

BENEFIT COST ANALYSIS (BCA) FOR FEDERAL GRANT PROJECTS

What is a Benefit Cost Analysis?

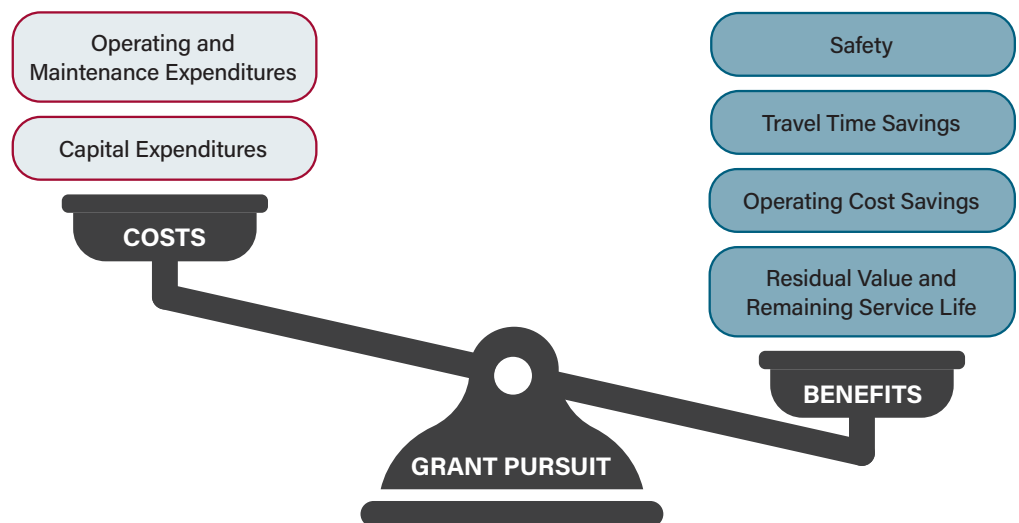
In the context of transportation projects, a **Benefit Cost Analysis (BCA)** is a systematic process used to identify, quantify, and compare the expected net benefits of a potential infrastructure investment, action, or policy expected to accrue over its lifespan. BCAs are often required for federal discretionary grants, but are also used when prioritizing projects among limited resources. The U.S. Department of Transportation (USDOT) supports data-driven decision-making using tools such as BCAs, requiring that all grants, loans, and contracts contribute to bolstering the American economy and benefiting the public ([DOT Order 2100.7](#)).

A BCA is typically developed in Microsoft Excel using USDOT-approved values for monetizing and normalizing costs and benefits, and accompanied by a report that includes context and methodologies for assumptions, particularly when non-standard values are used. If benefits cannot be reasonably monetized, they should be linked to specific project components and explained in the accompanying report, allowing reviewers to understand the project's context.

What do you include?

Typical benefits include safety improvements, travel time savings, operating cost reductions, and increased residual value, among others. Any benefits included in the BCA should be reasonable and defensible, based on standard values. Adjustments to standard values can be completed with a *sensitivity* analysis.

Costs include up-front capital expenditures and operating and maintenance costs incurred over the project's lifecycle. **The costs should include all project phases, not just construction, regardless of whether the costs were previously incurred or how they were funded.** Disbenefits are also considered, including reduced traffic flow during the project period.

