WHITE PAPER

Asset Valuations in the Power Sector

Power Generation, Transmission and Distribution, Energy Storage, and Microgrids

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Introduction

Asset valuation is a complex but vitally important task for any organization involved in the development, financing, investing, or operation of power generation, transmission, distribution, and energy storage assets. Today's energy industry is rapidly evolving; the questions surrounding changing energy regulations and subsidies, the tradeoffs between new and old power technologies, the long-term price of natural gas, and the often-volatile financial markets all combine to make utility asset valuations challenging. Accurate valuations must be based on a keen understanding of power technologies and the industry with in-depth knowledge of technology costs, revenue drivers, and the regulatory landscape. Sargent & Lundy has worked in the electric power industry since our founding in 1891, meaning we possess an understanding of the electric power industry that is unparalleled. We have designed facilities from billion-dollar nuclear stations to much smaller distributed solar installations. This depth of experience provides a significant advantage to our clients and sets Sargent & Lundy apart from others in the industry.

Challenges of Valuations

On a macro level, most electric utility assets are illiquid—they do not change ownership very frequently. It can be challenging to easily establish a fair market value. A careful analysis of the underlying project details and the energy market must be undertaken to establish proper valuations. Decisions regarding financing and development often center on the opportunity costs of different technologies. Many common questions for potential investors or developers arise from the fact that changing commodity prices and technological advancements over the last decade have caused a swift change in the generation landscape. Proper valuations and associated recommendations require a strong knowledge not only of the details of the specific generation asset, but also a sense for where the energy industry is moving in the future. Additionally, changing regulations, energy subsidies, and the state of financial markets can all have a sizeable impact on valuations. Integrating each of these different elements helps to illuminate the challenge of making accurate valuations—any organization engaged in determining the fair market value of a generation asset must be able to quantify the impacts.

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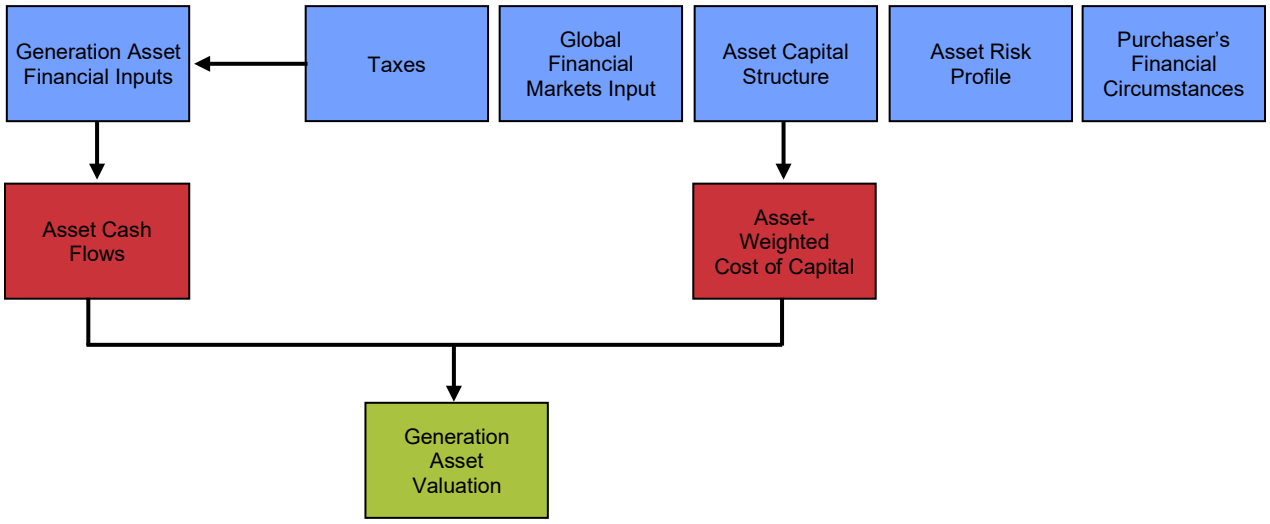
Valuation Methodologies

In general, valuation methodologies fall into three distinct categories: an income-based approach, a sales comparison approach, and a cost approach. Each method is suited to particular situations. Ideally, a valuation would consider two or more methods to have independently derived evidence of where fair market value of an asset lies. The key elements of each method are explored below.

