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Agency of Administration

Valuation of Natural Gas Companies

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Three conventional approaches to value

- The valuation of natural gas is subject to Vermont's standard for property appraisal which is that it should be valued at 100 percent of fair market value. While this is clear, there are several approaches one can take to arrive at a market estimate for any type of real property. Typically the approaches to valuation are based on one or more of the following:
 - Based on the cost of building the asset;
 - Based on the analysis of sales data from the sales of comparable assets;
 - Based on the present value of the income generated from the use of the asset.

Typically, appraisal methodology would suggest that the appraisal attempt to derive values using all three of the approaches listed above and then reconcile the values to choose the most defensible methodology.

In the case of a natural gas company with property for both the transmission and distribution of natural gas some of these approaches would tend to work better than others.

Valuation based on income. With an income approach to value the appraiser examines both revenue and expense data for the company subject to valuation to first derive a net income or the amount of profit after accounting for most forms of expenses. The net income is then discounted using one of two usually accepted formulas to produce a present value. The present value would represent what a prospective buyer would be willing to pay to buy a property with this associated income stream.

While using an income approach is a reasonable method of valuation for a company like Vermont Gas, statutory changes would probably have to be made in order for this method to work in Vermont. This is because an income approach involves a unitary calculation of the entire company's income and expenses regardless of where they are generated within the State. To do this, we would look at the company's income and expense throughout Vermont to first compute a single statewide value and then an allocation system would have to be developed that would parse the total value across all of the municipalities in which Vermont Gas owns property. Presently, municipalities are statutorily responsible for establishing grand list values and while the State could develop income based values for all municipalities with Vermont Gas properties, the cities and towns would not be obligated to use these values. Also, regulated transmission and distribution gas companies like Vermont gas are complex financial organizations and at present the department has no one on staff with the expertise to evaluate the appropriateness of the company's income and expenses. Given this, without some outside expert appraisal assistance it would be difficult for the State to know if its valuation results are reasonably accurate.



Valuation based on Sales comparison. The sales comparison approach is the appraisal methodology that most people are familiar with as it is frequently the basis for estimating the value of residential property. This valuation method attempts to identify a number of recently sold properties with similar characteristics to the subject property and then uses the sale prices of the comparable properties to establish an estimated value for the subject. The key to using this method reliably is to have sufficient recently sold properties that are reasonably comparable with the subject property.

In theory the sales comparison approach would work well for establishing a value for a companies like the Vermont Gas Company but our understanding is the there are relatively few sales of regulated companies with both natural gas transmission and distribution. This would be true not only on a national basis but there would be even fewer when viewed solely with New England and it is our understanding that the natural gas market in New England differs significantly from other regions of the country which generally would have better access to major natural gas transmission pipelines. Finally, like the income approach, the department currently lacks the staff with the necessary expertise to both identify potential comparable sales and then to reliably evaluate sales of natural gas companies to establish whether they are reasonably comparable to a company like Vermont Gas.

Valuation based on the cost. The last approach to value would produce an estimated market value using the cost to build out the infrastructure of a improvement. The theory supporting the use of a cost methodology is that a rational buyer would pay no more for a property than the cost to build a property with comparable functionality – this is referred to as the “principle of substitution”. As such it starts by determining a comprehensive replacement cost to build a similar property and then decreases that value to reflect factors such as the age and condition of the property subject to valuation.

Establishing the initial cost can be accomplished several different ways.

- Based on the actual original costs to build the infrastructure then indexing the costs to estimate the present cost to build the same infrastructure new;
- Based on average construction cost data to build the infrastructure available from a state regulatory agency or a commercial service that researches national and regional costs;
- Based on the net book value maintained by the company subject to valuation.

Regardless of the source of data as listed above, each to the resulting cost estimates would be depreciated to reflect the property’s current age, condition and functionality. While some form of depreciation would be used for all of the cost methodologies, there are a number of ways to depreciate an estimate value and they can yield significantly different results.

So what valuation approach would make the most sense?

