EXHIBIT MAA-19

ECONOMIC OBSOLESCENCE: *INUTILITY AND BEYOND*

PAUL CHILL
PRINCIPAL
DELOITTE TRANSACTIONS AND BUSINESS ANALYTICS LLP
ATLANTA, GA
404.220.1950
PCHILL@DELOITTE.COM

KEVIN REILLY
MANAGING PARTNER
EVCVALUATION
BROOKFIELD, WI
262.409.0498
KREILLY@EVCVALUATION.COM

Economic Obsolescence

Economic obsolescence is defined by the American Society of Appraisers as "a form of depreciation where the loss in value or usefulness of a property is caused by factors external to the property. [1]

[1] *Valuing Machinery and Equipment: The fundamentals of Appraising Machinery and Technical Assets, 3rd Ed.*, American Society of Appraisers, 2011, p. 522

Economic Obsolescence (cont.)

- Some common causes of EO are:
  - *Weakness in economics of the industry*
  - *Loss of material and/or labor sources*
  - *Passage of new legislation*
  - *Changes in ordinances*
  - *Increased cost of raw materials, labor, or utilities*
  - *Reduced demand for the product*
  - *Increased competition*
  - *High interest rates*
  - *Unavailability of financing*

Economic Obsolescence (cont.)

- The existence of EO is something that is considered by buyers and sellers:
  - *EO may be inherent in the income and sales comparison approaches*
  - *Should be considered, analyzed and if it exists deducted in the cost approach.*

Economic Obsolescence (cont.)

- Cost Approach Equation Summarized:

Reproduction Cost New
Less: Excess Capital Cost
Replacement Cost New
Less: Physical Deterioration
Less: Functional Obsolescence
Less: Economic Obsolescence
Equals Fair Market Value

Various methods available to quantify EO

Economic Obsolescence (cont.)

- Investigation and Identification:
  - *Does it exist?*
  - *What is causing it?*
  - *Is it related to internal or external factors?*
- Quantification:
  - *Answering "What is causing it?" will guide to the appropriate method(s) to quantify*
- Document Results (Tell the Story):

Methods to Quantify EO

EO can be quantified using several different methods. Each may or may not be applicable in every valuation. Typically the cause of EO dictates the proper method to use.

- Some Common Methods included: [1]
  - *Inutility*
  - *Gross Margin*
  - *Industry Returns Analysis*
  - *Sales Transactions/Market-Derived Approach*
  - *Income-Derived Approach/Market Earnings Shortfall*

[1] *Valuing Machinery and Equipment: The fundamentals of Appraising Machinery and Technical Assets, 3rd Ed.*, American Society of Appraisers, 2011, p. 82

INUTILITY

Fair Market Value Roadmap

Units x Replacement Cost = Total Replacement Cost New x Percent Good = Fair Market Value

$$\text{Percent Good} = (1 - \text{Physical Depreciation } \%) \times (1 - \text{Functional Obsolescence } \%) \times (1 - \text{Economic Obsolescence } \%)$$

- Inutility is a form of Economic Obsolescence

Overview of the Inutility Model

What is Inutility?

- Indicator of Economic Obsolescence
- *"Whenever the operating level of an asset is significantly less than its rated or design capability… the asset is less valuable than it would otherwise be."*[1]

[1] *Valuing Machinery and Equipment, 3rd Ed.*, American Society of Appraisers, 2011, p. 76-77

Overview of the Inutility Model (cont.)

- The Appraisal Institute refers to Functional Inutility:
  - *Impairment of the functional capacity of a property or building according to market standards: equivalent to functional obsolescence because ongoing change makes layouts and features obsolete. (Appraisal of Real Estate, 13th edition)*
- Inutility Formula:

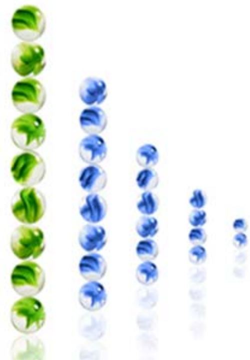
$$\text{Inutility \%} = \left[1 - \left(\frac{\text{Capacity B}}{\text{Capacity A}}\right)^{x}\right] \text{x } 100$$

The Scale Factor

- Overview
  - Cost of equipment of varying capacities changes in a non-linear fashion
  - Fixed vs. variable costs play a role
    - Example: Bicycle business has fixed costs of $1,000 to set up factory to produce a single bike and variable costs of $200 per bike.
    - 5 bikes = $1,000 + (5 x $200) = $2,000 ($400 per bike)
    - 10 bikes = $1,000 + (10 x $200) = $3,000 ($300 per bike)

The Scale Factor (cont.)

