# TMIP Peer Review Program Assessment and Evaluation Report

February 2012


TMIP

Better Methods. Better Outcomes.

U.S. Department of Transportation
Federal Highway Administration

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TMIP
Better Methods. Better Outcomes.

# TMIP Peer Review Program Assessment and Evaluation Report

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# 1.0 Executive Summary

This report provides an in-depth assessment and evaluation of the Travel Model Improvement Program (TMIP) Peer Review Program. The purpose of the assessment and evaluation was to understand the value transportation planning agencies derive from hosting a TMIP sponsored review of their travel modeling tools and procedures. This assessment goes beyond past synthesis and evaluation efforts which only summarized the peer reviews conducted over the preceding one-two year time period.

This assessment and evaluation reviewed all twenty-eight peer reviews conducted since the program's inception in 2003 to identify the common trends, themes, and challenges faced by state departments of transportation (DOTs) and metropolitan planning organizations (MPOs) in the development, application, and improvement of their travel modeling tools and procedures. This report documents the generalized findings culled from each of the peer review final reports[1]. In addition, this report presents a number of recommendations and proposed improvements to the TMIP Peer Review Program based on the reviewed documents and feedback elicited from recent host agencies.

## *1.1 TMIP Peer Review Program - Trends and Themes*

To summarize the achievements of the program, the reviews were categorized along a number of different dimensions, including year, geography, agency size, peer panel composition and agency motivating factors. This exercise revealed that the program has performed a wide variety of reviews for large, medium, and small-sized agencies and has done a good job attracting peer panelists with diverse backgrounds and varied expertise.

The assessment also examined the peer reviews conducted to date to draw out the salient generalized lessons, observed model limitations, suggested recommendations as well as general policy and modeling trends. Not surprisingly, given the diversity of the host agencies, this report illustrates the broad patterns present in the practice of travel modeling.

The major trends and themes were identified by isolating the specific technical questions posed by the host agency to the peer panel as well as the prioritized model improvement recommendations presented to each host agency by the peer panels. The technical questions and recommendations were grouped into major topic areas in order to understand what topics have been most discussed.

A few key findings emerged from this look at the past TMIP peer review reports:

1) Most of the technical questions are centered on modeling guidelines, data collection/preparation and observed best practices, which is to be expected since the peer reviews are primarily model assessment exercises.
2) In general, the same kinds of questions are asked by host agencies regardless of agency size and the peer panels generally recommend the same kinds of model improvements.
3) Furthermore, the same kinds of questions and recommendations have been discussed over the years the program has been active with no clear chronological trends.

[1] http://www.fhwa.dot.gov/planning/tmip/resources/peer_review_program/

4) Most of the shorter-term recommendations in each review are centered on increasing the detail of the existing travel modeling tools (e.g. geographic, market segmentation, time of day, land use types, mode choice sets, etc.)

5) The inclusion of freight/commercial modeling, transitioning to activity-based demand modeling, dynamic traffic assignment (DTA) and microsimulation, and land-use modeling frequently appear as longer-term panel recommendations.

Finally, the assessment examined past TMIP synthesis reports and elicited feedback from recent host agency participants to evaluate the overall effectiveness of the TMIP peer review program. Participant satisfaction is very high and overwhelmingly agency staff and participants benefited from participation in the program. There is almost universal agreement that participating in the program has helped advance the modeling tools and procedures utilized by the host agency.

## *1.2 TMIP Peer Review Program - Recommendations*

A list of recommendations for improving the TMIP peer review program has been compiled based on a comprehensive review of the twenty-eight peer reviews conducted since 2003, a review of past TMIP synthesis and evaluation reports, as well as 'user-experience' feedback elicited directly from past agency participants. The recommendations below are not in priority order.

a) More actively promote the program during years when interest appears low and continue promoting equal participation among large, medium and small-sized agencies especially in regions where TMIP peer review program participation has not yet occurred.

b) Continue to attract peer panelists with a diverse set of backgrounds and varied expertise without becoming too reliant on particular individuals and/or representatives from particular industry sectors. The peer networking and knowledge sharing offered by the program may be more important than the technical assessments.

c) Consider ways to make peer review meeting materials (e.g. presentation slideshows, model documentation) available to a broader audience beyond just the final report.

d) Consider having the TMIP program play a more active role before, during and after the peer review.

e) Consider having the TMIP program review and comment on published documentation to ensure it is reasonably thorough, prior to agreeing to sponsor a peer review.

f) Consider having the TMIP program review and help create the peer review agenda so it is clear and it is reasonable to expect that the agenda can be covered in the allotted meeting time.

g) Consider incorporating a "Preliminary Model Assessment" phase as the first phase of the TMIP peer review process, which takes place in advance of the meetings with the peer panel. The preliminary assessment would provide the "independent eye" often cited by host agencies and could help shine a light on elements of the travel modeling tools and procedures most deserving time and discussion during the formal in-person review.

# 2.0 Introduction

This report provides an in-depth assessment and evaluation of the Travel Model Improvement Program (TMIP) Peer Review Program. The purpose of the assessment and evaluation was to understand the value transportation planning agencies derive from hosting a TMIP-sponsored review of their travel modeling tools and procedures. This assessment goes beyond past synthesis and evaluation efforts which only summarized the peer reviews conducted over the preceding one-two year time period.

This assessment and evaluation reviewed all twenty-eight peer reviews conducted since the program's inception in 2003 to identify the common trends, themes, and challenges faced by state departments of transportation (DOTs) and metropolitan planning organizations (MPOs) in the development, application, and improvement of their travel modeling tools and procedures. This report presents a number of generalized findings culled from the diverse set of peer review final reports. In addition, this report presents a number of recommendations and proposed improvements to the TMIP Peer Review Program based on the reviewed documents and feedback elicited from recent host agencies.

## *2.1 TMIP Program Overview*

The TMIP Program provides a wide range of services to help planning agencies improve their travel analysis techniques. The TMIP Program mission is to *"support and empower planning agencies through leadership, innovation, and support of planning analysis improvements to provide better information to support transportation and planning decisions."* To serve the mission, the program has three specific goals:

1) To help planning agencies build their institutional capacity to develop and deliver travel related information to support transportation and planning decisions;
2) To develop and improve analytical methods that respond to the needs of planning and environmental decision making processes; and
3) To develop mechanisms to ensure the quality of technical analysis used to support decision-making and to meet local, state, and federal program requirements.

## *2.2 TMIP Peer Review Program*

As an integral part of the overall program, the Peer Review Program provides state and local planning agencies the opportunity to solicit input from experts in the field of travel modeling in order to achieve the three program goals described above. The purpose of the Peer Review Program is to have a process whereby leading practitioners in the fields of transportation, land-use, and air quality planning and modeling can provide guidance to ensure agencies are developing technical tools, procedures, and processes that meet an agency's needs while also satisfying state, federal and local planning requirements. The Peer Review Program began in April 2003.

# 3.0 Categorization of Past TMIP Peer Reviews

This assessment and evaluation sought to take a wide-angle view of the TMIP Peer Review Program. A great deal can be learned about the peer review program by simply looking back at what the program has achieved so far. This section of the report provides a historical glimpse of the program by categorizing the peer reviews conducted since the program's inauguration based on the following:

1) Peer reviews conducted by calendar year
2) Peer reviews conducted by geography
3) Peer reviews by panel participant affiliation
4) Peer reviews by agency size
5) Peer reviews by agency motivation

## *3.1 TMIP Peer Reviews by Calendar Year*

Since 2003, twenty-eight peer reviews have been conducted.

Table 1 below identifies the peer reviews conducted from 2003 to 2011. The table notes which reviews have been included in a previous synthesis and/or evaluated in past FHWA sponsored reports.