Without investing funds to hire an appraisal firm with specialized knowledge regarding the valuation of natural gas companies, neither the Department of Taxes nor any Vermont municipality has the staffing and expertise needed to value a company like Vermont Gas using either the income or comparable sales approaches to value. Beyond the limitations imposed by the lack of resources and expertise, there is also the issue that both the income and comparable sales methods result in a company-wide estimate of value and the resulting value would have to be allocated across all municipalities hosting the company’s property. While this is not an insurmountable issue, it can results in conflicts among municipalities as to what various infrastructure components contribute to the overall value and frequently allocation of income or sales derived valuations are allocated based on the proportional cost of infrastructure in each

municipality. Given all of this (i.e., limitations in terms of sales, expertise and the complexity of allocating a company-wide value), an strong argument can be made that our best choice for valuing a natural gas company, like Vermont Gas, is to use one of the cost approaches listed above.

Briefly, we will discuss the pros and cons of each cost-based system beginning with net book value.

Net book value. When estimating a cost valuation, real estate appraisers typically would not use a net book value approach. In part, this is because net book value uses the company's original cost and then depreciates that cost over time never attempting to determine an actual replacement cost for the infrastructure (though additions to plant would be added at their original cost). As such, a value based on net book value would probably always be less than a replacement cost and in theory would not reflect the cost to build a property with comparable functionality. Given this, it violates the appraisal theory embedded in the principle of substitution which suggests that one consideration of a buyer is that they will pay no more than the cost to replace a property with comparable functionality. Finally, net book value is really an accounting method that allows for assets to be fully depreciated often to zero value over their life time. This approach is fine if indeed the assets are no longer functional at the end of their theoretical economic lifespan but this frequently is not the case and it is not unusual for fully depreciated assets to remain functional and in service though they retain little or no book value.

At the same time, a reasoned case for using net book value for valuation purposes can be made for most regulated utilities like Vermont Gas. The rationale is based on the fact that typically it is the net book value of the company that is used by the oversight agency (in Vermont, the Public Service Board) to determine the rate structure for the commodity being sold. Given that rate structure largely controls the income stream of a regulated company, one can argue that any entity considering the purchase of a company like Vermont Gas would not pay more than that company's net book value to acquire it.

While theoretically this makes sense, at least with regulated electric utilities (with which we have more experience), we generally find that if a regulated electric utility company is purchased, the price is typically significantly higher than net book value. So to the degree that we are attempting to estimate a true market value, net book value will tend to under-estimate the likely purchase price of regulated electric utility companies.

Replacement cost new less depreciation (RCNLD) using national or regional averaged values. This approach would use a comprehensive construction cost for natural gas transmission and distribution pipelines (gas mains) and associated fixtures gathered by either a private entity that surveys national or regional construction trends or by averaging actual construction costs that all regulated utilities are required to report to a state oversight agency. Regardless of the source of the data, the assumption is that the data would provide a reasonable estimate of the actual replacement (or reproduction) cost of the company that you are attempting to value. The resulting original cost would then be depreciated based on the subject property's actual age and condition to estimate a market value.

A limitation with this method is it assumes that average costs, regardless of their source, provide a reasonable representation of the cost that would be incurred by the subject company to replace its infrastructure. This often would not be the case as construction costs will vary depending on many factors including topography, regional differences in permitting process and the density of the customer base.

The advantage of using an averaged replacement cost is that there are some national known companies that specialize in surveying many sectors of the construction industry to identify costs (sometimes by individual fixtures but more often by the comprehensive cost of developing a unit of plant like a mile of 24 inch gas main). Two well known sources for this type of information are Handy-Whitman and Marshall and Swift. Both companies conduct annual surveys and report on cost trends. Marshall and Swift costs and cost indices are available for a wide range of construction types from residential homes to golf courses and natural gas pipelines. Handy-Whitman specializes in cost trends for public utility construction.

Another possible source for average cost data would be from a state oversight agency as regulated companies are generally required to report the cost of construction for various units of plant like a gas main or a natural gas compressor station as part of the regulatory process.

Replacement cost new less depreciation (RCNLD) using original cost. The starting point for determining valuations using this method is the same as net book value as it looks at the actual cost of construction of the company's infrastructure. It differs from net book in that it then indexes plant assets, depending on their age, to estimate the current replacement cost of various component assets and then the resulting value is depreciated to reflect its age and condition.

A limitation of this approach is that if the construction costs of the subject property are atypical (e.g., due to poor business decisions or unusually low labor costs), then the resulting value may not provide an accurate measure of the current replacement cost. Another limitation is that this approach is generally only used in cases where a company has a detailed inventory of the various assets that make up its infrastructure so that they can be indexed to a replacement cost then depreciated for each component asset. This type of detailed inventory that includes the date of installation and purchase price may not be available for some older part of the company's plant which would limit our ability to use a RCNLD approach based on actual original cost.

