Rail Enhancement Fund:
Benefit Cost Analysis Update

January 19, 2016

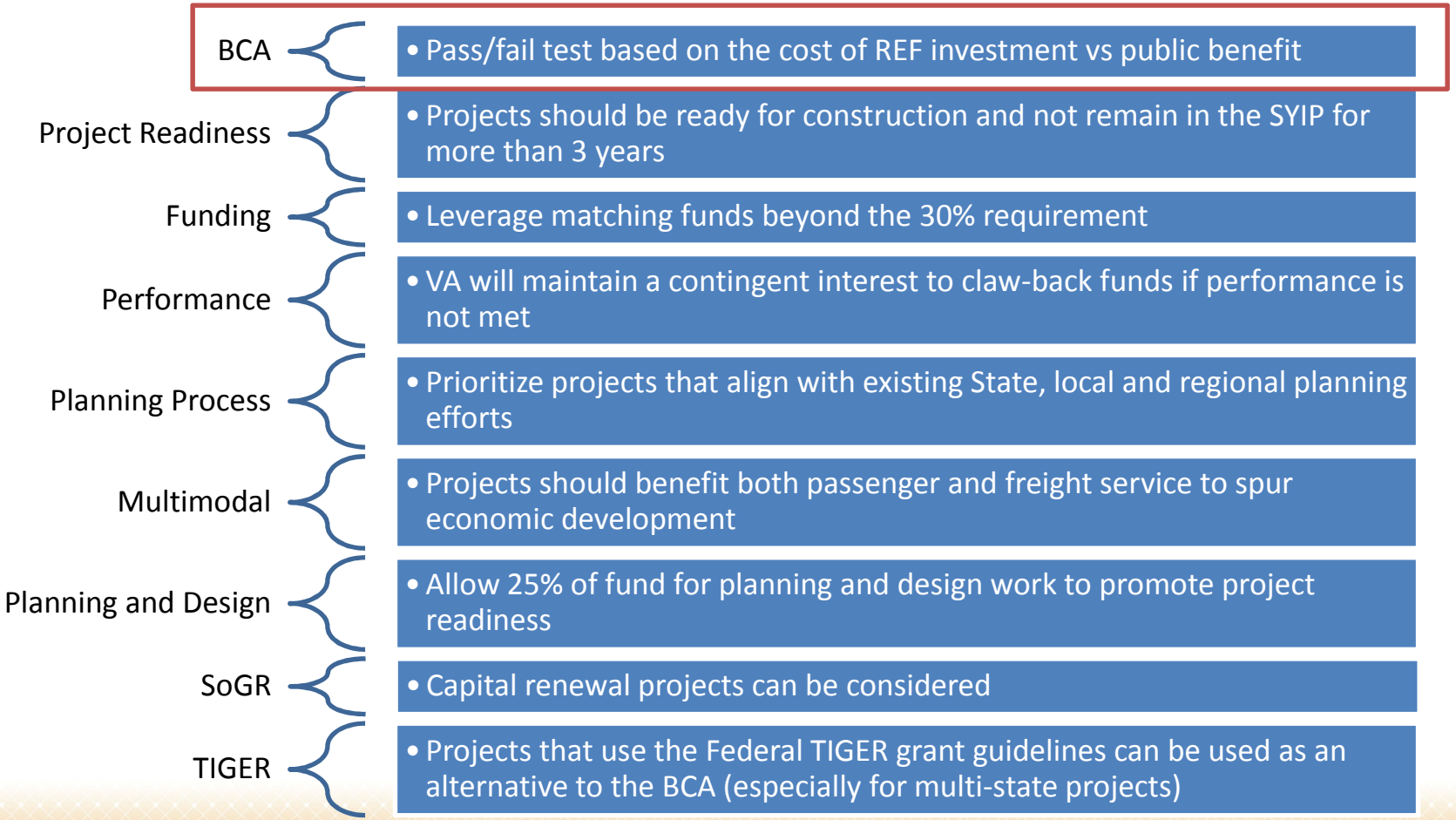
Commonwealth Transportation Board

Purpose

Update the BCA Model

- Update Metrics
  - last update 2005
- Follow Guiding Principles
  - Transparency and Simplicity
  - Scarcity of Funds
  - Public/Private and State/Local
  - Clear Policy Goals

Prioritization Checklist



Inputs

Project Description

- Timeline
- Location
- Cost

Freight Data (Current/Future)

- Tons
- Railcars
- Route Length

Passenger Data (Current/Future)