1) *TMIP Peer Review Program Synthesis Report*[2] dated November 2004 was prepared by the Volpe National Transportation Center (Volpe, 2004). This synthesis report summarized the first seven peer reviews conducted between 2003 and 2004.
2) *TMIP Peer Review Program Synthesis Report 2*[3] dated September 2005 was prepared by the Texas Transportation Institute (TTI, 2005). This synthesis report summarized the next five peer reviews conducted between 2004 and 2005.
3) *TMIP Peer Review Program Evaluation Report*[4] dated April 2009 was prepared again by the Volpe National Transportation Center (Volpe, 2009). This evaluation report summarized the four peer reviews conducted between 2005 and 2007. In addition, this report also interviewed four past host agency participants to address the program's overall effectiveness.

Table 1 also illustrates that twelve new peer reviews have been convened between 2008 and 2011 that have not yet been included in a synthesis report. This assessment and evaluation will not summarize these new peer reviews in the same manner as previous synthesis report efforts. The reader is encouraged to review the final reports from each of those agency peer reviews for specific details regarding those individual meetings. In contrast, this assessment will examine all twenty-eight peer reviews, the results of the program in totality, to identify common trends, themes, and challenges.

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[2] http://www.fhwa.dot.gov/planning/tmip/resources/peer_review_program/peer_review_program_synthesis_report.cfm

[3] http://www.fhwa.dot.gov/planning/tmip/resources/peer_review_program/peer_review_program_synthesis_report_2.cfm

[4] http://www.fhwa.dot.gov/planning/tmip/resources/peer_review_program/peer_review_program_evaluation.cfm

**Table 1: Past TMIP Peer Reviews (*2003-2011*)[5]**

| City | State | Agency | Year | Synthesis & Evaluation |
|---|---|---|---|---|
| Louisville | Kentucky | OKI | 2003 | 2004_Volpe |
| Anchorage | Alaska | AMATS | 2004 | 2004_Volpe |
| Atlanta | Georgia | ARC | 2004 | 2004_Volpe |
| | Iowa | IaDOT | 2004 | 2004_Volpe |
| | North Carolina | NCDOT | 2004 | 2004_Volpe |
| Denver | Colorado | DRCOG | 2003, 2004 | 2004_Volpe, 2009_Volpe |
| Los Angeles | California | SCAG | 2003, 2004, 2006 | 2004_Volpe, 2009_Volpe |
| San Francisco | California | MTC | 2004 | 2005_TTI |
| Colorado Springs | Colorado | PPACG | 2005 | 2005_TTI |
| Memphis | Tennessee | MATA | 2004, 2006 | 2005_TTI |
| Detroit | Michigan | SEMCOG | 2004 | 2005_TTI, 2009_Volpe |
| Baltimore | Maryland | BMC | 2004, 2005 | 2005_TTI, 2009_Volpe |
| Newark | New Jersey | NJTPA | 2005 | 2009_Volpe |
| San Diego | California | SANDAG | 2005 | 2009_Volpe |
| St. Louis | Missouri | EWGCG | 2006 | 2009_Volpe |
| Boise | Idaho | COMPASS | 2007 | 2009_Volpe |
| Logan | Utah | CMPO | 2008 | *not synthesized* |
| Davenport | Iowa | BRC | 2008 | *not synthesized* |
| St. George | Utah | DMPO | 2008 | *not synthesized* |
| Dubuque | Iowa | ECIA | 2008 | *not synthesized* |
| Sacramento | California | SACOG | 2008 | *not synthesized* |
| Austin | Texas | CAMPO | 2009 | *not synthesized* |
| Philadelphia | Pennsylvania | DVRPC | 2009 | *not synthesized* |
| Omaha | Nebraska | MAPA | 2010 | *not synthesized* |
| Burlington | Vermont | CCMPO | 2011 | *not synthesized* |
| Chattanooga | Tennessee | CHCNGA-TPO | 2011 | *not synthesized* |
| Monterey | California | AMBAG | 2011 | *not synthesized* |
| New York | New York | NYMTC | 2011 | *not synthesized* |

The number of peer reviews conducted each year has varied considerably. In 2004 for example, ten peer reviews were conducted, while only one peer review was conducted in 2007 and 2010 respectively. The variability by year is a function of host agency interest in the program, timing of application submittals, and scheduling, as opposed to program resource constraints. Since the program began there have been approximately three to four peer reviews per year on average. Figure 1 presents the number of peer reviews conducted during each calendar year.

[5] During this analysis, peer reviews were convened in Detroit (SEMCOG) and Arizona (AZDOT).

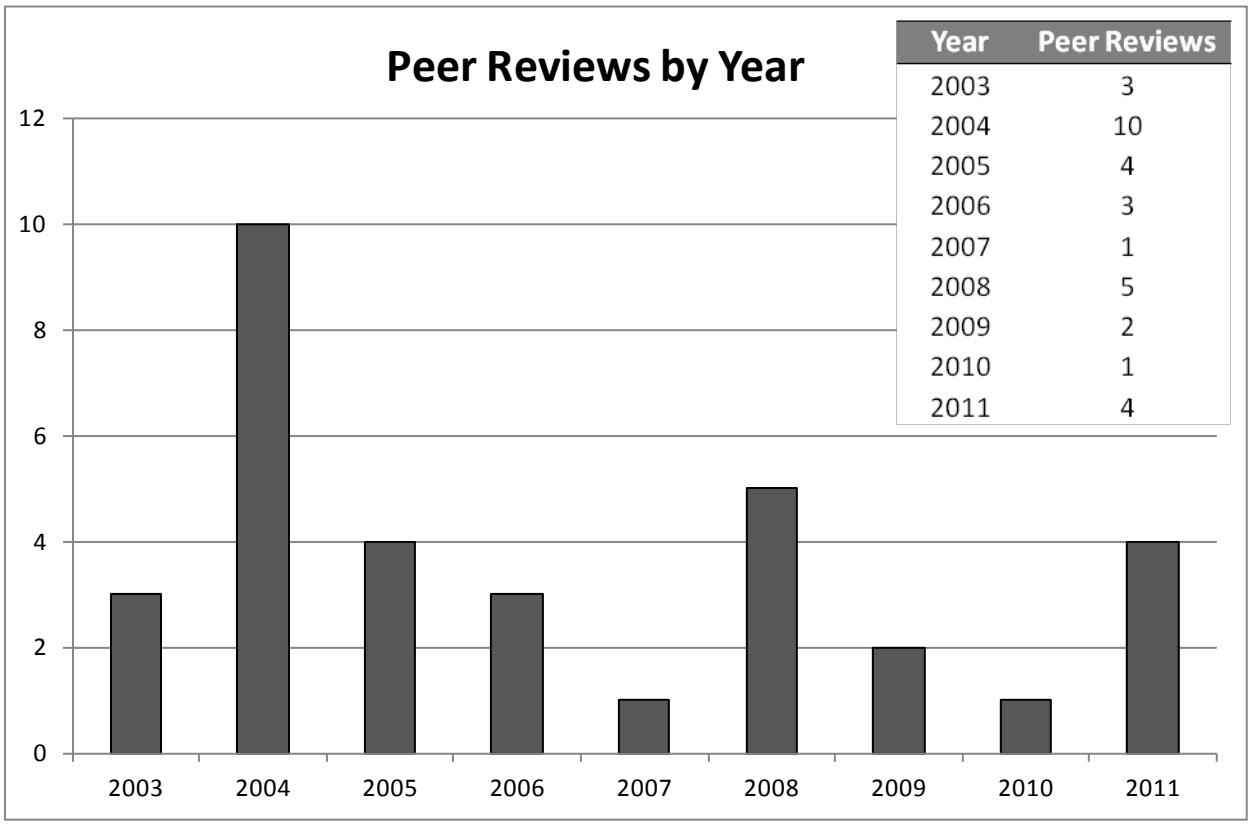



**Figure 1 TMIP Peer Reviews by Calendar Year**

## *3.2 TMIP Peer Reviews by Geography*

TMIP peer reviews have thus far been performed in nineteen states across the country, for two State Departments of Transportation (NCDOT, IaDOT) and twenty-six different Metropolitan Planning Organizations (MPOs). There are approximately 385 MPOs in the United States, so there are certainly opportunities to hold many more additional reviews. Some notable regions where peer reviews have not yet been requested include the Pacific Northwest (Portland, Seattle), parts of Texas (Dallas, Houston), the Gulf Coast and Florida, the northern Midwest, as well as portions of the Southwest (Arizona, New Mexico, Nevada). Where reviews have been conducted is of course a function of host agency interest and not determined by TMIP staff. Figure 2 illustrates the agencies that have participated in TMIP peer reviews since 2003.

