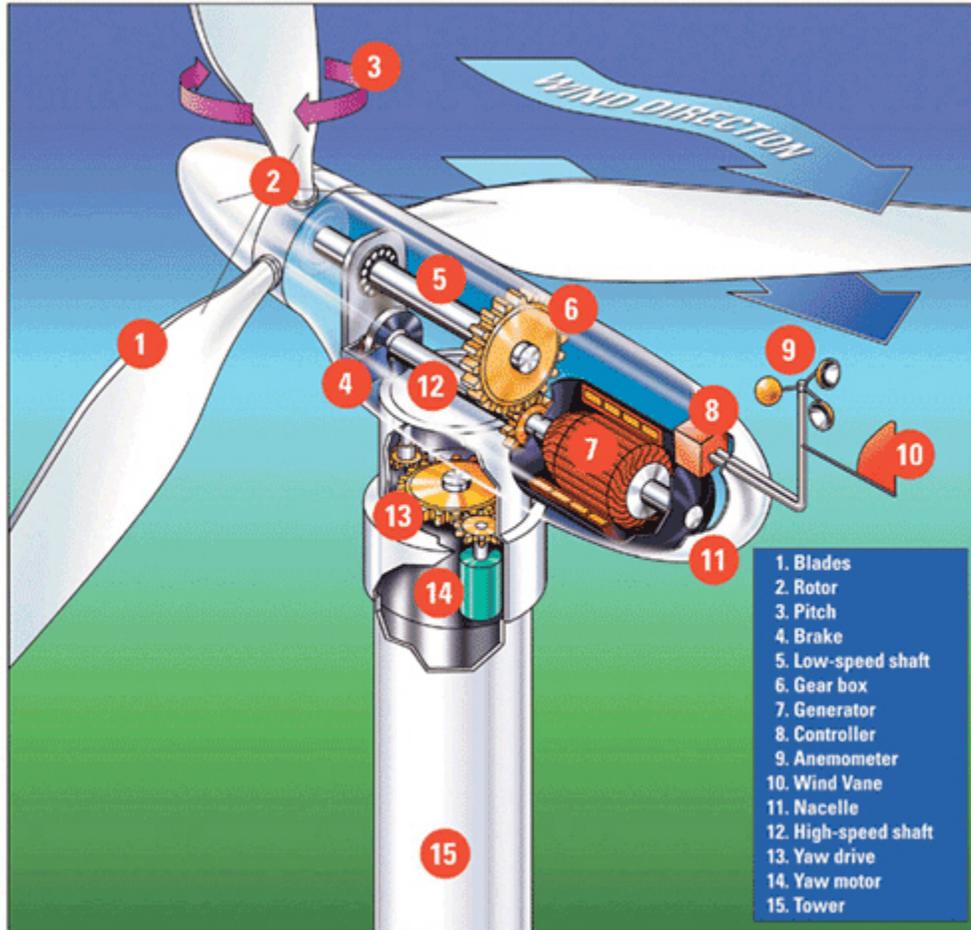
A *wind energy property* is an electric power generating plant consisting of interconnected wind turbines. The AWEA describes such facilities:²

Wind turbines often stand together in a windy area that has been through a robust development process in an interconnected group called a wind project or wind farm, which functions like a wind power plant. These turbines are connected so the electricity can travel from the wind farm to the power grid. Once wind energy is on the main power grid, electric utilities or power operators will deliver the electricity where it is needed. Smaller transmission lines called distribution lines will collect the electricity generated at the wind project site and transport it to larger "network" transmission lines where the electricity can travel across long distances to the locations where it is needed, when finally the smaller "distribution lines" deliver electricity directly to your town and home.

¹ From American Wind Energy Association's *Wind 101: The Basics of Wind Energy* at www.awea.org/Resources/Content.aspx?ItemNumber=900.

² *Ibid.*

Figure 1: Components of a Typical Wind Turbine



CLASSIFICATION

An improvement will be classified as a structure when its primary use or purpose is for housing or accommodation of personnel, personalty, or fixtures, or when the improvement has no direct application to the process or function of the trade, industry, or profession. An improvement will be classified as a fixture if its use or purpose directly applies to or augments the process or function of a trade, industry, or profession. Items which have a dual purpose will be classified according to their primary purpose.³

A wind turbine has a dual purpose in housing equipment, and it directly applies to the function of the wind energy generation industry. However, its primary purpose is related to the process of transforming kinetic energy harnessed from wind into electricity. Accordingly, wind turbines are properly classified as fixtures.

³ [Assessors' Handbook Section 502](#), *Advanced Appraisal*, December 1998, page 184.

TAX CREDITS AND THE CASH GRANT

In the 1970s, skyrocketing oil prices spurred interest and research in wind as a resource for generating electricity. In 1978, Congress passed the Public Utility Regulatory Policies Act of 1978 (PURPA) which required utilities to provide specified amounts of electricity from renewable energy sources—including wind.

By 1990, more than 2,200 megawatts (MW) of wind energy capacity were installed throughout California, creating more than half of the world's capacity for wind power at the time. In another effort by Congress to support wind energy, the Energy Policy Act was passed in 1992 authorizing a production tax credit of 1.5 cents per kilowatt hour (kWh) of wind-power-generated electricity.⁴

There are two federal tax credits and a Treasury cash grant that have been available to owners or developers of wind energy properties. The appraiser should understand these incentives in order to appropriately address their impact on the fair market value of wind energy properties for property tax purposes:

- Production tax credits
- Investment tax credits
- Treasury cash grant (cash grant) under section 1603 of the 2009 American Recovery and Reinvestment Act (2009 ARRA)

These incentives are often times a key part of the financial feasibility of wind energy properties and are premised on federal legislative action that is subject to sunset dates, extensions of sunset dates, renewal of incentives that were allowed to expire, and adjustments and modifications. Additionally, because the incentives are not bargained for between buyer and seller, but were established by Congress and vary from taxpayer to taxpayer depending on their individual situations, neither the tax credits nor cash grants should be a component of the fair market value for property tax purposes.

