



ECONOMIC OBSOLESCENCE

**Understanding & Recognizing Economic
Obsolescence In Personal Property Valuations
The Inutility Measurement**

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What is Economic Obsolescence?

Economic Obsolescence is the reduction in value of Real or Personal property due to the impact of events or conditions that are external, and *not controlled by* the nature of or mechanical operation of the personal property asset.¹ This is ***External Obsolescence*** – outside of the control of the owners and physically separate from the asset or assets themselves.

Causes of Economic Obsolescence...

A. *Environmental Factors* – Need for New costly Pollution Control Equipment

Other Examples?.....

B. *Litigation*– Legal actions by Courts/Others affecting assets.

What legal actions could cause Economic
Obsolescence?.....

C. *Legislation* – Product Safety Compliance.

Other Examples?.....

D. *Regulatory Actions* – Unfavorable change
in Union Rules.

Other Examples?.....

E. *Taxation* – Favorable tax law now becomes unfavorable

Other Examples?.....

F. *Competition* – Global workforce less costly, increases product supply

Georgia Appraisal Procedure Manual (APM)

Additional Depreciation₂

Physical Deterioration – the appraiser *shall consider* any evidence by the property owner demonstrating unusual physical deterioration...

Functional Obsolescence – the appraiser *shall consider* any evidence by the property owner demonstrating functional obsolescence...

Economic Obsolescence – the appraiser *shall consider* any and all evidence presented by the property owner demonstrating economic obsolescence...

Functional Obsolescence Example for Personal Property₃

Given:

The Important Company, Inc. operates a manufacturing facility in your county. In 1999 the company installed new equipment. The equipment is designed to produce 60 tons of products a month. However, because of a design flaw it is only able to produce 30 tons of products a month. TIC, Inc. files its property tax return and requests that additional depreciation be allowed for this condition. In support of its claim it provides the following documentation:

- ▶ The original specifications showing the designed capacity of 60 tons / month.
- ▶ Copies of the production summaries for the first six-months of full operation.
- ▶ A design analysis by the plant engineer in which the flaw is identified.

Required:

Decide if additional obsolescence is warranted and determine the amount of additional obsolescence if necessary.

Solution:

The principle of substitution would lead the appraiser to the conclusion that a potential buyer would not pay for 60-ton capacity if the actual production were only 30 tons. The appraiser can approach this problem at least three ways. If the construction cost of a 30-ton facility is available then it can be used as a basis for applying the cost approach. The appraiser could use the construction cost of the existing personal property and include a functional obsolescence factor of 50% (30 tons divided by 60 tons). The appraiser could base the functional obsolescence estimate based on the cost-to-cure if that information can be reasonable estimated.

Economic Obsolescence Example for Personal Property₃

Given:

The Important Company, Inc. operates a manufacturing facility in your county. The equipment in the plant is designed to produce 60 tons of products a month. However, because of new overseas producers that have undercut the price of domestic products, the demand for the plant's products is limited to 30 tons of a month. TIC, Inc. files its property tax return and requests that additional depreciation be allowed for this condition. In support of its claim it provides the following documentation:

- ▶ Historic production data supporting the designed capacity of 60 tons / month.
- ▶ Copies of the production summaries for the past year showing 30 tons / month.
- ▶ A market analysis by the company's sales manager that identifies the shift in demand.

Required:

Decide if additional obsolescence is warranted and determine the amount of additional obsolescence if necessary.

Solution:

The principle of substitution would lead the appraiser to the conclusion that a potential buyer would not pay for 60-ton capacity if the actual production were only 30 tons. The appraiser can approach this problem at least two ways. If the construction cost of a 30-ton facility is available then it can be used as a basis for applying the cost approach. The appraiser could use the construction cost of the existing personal property and include a functional obsolescence factor of 50% (30 tons divided by 60 tons).

American Society of Appraisers

ASA

Looking outside of the APM, the *American Society of Appraisers* (ASA), is *the* professional appraisal body in the USA that has set the standards of property appraisal and evaluation, and is the professional body that has been the standard of *expertise in property valuation litigation*. Here in part is what the ASA has established as to defining additional depreciation:⁴

Physical Deterioration – is the loss in value which may be the result of wear and tear either from use or from exposure to various elements.

(Lack of good maintenance and over use will increase physical deterioration.)