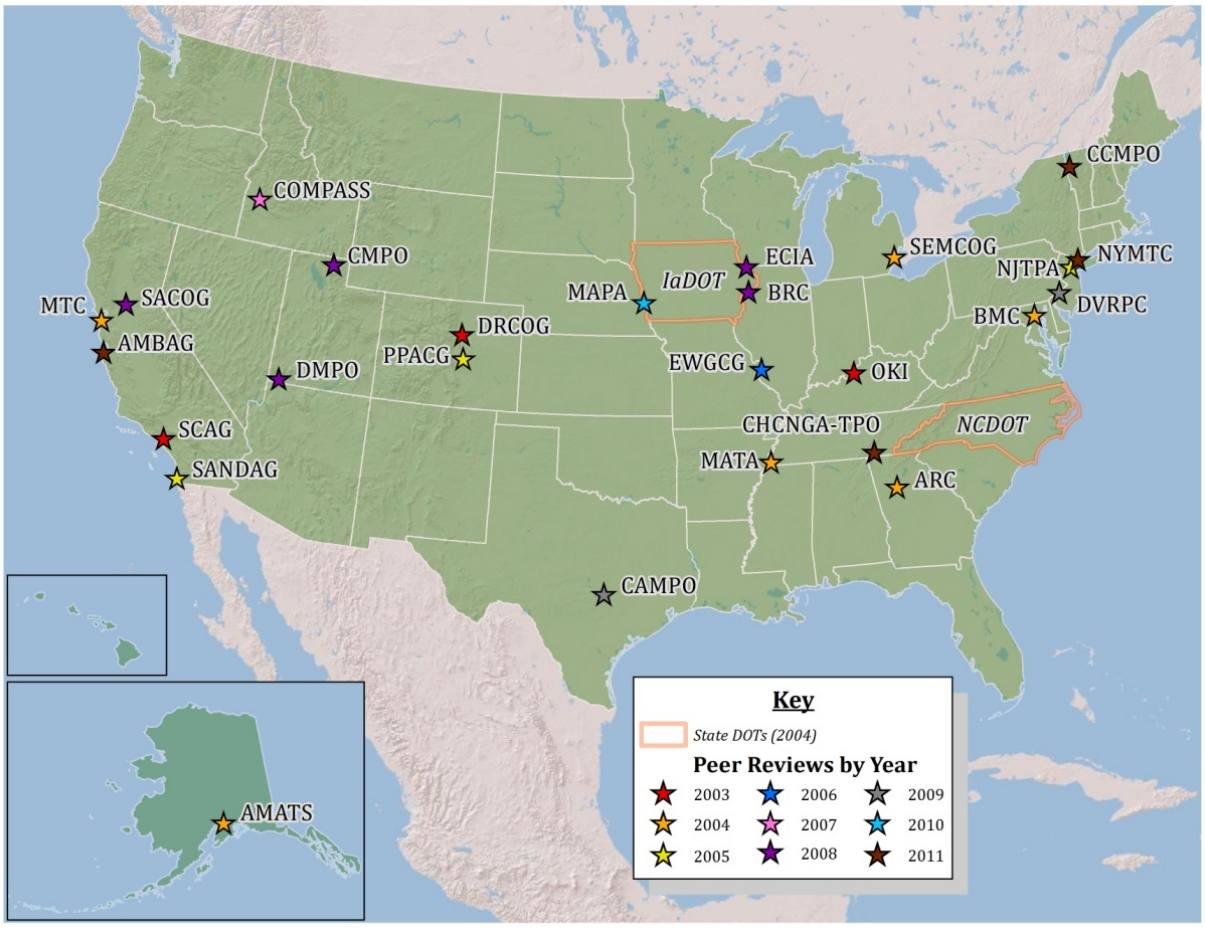



**Figure 2 TMIP Peer Reviews by Geography**

## *3.3 TMIP Peer Reviews by Panel Participant Affiliation*

The twenty-eight peer reviews conducted since 2003 utilized eighty-seven different panelists from a variety of backgrounds. The eighty-seven panel members included representatives from MPOs, State DOTs, private consulting firms, educational institutions (colleges/universities), federal government officials (FHWA, FTA), and other groups including environmental advocacy groups. Overall, the program has experienced very good participation and representation on the peer review panels among practitioners from different industry sectors (federal, state, local, private, and academic). Figure 3 illustrates the breakdown of panel representatives by affiliation type.