- Economies of Scale
  - Cost per unit decreases with increasing scale
- "6/10ths Formula"
  - Scale factor of 0.6 commonly used, but how is this derived?
  - C.H. Chilton study analyzed 36 products across various industries



The Scale Factor (cont.)

- Scale Factors can either be *sourced* from published guidelines or *calculated* using known inputs.
- Published sources for scale factors:
  - Plant Design and Economics for Chemical Engineers (Peters, Timmerhaus)
  - Process Plant Estimating, Evaluation, and Control (K.M. Guthrie)
  - Product & Process Design Principles (Seider, Seader & Lewin)
  - Valuing Machinery and Equipment, 3rd Ed. (ASA)

Scale Factor Calculation

$$\frac{\text{Cost B}}{\text{Cost A}} = \left(\frac{\text{Capacity B}}{\text{Capacity A}}\right)^{n}$$

- *n* is developed using logarithms.
- Both price and capacity of two similar items should be known.

Scale Factor Calculation (cont.)

- Sources for inputs to calculate scale factor
  - Equipment Inutility
    - Published sources (e.g. Marshall & Swift, RS Means)
    - Company purchasing data (e.g. MPAs, Invoices)
  - Plant/Network Inutility
    - Replacement cost new appraisals
    - Plant production reports
    - Network metrics (e.g. access line report)

Scale Factor Calculation (cont.)

Capacity Examples

- Buildings – Square feet, Cubic feet
- Steel Mills – Tons per year
- Oil Refinery – Barrels (of input) per day
- Wireline Networks – Number of access lines
- Wireless Networks – Port utilization, data rates
- Batch Plants – Tons per hour
- Metal Fabricating – Thousand press hours
- Machining – Thousand man hours
- Bakeries – lbs per hour, loaves per hour

Scale Factor Calculation (cont.)

Capacity Considerations

- For the purposes of property tax assessment, you should consider look at the historical annual production
  - May use peak production as annualized capacity
- Consider the environment in which the assets operate
  - Example: *Dreyer's Grand Ice Cream Inc. v. County of Kern*

Scale Factor Calculation (cont.)

Capacity Considerations

- *Dreyer's v. County of Kern* – Ice cream company
  - Company expanded plant in prior year.
  - Company claimed economic obsolescence (underutilization) due to external lack of demand in the market.
  - Assessor's specialist argued excess capacity is needed to allow for:
    - Seasonal fluctuations and
    - Potential for growth in order to preserve marketplace dominance.
  - The court ruled in favor of the assessor because the company "presented no evidence of market demand".

Scale Factor Calculation (cont.)

Example 1 – Pulp & Paper Manufacturing Plant

- Objective: Estimate the scale factor for paper plant recovery boilers.
- Boiler A – 100 boiler horsepower, $ 52,250
- Boiler B – 500 boiler horsepower, $ 135,000

$$\frac{\text{Cost B}}{\text{Cost A}} = \left(\frac{\text{Capacity B}}{\text{Capacity A}}\right)^{x} \qquad \frac{\$\,135{,}000}{\$\,52{,}250} = \left(\frac{500\text{ hp}}{100\text{ hp}}\right)^{x}$$

$$\ln\left(\frac{\$\,135{,}000}{\$\,52{,}250}\right) = \ln\left(\frac{500\,hp}{100\,hp}\right)x$$

$$\boxed{0.59 = x}$$

Scale Factor Calculation (cont.)

Example 2 – Wireline Network

- Objective: Estimate the scale factor for wireline network based on number of access lines.
- Network A – 150,000 access lines, $ 6.45M RCN
- Network B – 100,000 access lines, $ 5.20M RCN

$$\frac{\text{Cost B}}{\text{Cost A}} = \left(\frac{\text{Capacity B}}{\text{Capacity A}}\right)^{x} \qquad \frac{\$\ 5.20\text{M}}{\$\ 6.45\text{M}} = \left(\frac{100{,}000\ \text{lines}}{150{,}000\ \text{lines}}\right)^{x}$$

$$\ln\left(\frac{\$\ 5.20\text{M}}{\$\ 6.45\text{M}}\right) = \ln\left(\frac{100{,}000\ \text{lines}}{150{,}000\ \text{lines}}\right) x$$

$$\boxed{0.53 = x}$$

Inutility Calculation

- Objective: Estimate the fair market value of a production line which is not operating at its peak capacity due to foreign competition.
- Designed production capacity = 1,000 units/day
- Current operating capacity = 500 units/day
- Production is not expected to rebound or increase in the future.
- Replacement cost for the 1,000 unit plant = $1,000,000
- Scale factor = 0.65
- Line has experienced 15% of physical deterioration.

