



Peer Exchange Report

National Operations Center of Excellence Benefit-Cost and TSMO Peer Exchange

Purpose And Overview

NOCoE's Benefit-Cost and TSMO Virtual Peer Exchange is intended to host transportation agency professionals with experience in developing, implementing, and justifying to decision-makers benefit-cost and/or return on investment analyses for TSMO projects and programs to support policy makers and agency leadership.

The peer exchange will be virtual using the NOCoE's Zoom software and developed as a two-day exposure to various aspects of the topic. Staff from specific programs with experience in the topic will be invited to speak and attend. The peer exchange will also be open to state, regional, and local TSMO stakeholders.

Agenda

TUESDAY, JULY 25, 2023 (ALL TIMES LISTED BELOW ARE ET)

Time	Topic	Speakers
11:00 am	<u>Welcome and Introduction</u>	
–	• Facilitator Welcome	Faisal Saleem, NOCoE
11:30 am	• Agenda Review	ITE
(30 min.)	• Summary of expectations for this peer exchange	ITE
11:30 am	<u>Segment 1 – Federal Resources and Case Studies</u>	
–		
12:30 pm	• FHWA Resources	Jim Hunt, FHWA
(60 min.)	• Case Study 1: Utah DOT: Benefits and Costs of Implementing Automated Traffic Signal Performance	Mark Taylor, Utah DOT
	• Case Study 2: Cal B/C tools for TSMO and grant applications	Gilberto Chambers, Caltrans
	• Q&A	
12:30 pm	BREAK	
–		
1:30 pm		

<u>Segment 2 – Converting Qualitative Benefits into Quantitative Measures</u>		
1:30 pm – 2:30 pm (60 min.)	<ul style="list-style-type: none"> • Economic Evaluation of Equity in Operations • Benefit Cost Analysis for GDOT TIM: Mobility, Environmental, Safety, and Customer Satisfaction • Poll, Q&A 	Christopher Behr, HDR Christina Barry, Georgia DOT
<u>Segment 3 – Group Discussions</u>		
2:30 pm – 3:30 pm (60 min.)	<ul style="list-style-type: none"> • Initial Remarks • Breakouts • Topic 1 – Tools for measuring BCA – what’s out there, what’s needed? • Topic 2 - Using BCA to compare TSMO strategies vs. capacity improvements or as a complement to capacity improvements • Topic 3 – BCA for connected/automated vehicles and emerging technologies • Topic 4 – Challenges related to limited resources, timing for grant requests, dealing with multi-jurisdictional BCA, other challenges 	ITE Moderated by ITE
3:30 pm – 3:50 pm (20 min.)	<u>Summary from Breakout Rooms</u> <ul style="list-style-type: none"> • Report-out from all breakout room discussions 	ITE
3:50 pm – 4:00 pm (10 min.)	<u>Day Wrap Up</u> <ul style="list-style-type: none"> • Summary and what to expect next • Day closing remarks 	ITE Faisal Saleem, NOCoE

WEDNESDAY, JULY 26, 2023 (ALL TIMES LISTED BELOW ARE ET)

Time	Topic	Speakers
11:00 am – 11:30 am (30 min.)	<u>Recap from first day</u> • Highlights discussed on day 1 and objectives for day 2	ITE
11:30 am – 12:30 pm (60 min.)	<u>Segment 4 – How BCA and ROI Analysis fit into Agency Prioritization</u> • Initial remarks • BCA and ROI analysis through operational and safety perspective • MnDOT TSMO Implementation Plan • Q&A	Marcia Pincus, ITS-JPO Jim Windsor and Kerry Wilcoxon, Arizona DOT Brian Kary, Minnesota DOT
12:30 pm – 1:30 pm	BREAK	
1:30 pm – 2:30 pm (60 min.)	<u>Segment 5 – Benefit-Cost Analysis Case Studies</u> • NCDOT BCA examples • University Boulevard Corridor Improvements and Active Transportation BCA • Poll, Q&A	Jennifer Portanova, North Carolina DOT Olga Bredikhina, Alabama Transportation Institute
2:30 pm – 3:15 pm (45 min.)	<u>Segment 6 – Group discussion on Communicating Benefit-Cost Analysis</u> • Initial Remarks • Topics • Topic 1 – Emphasis on TIM • Topic 2 – Emphasis on capital budgets • Topic 3 – Emphasis on grant programs • Topic 4 – Emphasis on dashboards and tools	ITE Moderated by ITE
3:15 pm – 3:30 pm (15 min.)	<u>Day Wrap Up</u> • Gaps, Potential Actions, and Next Steps • Closing remarks	ITE Faisal Saleem, NOCoE