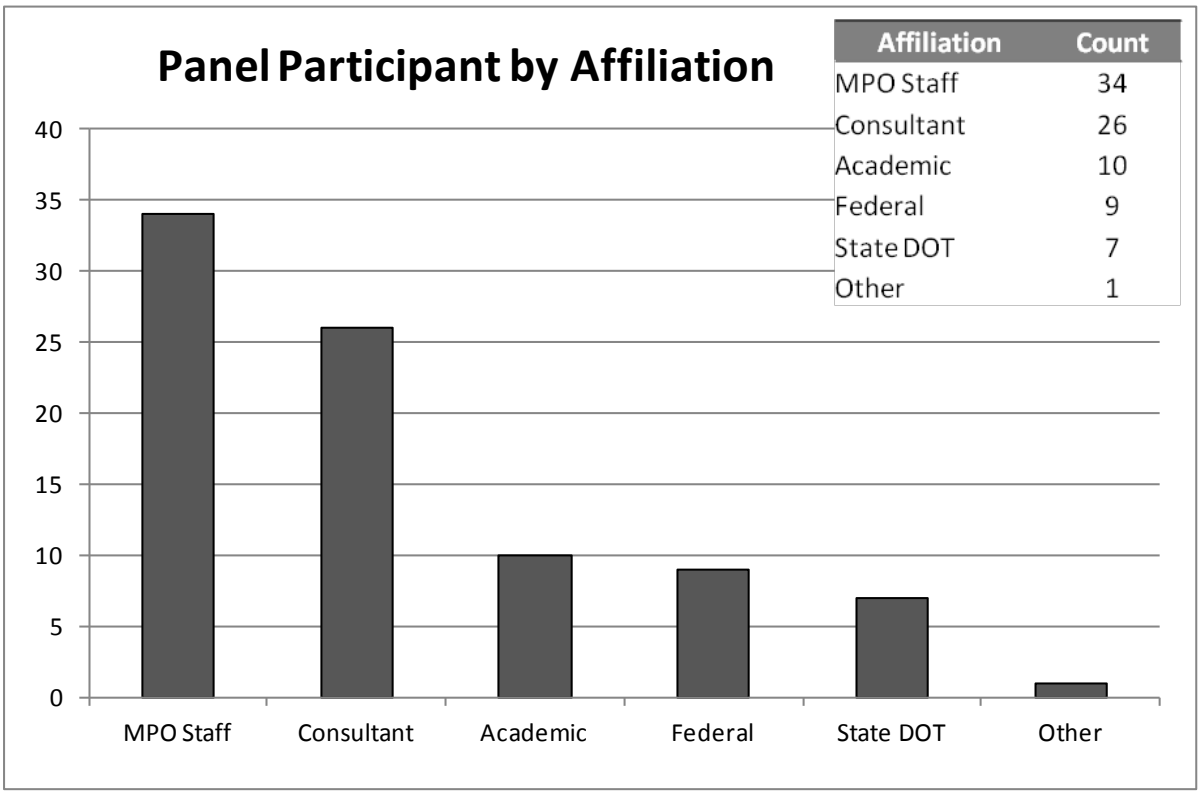



**Figure 3 TMIP Peer Reviews by Panel Participant Affiliation**

Because peer review panels are often comprised of nationally recognized practitioners and researchers in the industry, a number of individuals have participated in multiple peer reviews. Eighty-seven different individuals have participated in the twenty-eight peer reviews to date. Figure 4 illustrates panel participation among individuals who have participated in two or more peer reviews. Fifty-one individuals have only participated in a single peer review (*not shown in Figure 4*). Seventeen individuals have participated in two peer reviews, and nineteen individuals have participated in three or more peer reviews.

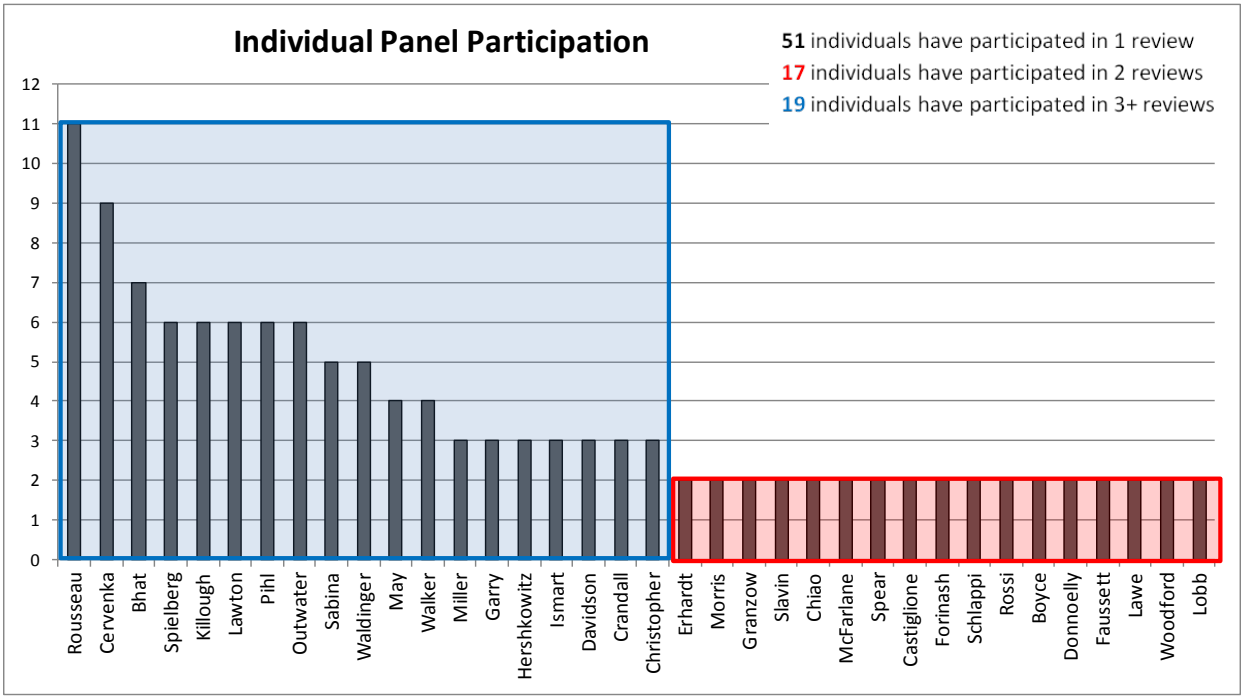



**Figure 4 TMIP Peer Reviews by Panel Participant Affiliation**

## *3.4 TMIP Peer Reviews by Agency Size*

TMIP peer reviews have been convened in some of the largest metropolitan areas in the country (e.g. New York City, Los Angeles), as well as some relatively small planning areas such as Dubuque, Iowa and Logan, Utah. Over the eight-year period during which TMIP peer reviews have been conducted there's been an almost equal distribution of reviews across agencies of differing sizes (large, medium, small).

For this assessment and evaluation, the population ranges used to classify the size of the agency is somewhat subjective. The population ranges do however produce logical breakpoints when all the reviews are considered together. Table 2 below illustrates the population ranges used to determine agency size and the number of reviews performed. Figure 5 plots the host agency population and illustrates the large-size, medium-size, and small-size agency breakpoints. These same large, medium, and small agency size classifications are utilized throughout the remainder of this report. Figure 6 presents a zoomed-in look at the host agency population within each agency size category.

**Table 2: Past TMIP Peer Reviews by Agency Size**

| Agency Size | Population Range | # of Reviews |
|---|---|---|
| Large | > 3 million | 10 |
| Medium | 750,000 - 3 million | 9 |
| Small | < 750,000 | 9 |