While an appraiser should not include the benefit derived by the tax credits or the cash grant in arriving at a fair market value, discussions related to the tax credits and cash grants are likely to arise. For this reason, understanding these incentives is necessary for the purpose of engaging in discussion relevant to the three approaches to value and how the tax credits and cash grants were designed to incentivize the development of certain wind energy properties.

The construction of wind energy properties can be cost prohibitive.⁵ Generally, investors will not construct wind energy properties in the absence of some form of financial incentive that may mitigate

⁴ <http://energy.gov/eere/wind/history-wind-energy>.

⁵ Levelized cost stated in the June 2015 U.S. Energy Information Administration report, *Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2015*, indicate the levelized cost of wind energy properties and gas-fired facilities are nearly equal. The report states, however, that caution should be used when comparing costs. Not included in levelized cost computation is the integration cost associated with wind energy (see the Policy and Market Drivers discussion in the *2014 Wind Technologies Market Report*). The appraiser should be aware that costs across technologies are dynamic and vary from one year to the next.

the high cost to construct. The production tax credits and the investment tax credits, when monetized, generally provide funds that approximate 30 percent of the full economic cost to construct. The cash grant in-lieu of the tax credits provides for a direct cash outlay from the United States Treasury Department and approximates 30 percent of full economic cost to construct.

Each wind energy property has distinct development costs, energy output capacity, and contracted electric energy rates that dictate the extent to which the incentives impact the financial feasibility of any particular wind energy property.

For example, the tax credits or the cash grant may provide owners with incentives in excess of what is needed to promote investment. In instances where the subject wind energy property is capable of achieving relatively high energy output, for example, that attribute alone may partially mitigate the need for the incentives. In other instances, the subject property may have several positive attributes and, as a result, may not need any incentives to make the development financially feasible. Attributes may include relatively high energy output, a relatively high contracted energy rate, and a relatively low cost to construct. In either event, the tax credits or the cash grant may provide benefits that result in a value that is greater than full economic cost.

Conversely, a wind energy property may possess negative attributes, such as relatively low energy output, relatively low contracted energy rate, and relatively high cost to construct. In such a case, the tax credits or the cash grant may be necessary to secure financial feasibility. However, the degree of these negative attributes may be such that the tax credits or the cash grant cannot fully make a particular wind energy property financially feasible. The appraiser should recognize that the design of the federal incentives is based on a certain set of assumptions related to average electric productivity, average energy rates, average operating and maintenance expenses, and dollars-per-megawatt to construct. Furthermore, it should be recognized that certain wind energy properties are constructed and operate above or below these assumptions, in which case the appraiser will need to recognize this in each individual assessment. The treatment of these incentives in deriving a fair market value for property tax purposes is discussed later in the *Approaches to Value* section.

Each of these incentives operates under fairly complex rules, many of which have implications beyond valuation for property tax purposes. With this in mind, the discussion in this summary focuses primarily on the rules for these incentives relevant to ad valorem valuation.

PRODUCTION TAX CREDITS

The production tax credits (PTCs) were originally enacted as part of the Energy Policy Act of 1992. Since then, there have been extensions of the provision, and on occasions it has been allowed to sunset.⁶ The PTC is codified in section 45 of title 26 of the Internal Revenue Code. The PTC was the only federal incentive available to wind project owners until 2009 when the ARRA provided owners of wind projects the ability to opt for either the ITC or the cash grant in lieu of the PTC.

Unlike the investment tax credits and the cash grant, which are both based on the cost of qualified energy property, the PTC is a performance-based incentive based on the output of qualified energy

⁶ www.ucsusa.org/clean_energy/smart-energy-solutions/increase-renewables/production-tax-credit-for.html.

property. The PTC provides owners of wind projects with a dollar-for-dollar income tax credit based on the amount of electricity produced. In 2013, the PTC provided owners of wind projects 2.3 cents of credit for every kilowatt hour of electricity produced. Each year the IRS re-calculates the dollars per kilowatt hour credit based on a cost-of-living formula. Other relevant aspects of the PTC include:

- Ten-year eligibility period for claiming the PTC commencing on the original date the project was placed in service.
- The electricity must be produced by the owner. For this reason, the PTC is not available to leasing structures (sale-leaseback and lease pass-through).
- The electricity must be sold to an unrelated party and cannot be for self-use by the taxpayer.
- There is no recapture provision.
- If a wind project is sold within the 10-year period commencing with the original date the project was placed in service, the purchaser may claim the PTC for the remainder of the original 10-year period as long as the electricity is produced by the new owner and the electricity produced is sold to an unrelated party.