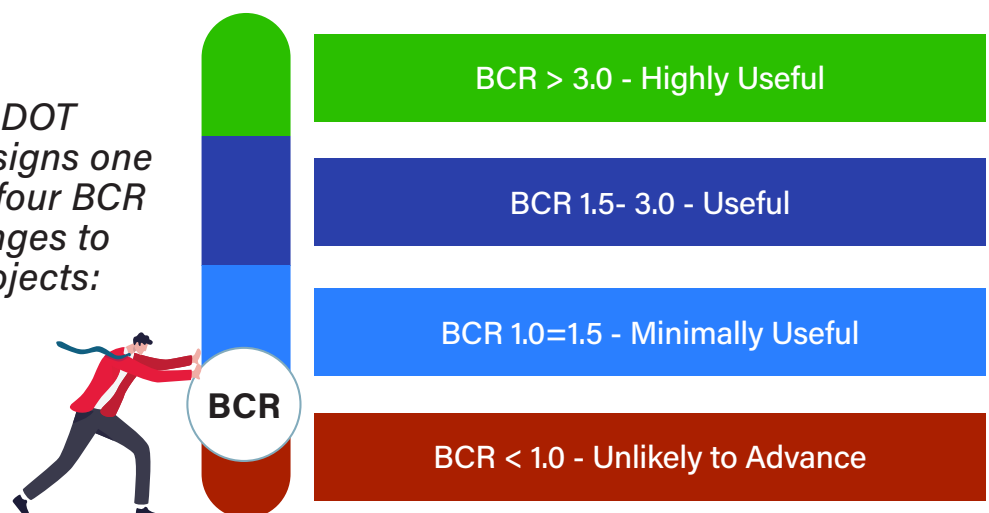


How are the results represented?

Once the project benefits and costs are monetized and included in the analysis, the BCA calculates the *benefit-cost ratio* (BCR), which is a ratio of project benefits over costs, adjusted to account for inflation (previous years' costs) or *discounting* (future year costs) to ensure a consistent value. A BCR higher than 1 indicates that the monetized benefits of the project exceed its costs.

The goal of a
BCA is to achieve
a BCR of
1.5
or greater

USDOT
assigns one
of four BCR
ranges to
projects:



Common Tripping Points

Attributing Values to the Wrong Component

The costs should only include capital costs, with net maintenance costs and *residual value* considered among benefits.

Double-Counting Benefits

Avoid double-counting benefits, such as travel time savings and reduced fuel use, to ensure all benefits are mutually exclusive.

Including Components of Other Economic Analysis Tools

A BCA considers the increased economic efficiency resulting from a project, and the net change to overall societal welfare is assessed. This is distinct from other types of economic analysis, such as economic impact analysis.

Using Inconsistent Project Scopes

The project scope considered for the BCA must be consistent. For example, if costs are included only for five miles of a ten-mile roadway project, the total benefits of the full build must be scaled consistently.

Key Terms

- ✦ **Analysis Period**
The time span over which project benefits and costs are evaluated, typically 20 to 30 years for transportation infrastructure.
- ✦ **Benefit-Cost Ratio (BCR)**
The ratio of total discounted benefits to total discounted costs. A BCR greater than 1 indicates that benefits exceed costs.
- ✦ **Constant (or Real) Dollars**
Dollar values that have been adjusted to remove the effects of inflation, representing purchasing power in a specific base year.
- ✦ **Current (or Nominal) Dollars**
Dollar values that reflect prices in the year they occur, including the effects of inflation.
- ✦ **Discount Rate**
A percentage used to adjust future values to present value, reflecting the time value of money and opportunity cost of capital.
- ✦ **Discounting**
Converts future benefits and costs into present-day values using a discount rate such as 7%, allowing for consistent comparison over time.
- ✦ **Inflation Adjustment (or Escalation)**
Converts past costs or expenditures into present-day dollars using a price index, ensuring consistency with current economic conditions.
- ✦ **Net Present Value (NPV)**
The difference between a project's discounted benefits and costs, showing its total economic value in today's dollars.
- ✦ **Residual Value**
The remaining value of a project's assets at the end of the analysis period, included as a benefit in the final year.
- ✦ **Sensitivity Analysis**
Tests how changes in key assumptions affect a project's outcomes, helping to assess risk and uncertainty through scenario testing or simulation.

Additional Resources

Core Guidance and Policy Documents

- ✦ [**USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs \(May 2025\)**](#)
The primary resource outlining BCA methodology, recommended values, and submission standards.
- ✦ [**DOT Order 2100.7 - Ensuring Reliance Upon Sound Economic Analysis**](#)
Establishes the requirement for rigorous economic analysis in all DOT-supported activities.

Tools and Templates

- ✦ [**USDOT BCA Spreadsheet Template \(May 2025\)**](#)
A downloadable Excel template to structure and calculate your BCA.

How-To Resources and Training

- ✦ [**DOT Navigator: What Is a Benefit-Cost Analysis?**](#)
Overview of BCA concepts, use cases, and grant programs that require it.
- ✦ [**Specialized Data Resources for BCA**](#)
Provides monetization values and other inputs for BCA development.