Inutility Calculation (cont.)

$$\text{Inutility \%} = \left[1 - \left(\frac{\text{Actual Capacity}}{\text{Rated Capacity}}\right)^{x}\right] \text{x } 100$$

$$\text{Inutility \%} = \left[1 - \left(\frac{500}{1{,}000}\right)^{0.65}\right] \text{x } 100$$

$$\text{Inutility \%} = [1 - 0.637] \text{ x } 100$$

$$\boxed{\text{Inutility \%} = 36.3\%}$$

Inutility Calculation (cont.)

Replacement Cost New	$ 1,000,000
Less Physical Deterioration at 15%	-$ 150,000
Replacement Cost New Less Physical Deterioration	$ 850,000
Less Economic Obsolescence Calculated at 36.3%	-$ 308,550
Fair Market Value in Continued Use	$ 541,450
Rounded Fair Market Value	$ 550,000

Benefits & Drawbacks of the Inutility Model

- **Benefits**
  - Useful when performing cost approach to estimate value.
  - Objective rather than subjective when scale factor calculated using known data points.
  - Can be strong indicator of obsolescence when reduced operating capacity is permanent or long-term.

Benefits & Drawbacks of the Inutility Model

- **Drawbacks**
  - Limitations of scaling (how far before equation becomes invalid).
  - Scale factors not readily available for many applications.
  - Margin of error increases as exponents vary.
  - More complex if reduced operating capacity is not permanent.

Common Errors

- Applying an inutility penalty without considering reduced capacities that may only be temporary.
- Inutility penalty is used long-term and not adjusted when market conditions change.
- Utilizing improper scale factors.
- Assuming that current inutility appropriately considers future inutility.

Gross Margin Analysis

- **The Gross margin analysis quantifies EO by comparing gross margins over time.**
  - Gross Margin = Revenues – Cost of Raw Materials
  - Useful method when margins and profitability are the direct cause of value reductions
  - Current or future gross margins are compared to a benchmark in time when gross margins were considered to be at "normal" levels

Gross Margin Analysis: Example 1

Current Gross Margin: $50 per unit

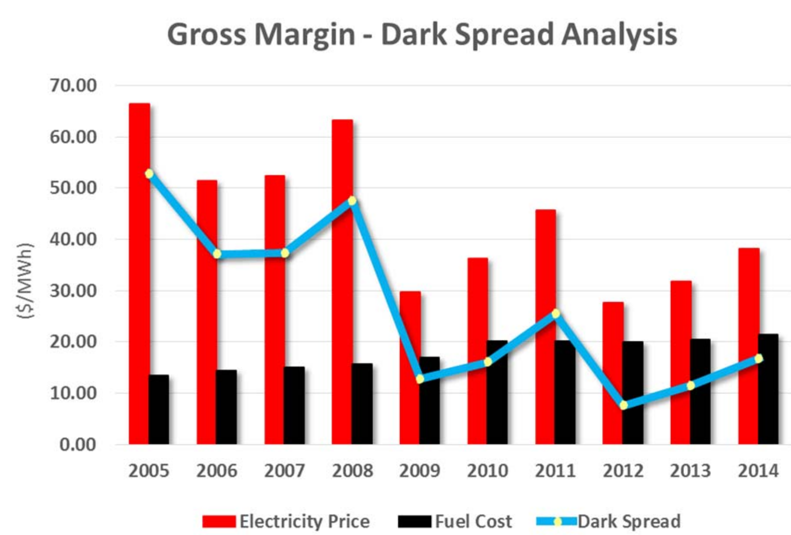
Benchmark Gross Margin: $70 per unit (profitability level in normal/expected market conditions)

$$EO = \frac{(\text{Benchmark Gross Margin} - \text{Current Gross Margin})}{\text{Benchmark Gross Margin}}$$

$$EO = \frac{(\$70 - \$50)}{\$70}$$

EO = .29 or 29%

Gross Margin Analysis: Example 2



Gross Margin Analysis: Example 2

Year	Electricity Price ($/MWh)	Coal Price ($/MMBtu)	Fuel Cost ($/MWh)	Dark Spread ($/MWh)
2005	66.36	1.23	13.51	52.85
2006	51.45	1.31	14.38	37.07
2007	52.40	1.37	15.04	37.36
2008	63.28	1.43	15.70	47.58
2009	29.78	1.55	17.02	12.76
2010	36.23	1.84	20.20	16.03
2011	45.68	1.84	20.20	25.48
2012	27.58	1.82	19.98	7.60
2013	31.86	1.86	20.42	11.44
2014	38.13	1.95	21.41	16.72