Panel Discussion

The Benefit-Cost and TSMO Virtual Peer Exchange, a two-day virtual meeting. There were two plenary sessions followed by a breakout group discussion session on each day.

PLENARY SESSION: FEDERAL RESOURCES AND CASE STUDIES

- **Applications of Benefit Cost Analysis in TSMO:** Explore how Benefit-Cost Analysis (BCA) is applied to the analysis of Transportation Systems Management and Operations (TSMO) investments.
- **Overview of FHWA TSMO BCA Resources:** Provide an overview of the resources available from the Federal Highway Administration (FHWA) for conducting BCA specific to TSMO
- **Prioritize Efficiency:** BCA enables the prioritization of operations projects based on expected efficiency of investment.
- **Compare Projects:** Facilitates a fair comparison between operations and non-operations projects on a consistent basis.
- **Justify Strategies:** Helps justify operations projects and strategies for consideration in the decision-making process.
- **Support for Evaluations:** BCA supports both pre-deployment and post-deployment evaluations, ensuring a comprehensive analysis throughout the project lifecycle.
- **TSMO Benefits at a glance (Case Studies)**
 - **Arizona's Innovative Striping and Signage:** Arizona DOT's TSMO Division successfully reduced serious and fatal crashes by 66% on a critical segment of westbound US-60 merging with I-10 in Phoenix. A sign redesign and lane restriping project led to 385 fewer crashes in the 12 months post-implementation, showcasing a remarkable 1,961:1 Benefit-Cost Ratio.
 - **Florida's Integrated Corridor Management (ICM):** Florida DOT addressed Orlando's infrastructure challenges with ICM, meshing freeway and arterial operations. Through transit signal priority and adaptive signal control, FDOT achieved a 40% reduction in delays, improved bus times, reduced emissions, enhancing travel time and reliability.
 - **Nevada's Traffic Incident Management:** Nevada DOT collaborated with state agencies to create a real-time incident data platform, resulting in a 12-minute reduction in incident response times and mitigating secondary crashes.
 - **Maryland's Traffic and Event Management:** Maryland's innovative approach to traffic and event management yields an annual savings of \$1.5 billion, managing events every 16 minutes efficiently.
 - **Michigan's Improved System Reliability:** Michigan DOT's adoption of Active Transportation Management strategies on US-23 saw a 56% improvement in system reliability, coupled with corridor speed enhancements of up to 19 miles per hour, providing commuters with safer and more predictable travel experiences.



TSMO BENEFITS AT A GLANCE

State departments of transportation (DOTs) are using Transportation Systems Management and Operations (TSMO) strategies to get the most out of their existing transportation systems, whether it's to improve safety, reduce delays caused by congestion, save taxpayer dollars, or reduce emissions and their impact on the environment. Here are a few of the many benefits State DOTs have reported from incorporating TSMO strategies and focusing on the broader operational picture.



The Georgia Department of Transportation (GDOT) has devised a comprehensive analysis tool involving a spreadsheet to compute benefit-cost ratios for both intersections and corridors. In this methodology, benefit factors include crash modification factors and a decade-long crash history, while cost considerations encompass right-of-way, engineering, utilities, and construction expenses. As an illustrative example, the analysis applied to a rural intersection (SR 37 at Thigpen Tr) resulted in varying benefit-cost ratios for intersection alternatives, ranging from 4.9 (for offset-T) to 9.3 (for a roundabout). This approach provides a systematic and quantitative means to evaluate and prioritize transportation projects based on their economic viability and safety impact.