Valuation Approaches

Income-Based Valuation Approach

The income-based approach attempts to quantify the future economic benefits and costs of a generation asset to establish the fair market value. This valuation approach follows the theory that the current value of an asset is the sum of its discounted future cash flows. The valuation is based on the understanding that an informed purchaser will not be willing to pay more for a facility than could be earned by instead undertaking a different investment that has a comparable risk profile. Cash flows are derived from several different financial inputs, including projected revenues, expenses, depreciation, taxes, and potential subsidies. All cash flows are discounted to the present value using an appropriate discounting rate, such as a weighted average cost of capital. The weighted cost of capital is dependent on appropriate assumptions about capital structure, risk profile, financial markets, and taxes. The following flow chart provides a high-level illustration of how the different inputs combine to yield a valuation:



A challenge for the income approach lies in the difficulty of forecasting the future, whether that centers on the merchant power market, changing regulations and subsidies, or technological advancement. Often a series of educated assumptions must be made to forecast future years; however, a valuation is only as accurate as the assumption on which it is based. A sensitivity analysis can be used to quantify the degree of impact each assumption has upon the overall valuation. See below for more information on sensitivity analyses.

A common way of quantifying the degree of equity risk attached to the generation asset is to start with a comparison to similar assets and then adjust accordingly based on variables unique to the asset in question.

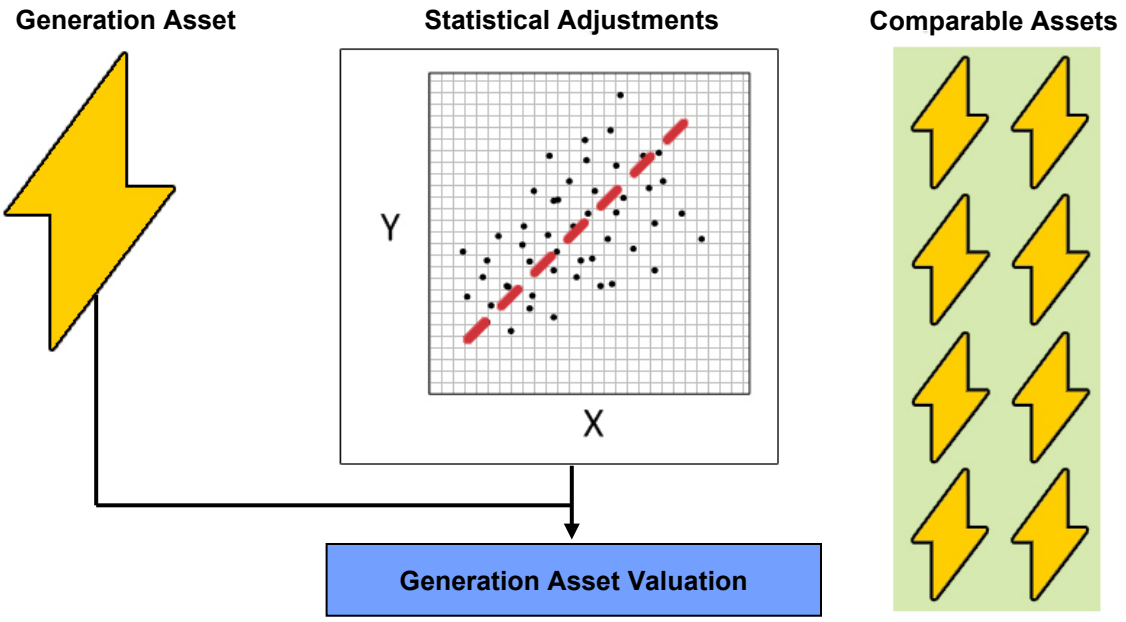
Another fundamental challenge for the income-based valuation approach is determining the proper discount rate, or weighted average cost of capital. The weighted average cost of capital should reflect a financing structure suitable for the generation asset, the risk profile of the asset, the financial circumstances of the purchaser, and the financial market. Typically, a mix of debt and equity are used to finance such projects. The cost of debt reflects current market interest rates for debt at the appropriate credit rating. Similarly, the cost of equity is a risk-adjusted equity return based on the market return for equity, an associated market risk premium for the particular generation asset, and the market risk-free rate. A common way of quantifying the degree of equity risk attached to the generation asset is to start with a comparison to similar assets and then adjust accordingly based on variables unique to the asset in question.

