**VALUATION OF SOLAR GENERATION ASSETS**

The valuation of solar energy projects is a complex subject and is a source of tension between regulators, developers and debt and equity investors. This paper is intended to highlight best practices, as well as common pitfalls in valuing solar energy projects including the tangible and intangible assets comprising a fully contracted in-place system (a “solar asset”).

Solar assets may be valued for many purposes, including:

- Strategic planning
- Acquisition
- Debt and equity financing
- Investment tax credit and Section 1603 grant in lieu of credit
- Buyout options
- Allocation of purchase price for an acquisition

Depending on the purpose of a valuation, there can also be different standards (also referred to as definitions) of value required by regulators, or requested by the users of valuations. These standards include fair market value (“FMV”), market value, fair value, investment value, book value, and value to the holder. However, the most common valuations of solar assets will utilize the FMV standard. Fair market value is required for federal income tax purposes (e.g., investment tax credit, and tax allocation of acquisition purchase price) as well as for Section 1603 grant purposes, and is frequently requested by investors. Accordingly, this paper focuses only on valuations under FMV for new or “as-if fully complete” assets.

Many common errors are made by not adhering to the well-defined standard of FMV. Valuations should clearly state and define the standard of value. FMV is defined in accordance with Revenue Ruling 59-60 as follows:

“The price at which property would change hands between a willing buyer and a willing seller when the former is not under any compulsion to buy and the latter is not under any compulsion to sell, both parties having reasonable knowledge of relevant facts.”

It is generally accepted and supported by numerous cases that the term “fair market value” contemplates a hypothetical willing buyer and a hypothetical willing seller. FMV does not consider the unique motivations of a particular buyer or seller, nor does it consider unique synergistic value that a particular buyer may perceive. FMV also considers all risks inherent in ownership including factors related to control and marketability.

It is important to note that FMV contemplates an arm’s length transaction whether or not there is an actual or contemplated transaction. Accordingly, the attributes of the current owner/holder (e.g., actual costs incurred and tax attributes) are generally not relevant unless they can be transferred to a hypothetical buyer. This concept is particularly important for solar assets that generate substantial value from tax attributes such as accelerated depreciation and tax credits. For example, a project owner entity’s investment tax credits would be based on actual eligible direct and indirect costs, overhead and may include a developer fee paid to a related party, whereas FMV is determined from the buyer’s perspective based on the expected price of the system and an allocation of that price to eligible components.
There are many accepted methods for valuing assets that do not have a readily available or quoted market price such as solar assets. These valuation methods can generally be aggregated into the following three categories:

- Asset/Cost Based
- Income Based
- Market Based

In the valuation of solar assets, generally all three approaches should be developed because each provides relevant information to estimating FMV (i.e., the price that would be negotiated between a hypothetical buyer and hypothetical seller). Each approach has its strengths and weaknesses and will be afforded different weight based on the facts and circumstances. Each approach, its strengths and weaknesses, and typical pitfalls are discussed below.

**Cost Approach**

The cost approach is applied using either the reproduction cost method (costs to replicate an identical asset) or the replacement cost method (costs to develop an asset of similar utility). The cost approach is most applicable in estimating the value of a new or hypothetical "as if complete" solar asset. This method becomes much less reliable for in-service assets because of the difficulty in estimating physical, functional, technological and economic obsolescence/depreciation.

The cost approach is developed by accumulating the market based direct and indirect costs to develop an asset of equivalent utility that would be incurred by a market participant, adding opportunity cost for the cost of capital during the development period, and adding an entrepreneurial profit to compensate for the risk in undertaking the development.

The cost approach has received a tremendous amount of attention in the valuation of solar assets, in part because certain grant applications required a cost certification from an independent certified public accountant (“Cost Certification”). However, from a valuation perspective, the cost approach is generally no more important than income or market approach, and is often the least reliable method in reaching a conclusion of fair market value. The factors causing the limitations of the cost approach mirror its lack of utility in an arm’s length negotiation between a willing buyer and willing seller, which is the required standard inherent in FMV analysis.

