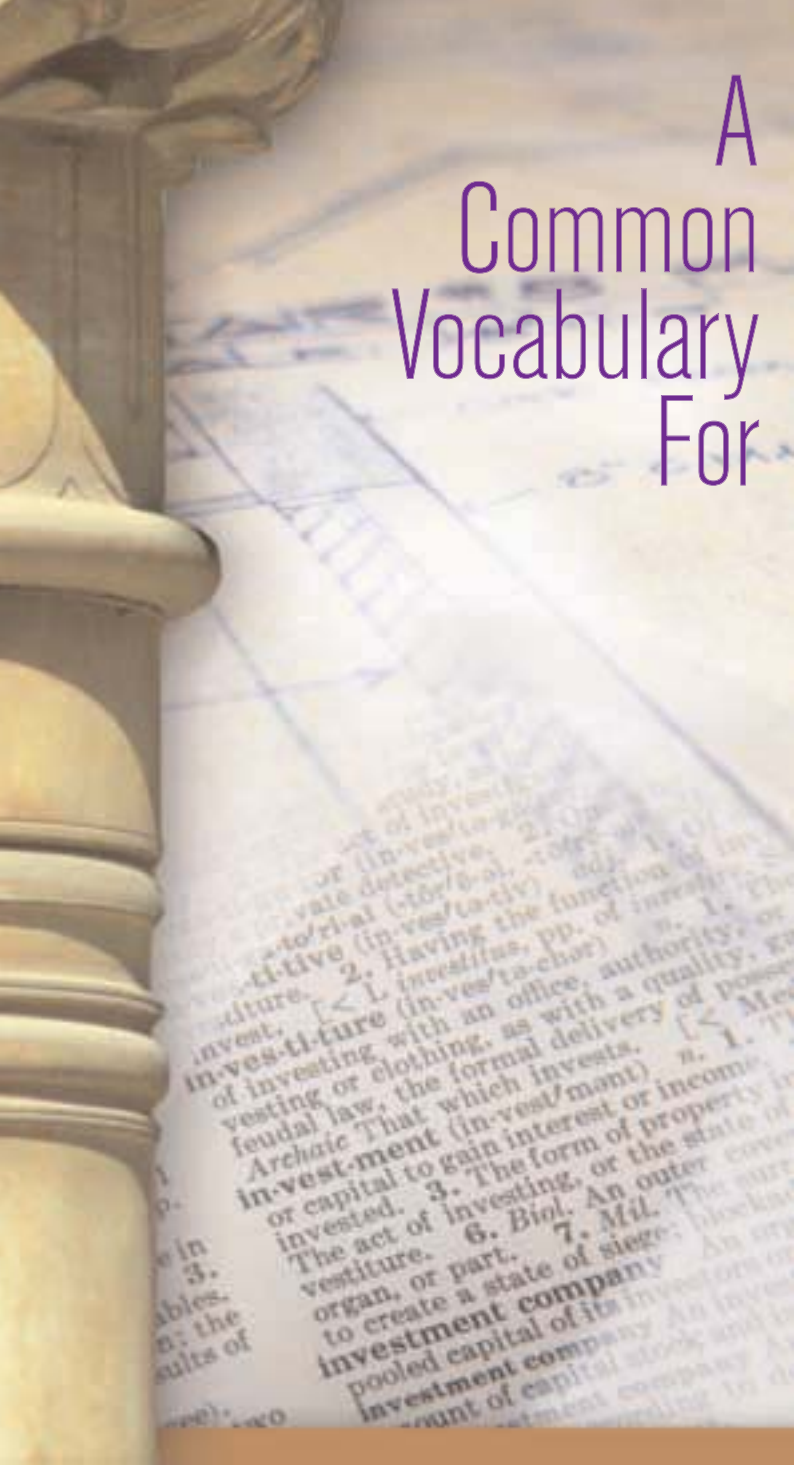

A Common Vocabulary For Asset Investment Strategy

by Douglas K. Christensen, Rodney Rose, and Terry W. Ruprecht

Understanding the meaning of common terms and translating these terms into factors that apply to facilities investment decisions is fundamental to any asset investment strategy. Understanding the definitions of these terms is especially important when determining how to use an analysis of the total cost of ownership.