INVESTMENT TAX CREDITS

Prior to 2009, the investment tax credits (ITCs) were available to a host of energy projects with the exception of wind projects. The enactment of the 2009 ARRA provided owners of wind projects the ability to opt for the ITC in lieu of the production tax credit. The ITC is codified in section 48 of title 26 of the Internal Revenue Code. The ITC provides for an income tax credit based on 30 percent of the qualified eligible cost of a wind project. The vast majority of the development costs of wind projects are considered eligible costs. Eligible cost is based on the principle that it reflects the true economic cost of the underlying assets. Ineligible costs are non-arm's-length transactions or costs peculiar to the circumstances of a particular project. These ineligible costs do not represent market costs. Operating reserves and permanent loan fees are examples of ineligible costs. Other relevant aspects of the ITC include:

- The ITC is generated as soon as a wind project is placed in service and is claimed on the owner's tax return no earlier than the year in which the project is placed in service.
- The ITC is subject to recapture upon disposition during an initial five-year period, vesting at 20 percent per year. At the end of year five, the owner is fully vested and no recapture is required in the event of a sale.
- The purchaser of a wind project from a seller who has claimed the ITC is not entitled to claim any of the federal incentives (for example, the ITC, the production tax credit, or the cash grant).
- There is no requirement that electricity be sold to an unrelated person. Thus, the ITC may be claimed on behind-the-meter wind projects or distributed generation wind projects.

- Leasing structures such as sale-leaseback and lease pass-through can be used to pass through the ITC to a lessee.
- The value of the ITC is based upon the cost of the wind energy property when the entity that builds the property claims the ITC. The value of the ITC is based upon the fair market value when the entity claiming the ITC did not build the property.

CASH GRANT

The cash grant was a response to the 2008 financial crisis. Policy makers believed that the 2008 financial crisis had impaired the appetite of tax equity investors for tax incentivized renewable energy projects and therefore a program needed to be instituted in order to subsidize the continued development of the renewable energy industry. The cash grant was designed to allow developers of renewable energy projects to immediately monetize the incentives provided by the ITC and the PTC. Both the ITC and the PTC can only be monetized against tax liabilities. Rules under the 2009 ARRA obligate the Treasury to fund 30 percent of an eligible wind project cost to successful applicants within 60 days of the later of the date the grant application is approved or the date the facility is placed in service. Other relevant aspects of the cash grant include:

- Currently, the cash grant is available for wind projects placed in service in 2009, 2010, or 2011, or on which construction commenced in 2009, 2010, or 2011.
- The cash grant is non-taxable for federal and California income tax purposes. A lessor who is eligible to receive the cash grant payment with respect to a wind project may elect to pass through the cash grant payment to a lessee. Again, as with the lease structure rules for the ITC, the lessee and the lessor must agree to pass through the cash grant payment to the lessee and the original use of the project must commence with the lessee.
- The value of the cash grant is based upon the cost of the wind energy property when the entity which builds the property claims the cash grant. The value of the cash grant is based upon the fair market value when the entity claiming the cash grant did not build the property.
- The cash grant funds are in lieu of the ITC and the PTC.
- Like the ITC, the purchaser of a wind project from a seller who has claimed the cash grant funds is not entitled to claim any of the federal incentives (for example, the ITC, the PTC, or the cash grant).
- The applicant must repay funds if the property is sold to a disqualified entity (for example, a tax-exempt entity) or if the property ceases to be qualified property within five years of the property being placed in service. As with the ITC, vesting takes place over a five-year period at 20 percent per year.

Note: Form BOE-571-W, *Wind Generation Property Statement*, contains a request for the taxpayer to provide the appraiser with a copy of the fair market value analysis for properties subject to a leaseback or lease pass-through agreement. Taxpayers involved in a lease structure that did not build

the subject wind energy property and are claiming either the ITC or the cash grant should provide a fair market value analysis, which may be useful to the appraiser in arriving at a fair market value conclusion.

FACTORS IN DETERMINING THE RIGHT INCENTIVE

There are a number of reasons an entity selects a particular incentive. Some of the reasons are summarized below. For a detailed discussion, the National Renewable Energy Laboratory issued a relevant paper entitled, *PTC, ITC, or Cash Grant? An Analysis of the Choice Facing Renewable Power Projects in the United States*.⁷

- The cash grant may be the only option when a developer cannot find a tax equity investor for the project.
- The PTC may be the best option for an efficient wind project that produces a lot of electricity.
- The ITC may be the best option for projects with relatively high dollars to megawatts capital cost and inefficient electricity production due to low wind.
- The PTC may be the best option for a project with significant ineligible costs which cannot be included in the basis for the ITC or the cash grant.
- The PTC may be the best option where the tax equity investor is concerned about liquidity.
- The ITC may be the best option where the tax equity investor prefers a shorter term investment. An ITC property generally can flip sometime after the five-year period.
- The ITC may be a good option where the developer has a strong interest in acquiring the project from the investor shortly after the five-year period as opposed to the ten-year period associated with the PTC.

RENEWABLE PORTFOLIO STANDARD

California's Renewable Portfolio Standard (RPS) was established in 2002 under Senate Bill 1078. California's RPS was accelerated in 2006 under Senate Bill 107 by requiring that 20 percent of electricity retail sales be served by renewable energy resources by 2010. Subsequent recommendations in California energy policy reports advocated a goal of 33 percent by 2020, and on November 17, 2008, the Governor signed Executive Order S-14-08 requiring that "...[a]ll retail sellers of electricity shall serve 33 percent of their load with renewable energy by 2020." The following year, Executive Order S-21-09 directed the California Air Resources Board, under its Assembly Bill 32 authority, to enact regulations to achieve the goal of 33 percent renewables by 2020.

In April 2011, Senate Bill X1-2 was signed by the Governor. This new RPS preempts the California Air Resources Board's 33 percent Renewable Electricity Standard and applies to all electricity

⁷ <https://financere.nrel.gov/finance/content/ptc-itc-or-cash-grant-analysis-choice-facing-renewable-power-projects-united-states>.

retailers in the state, including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. All of these entities became subject to the new RPS goals of 20 percent of retail sales from renewables by the end of 2013, 25 percent by the end of 2016, and 33 percent by the end of 2020.⁸

RPS impacts the market place for electricity in various ways. It directly impacts a wind generation facility's ability to obtain power purchase agreements. If not for RPS, electric retailers would likely not enter into long-term power purchase agreements with wind energy properties.