	Benchmark Dark Spread ($/MWh)	2014 Dark Spread ($/MWh)	Variance ($/MWh)	Calculated EO
Best Historical Year	52.85	16.72	36.13	68%
Best Three Years Average	45.93	16.72	29.21	64%
All Years Average Excluding Best and Worst Y	25.56	16.72	8.84	35%
			EO Conclusion:	????

Market-Derived Approach

- **The market-derived approach quantifies EO from sales of Similar property**
  - Sales of similar properties must be available
  - Sufficient information on the sales must be available to correlate their similarity with the subject
- **Steps Include:**
  1. Deducting land value from the sale price
  2. Calculating the replacement cost new ("RCN")
  3. Calculating and deducting physical depreciation and functional obsolescence from the RCN
  4. Subtracting the adjusted sale price (step 1) from the RCN less depreciation (prior to EO deduction) (step 3)

The result is EO based on market transactions.

Market-Derived Approach (cont.)

Step 1: Deduct Land Value from Sales Price	
Sale price of comparable property	$100,000,000
Less land value	$5,000,000
Equals sale price less land	$95,000,000
Step 2: Develop RCN	
RCN	$150,000,000
Step 3: Calculate Cost Indicator Before EO	
RCN	$200,000,000
Less physical deterioration	$50,000,000
Less functional obsolescence	$25,000,000
Equals cost indicator of value before EO	$125,000,000
Step 4: Calculate EO	
Cost indicator of value before EO	$125,000,000
Sales price less land	$95,000,000
EO	$30,000,000

Income-Derived Approach

- **The income-derived approach quantifies EO by comparing the results of an income approach of a modern replacement plant to the replacement cost new**
- Steps Include:
  1. Using a discounted cash flow ("DCF") analysis, determine the income indicator of value for a modern replacement plant
  2. Deduct land value from the income indicator of value of the modern replacement plant
  3. Calculate the RCN
  4. Subtract the adjusted income indicator of value (step 1) from the RCN (step 3)

Note: Because the analysis is based on a modern replacement plant, physical deterioration and functional obsolescence won't exist

Income-Derived Approach (cont.)

Step 1: DCF Analysis on the Replacement Plant

Income indicator of value for the modern replacement	$300,000,000

Step 2: Develop RCN

Income indicator of value for the modern replacement	$300,000,000
Less land value	$5,000,0000
Equals income indicator less land	$295,000,000

Step 3: Calculate Cost Indicator Before EO

RCN	$355,000,000

Step 4: Calculate EO

RCN	$355,000,000
Income indicator less Land	$295,000,000
EO	$60,000,000

Industry Returns Analysis

- **The industry returns approach quantifies EO by comparing the current industry returns to a benchmark industry return**
  - **Typical methods are return on equity, return on total capital**
  - **Useful for regulated assets (e.g. electric & gas utilities)**
  - **Publicly traded companies publish the needed information**
  - **Financial databases such as valueline or capital IQ provide industry return numbers**
  - **Various benchmarks can be used**

Industry Returns Analysis (cont.)

- Steps Include (Using the return on common equity method):

1. Determine the historical level of return on common equity of publicly traded companies within the same industry
2. Determine the current level of return on common equity of publicly traded companies within the same industry
3. Conclude a historical level of the return on common equity
4. Conclude a current level of the return on common equity
5. Calculate EO

Industry Returns Analysis: Example

- Collected industry return on common equity data is as follows:

Company	5-Year Mean (%)	Current Date (%)
New York Mfg.	15.2	10.2
Texas Industries	11.1	7.7
California Mfg.	10.3	6.1
Kansas Services	12.2	9.7
Minimum	10.3	6.1
Maximum	15.2	10.2
Median	11.7	8.7
Mean	12.2	8.4
Conclude	12.0	8.5

Industry Returns Analysis: Example (cont.)

5-Year Mean Return: 12%

Current Return: 8.5%

$$EO = \frac{(\text{5-Year Mean Return} - \text{Current Return})}{\text{5-Year Mean Return}}$$

$$EO = \frac{(12\% - 8.5\%)}{12\%}$$

EO = .29 or 29%

Questions?