As in most specialized industries or professions, the vocabulary and jargon of the facilities management profession and the design and construction industry are often confusing—if not somewhat mysterious—to the layperson. Comprehension of the use of common terminology and applied metrics allows for sound decision making on investing in facilities.

The relatively straightforward term "square feet" provides an excellent example of the need to ensure that the terminology used is clearly understood. The term "gross square feet" (GSF) refers to the total amount of space in a given building—the space that lies between the exterior walls—whereas "assignable square feet" (ASF) usually refers to only the amount of space that a given function or program can effectively use, which may or may not exclude certain lobbies, corridors, utility rooms, and so forth.

In the commercial world, "assignable space" means nothing. Owners of commercial property prefer the term "rentable square feet," because tenants of an office building, for example, are required to rent an entire floor, which, when designed for a specific use or function, might yield more assignable square feet or fewer. The important metrics for commercial tenants are the amount of space they have to rent and the terms of the lease. Elevators, chiller plants, and ground-floor lobby areas are part of the building's gross square footage and are not specifically charged to tenants, although they end up paying for a portion of this space in their rental package.

In colleges and universities, where space standards or guidelines are applicable—and this is particularly true for public institutions—such standards are usually based on as-

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signable square feet. Thus, a standard for faculty offices might be 120 ASF, which represents the wall-to-wall dimensions of an average office. But architects can't design only in terms of ASF; they need to include interior corridors or circulation space, rest rooms, utility space, and so forth—all of which is counted in the gross square footage. The ratio of ASF to GSF is called the "net-to-gross ratio," a measure of building efficiency. The higher the efficiency factor, the more assignable square footage a given building has.

The problem for facility directors then is to help financial officers understand the implications of building a facility that is more or less efficient. These impacts are especially important for determining the costs of utilities, energy, and maintenance; and, of course the capacity of the building to accommodate more or less program space.

The issue of common definitions becomes much more complicated when owners try to evaluate the cost estimates for a given building or major renovation project. Contractors provide estimates based only on actual construction costs because that's their responsibility, and it is their construction budget that is a key basis for their contract with an owner. Architects' budgets, on the other hand, need to include estimates of "soft costs," which usually consist of their fees, engineering and environmental studies, and general conditions. And the inclusion of those items is the basis for the architect's fee agreement with a building owner. However, owners have their own set of costs, which architects or contractors usually are not aware of. Such costs, for example, might include project management, planning to determine needs and program criteria that the architect must take into account, the costs of moving into the building, financing, and the costs of equipment or technology that is not included in the "hard costs" of the construction budget.

Thus, owners need to look at costs in at least three ways, because they have to pay for the total cost of building, which includes hard construction costs; the soft costs estimated by the architect; and the owners' own costs, which are most often regarded as overhead. Often, institutions do not account for these costs separately and do not attribute them to a given project. The architect and contractors don't have to worry about the owner's costs, but they certainly care about the hard and soft costs that they estimated. Because owners usually sign separate contracts for architecture and construction—not to mention many for other subspecialties—owners are often faced with a multitude of cost estimates, different contracts, and, of course, different expectations, depending on who is doing what.

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Even if all the above costs are considered within some accounting structure, they still only represent the building's initial costs, which represent only about one-third of the costs of owning the building. Excluding the costs of land—which colleges and universities almost never count—the additional two-thirds of ownership costs has to include the need for ongoing maintenance and operations and capital renewal required because of the predictable life cycle of the major systems and subsystems of any building.

Therefore, a critical element of any financial perspective is the development of a simple method for understanding common cost categories, which must be universally accepted and consistently applied.