GROUP DISCUSSION: SUMMARY

- Tools for BCA in TSMO:

Participants discussed existing tools for Benefit-Cost Analysis (BCA) in Transportation System Management and Operations (TSMO) and highlighted the need for effective methodologies. They emphasized the importance of considering factors like crash modification, historical crash data, and various costs, such as right-of-way and engineering expenses.

- Limitations and Gaps:

Identified limitations in current tools included challenges in data-driven congestion analysis, resource

disparities across different offices, and difficulties in communicating benefits and appealing to decision-makers. The need for uniform implementation and region-specific understanding was stressed.

- BCA for TSMO vs. Capacity Improvements:

BCA was discussed as a tool for comparing TSMO strategies and capacity improvements. Factors like operation and maintenance costs, software, monitoring, life cycle considerations, and monetization of travel time and reliability were emphasized. Participants shared experiences from different states, showcasing BCA's role in prioritizing TSMO projects.

- Challenges in BCA for TSMO and Capacity Improvements:

Challenges discussed included data-driven congestion analysis, translating operational impacts into real costs, and the need for TSMO to have a prominent role in decision-making alongside capacity improvements. Overcoming these challenges involved emphasizing operational impacts and user delay costs.

- TSMO Strategies and Capacity Improvements as Complementary:

Participants explored the idea that TSMO strategies and capacity improvements are not mutually exclusive but can be complementary. BCA was seen as a tool to identify the optimal combination of both approaches, ensuring a holistic and cost-effective transportation solution.

- BCA for Connected/Automated Vehicles and Emerging Technologies:

Challenges in BCA for connected/automated vehicles and emerging technologies were discussed, including life-cycle cost management, and ensuring sustainability in technical support. Examples, case studies, and research projects were shared to highlight the complexities and benefits of assessing these technologies.

- Challenges Related to Limited Resources and Multi-Jurisdictional BCA:

Limited resources posed challenges in conducting BCA for TSMO initiatives, requiring careful consideration of grant timing and strategies for application. Multi-jurisdictional challenges were addressed, with the mention of frameworks like MAP 21 for PM3 measures.

- Rural vs. Urban Considerations:

Different challenges in BCA for TSMO initiatives in rural and urban areas were discussed, including economic impact considerations, seasonal issues, and the need for a balance between art and science in BCA.

- Critical Factors for BCA under Resource Constraints:

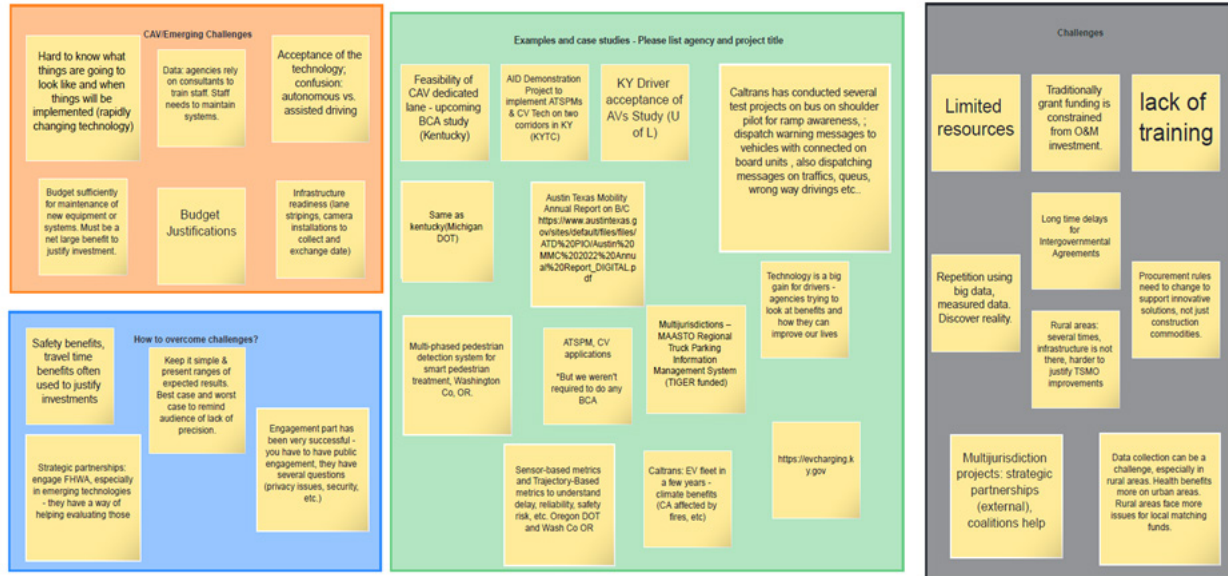
Critical factors for BCA under resource constraints included justifying qualitative aspects, considering economic impacts beyond traffic volumes, and emphasizing the 20% art and 80% science balance in the BCA process.

