



Maritime Administration
Port Infrastructure
Development Grant Program

**Preparing a Benefit-Cost
Analysis**

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Presented by:
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Economist

United States
Department of
Transportation

- **All project sponsors should submit a benefit-cost analysis (BCA) as part of their PIDG application**
- **USDOT will consider a project's demonstrated benefits and costs in evaluating applications**

- **USDOT economists will review the applicant's BCA**
 - Examine key assumptions
 - Correct for any technical errors
 - Perform sensitivity analysis on key inputs
 - Consider any unquantified benefits

- Covers all USDOT discretionary grant programs
- Contains most recent recommended values
- Available at:
<https://www.transportation.gov/office-policy/transportation-policy/benefit-cost-analysis-guidance>

- **BCAs should provide enough information for a reviewer to follow the logic and reproduce the results**
 - Spreadsheet or database files showing the calculations
 - Technical memos describing the analysis and documenting sources of information used (assumptions and inputs)
 - Present annual benefit & cost streams by type (not just summary output)

- **Should measure costs and benefits of a proposed project against a baseline alternative (“base” or “no build”)**
- **“Do’s”**
 - Factor in any projected changes (e.g., increased traffic volumes) that would occur even in the absence of the requested project
 - Factor in ongoing routine maintenance
 - Consider full impacts of no build
 - Explain and provide support for the chosen baseline
- **“Don’t’s”**
 - Assume that the same (or similar) improvement will be implemented later
 - Use unrealistic assumptions about alternative traffic flows

- **Most benefit estimates depend on usage estimates**
- **Provide supporting info on forecasts**
 - Geographic scope, assumptions, data sources, methodology
- **Provide forecasts for intermediate years**
 - Or at least interpolate—don't apply forecast year impacts to interim years
- **Exercise caution about long-term growth assumptions**
 - Consider underlying capacity limits of the facility

- **Should cover both initial development and construction and a subsequent operational period**
- **Generally tied to the expected service life of the improvement or asset**
 - I.e., the number of years until you would anticipate having to take the same action again
 - Lesser improvements should have shorter service lives
- **Avoid excessively long analysis periods (over 30 years of operations)**
 - Use residual value to cover out-years of remaining service life for long-lived assets

■ Inflation Adjustments

- Recommend using a 2017 base year for all cost and benefit data
- Index values for the GDP Deflator included in the BCA guidance

■ Discounting

- Use a 7% discount rate

- **Project scope included in estimated costs and benefits must match**
 - E.g., don't claim benefits from an entire project, but only count costs from the grant-funded portion
- **Scope should cover a project that has independent utility**
 - May need to incorporate costs for related investments necessary to achieve the projected benefits
- **Project elements with independent utility should be individually evaluated in the BCA**
 - BCA evaluation will cover both independent elements and the submitted project as a whole

- **Should be presented on an annual basis**
 - Don't assume constant annual benefits without a good reason to do so
- **Negative outcomes should be counted as “disbenefits”**
 - E.g., work zone impacts
- **Avoid double-counting benefits**

- **Recommended values found in BCA Guidance**
 - See footnotes for discussion on non-vehicle time, long-distance travel, business travel
- **Consider vehicle occupancy where appropriate**
- **If valuing travel time reliability:**
 - Carefully document methodology and tools used
 - Show how valuation parameters are distinct from general travel time savings

- **Avoid double counting operating savings and other impacts**
 - E.g., truck travel time savings, fuel usage reductions
- **Localized, specific data preferred, but standard values for light duty vehicles and commercial trucks provided in BCA guidance**

- **Typically associated with reducing fatalities, injuries, and property damage**
- **Projected improvements in safety outcomes should be explained and documented**
 - Justify assumptions about expected reductions in crashes, injuries, and/or fatalities
 - Show clear linkage between project and improved outcomes
 - Use facility-specific data history where possible
- **Available crash-related injury data may need to be converted from KABCO to MAIS (see BCA Guidance document)**

- **For infrastructure improvements, emissions reductions will typically be a function of reduced fuel consumption**
- **Recommended unit values for CO₂, SO₂, VOCs, NO_x, and PM_{2.5} found in BCA guidance**
 - Be careful about the measurement units being applied

- **Primary benefits typically experienced directly by users of the improved facility**
- **Includes both “existing” users (under baseline) and “additional” users attracted to the facility as a result of the improvement**
 - Standard practice in BCA would value benefits to additional users less than those for existing users (see BCA guidance)

- **Projected magnitude**
 - Should be based on careful analysis of the market and potential for diversion from other modes that might be attributable to the project

- **Benefits estimates should not be based on comparing user costs of “old” and “new” mode**
 - Would be reflected in benefits to additional users

- **Reductions in external costs would be relevant**
 - E.g., emissions costs, pavement damage

- **If using 1997 HCAS values...**
 - Don't apply urban values to rural truck travel
 - Should net out highway user fees paid by trucks from marginal pavement damage costs

- **Resilience**
 - Consider expected frequency of events and their consequences
- **Noise Reduction**
- **Emergency Response**
 - FEMA methodology for fire and ambulance services
- **Quality of Life**
- **Property Value Increases**
 - Is a measure rather than a benefit—avoid double-counting

- **Should quantify magnitudes/timing of the impacts wherever possible**
- **Should clearly link specific project outcomes to any claimed unquantified benefits**

- **Include all costs of implementing the project**
 - E.g., design, ROW acquisition, construction
 - Regardless of funding source
 - Include previously incurred costs

- **Net maintenance costs may be positive or negative**
 - New facilities would incur ongoing maintenance costs over the life of the project
 - Rehabilitated/reconstructed facilities may result in net savings in maintenance costs between the build/no-build

- For assets with remaining service life at the end of the analysis period, may calculate a “residual value” for the project
- Simple approach: assume linear depreciation
- Be sure to properly apply discounting

- **Net Present Value (Benefits – Costs)**

- **Benefit-Cost Ratio (Benefits / Costs)**
 - Denominator should only include capital costs (i.e., net maintenance costs and residual value should be in the numerator)

- **Economic Impact Analysis (EIA)**
 - BCA measures the value of a project's benefits and costs to society
 - EIA measures the impact of increased economic activity within a region attributable to a project
 - EIA represents the translation of “first order” benefits into other economic outcomes—not added benefits to be counted in BCA

- **Transfers**

- **“Avoided” Costs**

- Visit – <https://www.maritime.dot.gov/PIDPgrants>
- Applications – Must be submitted on or before 8:00 PM E.D.T. on September 16, 2019

A map of the United States and Canada with numerous red dots representing port locations. The dots are densely packed along the West Coast, particularly in California and Oregon, and are also scattered along the Gulf and Atlantic coasts. The map includes labels for 'CANADA' and 'UNITED STATES'. Various bodies of water are labeled, including the Bering Sea, Gulf of Alaska, Hudson Bay, Labrador Sea, Gulf of Mexico, and Caribbean Sea. The text 'Maritime Administration Port Infrastructure Development Grant Program' is overlaid on the top left of the map.

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Question and Answer Session