Sargent & Lundy uses the income-based valuation approach to value generating assets with defined future income streams. This method is also useful for unique or uncommon generation assets for which recent similar valuations (often referred to as “comparables”) may be sparse or not exist at all. Generally, an income-based approach is superior to other valuation methods because it concentrates on the underlying ability of the asset to generate future cash flows, providing a means of accounting for the market and operating environment in which the facility is to be used. However, there are times where it is not possible to use an income-based approach, such as when an asset does not earn income. This would apply to many transmission and distribution systems. In these instances, other methods must be employed.

Sales Comparison Approach

The sales comparison approach is a method that can be used to value an electric utility asset when there are a sufficient number of comparable assets that have recently transferred ownership. For large generation facilities, it may be challenging to find enough similar assets that can be used for comparison. Transactions (i.e., buying and selling) of electric utility assets are sometimes done in portfolios, or groups of assets, which means that the exact price of individual assets is not publicly available or is confidential. Additionally, comparable assets may not be similar enough to the unvalued asset to allow for a direct comparison. In these cases, adjustments must be made to reconcile differences between the comparable assets and the asset to be valued. Statistical techniques, such as multi-variable regression and other methods, may be employed to reconcile any differences. The flow chart below provides a high-level illustration of the sales comparison approach.

Figure 1 — High-Level – Sales Comparison Approach



As mentioned, the sample size of comparable asset transactions must be sufficiently large to allow for meaningful comparison. Additionally, the comparable assets must be similar enough to the unvalued asset to allow for an accurate valuation. It is also important to note that differences between geographical regions can skew comparable values. For example, regulations and subsidies tied to specific locations might be different and therefore must be adjusted for when using this valuation approach. On a more general level, using comparable asset values in a valuation inherently assumes that each comparable asset's transaction price accurately reflects its fair market value. The transaction price and the fair market value of an asset are not always mutually inclusive. The impact of mispriced assets in the data sample may be controlled by incorporating other information sources and valuation methodologies.

This method can often be used on projects in the wind or solar generation sector, where the individual generation assets are often similar from location to location. However, regulatory differences between locations would need to be accounted for to provide an accurate valuation. Sargent & Lundy typically uses this valuation method for generation assets where there is a large sample size of comparable asset transactions.

Cost-Based Valuation Approach

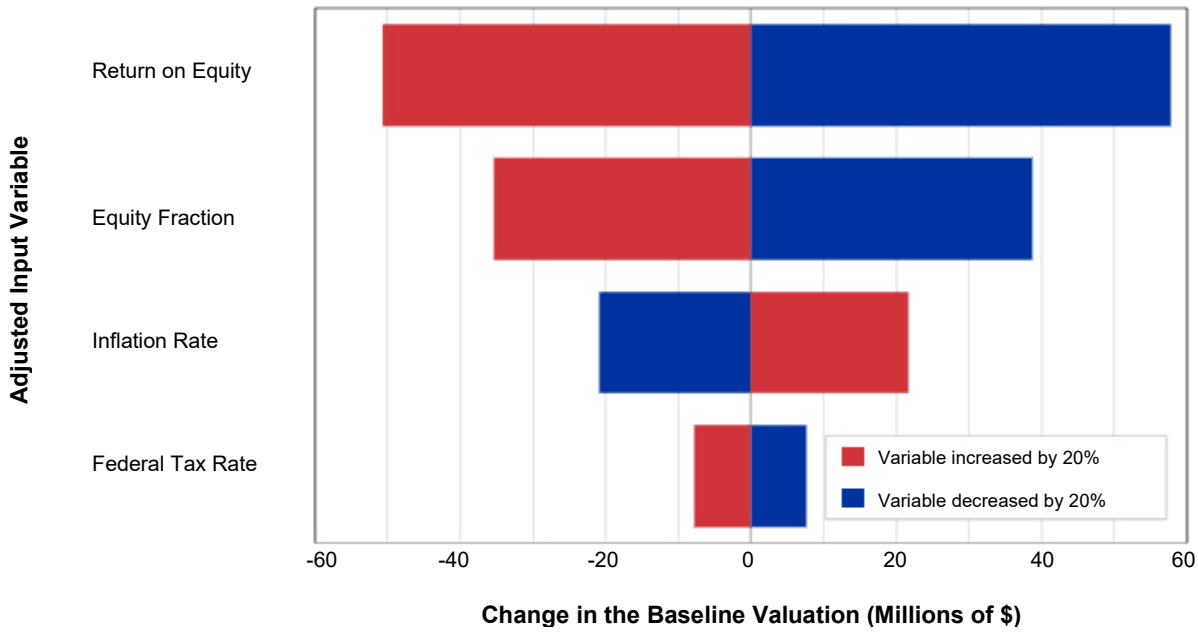
The replacement cost-based valuation approach is a method based on the economics of substitution. This approach determines the cost to replicate or replace an identical asset, and it is based on the assumption that an informed purchaser would not pay more for the facility than the cost to construct a substitute facility. This method may be the ideal method to use when there is no revenue stream. For example, Sargent & Lundy has used a cost-based valuation approach to determine the fair market value for transmission lines, substations, converter stations, and a host of other asset types for a variety of clients.