- AV/CV Role and Future Directions:

The role of BCA in articulating the benefits of Automated and Connected Vehicles (AV/CV) in TSMO was highlighted as a significant opportunity. Participants stressed the importance of learning from

experiences, simplifying methodologies, and effectively explaining the achieved benefits in the evolving landscape of transportation management.

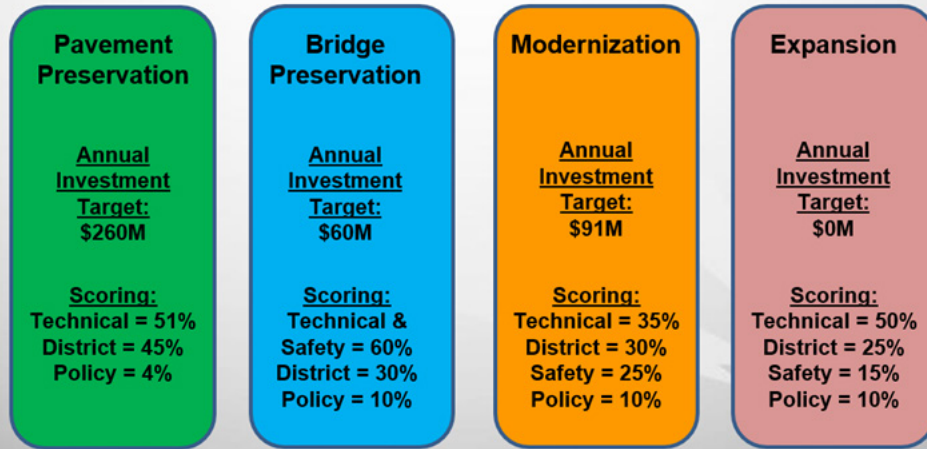
The snippets of the whiteboard from the breakout group discussion are presented below:



PLENARY SESSION: HOW BCA AND ROI ANALYSIS FIT INTO AGENCY PRIORITIZATION

In the Planning to Programming (P2P) GIS Tool within ArcGIS Pro, safety scoring is developed through geocoded crash data, incorporating incident date, injury severity, and additional attributes providing insights into crash characteristics. Roadway geometry, attribute data, and traffic volume history from the Highway Performance Monitoring System (HPMS) further contribute to the scoring process. Following the ranking of P2P projects, top priorities undergo Planning Level Scoping, involving fully itemized cost estimates adhering to ADOT's Estimated Engineering Construction Cost (E2C2) formatting, with the resultant document submitted for project updates in the Draft Five-Year Program, while an informal ROI calculation guides the selection of high-return projects for programming. P2P scoring overview is presented below:

P2P Scoring Overview



Investment targets represent statewide totals excluding Maricopa (MAG) and Pima County (PAG) regions

PLENARY SESSION: BENEFIT-COST ANALYSIS CASE STUDIES

The peer exchange explored the integration of Benefit-Cost Analysis (BCA) and Return on Investment (ROI) Analysis into the prioritization strategies of transportation agencies. It featured insights from experts such as Marcia Pincus from ITS-JPO, Jim Windsor, and Kerry Wilcoxon from Arizona DOT, as well as Brian Kary from Minnesota DOT. The focus is on understanding how these analytical approaches influence decision-making processes within agencies. Additionally, the discussion included specific Benefit-Cost Analysis case studies presented by Jennifer Portanova of North Carolina DOT and Olga Bredikhina from the Alabama Transportation Institute, providing practical examples to illustrate the application of these analyses in transportation prioritization.