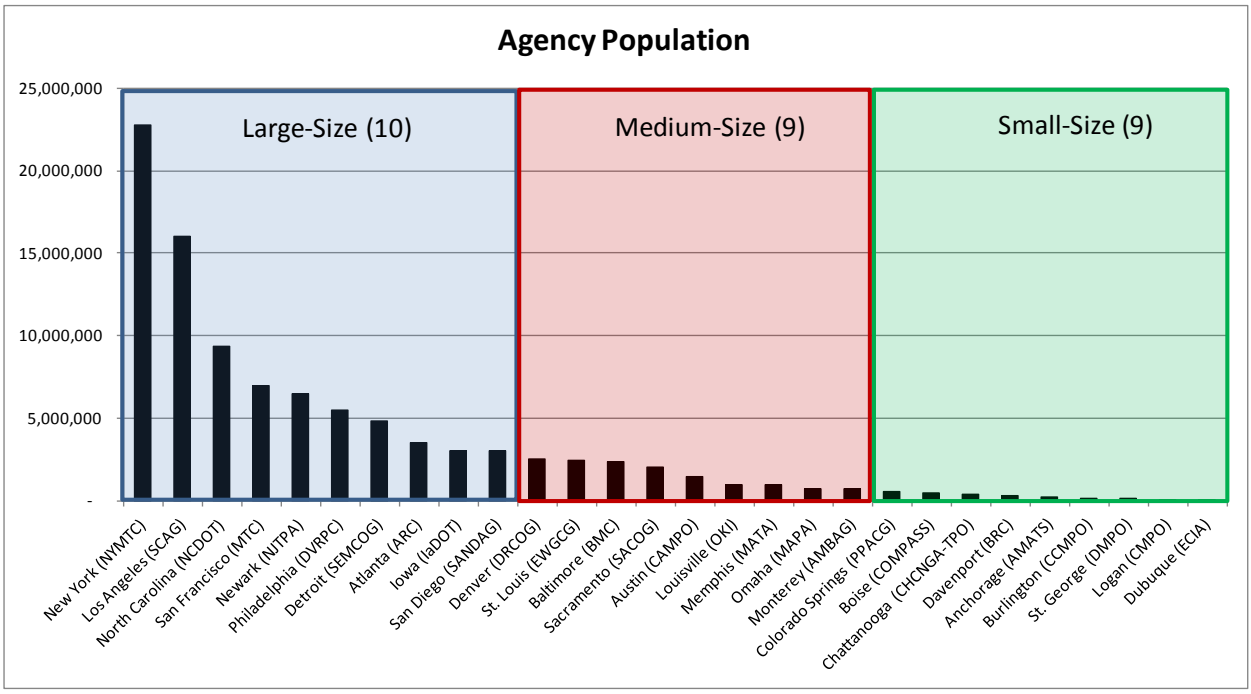



**Figure 5 TMIP Peer Reviews by Agency Size**

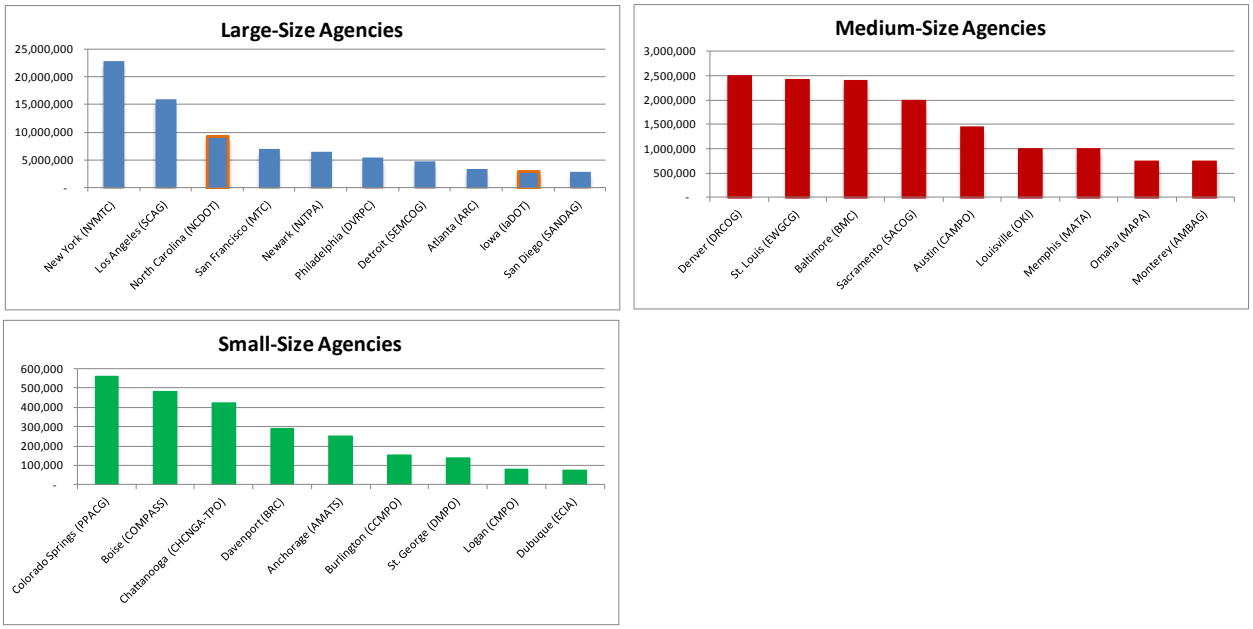



**Figure 6 TMIP Peer Reviews by Agency Size Category (Large, Medium, Small)**

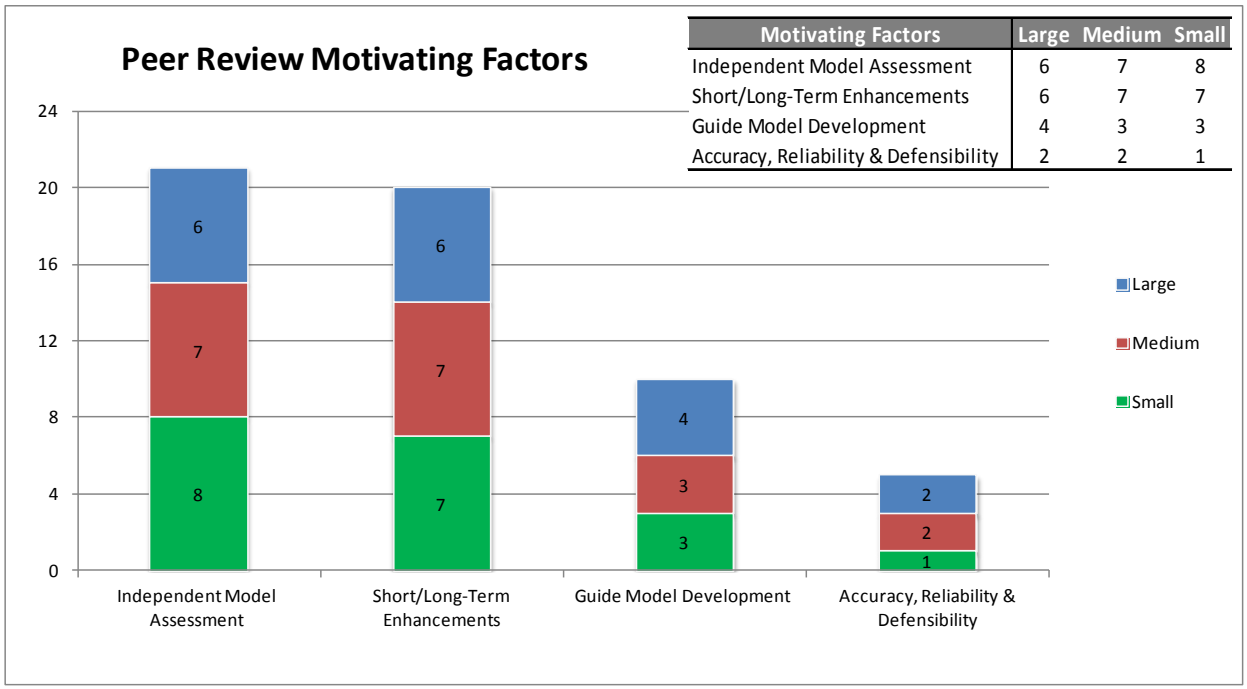
## *3.5 TMIP Peer Reviews by Agency Motivation*

Each TMIP peer review is unique in that the host agency has the freedom and flexibility to frame the meeting in many different ways. The goal is to develop a peer review meeting agenda and schedule that supports a discussion of the issues, challenges, and questions faced by the host agency and their own particular travel modeling needs. Nonetheless, there are some common stated reasons for why agencies express interest in and subsequently participate in the TMIP peer review program.

In general, there are four primary motivating factors for agencies when requesting a peer review:

1. The most common motivating factor is to have a group of technical experts conduct an independent model assessment of an agency's travel modeling assumptions, tools and procedures.
2. A relatively common motivation expressed by host agencies is to obtain feedback on specific short and long-term model improvements the agency can implement to enhance their existing modeling tools and procedures.
3. Agencies also look to peer review panels to guide model development efforts soon to be initiated at the host agency. An example is the DRCOG (Denver) peer review, which was convened to support development of a roadmap for the agency's migration to an activity-based demand model.
4. Finally, determining the accuracy, reliability, and defensibility of an agency's travel modeling tools is a frequent motivating factor. Agencies want assurances their travel forecasting methods reflect current industry best practices so the outputs of their forecasting tools can be used confidently in transportation policy, air quality, land use and economic development planning efforts.