It is critical to note that the cost method is not a Cost Certification, and actual costs are not utilized because costs must be based on what a hypothetical market participant would incur to replace the asset, not necessarily the costs that the developer incurred in developing the asset. The market participant concept is also applied in estimating opportunity costs. Entrepreneurial profit is difficult to estimate and based on market factors. Entrepreneurial profit should not be based on actual development agreements in place, which are often between related parties and may not be viewed as representative of a market transaction.

The cost approach provides relevant information in estimating FMV under the premise that a market participant would pay no more for an asset than their cost to develop an asset of equivalent utility. The cost approach, however, has significant weaknesses because it does not easily provide for consideration of an actual power purchase agreement (“PPA”), a contract for solar renewable energy certificates (“SREC”) sale (and they may be favorable or unfavorable to the value of the solar asset), or substantial differences among state and local incentives in different jurisdictions.
The cost approach often provides the upper bound for the FMV of the solar asset. However, in circumstances where the cost approach provides a higher indication of value than income and market approaches, say because of a below-market PPA, the cost approach should be given little or no weight in reaching a conclusion of FMV to best reflect the expected action of the hypothetical buyer. In situations where the cost approach provides a lower indication of value than the income or market approach, this may justify increasing the entrepreneurial profit (and cost approach value) or relying more heavily on income or market approaches because the seller would demand this additional value.

Accordingly, in estimating FMV and similar to the process when parties negotiate a price, the cost approach is typically no more important than the income or market approach, and is often the least important method in reaching a conclusion. As is evident in many real estate markets that have seen market disruption, replacement cost can be substantially higher than fair market value.

The most common pitfalls using the cost approach include:

- Utilizing actual costs and not considering current market costs particularly when prices have dropped and the project is delayed.
- Utilizing a related party developer fee as entrepreneurial profit when the solar asset’s economics do not justify a large entrepreneurial profit.
- Placing too much reliance on the cost approach when it is a higher indication of value than the income and market approach (i.e., the economics do not support replacement cost).
- Placing too much reliance on the cost approach when it is a lower indication of value than the income and market approach (i.e. the economics support a higher value than represented by replacement costs and a reasonable entrepreneurial profit).

**Income Approach**

Valuation methods based on the income approach use the expected economic earnings capacity of the solar asset in question to estimate value. This approach is generally used by market participants in pricing solar assets, and is usually the most relevant method to estimate FMV because it considers the specific contracts and incentives applicable to the solar asset. There is also a substantial history of case law and tax authority that indicates that the income approach is most appropriate for determining the fair market value of property that generates income, particularly a consistent income stream over a long period.

For solar assets, the income approach is generally developed using the discounted cash flow (“DCF”) method. The DCF method is based on the fundamental financial premise that the value of any investment is the present value of expected future economic benefits. The DCF method considers all of the relevant factors an investor would consider in determining value (i.e., economic benefits, risk, and the liquidation time horizon). In applying the DCF method, the economic benefit stream over the projection period is converted to present value at a discount rate which meets the return requirements of debt and equity investors (i.e., the weighted average cost of capital). A projection of economic benefits (after tax cash flows including tax benefits) covering the expected life of the system is utilized because the timing of significant benefits such as tax credits and depreciation and state and local incentives varies from year to year.

One of the inherent factors and potential weaknesses of the DCF method is the reliance on a projection covering the estimated useful life of the system. However, many solar assets will have a PPA with extensions covering a
substantial portion of the estimated life of the system and statutory provisions or contracts covering SRECs or incentives. Furthermore, the timing and amount of tax credits and depreciation benefits, which represent a significant portion of the economic value, can be estimated once the price/FMV is determined. Accordingly, the uncertainty for solar assets relates principally to merchant sales or un-contracted SREC revenue.

One of the more difficult aspects for some appraisers in applying the DCF method is determining the appropriate unleveraged discount rate or weighted average cost of capital (“WACC”). The WACC should reflect the required market rate of return on equity and the required market rate of return on debt with each weighted based on their respective portion of the long-term capital structure. The market return on equity should be based on current requirements for equity investors and is usually estimated using techniques like the capital asset pricing model used by valuation professionals. The cost of debt should reflect the market interest rate and fees on long-term solar asset debt financing.