POLL QUESTION/ANSWERS

Following the peer exchange, a poll was conducted, inviting panelists to engage in a survey. The results of the poll are presented below.

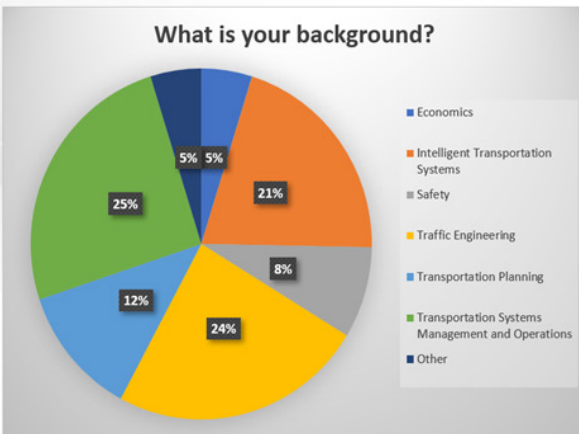
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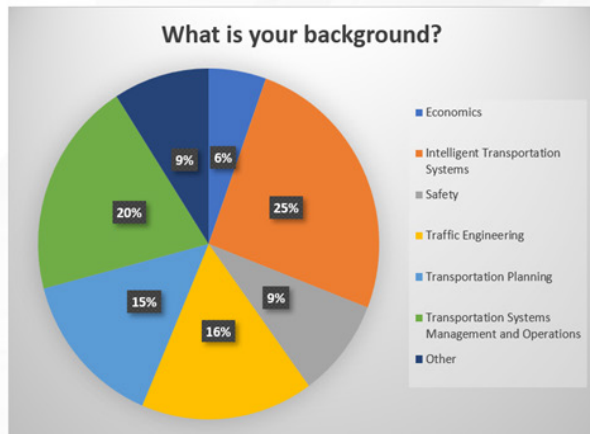
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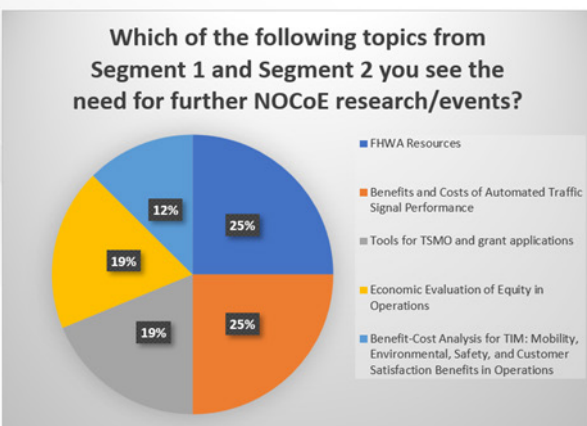
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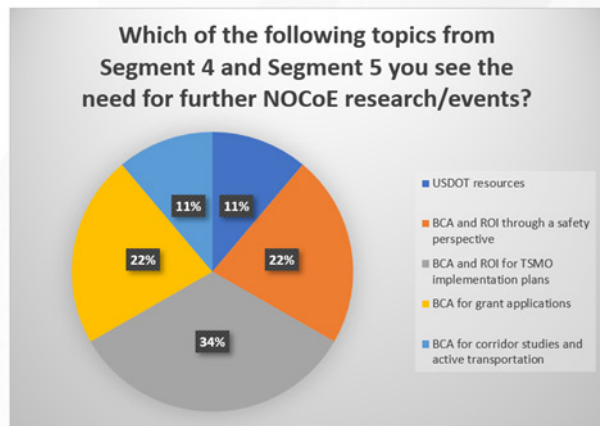
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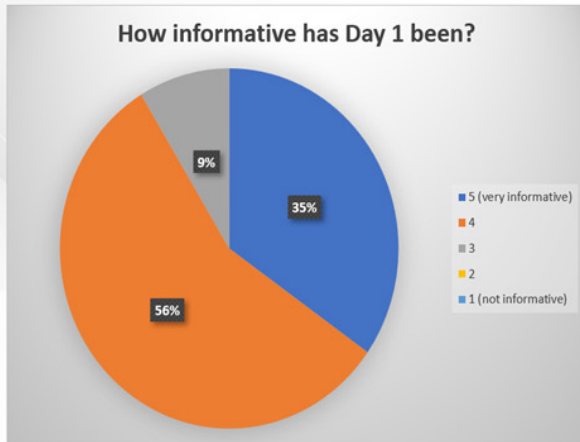
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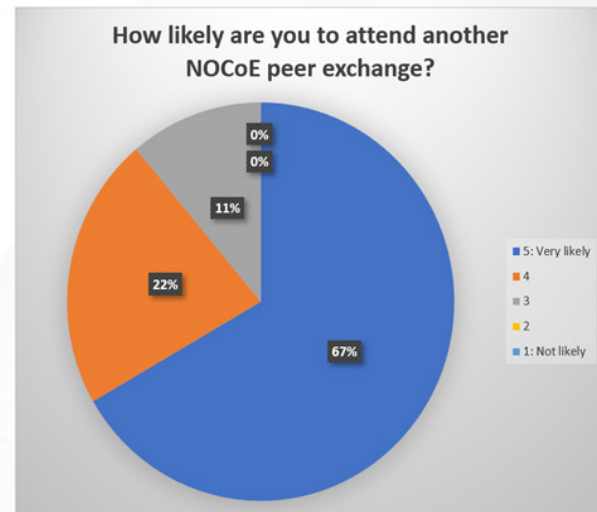
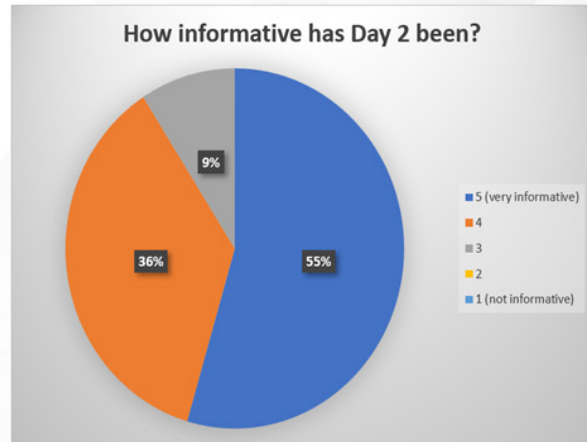
DAY 2



DAY 1



DAY 2



Resources

1. [AN EVALUATION OF THE FEDERAL HIGHWAY ADMINISTRATION'S TOOL FOR OPERATIONS BENEFIT/COST ANALYSIS](#)
2. [Highway Safety Benefit–Cost Analysis Guide](#)
3. [Tools from Clear Roads](#)
4. [Tool for Operations Benefit Cost Analysis \(TOPS-BC\)](#)

Next Steps

NOCoE will review the key takeaways from this peer exchange work on the next steps. Based on participants' feedback, it is anticipated that priority topics that need to be further explored are:

- Benefit-Cost Analysis in the context of Transportation Incident Management (TIM), capital budgets, grant programs, and the use of dashboards/tools.
- Key topics include tailored messaging, public involvement, challenges in communication, successful case studies, and recommended visualization techniques.
- The emphasis should be on addressing specific stakeholder concerns, overcoming obstacles, and utilizing diverse communication channels to convey the benefits of TSMO initiatives in a compelling manner.

Further, NOCoE plans on continuing to deliver “agile” peer exchange.