



Quantification of Research Benefits

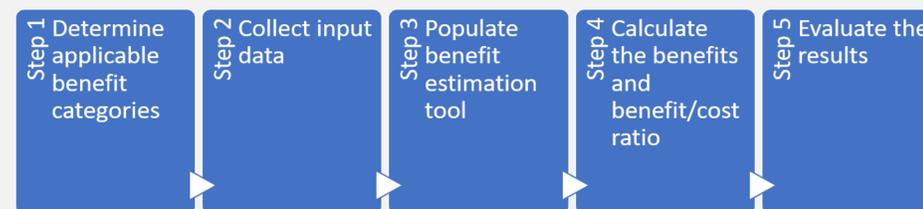
AUTHORS: Dr. Frank Gross, P.E., Thanh Le, P.E.
REPORT # QR17-2

BACKGROUND

With limited research funds, agencies must evaluate and justify the economic effectiveness of research projects to the agencies and other stakeholders. Quantifying research benefits allows agencies to understand and improve the effectiveness of their research. The six States comprising the NETC were interested in developing a consistent way to evaluate and quantify the monetary benefits from research projects. It is important to have a tool that can analyze different types of transportation research projects and quantify their benefits in comparable financial terms. The results can be used as a key piece of input for assessing the effectiveness of agency's research program and make informed decisions to implement or not implement research recommendations. Additionally, having all New England States use the same estimation tool will allow the NETC to better collaborate and coordinate joint research. This project adapted the Minnesota Department of Transportation's (MnDOT) Excel-based benefit estimation tool to develop an updated and enhanced tool for the New England Transportation Consortium (NETC) and its member States. The development of this tool also provides information that can help NETC with more detailed research questions for its future requests for proposals (RFP). The results are an updated guideline for quantifying research benefits and an companion Excel-based calculation tool.

RESEARCH BENEFIT QUANTIFICATION PROCEDURE

Five-Step Process of Quantifying Research Benefits



Potential Benefit Categories

Engineering/administrative costs	Environmental costs
Construction/installation costs	Lifecycle costs
Operation and maintenance costs	Safety costs
Road user costs	Risk management costs

EXCEL-BASED CALCULATION TOOL

- Include a set of Excel-spreadsheet templates for all benefit categories
- Provide one calculation sheet with guidance for each benefit category and one general sheet for project information, key inputs and outputs
- Automate the calculation built-in formulas and linked sheets
- Come with color-coded cells and guidance to assist users through the process, from identifying benefit categories, collecting and entering inputs to performing the calculation and evaluating the results

Project information	
Project Title	<Enter project title>
Project Number	<Enter project number>
PI	<Enter name of PI>
Organization	<Enter research team's affiliation>
Project Start	Jan-11
Project End	Jan-11
Project cost	\$ 1
Input for Analysis	
Analysis Time Frame (years)	5
Inflation rate (%)	2%
Current year	2019
Total cost (in 2019 dollars)	\$ 1
Analysis Output	
Benefit/Cost Ratio	0:1
Total benefits (in 2019 dollars)	\$ -
Engineering & admin	\$ -
Construction/Installation	\$ -
Operation & Maintenance	\$ -
Lifecycle	\$ -
Road users	\$ -
Safety	\$ -
Environmental	\$ -
Risk Management	\$ -
Others	\$ -

CONSTRUCTION/INSTALLATION COST ANALYSIS							
DIRECT LABOR							
Labor category description	Unit	Loaded rate	Number of hours (Before)	Number of hours (After)	Total cost (Before)	Total cost (after)	
Installation	hr	\$ -	-	-	-	-	
<Add description of labor>	hr	\$ -	-	-	-	-	
<Add description of labor>	hr	\$ -	-	-	-	-	
Sub-Total							
MATERIAL, EQUIPMENT, & ACTIVITIES							
Item description	Unit	Unit price (Before)	Unit price (After)	Quantity (Before)	Quantity (After)	Total cost (Before)	Total cost (after)
<Add description of item 1>	<Unit>	\$ -	\$ -	-	-	-	-
<Add description of item 2>	<Unit>	\$ -	\$ -	-	-	-	-
<Add description of item 3>	<Unit>	\$ -	\$ -	-	-	-	-
<Add description of item 4>	<Unit>	\$ -	\$ -	-	-	-	-
Sub-Total							
Total Construction & Installation Cost (Before)	\$ -						
Total Construction & Installation Cost (After)	\$ -						
Total Benefits (for 5 years)	\$ -						

ACKNOWLEDGMENTS

We gratefully acknowledge help from the Minnesota Department of Transportation for sharing resources and information on their Benefit Estimation Tool.

RECOMMENDATIONS

- Estimation tool can be used to test the benefits with various assumptions of inputs and different deployment/implementation of the research.
- NETC should consider including a requirement or at least preference for a list of applicable benefits to its future requests for proposals. This will help NETC with the needs of quantifying the benefits of research projects and evaluation of NETC's research program.