POWER PURCHASE AGREEMENTS

Electricity retailers commonly contract with wind energy properties using power purchase agreements (PPAs). PPAs are awarded through a competitive bidding process. The PPA bidding process replaced the qualifying facility contract process in 2003. It is important for electric retailers to obtain long-term PPAs with renewables in order to secure their required renewable portfolio under the RPS. PPAs are important to wind energy properties for the purpose of securing equity financing needed for construction, although sometimes financing is obtained on the perceived ability to secure a PPA with one of California's electric retailers.⁹

Under the Public Utility Regulatory Policies Act (PURPA), the Federal Energy Regulatory Commission (FERC) developed broad regulations that defined qualifying facilities as smaller generating units that used renewable resources, such as solar and wind energy, or alternative technologies, such as cogeneration. FERC required state regulators to ensure that electric utilities would interconnect with qualifying facilities and purchase qualifying facilities power based on "avoided cost," the cost that utilities avoided by using renewable and alternative energy instead of a fossil fuel. PURPA left it to state regulators to decide how "avoided cost" would be determined.

The California Public Utilities Commission (CPUC) decided to encourage qualifying facility development further by establishing generous "Standard Offer" power purchase contracts that utilities were required to accept from qualifying facilities. The CPUC based avoided cost on the cost of owning and operating a natural gas-fired power plant, which, at the time, was the most costly of fossil fuel plants to run.

In 1983, the bottom fell out of international energy prices and the cost of oil and gas dropped precipitously, but the lucrative terms of the Standard Offer contracts did not change, producing an increase of new applicants. In response, the CPUC began to phase out the Standard Offer program. By 1986, the CPUC had suspended the availability of new power purchase contracts for qualifying facility projects larger than 100 kilowatts.

Older wind energy properties currently under a qualifying facility contract are generally not considered strong candidates in the PPA competitive bidding process and, therefore, are not likely to receive a long-term PPA. When projecting revenues for qualifying facilities, the appraiser should

⁸ www.energy.ca.gov/portfolio/.

⁹ Discussion with investor-owned utilities' contract specialist revealed that certain projects will gamble on the ability to secure a PPA and commence construction before winning a PPA.

only use the qualifying facility contract up to its term.¹⁰ Extending prices stated in the qualifying facility contract beyond the term of the contract is inappropriate as we know that the qualifying facility contracts were structured on favorable terms based on antiquated avoided cost rules. When the remaining economic life of the subject wind energy property is believed to be longer than the remaining term of a qualifying facility contract, assessors should work cooperatively in collecting information on recently executed PPAs to ascertain electricity rates which can be used to project revenues for older qualifying facilities beyond the term of the qualifying facility contract.

PPAs are similar to qualifying facility contracts in that they are generally site specific. Generally, PPAs are structured such that:

- The electricity must be delivered to the point on the grid where the subject wind energy properties is connected;
- The PPA contains a clause specifically addressing the event of a sale. Under this clause the investor-owned utility has the right to approve the transfer of the PPA to a new owner.

The appraiser should review the PPA and the subject property and determine if the contract requirements are similar to qualifying facility contracts as discussed above. If so, the appraiser should use the electricity rate contained in the PPA of the subject property for forecasting revenue.¹¹

APPROACHES TO VALUE

The preferred method of valuation is by reference to sales prices.¹² The comparative sales approach is preferable to other value approaches when reliable market data on the sale of wind energy properties are available. Wind energy properties are complex properties containing a number of physical and operational attributes requiring analysis when considering appropriate comparables. The appraiser will need to exercise great care when selecting sales for consideration.

The cost approach, like the comparative sales approach, may present significant challenges. For example, the appraiser may need to adjust replacement cost new to reflect potential additional obsolescence associated with the high cost to construct wind energy properties relative to conventional power plants. The cost approach may be most useful in instances where the subject wind energy property has little or no additional obsolescence or in instances where the appraiser is able to identify and express additional obsolescence within the cost approach calculation.

The income approach for facilities recently placed in service may provide a reliable value indicator providing there is a reasonable level of confidence in the pro forma information reported by the taxpayer. The income approach will likely provide the most reliable value indicator for facilities with an established income stream.

¹⁰ See *Freeport-McMoran Resource Partners v. County of Lake* (1993) 12 Cal.App.4th 635.

¹¹ See *Freeport-McMoran, supra*, 12 Cal.App.4th at p. 646, where the court found that "...income generated by the [contract] is inextricably tied to the beneficial use of the property and properly considered in assessing its value."

¹² Property Tax Rule 4, *The Comparative Sales Approach to Value*. All references to Property Tax Rules are to sections of the California Code of Regulations, Title 18, Public Revenues

COMPARATIVE SALES APPROACH

The comparative sales approach may be the most reliable approach if comparable sales exist and detailed information about those sales is available. Selecting appropriate sales for comparison may be challenging due to the need to analyze a number of physical and operational attributes, some of which may require adjustments. The appraiser should have an accurate understanding of the physical depreciation of both the subject property and the properties selected for comparison. In addition, the appraiser should have detailed information of the operational attributes of both the subject and properties selected for comparison. Examples of the operational attributes include energy rates, electricity production, operating cost, and any conditions that may impact market value. The appraiser will need to make appropriate adjustments to selected comparable properties to reflect differences in both physical depreciation and operational attributes.

Use of the comparable sales approach may not be possible due to difficulty in obtaining the detailed information on the physical and operational attributes of selected comparables. Nevertheless, while market sales information of selected comparable properties may not be reliable for developing a sales indicator of value, the sales data may be useful in the development of a discount rate.