Life-Cycle Cost Category Comparison
Example – Using Annualized Life-Cycle Costs

Costs	National Averages		Actual Averages		Total Cost Impact
	$ GSF/ Yr	% CRV/ Yr	$ GSF/ Yr	% CRV/ Yr	
Birth & Burial Costs					
Cost A: Planning & Design	$0.30	0.20%	$0.26	0.17%	31.7%
Cost B: Financing	$0.13	0.09%	$0.23	0.15%	
Cost C: Construction, Installation, Acquisition	$3.00	2.00%	$3.67	2.45%	
Cost J: Decommissioning, Demolition, Disposal	$0.80	0.53%	$0.56	0.37%	
Maintenance & Operations Costs					
Cost D: Operations	$1.50	1.00%	$2.22	1.48%	48.3%
Cost E: Maintenance	$2.50	1.67%	$3.12	2.08%	
Cost F: Utilities	$1.50	1.00%	$1.86	1.24%	
Recapitalization Costs					
Cost G: Improvements	$1.20	0.80%	$0.67	0.45%	20.0%
Cost H: Programmatic Upgrades	$1.00	0.67%	$1.34	0.89%	
Cost I: Replacements and Renewal	$0.80	0.53%	$0.97	0.65%	
Totals	$12.73	8.49%	$14.90	9.93%	100.0%

The cost categories described below are organized into three groups considered to be one-time, annual, and periodic costs. These groups are subdivided into ten components (A–J). In addition to these broad categories, many of the categories have been further separated into subcomponents (i–iv) in order to demonstrate how they relate to the major categories.

1. Birth and Burial: These are *one-time* costs associated with the funding, planning, design, and construction or installation of a fixed asset as well as the removal of that asset from the organization's capital inventory. Components A–C are associated with the beginning of an asset's life, and component J identifies costs associated with the end of its useful life.

A. *Planning and Design:* These costs include the activities necessary for the development and analysis of feasible solutions to organizational needs through the provision of facility solutions.

i. Planning is the process of defining the scope or statement of work based on an organization or owner's expectations for new or adjustments to an existing facility's performance, quality, cost, and schedule. Alternative design solutions can be considered during this phase. For example, planning includes analysis and feasibility (go/no-go) studies as well as internal tests regarding the alignment of a particular solution with the organization's strategic goals.

ii. The design phase begins once the statement of work and preferred design approach has been developed. This phase consists of schematic designs, design development, and contract documents, which provide a detailed solution from which equipment procurement and construction bids can be solicited.

Examples:

- Schematic designs include the initial layout for a project and incorporate all project or program elements, including those that are adjacent to other program elements in an initial solution.
- Design development encompasses the investigation of constructability and other details of the initial solution.
- Contract documents refer to the detailed graphic and verbal information required to reach an agreement with a contractor who will implement the design.

B. *Financing:* These costs are associated with the use of the actual funds required for the capital investment. Examples include the cost of interest to pay for revenue bonds, development fees, and penalties or fees incurred as a result of accessing a source of funding. Opportunity cost calculations may be included if they are applied in a manner that is consistent with the other financial decision-making processes that the institution employs.

C. *Construction, Installation, and Acquisition:* These costs are related to procurement, erection, installation, assembly, or fabrication activities required to create a new facility or structure or to alter or add to an existing facility or structure and its support areas.

J. *Decommissioning, Demolition, and Disposal:* These costs involve the removal of a building or fixed asset from the organization's inventory. In general demolition and disposal physically remove the asset; decommissioning takes the asset out of service but allows it to remain in place. More specific definitions are as follows;

i. Decommissioning: The facility is removed from service, and no occupancy is permitted. Costs are associated with activities that require minimal facility support, such as draining water lines.

ii. Demolition: The facility is destroyed and the ground plane is cleared for a subsequent use. Costs are related to tearing down the facility, removing the debris, and making the site safe.

iii. Disposal: The facility is removed from the campus site and the site made ready for some other purpose. This action is most commonly undertaken with small assets, such as residential buildings that are sold and removed for further use at another location.

2. Maintenance and Operations: These are the *annual* costs required to support the functionality of a building or fixed asset on a daily or annual basis. The costs are focused on those actions or requirements that are predictable and are based on the normal wear and tear and use of the facility.

D. *Operations:* These are costs for all the activities associated with the routine, day-to-day use, support, and operation (not maintenance) of a building or physical asset.