Assuming a company has the data necessary to comply with this approach and its original construction costs were reasonably typical of the industry given its location, the use of a company's actual original costs is arguably the most precise cost methodology.

A note on depreciation

Depreciation is an essential part of utilizing a cost approach as there are several reasons why a replacement cost is not reflective of the market value of a property. As the application of depreciation is a complex topic, for the purpose of this document, we will only touch on a two aspects of depreciation. They are:

- The amount of depreciation relative to the age of the asset being depreciated;
- Whether it is realistic to fully depreciate an asset assuming it remains in service.

The application of depreciation assumes that all improvements have an economic lifespan and the value of the improvement decreases over the associated timeframe. For example, a gas main may have a typical useful lifespan of 50 or 70 years but a gas meter's lifespan may be only 20 or 25 years. In theory one would gauge the rate of loss in value as increments over the asset's lifespan so at the end of that timeframe the accumulated depreciation would reduce the value to zero and at that point the owner theoretically would have to incur the cost to replace the asset. In appraisal there are a number of

methods to gauge depreciation relative to an asset's economic lifespan. One commonly used approach uses one of the many types of "Iowa Curves". Iowa Curves typically reflect some degree of accelerated depreciation in the earlier years of an asset's lifespan. Another approach to gauging depreciation is commonly known as straight-line depreciation. This method simply measures depreciation based on equal increments over the asset's lifespan. While there are arguments that can be made for using one versus the other of these depreciation methods, we believe that generally a straight-line approach is preferably simply because it is our understanding that this is the method most widely used for depreciating natural gas utilities.

The second aspect of depreciation that we will discuss here is whether it is appropriate to fully depreciate the value of an asset to zero as it reaches the end of its economic lifespan. With regard to this issue, we would suggest that generally this would not be appropriate. There are two primary reasons for stopping depreciation before it reaches a zero value. First, most assets have some remaining salvage value at the end of their lifespan and after they have been retired from service. While this value may be minimal, it should be recognized as part of the valuation process

Second, and more important, is that in the event that the asset remains in service beyond its economic lifespan and continues to function as part of the overall plant, it is contributing to the company's income stream. This continued utility would suggest that the asset should be recognized in the valuation methodology. This would be especially true if the cost approach used relies on an average cost system for units of plants such as miles of gas main. If this is the case, it is likely that some of the assets making up the infrastructure would have been replaced over time as part of ongoing additions to plant to replace worn out assets or as a means of modernizing the plant to improve efficiency.

So at what level should there be a floor in value beyond which physical depreciation stops? Often there will be no certain answer to this and the minimum could be zero or salvage value in instances where the plant must totally be retired to 30 percent or more in instances where assets typically continue in service long after the end of their supposed economic life.

One proposal for the valuation of natural gas plants in Vermont

Hopefully this document has demonstrated that there are a number of ways to arrive at an estimated market value for a company like Vermont Gas and none of them are perfect. At the same time, it is likely that a cost-based methodology would make the most sense given the structure of Vermont's property tax system.

The next decision involves which of the three cost-based methods discussed above may be most appropriate. We would suggest that using Vermont Gas's actual unit-based original cost data would probably make the most sense. This would have an advantage as the company currently reports its cost to its host municipalities on a unit basis (e.g., miles of transmission and distribution mains), so we have reason to believe that this is available. And, at least based on what we know now, we have no reason to believe that this data is not reasonably in line with general natural gas industry costs for the New England region.

Now that we have an original cost, the next decision is how that cost should be adjusted to reflect a current replacement cost. For this, we would suggest using Handy-Whitman indices to adjust Vermont Gas's original costs. Not only are we more familiar with Handy-Whitman but the company specializes in

studying cost trends for public utilities like natural gas companies and thus has a good understanding of this market sector.

Finally, we need to make a decision about how to depreciate the resulting replacement costs. Here we would suggest using the straight-line depreciation method calculated over a 70 year economic lifespan. In terms of a floor at which depreciation stops, we would suggest a floor at 30 percent good.

While we make these recommendations, we recognize that we have limited expertise in the valuation of natural gas companies. Given this, these recommendations could serve as a starting point from which we could engage in a discussion with both Vermont Gas and its many host municipalities to determine a fair and equitable approach to valuing regulated natural gas companies in Vermont.