INCOME APPROACH

Of the three approaches to value, the income approach is generally thought to be the most reliable approach given the complexities related to the potential presence of additional obsolescence in wind energy properties.

Property Tax Rule 8, *The Income Approach to Value*, subdivision (a) addresses the applicability of the income approach:

The income approach to value is used in conjunction with other approaches when the property under appraisal is typically purchased in anticipation of a money income and either has an established income stream or can be attributed a real or hypothetical income stream by comparison with other properties. It is the preferred approach for the appraisal of land when reliable sales data for comparable properties are not available. It is the preferred approach for the appraisal of improved real properties and personal properties when reliable sales data are not available and the cost approaches are unreliable because the reproducible property has suffered considerable physical depreciation, functional obsolescence or economic obsolescence, is a substantial over- or underimprovement, is misplaced, or is subject to legal restrictions on income that are unrelated to cost.

Discounted Cash Flow Method

Wind energy properties are subject to varying cash flows from year to year. For this reason, the appraiser should use the discounted cash flow (DCF) method, also referred to as yield capitalization, for developing the income indicator of value. The DCF method is an income capitalization method in which income is converted into an indicator of value by forecasting each future year's income over an income projection period, discounting these future income streams at an appropriate yield (or

discount) rate into present value amounts, and then summing these amounts to produce a value indicator for the property.¹³

Cash Flow

Rule 8 requires that the appraiser discount before-tax income using a before-tax discount rate. The reporting format of form BOE-571-W, *Wind Generation Property Statement*, provides for the property owner to report projected revenue and expenses such that the appraiser can compute anticipated gross income before recapture and taxes (before-tax income) in accordance with Rule 8. The income to be capitalized is the income that a typical, prudent buyer would expect the property to yield over the income projection period. Wind energy properties are normally under a site-specific PPA. A prospective purchaser would be expected to fulfill the terms and conditions of the PPA, and thus it is the basis for estimating future revenue (see relevant discussion under the section Power Purchase Agreement).

As discussed earlier, benefits related to the tax credits or the cash grant should not be reflected in developing the fair market value. The appraiser should avoid viewing the tax credits or the cash grant as income and, therefore, should not include the tax credits or the cash grant in the cash flow.

Discount Rate

The appraiser should annually develop a discount rate that appropriately reflects the risk associated with wind energy properties. As noted above, market sales information of selected comparable properties may not be reliable for developing an indicator of value using the comparative sales approach. However, the sales data may provide information useful in the development of a discount rate.¹⁴ The appraiser should use the DCF method to derive the income value indicator. When discounting the before-tax income stream, the appraiser should ensure the use of an appropriate before-tax discount rate.

COST APPROACH

Equipment index factors are developed for use in mass appraisals and are generally reliable and practical for converting original cost to estimates of reproduction cost or replacement cost new.¹⁵ The percent good table (discussed in a later section) is based on the Iowa R2 curve with an average service life of 17 years and should be updated by the appraiser annually. The appropriate percent good factor should be applied to the replacement cost new (RCN) in order to reflect normal physical depreciation and normal obsolescence. Application of an appropriate percent good factor to RCN will result in replacement cost new less depreciation (RCNLD).

Due to the site-specific attributes of each wind energy property, development of a generic additional obsolescence formula is not possible, and the appraiser's ability to reasonably measure additional obsolescence through the cost approach may be limited. However, when the appraiser is able to identify the presence of additional obsolescence and develop an additional obsolescence adjustment,

¹³ Assessors' Handbook Section 502, Chapter 4.

¹⁴ Rule 8, subdivision (g)(1); Assessors' Handbook Section 502, page 77.

¹⁵ Assessors' Handbook Section 581, *Equipment and Fixtures Index, Percent Good and Valuation Factors*, Chapter 1.

this adjustment should be applied to RCNLD resulting in RCNLD less additional functional and external obsolescence.¹⁶

Replacement Cost New

The cost approach to value estimates the value of an asset or a group of assets based on the original or historical cost of the asset (or group of assets), adjusted to account for changes in value since purchase or installation. It is the method of valuation used most frequently to value personal property and business fixtures for assessment purposes because it lends itself to mass appraisal.¹⁷ Rule 3, *Value Approaches*, describes the three variations of the cost approach: reproduction cost, replacement cost, and historical cost. Of the three variations, the replacement cost (that is, the cost to replace an existing property with a property of equivalent utility as of a particular date) is the most meaningful as far as the principle of substitution is concerned.

The Lawrence Berkeley National Laboratory (LBNL) has accumulated historical cost data on wind energy properties. LBNL updates and obtains new cost data annually. The LBNL data can be used to compute price index factors (see Appendix A for discussion on computing the price index factors). The price index factors resulting from the use of the LBNL data when applied to the historical costs of a subject wind energy property is considered to be an approximation of RCN. The appraiser should be aware that the RCN resulting from the application of the price index factor developed from LBNL data is an RCN based on a composite of wind technologies.¹⁸ The appraiser should obtain the historical cost data from LBNL annually and develop an RCN index factor for the current year.

