Preparing a Benefit-Cost Analysis

Presented by the Office of the Assistant Secretary for Transportation Policy
United States Department of Transportation
$600 million multimodal, merit-based discretionary grant program

- $120 million for rural areas
- $35 million for planning grants

Strong focus on creating “ladders of opportunity”

- Modal and geographic equity requirements
- No Pre-Application required
How is TIGER different?

- Broadly multimodal
- Open to any governmental entity
- Outcome-based
- Strict time limits on funding
- Performance measures
- Extremely competitive
- *Use of economic analysis*
Why Benefit-Cost Analysis (BCA)?

- President’s commitment to data-driven decision-making

- Requirement has applied in all five rounds of TIGER grants
  - No funding for projects for which \( C > B \)

- Value of BCA in project selection
  - BCA quality matters more than size of the \( B/C \) ratio
  - Focus your analysis on how it demonstrates need for your project
Additional Information in BCA Guidance & Resource Guide

- Available at [www.dot.gov/tiger/](http://www.dot.gov/tiger/)

- Recommended monetization values:
  - Value of Statistical Life
  - Value of injuries
  - Property damage
  - Travel time
  - Emissions

- Guidance on converting crash data (KABCO to MAIS)

- Additional background & reference texts
Basic Requirements

- **Project Summary**
  - Base case ("no-build")
  - Project description
  - Justification and impact on long-term outcomes
  - Affected population(s)
  - Expected economic benefits
  - Alternatives

- **Monetized estimates of benefits & costs**
  - Year-by-year stream of benefits and costs
  - Discounted to present value (3% & 7%)

- **Replicable methodology**

- **Demonstrate Independent Utility**
Ridership

- Most benefits depend on ridership ("usership") estimates

- Provide forecast estimates
  - Basic underlying assumptions
  - Data sources
  - Methodology

- Provide forecasts for intermediate years
  - Not just single forecast year

- Assess reliability of forecasts
BCA vs. EIA

- Economic Impact Analysis (EIA) focuses on local benefits
  - Ignores costs to other localities
  - Includes transfer payments as “impacts”
    - Payrolls, tax revenues, real estate investments

- BCA focuses on national benefits (including local)
  - Nets out costs to other areas
  - Includes only productivity increases resulting from job creation, increases in property values
Benefits – Quality of Life

- Quality of Life benefits are often associated with:
  - Accessibility
    - Improved access to jobs, amenities
    - Accessibility to wider range of transportation modes
      - Transit, bicycle lanes, walking
    - Accessibility for disadvantaged communities
  - Land use changes that bring destinations closer
  - Important to show ridership/usership
    - Try to estimate value per user
    - Increases in property values may indicate value
Benefits—Economic Competitiveness

- Benefits in this category typically include:
  - Savings to passengers, carriers, and shippers
    - Lower operating costs
    - Travel time savings
    - Improvements in reliability
  - Positive impacts on national exports
  - Ladders of Opportunity: new or improved connections between people and centers of employment, education, and services

- Take care in estimating:
  - Job creation benefits (focus on productivity increases)
  - Leave out multiplier effects

- Can include increases in labor and land productivity
  - But avoid double-counting
Benefits – Safety

- Safety benefits are typically associated with reducing fatalities, injuries, crash costs, and hazmat releases.

- Benefits should be based on good crash data and valid analysis of cause (crash causation factors).

- Available crash data may need to be converted from KABCO to MAIS (see BCA Resource Guide).

- Recommended values for Value of Statistical Life (VSL), injuries, property damage are available in BCA Resource Guide.
Benefits – State of Good Repair

- State of Good Repair benefits can include:
  - Reducing long-term maintenance and repair costs (life-cycle costs)
  - Travel time savings (from preventing closures of facilities, lack of speed and weight restrictions)
  - Other user benefits from better pavement, improved safety

- Need to consider benefits and costs of alternatives
  - Replacement vs. rehabilitation
- Risk analysis
Benefits – Environmental Sustainability

- Environmental sustainability benefits are typically from reduced emissions
  - Greenhouse gases (e.g., CO2)
  - SOx
  - NOx
  - Particulate matter (PM)
  - Volatile organic compounds (VOC)
- May also be water quality, habitat benefits
- Recommended values are available in BCA Resource Guide
Costs

- Provide costs from all sources (local, State, other Federal grants, private)
- Direct capital costs: construction, design, land acquisition
- Beyond capital costs
  - O&M, rehabilitation, life-cycle costs
  - External costs: noise, congestion, pollutants
  - Cost to users during project construction: increased delay, vehicle operating costs
- Costs of whole project should be compared with benefits of whole project (no “leveraging”)
  - Can’t just compare TIGER costs to whole-project benefits
  - Can compare benefits and costs of just one phase if it has independent utility
BCA Review Process

Each BCA is reviewed by two Departmental economists, and assigned two consensus-based ratings:

- **BCA Usefulness**
  - Very Useful
  - Useful
  - Marginally Useful
  - Not Useful

- **BCA Assessment**
  - Benefits > Costs
  - Uncertain, but Probably Benefits > Costs
  - Uncertain
  - Uncertain, but Probably Benefits < Costs
  - Benefits < Costs
Lessons Learned

- We don’t rank projects by B/C Ratio
  - Better to be conservative and get a modest excess of benefits over costs than to exaggerate benefits to get a big B/C Ratio

- Always document and provide reliable sources for data and calculations

- Be realistic in assumptions and estimates

- Qualitative discussion of benefits helps supplement understanding for difficult-to-measure benefits

- Consider the viewpoint of objective reviewers
  - Are estimates plausible and reasonable?
BCA Resources

- TIGER Website: [www.dot.gov/tiger/](http://www.dot.gov/tiger/)
  - March 3, 2014 Federal Register NOFA
  - BCA Guidance & Resource Guide
  - BCA Examples
    - Tribal BCA Examples
  - Preparing a BCA for a Rural TIGER Grant Application (August 2011)
  - 2010 archived webcast for *Benefit-Cost Analysis for Transportation Infrastructure: A Practitioner’s Workshop*

- The Value of Statistical Life (VSL) and Value of Time (VOT) guidance will be updated and posted on [www.dot.gov/tiger/](http://www.dot.gov/tiger/) soon.

- USDOT offers technical assistance to help applicants through the TIGER process

- General inquiries to [TIGERGrants@dot.gov](mailto:TIGERGrants@dot.gov) about BCA before April 28, 2014
Parting Words…

- BCA is an opportunity to objectively demonstrate the need for your project
  - Highlight benefits that are well-documented and align well with program’s selection criteria
  - Don’t forget to include all the costs of the project
  - Include a ridership/usership estimate, and estimate benefits per user

- Document, document, document

- Be realistic in your assumptions and estimates
Must have submitted Applications on or before April 28, 2014 at 5:00 p.m. EDT via www.grants.gov.

Question and Answer Session