Figure 7 presents the four primary motivating factors by agency size. The desire to have an independent model assessment and obtain a list of specific and prioritized model improvements are the two most frequently expressed motivating factors. Agencies regardless of size tend to identify the same motivating factors.




| Motivating Factors | Large | Medium | Small |
|---|---|---|---|
| Independent Model Assessment | 6 | 7 | 8 |
| Short/Long-Term Enhancements | 6 | 7 | 7 |
| Guide Model Development | 4 | 3 | 3 |
| Accuracy, Reliability & Defensibility | 2 | 2 | 1 |

**Figure 7 TMIP Peer Review Motivating Factors by Agency Size**

# 4.0 TMIP Peer Reviews – Trends & Themes

TMIP peer reviews yield many interesting and valuable insights for the host agency. Some of the findings are agency specific, while many are common and can be generalized. A review of the twenty-eight peer reviews was performed to draw out the salient lessons, observed model limitations, suggested recommendations, as well as general policy and modeling trends. This section of the report presents these themes.

Major trends and themes can be culled from the peer review final reports by getting a sense for what was discussed at each of the individual peer review meetings. There are two important elements available in almost all of the peer review final reports that can be used for this purpose. The peer review final reports typically include:

1) The host agency technical questions posed to the peer panel, and
2) The panel recommendations delivered to the host agency

The host agency technical questions and the panel recommendations can then be organized into major topic areas to draw out commonalities that exist not only within the industry, but across planning agencies of different sizes and how the major topics have changed over time.

## *4.1 Review of Host Agency Technical Questions*

As part of the TMIP peer review application process, the host agency is required to develop a "charge to the peer review panel." This charge to the peer review panel is often conveyed as a list of topic areas the host agency is interested in and most commonly as a list of ten to fifteen specific technical questions. The technical questions posed to the peer review panel can therefore provide a clear picture of the concerns, challenges and modeling issues from the perspective of a host agency.

The format and structure of the TMIP peer review final reports have evolved over time partly as a result of varied authorship over the years (Volpe *2003-2004,* TTI *2004-2005*, Volpe *2005-2007*, *RSG 2010-current).* The specific technical questions posed by the host agency have only recently been explicitly included in the peer review final reports as an appendix. However, the technical questions that were likely posed can often be found and extracted from other sections in the older peer review final reports.

There is very good documentation on the specific technical questions posed by the host agency for thirteen of the twenty-eight total peer reviews. The thirteen reviews which have good documentation on the specific technical questions still represent a good mix of the large, medium, and small sized agencies. Table 3 below identifies the agency peer review for which there is good technical question documentation included in the peer review final report. Table 4 characterizes the thirteen reviews that identified the technical questions using the large, medium, and small agency categorization.

**Table 3: TMIP Peer Reviews – Documentation of Technical Questions**

| Technical Questions Posed | Count | Agencies |
|---|---|---|
| Documented in Final Report | 13 | NYMTC, NCDOT, MTC, DVRPC, IaDOT, BMC, SACOG, CAMPO, MAPA, AMBAG, CHCNGA-TPO, AMATS, CCMPO |
| **Not** Documented in Final Report | 15 | SCAG, NJTPA, SEMCOG, ARC, SANDAG, DRCOG, EWGCG, OKI, MATA, PPACG, COMPASS, BRC, DMPO, CMPO, ECIA |
| Total | 28 | |

**Table 4: TMIP Peer Reviews with Well-Documented Technical Questions**

| Agency Size | Count | Agencies |
|---|---|---|
| Large | 5 | NYMTC, NCDOT, MTC, DVRPC, IaDOT |
| Medium | 5 | BMC, SACOG, CAMPO, MAPA, AMBAG |
| Small | 3 | CHCNGA-TPO, AMATS, CCMPO |
| Total | 13 | |

### 4.1.1 Technical Questions - Major Topic Areas

Approximately two-hundred different specific technical questions were posed to the peer review panels in the thirteen host agency reviews where this information is well-documented in the final reports. This broad and diverse set of technical questions was categorized using twenty-one generalized major topic areas. The process by which technical questions were collected and grouped into the generalized major topic areas is somewhat subjective. A sample technical question and the resulting topic area assignment along with the host agency and peer review date are presented below.

***"How accurate is the travel model in capturing intrastate and interstate freight movements?" (AMATS, 2004)***

***Topic Area → Freight Modeling***

Some judgment is required as this particular question posed by staff during the Anchorage, Alaska peer review could have been categorized into other major topic areas as well. The intent was to categorize the technical questions in a straightforward way without attributing the same question to multiple topic areas, although there were a few cases when this was done. **Appendix A** provides detailed descriptions of the twenty-one generalized major topic areas along with an example of a specific host agency technical question that was attributed to the topic area.

Figure 8 illustrates the percent share of technical questions by topic area posed by host agencies sorted from smallest to largest. Eleven percent of all the technical questions posed by host agencies for example were related to calibration and validation. Figure 9 disaggregates the data presented in Figure 8 by agency size. Thirteen percent of all technical questions posed by *large-size* host agencies for example were related to the topic of calibration and validation. Ten percent of all the technical questions posed by *medium-size* host agencies and almost none percent of all technical questions posed by *small-size* host agencies were related to calibration / validation. Finally, Figure

10 disaggregates the data presented in Figure 8 by year. The yearly data was grouped into three ranges: 2004-2005, 2008-2010, and 2011. This was done to eliminate years where few (or no) technical questions were documented in the peer review final reports (e.g. 2003, 2006-2007). Note, the same axis category order and axis scaling are applied to each figure to facilitate comparisons down the page.