Additional Obsolescence

The federal tax credits and the cash grant by design were meant to support the financial feasibility of wind energy properties, and the amount of the federal tax credits and the cash grant are based on a certain set of assumptions. Depending on the attributes specific to the subject wind energy property, the financial support provided by the tax credits and cash grant may or may not be needed. In instances where the financial support from the tax credits and the cash grant are necessary in order to make the facility financially feasible, the subject wind energy property likely possesses a degree of additional external obsolescence. The appraiser should not use the benefit attributable to the tax credits and the cash grants as a means to measure additional external obsolescence for two primary reasons. First, as mentioned earlier, the incentives are not bargained for between buyer and seller, but instead vary from taxpayer to taxpayer depending on their individual income tax situations. And, secondly, the tax credits and the cash grant at times may provide a benefit that is greater than the additional external obsolescence for any particular wind energy property, it may not provide enough benefit to offset the additional external obsolescence, or the subject wind energy property may not have any additional external obsolescence.

¹⁶ See the BOE's *Guidelines for Substantiating Additional Obsolescence for Personal Property and Fixtures*. www.boe.ca.gov/proptaxes/pdf/ltal10030.pdf.

¹⁷ *Mass appraisal* is "the process of valuing a universe of properties as of a given date utilizing standard methodology, employing common data, and allowing for statistical testing" according to the Appraisal Institute, *The Dictionary of Real Estate Appraisal*, Third Edition, page 224.

¹⁸ For any given year, the LBNL historical cost data may reflect cost data for different technologies. For example, total cost data for a particular year may be the result of cost data collected from a number of 1-megawatt facilities, a number of 750-kilowatt facilities, and a 500-kilowatt facility.

There are a number of reasons the federal tax credits or the cash grant at times may provide too much or too little financial support. The primary drivers determining the effectiveness of the federal tax credits or the cash grant, or the lack thereof, are energy productivity, energy rate, and dollars per megawatt to construct. Owners of wind energy properties that are able to secure high energy rates through their PPAs or that experience above average energy productivity, or both, can expect to experience little additional external obsolescence, or perhaps no additional obsolescence. Conversely, owners of wind energy properties that secure relatively low energy rates through their PPAs or experience below average energy productivity, or both, may experience a high degree of additional external obsolescence.

Because of the nature of wind energy technology and the site-specific RCN attributes, it is not possible to develop a generic formula for the purpose of identifying and measuring additional external or functional obsolescence in the cost approach. Wind energy properties, unlike some other technologies, are not necessarily replaced with the most advanced technology available. There are a number of site-specific features that influence the selection of the best replacement technology. These features include topography of the facility, proven wind quality, and proven wind speeds and wind patterns.

Wind turbines are originally placed in service based on a lengthy wind study conducted prior to construction. The wind study provides data on wind characteristics throughout the site. Engineers use the data from the wind study in selecting the technology of wind turbines and the configuration of the siting of each individual wind turbine in order to maximize energy productivity. While most wind studies are useful in helping engineers design the most efficient wind facilities, there are instances where the data collected from actually having an operational facility result in the development of a replacement facility that is of different technology than the current technology.

It is possible that the appropriate replacement technology may be a generation or two behind the most advanced technology available as of the lien date. Understanding the dynamics of replacement cost for the facility and how replacement cost is computed in the cost approach is important in allowing both the appraiser and the property owner to arrive at a reasonable conclusion of the resulting cost indicator of value and the need, if any, for further adjustments.

Rule 6, *The Reproduction and Replacement Cost Approaches to Value*, points to the potential shortcoming of the cost approach as an indicator of value for wind energy properties, stating:

- (a) . . .It is particularly appropriate for construction work in progress and for other property that has experienced relatively little physical deterioration, is not misplaced, is neither over- nor underimproved, and is not affected by other forms of depreciation or *obsolescence*. [Emphasis added.]

This is one of the main reasons why the cost indicator of value should not be the sole indicator and provides the need to reconcile the cost indicator of value with the income and sales indicators of value. More detailed discussion on the reconciliation of the value indicators is provided in the following section.

Percent Good

The appraiser should annually develop the percent good factors using an Iowa R2 curve with a 17-year average service life. The rate of return should be based on the after-tax discount rate less inflation. The selection of the R2 curve with a 17-year average service life is based on industry and assessors' assumptions. The R2 curve reflects a retirement pattern that both industry and the assessors believe best matches the retirement pattern that an average wind facility will experience. The Iowa R2 curve with an average service life of 17 years reflects industry's and the assessors' assumption of a total economic life of 30 years for an average wind energy property.

RECONCILIATION OF THE VALUE INDICATORS

Reconciliation is the last analytical step in any valuation in which two or more value indicators have been estimated. In reconciliation, the appraiser reviews and summarizes the data and analyzes the relative reliability of the resulting value indicators.

Rules 4, 6, and 8 provide direction concerning the appropriateness of the comparative sales approach, cost approach, and the income approach, respectively. Rule 4 states that the preferred method of valuation is by reference to sales prices when reliable market data are available.

Rule 6(a) states that the cost approach is preferred when neither reliable sales data nor income data are available:

The reproduction or replacement cost approach to value is used in conjunction with other value approaches and is preferred when neither reliable sales data (including sales of fractional interests) nor reliable income data are available and when the income from the property is not so regulated as to make such cost irrelevant. It is particularly appropriate for construction work in progress and for other property that has experienced relatively little physical deterioration, is not misplaced, is neither over- nor underimproved, and is not affected by other forms of depreciation or obsolescence.

Rule 8(a) prescribes that the income approach should be used in conjunction with other approaches when the property being appraised is typically purchased in anticipation of a money income and either has an established income stream or can be attributed a real or hypothetical income stream by comparison with other properties:

(a) . . . It is the preferred approach for the appraisal of improved real properties and personal properties when reliable sales data are not available and the cost approaches are unreliable because the reproducible property has suffered considerable physical depreciation, functional obsolescence or economic obsolescence, is a substantial over- or underimprovement, is misplaced, or is subject to legal restrictions on income that are unrelated to cost.