Some challenges specific to a cost-based valuation approach stem from the fact that construction costs and depreciation can be difficult to measure. For example, determining the cost to replace an old facility with another, equally depreciated facility is often not a straightforward calculation due to the difficulty in quantifying physical, technological, and economic depreciation. Additionally, this approach is by its nature subject to the market conditions of the present day. Changes in energy prices in the future, technological advancements, and changing regulations all have the potential to limit the accuracy of this valuation method, particularly for generation assets. The valuation must also consider the potential that permitting, right of way, transmission access, and other factors may not be easily valued and are not always replaceable.

Sensitivity Analyses

Sensitivity analyses are a valuable tool that can help illuminate the degree to which deviations in the input variables affect the final valuation. The following graph presents a simplified sensitivity analysis for a hypothetical income-based valuation. In this example, the input variables shown (inflation rate, return on equity, the federal tax rate, and the equity fraction) are first individually increased by 20% and then decreased by 20%. Only one variable is changed at a time. The resulting impacts upon the baseline valuation are then plotted:

Figure 2 — Hypothetical Simplified Sensitivity Analysis



This is a simplified example for illustrative purposes; a thorough sensitivity analyses would involve adjusting a greater number of the input variables and having the experience to apply a meaningful range of adjustments. If enough information is known about the input variables, sensitivity analyses can also be approached probabilistically, allowing for valuations with associated degrees of statistical confidence.

Final Valuation

Each of the three valuation methods discussed can be used to approximate the fair market value of an electric utility asset. Given that each method is calculated independently from one another, it is recommended to use as many methods as possible to provide a level of confidence that the final valuation is an accurate reflection of fair market value. If enough information is available, the weightings attached to each method's valuation are adjusted if certain methods are deemed to carry more influence on the final valuation. As mentioned previously, an income-based approach is often superior to other valuation methods because it concentrates on the underlying ability of the asset to generate future cash flows; therefore, the results from this approach are typically given the highest weighting.

Summary

Asset valuations are essential for any organization in the energy industry involved in development, financing, investing, or operation. They are complex, requiring a strong understanding of the technical and economic aspects of utility assets and the markets in which they are financed, developed, and operated. What sets Sargent & Lundy apart is our ability to leverage our experience and expertise in the power generation industry, both technical and economic. We offer valuation services, often in conjunction with our technical and financial due diligence services that provides sellers, prospective purchasers, lenders, investors, and other stakeholders with informed guidance regarding the market value of generation, transmission, distribution, and energy storage assets. With 125 years of experience in the power generation industry, a culture of quality and attention to detail, and a diverse staff of experienced engineers and financial experts, Sargent & Lundy has been able to provide reliable utility asset valuations for clients around the globe.

About Sargent & Lundy

Sargent & Lundy is one of the oldest and most experienced full-service architect engineering firms in the world. Founded in 1891, the firm is a global leader in power and energy with expertise in grid modernization, renewable energy, energy storage, nuclear power, and fossil fuels. Sargent & Lundy delivers comprehensive project services—from consulting, design, and implementation to construction management, commissioning, and operations/maintenance—with an emphasis on quality and safety. The firm serves public and private sector clients in the power and energy, gas distribution, industrial, and government sectors.

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