Another difficult input to estimate is the long-term equity and debt weighting. Much like real estate and other long-lived tangible assets, solar assets are generally debt financed with amortizing debt with an amortization period and term that is significantly less than the life of the asset utilized in the DCF projection. Accordingly, the debt weight cannot be computed based on the initial loan to value or the WACC will be understated resulting in an overstatement of value. Additionally, the unlevered return or WACC should be referenced to recent studies on unleveraged rates of returns or direct observations from actual transactions in solar assets.

A further challenge in using the DCF method is projecting tax attributes such as depreciation and income tax rates. Many projects are eligible for bonus depreciation. However, if bonus depreciation creates projected losses, care must be taken to consider whether a typical market participant would put value on these benefits at marginal tax rates, and whether bonus depreciation would be considered by a typical market participant in pricing the subject asset.

It is also important to note that projections and the WACC should be determined from the perspective of a market participant, not the current holder of the asset. This is extremely important in estimating the correct amount of tax credits and depreciation that a buyer would obtain upon purchasing at FMV, allocating costs to eligible vs. ineligible items, and segregating components into depreciable lives. Additionally, the financing rates and debt and equity weighting for the current holder/owner are much less important than rates and weighting for a typical market participant.

Common pitfalls in using the income approach include:

- Utilizing the initial loan to value as the long-term debt weighting and understating the WACC.
- Failure to include a risk premium in the WACC for merchant sales or un-contracted SRECs and understating the WACC.

**Market Approach**

The market approach is typically developed in valuing solar assets when a sufficient number of adequately comparable assets have recently transferred ownership, and valuation metrics for the transactions can be obtained. Given the volume of solar transactions in most jurisdictions and access to reliable data, the market approach is utilized for most solar asset valuations using the comparative transaction method. Using the comparative transaction method, the reported price per capacity unit (e.g. megawatt) for recent comparable systems is
analyzed and a selected cost per capacity unit is then applied to provide an indication of the estimated fair market value for the solar asset.

The first challenge in applying the market approach is finding a sufficient number of recent comparable transactions from which valuation metrics can be obtained. Given the substantial difference for solar assets between jurisdictions for capacity factors, RECs and other incentives, comparable transactions should typically be from the same region and state, and consideration should be given to the size of the system. If these criteria cannot be met, little or no reliance should be placed on the market approach.

Even if an adequate number of comparable transactions are identified, an inherent weakness in the market approach is obtaining specific information on the comparables to quantify adjustments that may be appropriate to properly estimate FMV. The terms of the PPA can obviously have a substantial impact on the value of the solar asset, but it is often not possible to obtain the details to accurately adjust metrics from comparable transactions.

The most common pitfalls in using the market approach include:

- Utilizing price data from transactions that are not reasonably comparable because of location or size
- Utilizing transaction data is not current particularly given market forces over the last several years.
- Failure to consider whether adjustments to reported transactions should be made for factors specific to the system (e.g., terms of a PPA that are above or below market).

**A Note Regarding Purchase Price Allocations**

The allocation of the purchase price by buyers for both financial reporting and income tax reporting has also been the subject of controversy and wide disparity in practice for solar assets. The rules and approach may be different for financial reporting (using fair value as the required standard of value) than for income tax purposes (using FMV as the required standard for value). While the subject of purchase price allocation is beyond the scope of this article, it is important to note that certain concepts must be considered in estimating the FMV of the solar asset because FMV contemplates an arm’s length transaction. For example, the amount of investment tax credit and depreciation considered in the valuation must be based on the perspective of the buyer, applying the concepts that a hypothetical buyer would apply in its purchase price allocation.

This general overview of best practices in fair market value determination and the importance of appraisals does not delve into the details of purchase price allocations, a complex and important process that will be the subject of a subsequent SEIA white paper.
Conclusion

Rigorous, accurate, third-party appraisals are critical to proper evaluation of solar energy generating assets. Even after valuation approaches are applied rigorously with the best available market data, reaching a conclusion is often difficult. In reaching a conclusion, each method should be analyzed for the quality of data obtained, actual and inherent weaknesses, and the importance of the indications from each method to a hypothetical purchaser. There is no basis for relying equally on the three (or fewer) approaches unless each provides the same quality of information. If the indications of value from the three approaches result in a reasonable range of indications, it may be appropriate to weight each equally. However, a wide range of indications may warrant revisiting each method and its inputs and assumptions, and in many circumstances, the cost and market approaches may need to be given less weight in reaching a conclusion.

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