- Passengers
- Travel Time
- Route Length

Truck Trip

- Length
- Tons/Truck
- Trucks/Railcar

Car Trip

- Lengths
- Passengers/Car

Public Data Sources

Source	Location
2009 NHTS VA add-on survey	http://nhts.ornl.gov/2009/pub/usersguidev2.pdf
2014 California High-Speed Rail Benefit Cost Analysis	http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2014_Sec_7_CaHSR_Benefit_Cost_Analysis.pdf
AAA, Your driving costs 2015	http://exchange.aaa.com/wp-content/uploads/2015/04/Your-Driving-Costs-2015.pdf
Amtrak	https://www.narprail.org/our-issues/ridership-statistics/
VRE	http://www.vre.org/service/rider/consist/
Association of American Railroads (2013)	https://www.aar.org/data-center
Census Bureau	http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml
DAT Solutions, DAT Trendlines, Southeast Regional Van Rates, (Spring 2015)	http://www.dat.com/resources/trendlines
EPA - "Regulatory Impact Analysis: Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Engines Less than 30 Liters per Cylinder" (2008)	http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P10024CN.TXT
Federal Highway Cost Allocation Study (1997)	http://www.fhwa.dot.gov/policy/hcas/addendum.cfm
Forkenbrock (2001)	http://nexus.umn.edu/Courses/ce8214/papers/Forkenbrock2001.pdf
FRA Office of Safety, Accident Reports (2010-2015)	http://safetydata.fra.dot.gov/officeofsafety/default.aspx
Muller and Mendelsohn, "Measuring the Damages of Air Pollution in the United States" (2007)	Not publicly available
Public Waybill Sample	http://www.stb.dot.gov/stb/industry/econ_waybill.html
TIGER Benefit-Cost Anaylsis Resource Guide (2014	https://www.transportation.gov/sites/dot.gov/files/docs/TIGER%20BCA%20Resource%20Guide%202014.pdf
US Department of Environmental Protection: Motor Vehicle Emission Simulator (MOVES2014a)	http://www3.epa.gov/otaq/models/moves/
USDOT Bureau of Transportation Statistics 2015	http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/index.html
USDOT, FHWA, Freight Analysis Framework (2012)	http://ops.fhwa.dot.gov/FREIGHT/freight_analysis/faf/index.htm
VDOT, Accident, Fatality and Injury Frequency (2014	http://www.dmv.state.va.us/safety/#crash_data/crash_facts/index.asp
VDOT, Investigation of Speed-Flow Relations and Estimation of Volume Delay Functions for Travel Demand Models in Virginia (2009).	http://trbappcon.org/2009conf/TRB2009presentations/s12/TRB_App_Conf_12_100_Lee_Munn_0519_2009.ppt
VDOT, Rail Crossing Injuries (2010-2015)	http://www.virginiadot.org/sitemap/default.asp

Outputs - Freight

Congestion Cost

- Total reduction in truck VMT * congestion cost per truck mile

Environmental Improvement

- (Truck VMT * air and noise pollution cost per truck) – (train ton miles * air and noise pollution cost per train ton mile)

Shipping Distance Reduction

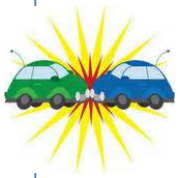
- Reduced freight mileage * annual rail ton shipments * shipping rate per ton

Shipping Cost Reduction

- (Truck VMT * shipping rate) – (train ton miles * shipping rate)

Pavement Maintenance Savings

- Truck VMT reduction * maintenance cost per truck mile



Accident Cost Savings

- (Truck ton miles * accident cost per mile) – (train ton miles * accident cost) + (accident cost per rail crossing * rail crossings removed)

Outputs - Passenger

Congestion Cost

- Total reduction in passenger VMT * congestion cost per vehicle mile

Environmental Improvement

- (Reduction in passenger VMT * air pollution cost per vehicle) – (additional train passengers * train trip length * air pollution cost per train mile)

Passenger Cost Reduction

- (Reduction in passenger VMT * operating cost per mile) – (increased rail passenger cost * fare per mile)

Travel Time Savings

- Travel time savings per trip * annual passengers * average value of time

Pavement Maintenance Savings

- VMT reduction * maintenance cost per mile

Accident Cost Savings

- Reduction in passenger VMT * accident cost per vehicle + removal of crossings

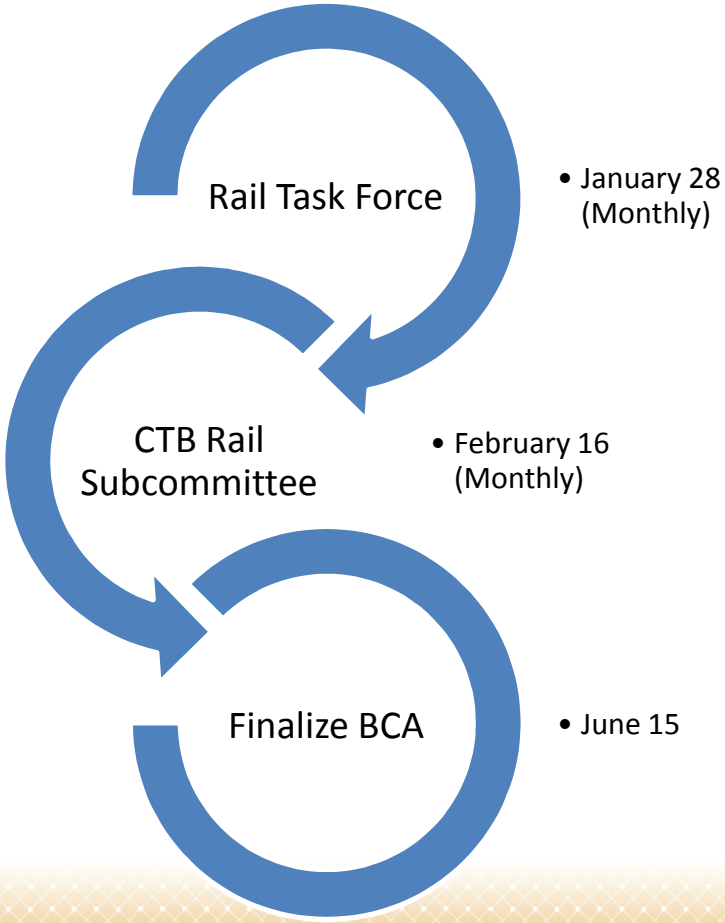
Wider Economic Benefits

- (Value of time savings + safety benefit + reduced vehicle operating cost) * 0.05

Important Model Updates

- Improve transparency through public data sources
- Improve transparency by providing model for grantee experimentation
- Update data sources and improve focus on Virginia metrics
- Establish BCA as one element of overall project evaluation checklist

Next Steps


Rail Task Force
• January 28 (Monthly)
CTB Rail Subcommittee
• February 16 (Monthly)
Finalize BCA
• June 15