VALUATION EXAMPLES

ESTABLISHED IN-SERVICE FACILITIES

Irrespective of the age of the utility scale wind facility or the perceived level of additional obsolescence, the appraiser should make every attempt to develop a sales indicator of value, a cost indicator of value, and an income indicator of value.

The sales indicator of value will likely be the best indicator of value when the appraiser is able to identify reliable sales data and detailed information related to the physical and operational attributes. However, before ruling out the cost and income indicator of values the appraiser should ensure that all of the appropriate adjustments have been made to the market sales data to ensure that the sales indicator of value reflects the market value of the subject.

When the appraiser is not able to develop a reliable sales indicator of value, consideration must be given to the cost and income indicators of value. The following examples illustrate the types of results the appraiser may encounter when left to only consider the cost and income indicators of value. Each of the examples includes value conclusions along with potential explanations.

Cost and Income Value Indicators Agree

Example 1

The property was placed in service on June 1, 2009. The assessment is for the January 1, 2015 lien date.

Cost indicator computation without an adjustment for additional obsolescence:

Historical Cost	\$100,000,000
RCN Factor	1.2 ¹⁹
RCN	\$120,000,000
Percent Good	75%
RCNLD	\$90,000,000
Cost indicator of value	\$90,000,000

Income indicator computation:

DCF, 25-year remaining economic life, 10% rate	\$89,500,000
Income Indicator of Value	\$89,500,000
Difference	\$500,000

¹⁹ RCN factors and percent good factors are provided for illustration purposes only. Actual factors will most likely be different than those used in this example.

Potential Explanation: The difference between the cost and income indicator of value is considered to be negligible. Further, based on a detailed analysis of both indicators, the appraiser is of the opinion that the property does not suffer from any form of additional obsolescence. For this reason, each value indicator is considered equally reliable.

Example 2

The property was placed in service on June 1, 2009. The assessment is for the January 1, 2015 lien date.

Cost indicator computation with an additional external obsolescence adjustment:

Historical Cost	\$150,000,000
RCN Factor	1.2 ²⁰
RCN	\$180,000,000
Percent Good	75% ²⁰
RCNLD	\$135,000,000
Less Additional External Obsolescence	\$13,500,000
Cost Indicator of Value	\$121,500,000

Income indicator computation:

DCF, 25-year remaining economic life, 10% rate	\$120,000,000
Income Indicator of Value	\$120,000,000
Difference	\$1,500,000

Potential Explanation: The difference between the cost and income indicators is considered to be negligible. The additional external obsolescence calculated in the cost approach is based on information provided by the property owner and agreed to by the appraiser. Based on a detailed analysis of both indicators, the appraiser is of the opinion that additional external obsolescence is appropriately reflected in both the cost and income indicator of value. However, since the property has experienced a significant amount of additional external obsolescence, greater reliance could be placed on the income indicator in accordance with Rule 8 as long as the income projection data are considered reliable.

Note: The appraiser should not arbitrarily input an additional obsolescence adjustment in the cost approach for the purpose of having the cost indicator of value comport with the income indicator of value.

²⁰ RCN factors and percent good factors are provided for illustration purposes only. Actual factors will most likely be different than those used in this example.

Cost and Income Value Indicators Disagree

Example 3

The property was placed in service on June 1, 2008. The assessment is for the January 1, 2015 lien date.

Cost indicator computation without an adjustment for additional external obsolescence:

Historical Cost	\$200,000,000
RCN Factor	1.25 ²¹
RCN	\$250,000,000
Percent Good	73% ²¹
RCNLD	\$182,500,000
Cost indicator of value	\$182,500,000

Income indicator computation:

DCF, 24-year remaining economic life, 10% rate	\$155,500,000
Income Indicator of Value	\$155,500,000
Difference	\$27,000,000

Potential Explanation: The difference between the cost and income indicators is significant. The property owner was not able to provide sufficient information to calculate an additional external obsolescence adjustment in the cost approach. Based on a detailed analysis of both indicators, and presuming all assumptions applied in the DCF/income approach are correctly supported by market data, the appraiser's opinion is that additional external obsolescence is present in this property and is appropriately reflected in the income indicator. Because the property is believed to have a significant amount of additional external obsolescence, no reliance should be placed on the cost approach in accordance with Rule 6.

There may be instances where the cost indicator of value is lower than the income indicator of value. In cases where the subject wind energy property has experienced a significant level of physical depreciation and additional obsolescence, the cost indicator of value may not be a reliable estimate of fair market value. Furthermore, the cost indicator of value may not be a reliable indicator of value in cases where the subject wind energy property has been in service for a number of years and has been extraordinarily well maintained and upgraded. Conversely, the cost indicator of value may be a better indicator of value when the subject wind energy property has recently been placed in service and no evidence of additional obsolescence has been made available and the appraiser lacks confidence in

²¹ RCN factors and percent good factors are provided for illustration purposes only. Actual factors will most likely be different than those used in this example.

the projected revenue and expenses reported by the property owner on the *Wind Generation Property Statement*.

Each wind energy property possesses unique physical and economic characteristics. The appraiser will need to analyze the indicators of value and the detailed information related to each facility, decide how much reliance to place on the indicators of value in determining a fair market value conclusion, and provide an explanation for the differences between value indicators and support for the final value conclusion.

CONSTRUCTION IN PROGRESS AND RECENTLY PLACED IN SERVICE FACILITIES

Normally the cost indicator of value is preferred for wind energy properties recently placed in service and for such facilities where construction is still in progress on the lien date. In cases where the appraiser is presented with credible evidence of additional obsolescence and is unable to determine an appropriate additional obsolescence adjustment in the cost approach, reliance on the cost indicator of value may be problematic. In such cases, the appraiser may need to place an unusual reliance on the income indicator of value.