Functional Obsolescence – the loss in value in usefulness of a property caused by the inefficiencies or inadequacies of the property itself, when compared to a more efficient or less costly replacement developed by new technology.

(Is curable – property owner can solve these problems).

Factors can include: Excess Operating Costs
Outdated Technology

Economic Obsolescence – the loss in value in usefulness of a property caused by factors *external to the property*.

(Typically is incurable by property owner).

Determining if Economic Obsolescence is Present *This Year*

Due Diligence is the investigative process and precautionary steps necessary to validate and support a decision on economic obsolescence.

The 5 Year Framework / View towards
Validating Economic Obsolescence, and the
Attributes / Variables Necessary towards
this goal.

Standard Plant Capacity

The planned production output by the plant engineers. This would be a measurement either in units, pounds, tons, board feet, etc. This would be sourced by plant production reports or studies.

Actual Plant Production or Output

This is the annual actual production results again measured in the appropriate measurement units again, in units, pounds, etc. This would be sourced by plant production reports.

Annual Gross Sales , Cost of Goods Sold, Operating Expenses & Profit before Tax

This represents the financial results of the company before state and federal taxes and is sourced from the federal income tax returns and/or company financial statements.

Annual Year End Work Force or Head Count

This primarily should be the manufacturing workforce / head count, but can include the full complement of administrative and technical employees as well. This would be sourced from human resources or production reports.

Number of Production Shifts Operating

This is a further example of work force and work force application, and shows how the whole of the work force was utilized. This is sourced by the plant manager or the plant engineer.

Raw Material Cost Increase vs. Product Unit Selling Price

In this comparison, *if* the increase in cost of raw materials is annually growing faster/higher than the increase in the selling price of the product, then this is an indicator of Economic Obsolescence.

Inventory Turnover

This is the number of *times* the finished goods inventory has “turned over” [sold] during a specific time period, typically 12 months.

Industry Wide Statistics

Local, state, national and international *industry specific data* that profiles it's economic health from the various statistics previously noted for the company.⁴

The Production Company, Inc.

Manufacturers of Metal Fabricated Products

*(simple example towards validating
economic obsolescence)*

Production Company, Inc.	# 1	Manufacturers of Metal Fabricated Components				
Schedule of Manufacturing Variables - 5 Year View						
		12/31/2010	12/31/2009	12/31/2008	12/31/2007	12/31/2006
1. Standard Max Capacity in Units	A	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000
2. Actual Production / Units Produced	B	850,000	975,000	1,100,000	1,200,000	1,290,000
3a. Annual Gross Sales		\$10,575,000	\$12,000,000	\$13,500,000	\$14,000,000	\$15,000,000
3b. Annual Cost of Goods Sold & Oper. Expense		<u>\$11,156,625</u>	<u>\$11,040,000</u>	<u>\$11,812,500</u>	<u>\$11,130,000</u>	<u>\$11,100,000</u>
3c. Annual Profit Before Tax		<u>(\$581,625)</u>	\$960,000	\$1,687,500	\$2,870,000	\$3,900,000
4. Year End Head Count / Work Force		60	75	90	110	130
5. Production Shifts		1 - 8 hr shift	2 - 8 hr shifts	2 - 10 hr shifts	3 - 8 hr shifts	3 - 8 hr shifts
6. Inventory Turnover		2.5	4	6	9	10
7. Raw Material Cost Increase	2005 base = \$.65	\$0.13	\$0.10	\$0.08	\$0.08	\$0.06
Product Selling Price Increase	2005 base = \$1.30	\$0.05	\$0.07	\$0.05	\$0.06	\$0.06

