



Standard Practice for Measuring Life-Cycle Costs of Buildings and Building Systems¹

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INTRODUCTION

Several methods of economic evaluation are available to measure the economic performance of a building or building system over a specified time period. These methods include, but are not limited to, life-cycle cost (LCC) analysis, the benefit-to-cost ratio, internal rate of return, net benefits, payback, multiattribute decision analysis, risk analysis, and related measures (see Practices [E964](#), [E1057](#), [E1074](#), [E1121](#), [E1765](#), and [E1946](#)). These methods differ in their measure and, to some extent, in their applicability to particular types of problems. Guide [E1185](#) directs you to the appropriate method for a particular economic problem. One of these methods, life-cycle cost (LCC) analysis, is the subject of this practice. The LCC method sums, in either present-value or annual-value terms, all relevant costs associated with a building or building system over a specified time period. Alternative (mutually exclusive) designs or systems for a given functional requirement can be compared on the basis of their LCCs to determine which is the least-cost means of satisfying that requirement over a specified study period.

1. Scope

1.1 This practice establishes a procedure for evaluating the life-cycle cost (LCC) of a building or building system and comparing the LCCs of alternative building designs or systems that satisfy the same functional requirements.

1.2 The LCC method measures, in present-value or annual-value terms, the sum of all relevant costs associated with owning and operating a building or building system over a specified time period.

1.3 The basic premise of the LCC method is that to an investor or decision maker all costs arising from an investment decision are potentially important to that decision, including future as well as present costs. Applied to buildings or building systems, the LCC encompasses all relevant costs over a designated study period, including the costs of designing, purchasing/leasing, constructing/installing, operating, maintaining, repairing, replacing, and disposing of a particular building design or system.

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical

conversions to SI units that are provided for information only and are not considered standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

[E631 Terminology of Building Constructions](#)

[E833 Terminology of Building Economics](#)

[E964 Practice for Measuring Benefit-to-Cost and Savings-to-Investment Ratios for Buildings and Building Systems](#)

[E1057 Practice for Measuring Internal Rate of Return and Adjusted Internal Rate of Return for Investments in Buildings and Building Systems](#)

[E1074 Practice for Measuring Net Benefits and Net Savings for Investments in Buildings and Building Systems](#)

[E1121 Practice for Measuring Payback for Investments in Buildings and Building Systems](#)

[E1185 Guide for Selecting Economic Methods for Evaluating Investments in Buildings and Building Systems](#)

[E1369 Guide for Selecting Techniques for Treating Uncertainty and Risk in the Economic Evaluation of Buildings and Building Systems](#)

[E1765 Practice for Applying Analytical Hierarchy Process \(AHP\) to Multiattribute Decision Analysis of Investments](#)

¹ This practice is under the jurisdiction of ASTM Committee [E06](#) on Performance of Buildings and is the direct responsibility of Subcommittee [E06.81](#) on Building Economics.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.