The taxpayer is required to provide a pro-forma cash flow on the *Wind Generation Property Statement* filed with the assessor. The assessor may develop an income indicator of value using the pro-forma cash flow information.

For facilities recently placed in service, the appraiser will need to go through the same reconciliation process as illustrated above for established in-service facilities. The appraiser should make a complete analysis of both the cost and income indicators of value and determine how much reliance should be placed on each indicator of value. The appraiser should also provide an explanation supporting the reasoning for the final value conclusion.

For construction in progress, the income indicator of value will need to be adjusted to reflect the percent of construction in progress completed relative to anticipated full economic cost of the facility upon completion.

Example 4

- On the January 1, 2015 lien date, the property owner reports construction in progress costs of \$100,000,000.
- Information provided by the property owner demonstrates that the anticipated full economic cost of the facility upon completion to be \$125,000,000.
- Percent of construction in progress complete is 80 percent or $\$100,000,000 / \$125,000,000$.
- Using reported pro-forma cash flows, the appraiser develops an indicator of value of \$115,000,000.

Based on the above set of facts, the appraiser may conclude that the income indicator of value appropriately reflects additional obsolescence. The appraiser may apply the construction in progress

percent complete of 80 percent to the income indicator of value to arrive at a construction in progress fair market value as of the 2015 lien date. Hence, the fair market value may be determined to be \$92,000,000 ($\$115,000,000 \times 80\%$) via the income approach.

Reliance on an income indicator of value in determining the fair market value of facilities recently placed in service, or where construction is still in progress on the lien date, should be tempered with the confidence that can be placed on pro-forma cash flow information used to develop the income indicator of value.

The final value estimate is an appraiser's opinion of value. There is no mathematical formula or statistical technique to which the appraiser can ultimately refer to in order to reach the final value estimate. It is an opinion that should be based on the appraiser's application of generally accepted appraisal methods and procedures.

APPENDIX A: COMPUTING PRICE INDEX FACTORS

Cost data published by Lawrence Berkeley National Laboratory (LBNL) is available according to region, facility size, and quality of data. Most new wind energy properties are placed in service toward the end of any given calendar year, and project construction costs are typically incurred throughout that same calendar year. Therefore, LBNL's historical cost data for any given calendar year will be the most relevant costs for that subsequent lien date. For example, calendar year 2013 historical cost data will be good for the 2014 lien date.

CRITERIA FOR SELECTING COST DATA USED FOR COMPUTING TWO PRICE INDEX FACTORS

WESTERN REGION AND NATIONAL COST DATA

The assessor will compute two sets of price index factors, western region and national. Western region price index factors are likely to approximate price changes within California and will be considered the source price index factors for use in developing the cost indicator of value. The assessor will compute national price index factors, and then compare the national price index factors to the regional index factors for the purpose of identifying unusual price changes within the western region that may require investigation. This comparison may be especially useful for times that LBNL is not able to collect cost data for certain year(s) and the assessor utilizes a regression technique to compute missing cost data.

FACILITY SIZE 20 MW AND GREATER

Historical cost data suggest that the cost advantages obtained from increasing capacity level off at 20 MW.²² Most of the wind energy properties subject to assessment by the assessor will be 20 MW and greater in size. In order to avoid variations attributable to the wide range in cost data generated from facilities with less than 20 MW, the assessor will only use cost data from facilities with total installed capacity of 20 MW and greater.

LBNL QUALITY DATA COST 3, 4 & 5

LBNL assigns a quality rating to the cost data collected. Only quality data cost with a ranking of 3, 4 or 5 should be used. The data is rated 1 through 5 as follows:

- 1 = cost data from news stories prior to construction.
- 2 = cost data from news stories after construction.
- 3 = cost data from more detail analysis before completion.

²² Scale economies are shown graphically in the [2014 Wind Technologies Market Report](http://energy.gov/sites/prod/files/2015/08/f25/2014-Wind-Technologies-Market-Report-8.7.pdf), in Figure 40 on page 49. The report can be found at: <http://energy.gov/sites/prod/files/2015/08/f25/2014-Wind-Technologies-Market-Report-8.7.pdf>, or at https://emp.lbl.gov/sites/all/files/lbnl-188167_1.pdf.

- 4 = cost data from more detail analysis after completion.
- 5 = cost data confirmed with property owners.

COMPUTATION

For each year cost data is provided, the assessor totals the costs for that year and computes the average \$/kW. The most current calendar year factor will always be 100.

For example, during the spring of 2015, just prior to the 2015 lien date valuation season for business property, the assessor contacts LBNL and requests historical cost data. In response, LBNL provides historical cost data based on the criteria above. The assessor averages the historical cost data for each year and organizes the average \$/kW in a table as illustrated in the first 3 columns below. The price index factor is computed in the final column. Price index factors are computed by dividing the most current year \$/kW by the historical \$/kW. Using this formula, the 2012 price index factor is computed as follows:

$$\text{\$1,700/kW} / \text{\$2,000/kW} = 85$$

Calendar Year	LBNL Avg. \$/kW ²³	Lien Date	Price Index Factor
2014	1,700	2015	100
2013	1,600	2014	106
2012	2,000	2013	85
2011	2,150	2012	79

For any given lien date, LBNL may not be able to provide historical cost data from the prior calendar year. When an incomplete historical data set is provided by LBNL the assessor may use a regression technique to determine the average \$/kW for those year(s) of missing historical cost data.

²³ \$/kW are estimates based on information provided in Figure 39 on page 48 of the [2014 Wind technologies Market Report](#).