BUILD Grants
Better Utilizing Investments to Leverage Development Transportation Discretionary Grants Program

Preparation of a Benefit-Cost Analysis

Presented by:
Office of the Under Secretary for Policy
United States Department of Transportation
BCA and BUILD

- Applicants for projects involving construction should submit a benefit-cost analysis (BCA) as part of their BUILD grant application.
- Excludes planning grant applications.
- USDOT will consider a project’s demonstrated benefits and costs in evaluating applications.
USDOT BCA Review

- 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
BCA Guidance

- Covers all USDOT discretionary grant programs
- Updated January 2020
- Available at: https://www.transportation.gov/office-policy/transportation-policy/benefit-cost-analysis-guidance
What’s new?

- Updated monetization values
- Additional guidance and recommended values for vehicle occupancy and crash reduction
- Additional clarifications on analysis period assumptions and the use of crash modification factors (CMFs)
Transparent & Reproducible Analysis

- 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)
Baselines

- 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 (e.g. bridge closure/posting)
  - 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
Demand Forecasts

- Most benefit estimates depend on ridership or 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
Analysis Period

- 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
- Recommend 20 years maximum for capacity expansion
Inflation and Discounting

- **Inflation Adjustments**
  - Recommend using a 2018 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
Scope of the Analysis

- 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
Benefits

- 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
Travel Time Savings

- Recommended values found in BCA Guidance
  - See footnotes for discussion on non-vehicle time, long-distance travel, business travel

- Consider vehicle occupancy where appropriate
  - Local/facility-specific values preferred
  - National-level values provided in BCA Guidance

- If valuing travel time reliability:
  - Carefully document methodology and tools used
  - Show how valuation parameters are distinct from general travel time savings
Operating Cost Savings

- Avoid double counting operating savings and other impacts
  - E.g., truck travel time savings, fuel consumption reductions
- Localized, specific data preferred
  - Standard per-mile values for light duty vehicles and commercial trucks provided in BCA Guidance
Safety Benefits

- 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 (and document any CMF used)
  - Show clear linkage between project and improved outcomes
  - Use facility-specific data history for baseline where possible
- Crash-related injury and fatality data may be available in different forms
  - MAIS/KABCO injury scales
  - Fatal/Injury crashes vs. fatalities/injuries
  - BCA Guidance provides values covering all of these
Emissions Reduction Benefits

- For infrastructure improvements, emissions reductions will typically be a function of reduced fuel consumption.

- Recommended unit values for CO$_2$, SO$_2$, VOCs, NO$_x$, and PM$_{2.5}$ found in BCA Guidance.

  - Be careful about the measurement units being applied.
Benefits to Existing and Additional Users

- 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)
**Modal Diversion**

- **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.
Other Benefits

- 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
Unquantified Benefits

- Should quantify magnitudes/timing of the impacts wherever possible

- Should clearly link specific project outcomes to any claimed unquantified benefits
Capital Costs

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

- Three forms of capital costs
  - Nominal dollars (project budget)
  - Real dollars (base year)
  - Discounted real dollars (use in BCA)
Maintenance 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
Residual Value

- 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
Comparing Benefits to Costs

- **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)
Other Issues

- 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
More information

- Visit – https://www.transportation.gov/BUILDgrants

- Email – BUILDgrants@dot.gov

- Applications – Must be submitted on or before 5:00 PM E.D.T. on May 18, 2020
Question and Answer Session

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