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

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

Preparing a Benefit-Cost Analysis
BCA and BUILD

- All project sponsors should submit a benefit-cost analysis (BCA) as part of their BUILD grant application
- USDOT will consider a project’s demonstrated benefits and costs in evaluating applications
What is a BCA?

- Comparison of the monetized value of a project’s impacts on users and society (benefits) to the resources required to implement the project (costs)

- What it is not
  - Economic Impact Analysis
  - Financial Analysis
  - Fiscal Analysis
What Makes a Good BCA?

- Transparent & Reproducible: should provide enough information for a reviewer to follow the logic and reproduce the results
- Technical memos describing the analysis and documenting sources of information used (assumptions and inputs)
- Spreadsheet or database files showing the calculations
- Present annual benefit & cost streams by type (not just summary output)
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
- Contains most recent recommended values
- Available at: https://www.transportation.gov/office-policy/transportation-policy/benefit-cost-analysis-guidance
Baselines

- Should measure costs and benefits of a proposed project against a baseline alternative (aka “base case” 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 under build/no-build—consider “next best” alternative
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

- Carefully explain/justify deviations between baseline and build case
  - Especially if projecting decreased travel/demand after infrastructure improvements
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 taking 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 and Discounting

- **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
Scope of the Analysis

- Project scope included in estimated costs and benefits must match
  - 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 estimated and presented for different types of impacts/benefits
  - Do not need to be tied to the categories in the selection criteria (but should be consistent with outcomes claimed in application narrative)

- Tips
  - Don’t assume constant annual benefits without a good reason to do so
  - Negative outcomes should be counted as “disbenefits”
  - Avoid double-counting different types of benefits
Travel Time Savings

- Recommended values found in BCA Guidance
  - See footnotes for discussion on non-vehicle time, long-distance travel, business travel
  - Note that commuting time is not business time
- 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
Operating Cost Savings

- Avoid double counting operating savings and other impacts
  - Ex: truck travel time savings; reduced fuel usage
- Vehicle op costs - typically a function of distance traveled
  - May also have increased fuel consumption from traffic delay/idling
- 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 from crashes and other incidents.
- Projected improvements in safety outcomes should be explained and documented:
  - Show clear linkage between the project and those improved outcomes.
  - Use facility-specific data history where possible—not just statewide averages.
- Available crash-related injury data may need to be converted from KABCO scale to MAIS (see BCA Guidance document).
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, NOx, 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 the “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
  - See 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
Costs

- Include all costs of implementing the project
  - Ex: design, ROW acquisition, construction
  - Regardless of funding source
  - Include previously incurred costs
- Costs should be stated in constant dollars
  - Match base year used to monetize benefits
  - Likely need to convert YOE costs from project budget (show/explain in the analysis)
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 and 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: 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**

- **“Avoided” Costs**
More information

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

- Email – BUILDgrants@dot.gov

- Applications – Must be submitted on or before 8:00 PM E.D.T. on July 15, 2019
Question and Answer Session

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