



Standard Practice for Measuring Benefit-to-Cost and Savings-to-Investment Ratios for Buildings and Building Systems¹

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INTRODUCTION

This is one in a series of practices for applying economic evaluation methods to building-related decisions. Methods covered by this practice are benefit-to-cost ratio (BCR) and savings-to-investment ratio (SIR). These are members of a family of economic evaluation methods that can be used to measure the economic consequences of a decision over a specified period of time. The BCR is used when the focus is on benefits (that is, advantages measured in dollars) relative to project costs. The SIR, a variation of the BCR, is used when the focus is on project savings (that is, cost reductions) relative to project costs. The family of methods includes, in addition to BCR and SIR, net benefits, life-cycle cost, internal rate-of-return, adjusted internal rate-of-return, and payback (see Practices E 917, E 1057, E 1074, and E 1121). Guide E 1185 directs you to the appropriate method for a particular economic problem.

BCR and SIR are numerical ratios that indicate the economic performance of a project by the size of the ratio. A ratio less than 1.0 indicates a project that is uneconomic, a ratio of 1.0 indicates a project whose benefits or savings just equal its costs, and a ratio greater than 1.0 indicates a project that is economic. While it is straightforward to use ratios to determine whether a given project is economic or uneconomic, care must be taken to correctly interpret ratios when using them to choose among alternative designs and sizes of a project, or to assign priority to projects competing for limited funds.

1. Scope

1.1 This practice presents a procedure for calculating and interpreting benefit-to-cost ratios (BCR) and savings-to-investment ratios (SIR) as an aid for making building-related decisions.

1.2 A basic premise of the BCR and SIR methods is that future as well as present benefits and costs arising from a decision are important to that decision, and, if measurable in dollars, should be included in calculating the BCR and SIR.

1.3 Dollar amounts used to calculate BCR and SIR are all discounted, that is, expressed in time-equivalent dollars, either in present value or uniform annual value terms.

2. Referenced Documents

2.1 ASTM Standards:

E 833 Terminology of Building Economics²

E 917 Practice for Measuring Life-Cycle Costs of Buildings

and Building Systems²

E 1057 Practice for Measuring Internal Rate of Return and Adjusted Internal Rate of Return for Investments in Buildings and Building Systems²

E 1074 Practice for Measuring Net Benefits for Investments in Buildings and Building Systems²

E 1121 Practice for Measuring Payback for Investments in Building and Building Systems²

E 1185 Guide for Selecting Economic Methods for Evaluating Investments in Buildings and Building Systems²

2.2 ASTM Adjuncts:

Discount Factor Tables, Adjunct to Practice E 917³

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, refer to Terminology E 833.

4. Summary of Practice

4.1 This practice identifies related ASTM standards and adjuncts. It outlines the recommended steps for carrying out an analysis using the BCR or SIR method, explains each step, and gives examples. This practice discusses the importance of

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² *Annual Book of ASTM Standards*, Vol 04.11.

³ Available from ASTM Headquarters. Order ADJE091703.