Production Company, Inc.	# 2	Manufacturers of Metal Fabricated Components				
Schedule of Manufacturing Variables - 5 Year View						
		12/31/2010	12/31/2009	12/31/2008	12/31/2007	12/31/2006
1. Standard Max Capacity in Units	A	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000
2. Actual Production / Units Produce	B	850,000	975,000	1,100,000	1,200,000	1,290,000
	<u>% Capacity Utilization</u>	62.96%	72.22%	81.48%	88.89%	95.56%
3a. Annual Gross Sales		\$10,575,000	\$12,000,000	\$13,500,000	\$14,000,000	\$15,000,000
3b. Annual Cost of Goods Sold & Oper. Expense		<u>\$11,156,625</u>	<u>\$11,040,000</u>	<u>\$11,812,500</u>	<u>\$11,130,000</u>	<u>\$11,100,000</u>
3c. Annual Profit Before Tax		(\$581,625)	\$960,000	\$1,687,500	\$2,870,000	\$3,900,000
	<u>% to Gross Sales</u>	-5.50%	8.00%	12.50%	20.50%	26.00%
4. Year End Head Count / Work Force		60	75	90	110	130
5. Production Shifts		1 - 8 hr shift	2 - 8 hr shifts	2 - 10 hr shifts	3 - 8 hr shifts	3 - 8 hr shifts
6. Inventory Turnover		3	4	6	9	10
7. Raw Material Cost Increase	2005 base = \$.65	\$0.13	\$0.10	\$0.08	\$0.08	\$0.06
	<u>% Increase to base</u>	13.40%	11.49%	10.13%	11.27%	9.23%
Product Selling Price Increase	2005 base = \$1.30	\$0.05	\$0.07	\$0.05	\$0.06	\$0.06
	<u>% Increase to base</u>	3.29%	4.76%	3.52%	4.41%	4.62%

Percent Capacity Utilization

This is a simple division where the Actual Production/units produced is divided by the Standard Operating Capacity all in units. The result is a percentage that reflects the actual usage of the maximum plant production capacity. What does the downward trend indicate?

Gross Profit Before Tax Percentage

This is a simple Profit Before Tax calculation dividing the profit before tax by the gross company sales. This is yet another simple indicator of company health.

Raw Material Cost Increase vs. Product Selling Price Increase

Here we have calculated the annual raw material percentage cost increase [annual raw material base price], and have compared it to the annual product selling price increase [annual product base selling price]. This comparison shows that the trend of raw material cost is increasing faster than the selling price of the product.

This can be a telling sign of Economic Obsolescence.

So What is Next... ?

Using the Inutility Formula to Determine Economic Obsolescence.

The inutility formula, *is one method* that can be used to calculate this further element of additional depreciation. It has been the most common method for the determination of economic obsolescence and will stand the acceptability test in litigation because of its mathematical / scientific basis. The percentage result of this formula is typically called the *Inutility Penalty*.

The Inutility Formula₅ is as follows:

$$\text{Inutility \%} = [1 - (\text{Capacity B} / \text{Capacity A})^n] \times 100$$

Capacity A = the Rated or Standard
Production Capacity

Capacity B = the Actual Production Achieved

n = the Exponent or Scale Factor

The *exponent or scale factor (n)* is based upon the concept that the cost of property at different capacities may vary in nonlinear fashion because of economies of scale.⁶

Economies of Scale is a term used by economists referring to situations where the cost of producing an additional unit of output of a product decreases as the volume of output increases.⁷ Scale factors vary but typically a factor of .6 or .7 is generally used as a standard of most industries. Because of this factor's general use, the inutility formula has been called *the 6/10^{ths} formula*.

Calculating / Applying the Inutility Formula

Example: *Production Company, Inc.*

$$\begin{aligned}\text{Inutility Penalty} &= [1 - (\text{Production B} / \text{Capacity A})^n] \times 100 \\ &= [1 - (850,000 / 1,350,000)^.6] \times 100 \\ &= [1 - (.62963)^.6] \times 100 \\ &= [1 - (.75762)] \times 100 \\ &= [.24238] \times 100 \\ \text{Inutility Penalty} &= 24.24 \%\end{aligned}$$

Footnotes:

1. *Valuations, The Measurement of Economic Obsolescence, Robert F. Reilly, American Society of Appraisers, pg.35, January 1989.*
2. *Rules of the Dept. of Revenue, Property Tax Division, Chapter 560-11-10, Appraisal Procedure Manual, pg. 24, January 1, 2000.*
3. *Rules of the Dept. of Revenue, Property Tax Division, Chapter 560-11-10, Appraisal Procedure Manual, Appendix, pgs. 3 & 4, January 1, 2000.*
4. *Valuations, The Measurement of Economic Obsolescence, Robert F. Reilly, American Society of Appraisers, pg.36, January 1989.*
- 5, 6. *Guidelines for Substantiating Additional Obsolescence for State-Assessed Telecommunication Properties, California Board of Equalization, pgs. 8 & 18, August 2009.*
7. The Linux Information Project, Economies of Scale Definition, www.linfo.org/economies_of_scale pg. 1.