Examples:

i. Transportation of material, mail delivery, setups for special events, and moving services;

ii. Exterior and interior services, which include operations such as custodial care, security, landscaping, groundskeeping, refuse collection, recycling, pest control, and snow removal.

E. *Maintenance:* These costs are required for activities that are funded through the annual budget cycle with the objective of continuing or achieving either the originally anticipated life of a fixed asset or an established suitable level of service. Maintenance can be further divided into key elements; two examples of these are provided below.

i. Proactive maintenance: Preventive or predictive measures, such as, checking and replacing belts and lubricating rotating equipment, checking and adjusting the alignment of linkages, inspecting roofs for ponding and other precursors to leaks (failures), re-lamping light fixtures, inspecting electrical equipment for high temperatures, and periodically inspecting structural improvements and painting that occurs on regular schedule—every seven years, for example.

ii. Reactive maintenance: Examples of such steps include replacing equipment following a failure that affects the operation of a building operation, repairing or fixing a system failure such as a roof leak, and responding to complaints from building occupants about such problems as thermstat failures or calibration problems.

F. *Utilities:* These costs are associated with the actual consumption of utility services by the asset. Breaking these costs into essential elements as identified below, as appropriate for each institution, provides valuable operational data. Some organizations may include the communications (telephone and information technology) infrastructure in this component.

i. Electricity

ii. Steam

iii. Domestic water/wastewater

iv. Chilled water

v. Information technology and telephone services

vi. Other fuels (oil, natural gas, coal, wood, biomass, and so forth)

3. Recapitalization: These are *periodic* costs associated with the reinvestment of funds in a building or fixed asset. These projects are typically larger in size than annual maintenance work is, and they often involve replacing or renewing a building's major subsystems or areas.

G. *Improvements:* These are costs for changes or additions to an asset that are not required from a facility or life cycle perspective that increase the value of the asset. Examples of the need for such modifications include the following:

i. Code compliance: Installation of equipment or a system that did not pre-exist, such as the addition of a new fire sprinkler system;

ii. Appearance: Installation of a carpet on an existing floor to provide a more acceptable appearance or for acoustical purposes;

iii. Addition: Installation of a building security system that was not previously installed or installation of an electronic keying system.

H. *Programmatic Upgrades:* These costs are associated with measures that increase the value of the asset as a result of changes or modifications to the space or subsystems in a building that are required because of changes in the function or use of the facility. Examples include:

i. Installing laboratory equipment, such as fume hoods;

ii. Upgrading classroom technology capability requiring additional infrastructure for information technology and media;

iii. Reconfiguring internal space to accommodate new requirements.

I. *Replacement and Renewal:* These costs are related to the known future cyclic repair and replacement requirements based on the recognized life cycle of building components. These efforts ensure that the overall facility reaches its planned useful life. This category also includes projects that, as a result of the renewal of components or systems, require taking additional measures in order to comply with current codes or safety regulations or to address obsolescence. Examples of such measures include:

i. Replacement tasks: A building's fire alarm system has a life cycle of 10 years and the building may have a design life of 50 years. Over the design life of the building, the fire alarm system is predicted to be replaced four times. When a replacement fire alarm system is installed, it must incorporate the technology that is available at the time of the installation, which may not be the same technology that was available when the former system was installed. Replacement tasks also include the replacement of obsolete equipment or systems.

ii. Renewal tasks: This effort includes periodic work of a substantial nature on a component in an attempt to restore operating characteristics that make the component run like new—for re-tubing a chiller halfway through its useful life, because without the renewal effort the chiller will operate poorly, if at all.

iii. Retrofitting tasks: This work is similar to renewal efforts and has the primary effect of adding economic life or value to the asset. An example is a modifying a boiler that ran on coal to one that operates on natural gas.

The advantage of having a logical, structured organization built on these common terms and definitions is that institutional decision makers and facilities managers can create and maintain a valuable base of knowledge that will be helpful in achieving predictable outcomes for any decision that is related to facilities.

Whether or not the above definitions are incorporated into institutional accounting structures, organizations that establish and consistently employ industry-based definitions will generally be in a better position to develop and leverage asset investment strategies in order to achieve their broad spectrum of program objectives.