BCA and TIGER

- All project sponsors should submit a benefit-cost analysis (BCA) as part of their TIGER grant application.
- 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
Updated BCA Guidance

- Covers both INFRA and TIGER
- Revised format (single document)
- Additional topics covered
- Additional and updated recommended values
- Available at https://www.transportation.gov/office-policy/transportation-policy/benefit-cost-analysis-guidance
Transparent & Reproducible Analysis

- BCAs should provide enough information for a reviewer to follow the logic and reproduce the results
  - Spreadsheet 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)

- "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
- Avoid excessively long analysis periods (over 40 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 2016 base year for all cost and benefit data
  - Index values for the GDP Deflator included in the BCA guidance

- **Discounting**
  - All BCAs should use a 7% discount rate
  - May also include 3% discount rate case as a sensitivity analysis
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 TIGER-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
Travel Time Savings

- Recommended values found in BCA Guidance
- Consider vehicle occupancy where appropriate
- Avoid double counting travel time savings and other impacts
- 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 usage reductions
- Localized, specific data preferred, but standard 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
  - Show clear linkage between project and improved outcomes
  - Use facility-specific data history where possible
  - Justify assumptions about reductions in crashes, injuries, and/or fatalities
- 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 SO2, VOCs, NOx, and PM found in BCA guidance.

- Be careful about the measurement units being applied.

USDOT does not currently have recommended values for CO2 emissions reduction.

- Should be discounted at the same rate as other benefits and based on domestic damages.
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
Hard-to-Quantify Benefits

Examples

- Resilience
- Noise reduction
- Emergency response improvements
- Property value increases
- Quality of life

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
  - 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
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
  - Account for major maintenance and rehabilitation actions during remaining service life period
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/tiger

- Email: TIGERgrants@dot.gov
Question and Answer Session

Must have submitted Applications on or before October 16, 2017 by 8:00 p.m. EDT via www.grants.gov.