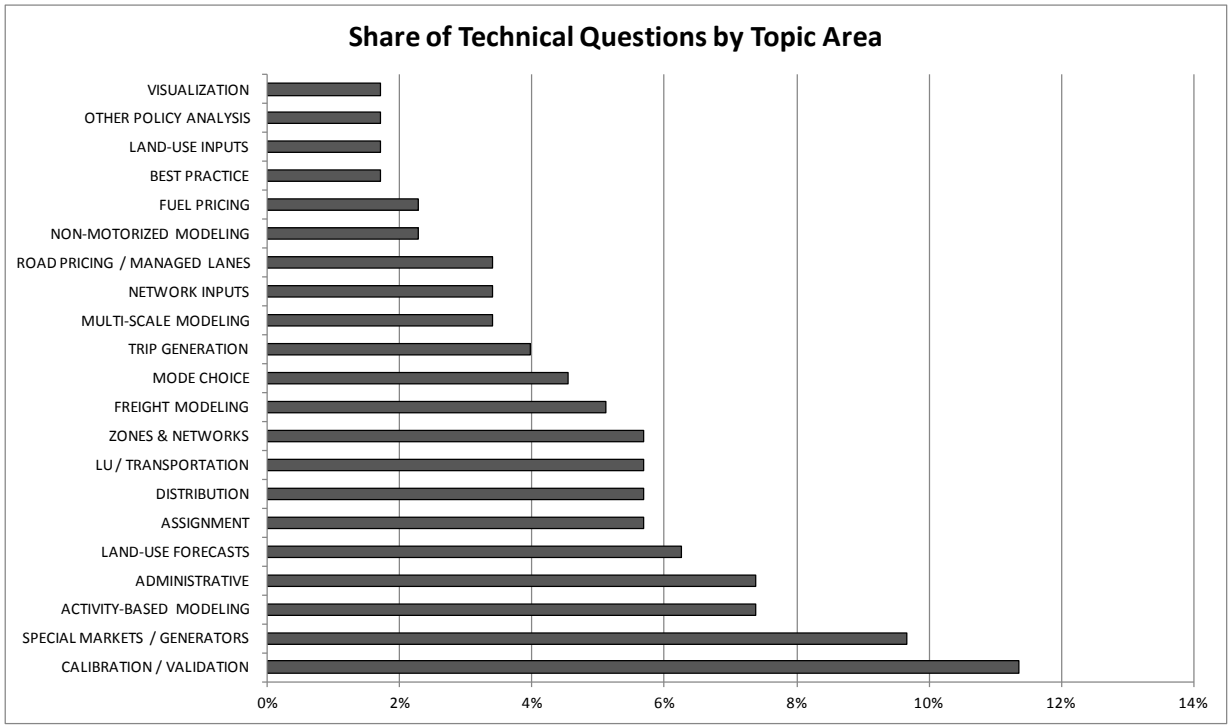



**Figure 8 Share of Technical Questions by Topic Area**

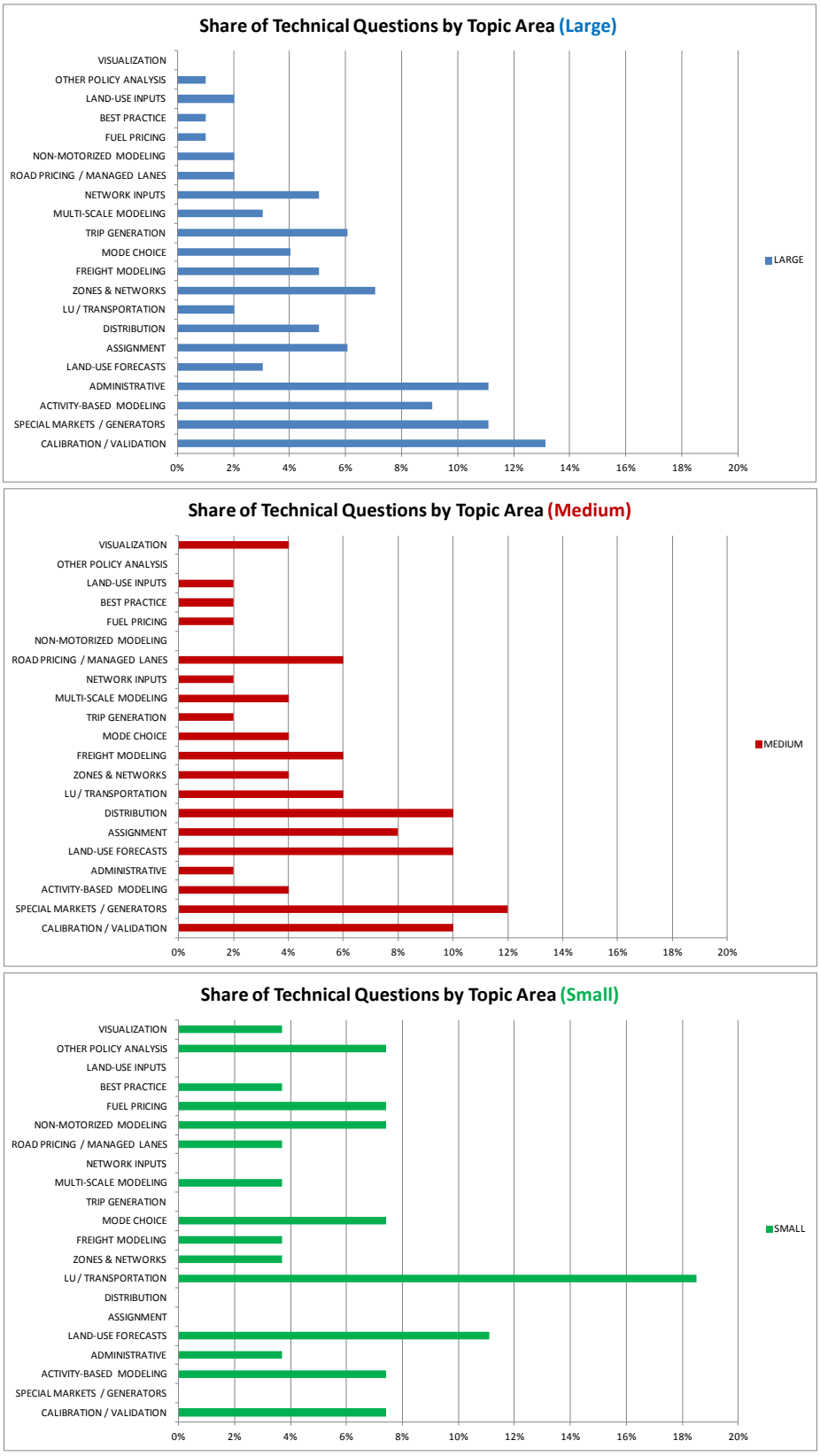



**Figure 9 Technical Questions by Topic Area by Agency Size**

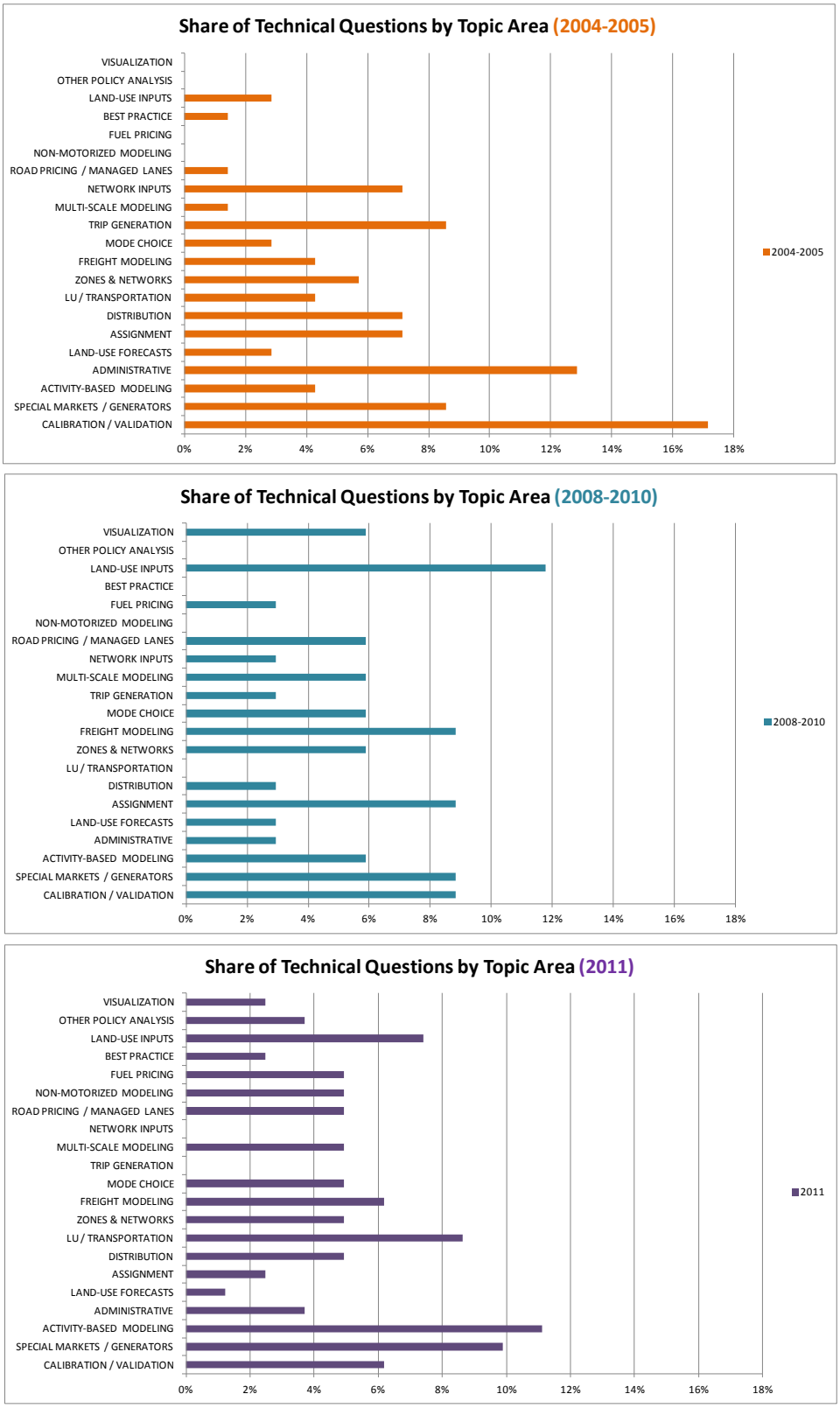



**Figure 10 Technical Questions by Topic Area by Calendar Year**

A few key findings emerge based on this review of the technical questions posed by the host agencies:

1) Most of the technical questions are centered on modeling guidelines, data collection/preparation, calibration/validation and observing best practices which are to be expected since the peer reviews are primarily model assessment exercises.
2) Medium and large size agencies tend to ask more targeted and specific technical questions for the peer review panels to address than do the smaller sized host agencies.
3) In general, host agencies regardless of size seem to be asking the same kinds of questions. However, some topic area questions are more prevalent in certain sized agencies. For example, there are many more questions at small-sized agencies regarding the integration of land-use and transportation planning, likely because medium and large sized agencies have already made some progress towards this goal. The large size agencies also tend to have fewer questions relating to the development of land use forecasts than do small and medium size agencies. In addition, small agencies have more questions about non-motorized modeling than do medium and large agencies.
4) In general, the same kinds of questions have been asked over the years the program has been in existence with no clear chronological trends. Modeling concepts important in 2004 are still important and frequently discussed today. However, some topic area questions have become more prevalent over time. For instance, questions pertaining to activity-based modeling have been more frequent in recent years which is to be expected as the industry continues to adopt new advanced methods. Questions pertaining to fuel pricing have also been on the rise which is also to be expected given the volatility in prices that have been observed.

## *4.2 Review of Peer Panel Recommendations*

Each TMIP peer review culminates in a list of recommendations which the peer panel presents to the agency staff. Peer panel recommendations are typically delivered as short-term and long-term priorities the agency should consider to improve their travel modeling tools and procedures. As with the technical questions submitted to the panel, a list of about ten to fifteen panel recommendations are presented to the agency staff in the final session of the multi-day meetings which then concludes the peer review. These recommendations are incredibly valuable given the make-up of these peer review panels. As described earlier in this report, these individuals are prominent practitioners in the industry and the nationally recognized technical leaders. A review of their specific recommendations can therefore provide a clear picture of the concerns, challenges and issues as well as solutions for addressing them from the perspective of peer panel experts.

All twenty-eight peer review final reports have good documentation on the recommendations presented by the peer panel at the conclusion of the review.

### 4.2.1 Panel Recommendations - Major Topic Areas

Approximately 175 different specific panel recommendations were presented to the host agencies in the twenty-eight peer review final reports. This broad and diverse set of panel recommendations was categorized using the same twenty-one generalized major topic areas used to categorize the host agency technical questions in the preceding section. The process by which the panel recommendations were collected and grouped into the generalized major topic areas is somewhat subjective. A sample panel recommendation and the resulting topic area assignment along with the host agency and peer review date are presented below.

***"MTC should consider developing a finer-grained regional zone system." (MTC, 2004)***

***Topic Area → Zones & Networks***

Some judgment is again required as was the case in assigning the host agency technical questions to generalized topic areas. The intent was to categorize the panel recommendations in the most straight-forward way possible without attributing the same recommendation to many different topic areas. **Appendix A** provides detailed descriptions of the twenty-one generalized major topic areas. Peer panel recommendations limited only to very specific agency implementation issues were not considered for this assessment and evaluation (e.g. remove bridge penalties).

Figure 11 illustrates the percent share of panel recommendations by topic area sorted from smallest to largest. Thirteen percent of all the peer panel recommendations for example were related to administrative items. Figure 12 disaggregates the data presented in Figure 11 by agency size. Just over fourteen percent of all the peer panel recommendations made during *large-size* agency reviews for example were related to the administrative topic area. Eight percent of all the peer panel recommendations made during *medium-size* agency reviews and slightly more than sixteen percent of all the recommendations made during *small-size* host agency reviews were related to administrative items. Figure 13 disaggregates the data presented in Figure 11 by year. The yearly data was grouped into three ranges: 2003-2005, 2006-2008, and 2009-2011. Grouping the recommendations into consecutive three-year ranges is possible when examining the peer panel recommendations because the panel recommendations are well-documented in all the peer review final reports which was not the case with the host agency technical questions. Finally, Figure 14 presents the panel recommendations based on the panel's prioritization (e.g. long-term, short-term). Note, the same axis category order and axis scaling are applied to each figure to facilitate comparisons down the page.

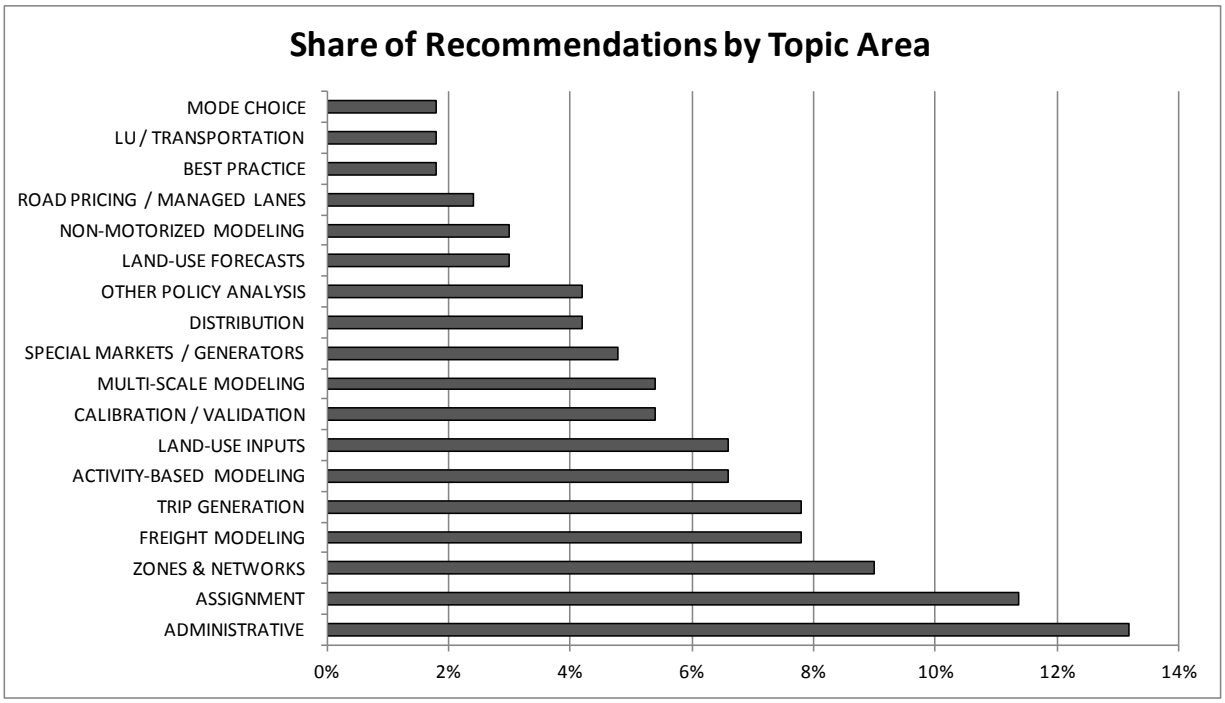



**Figure 11 Panel Recommendations by Topic Area**

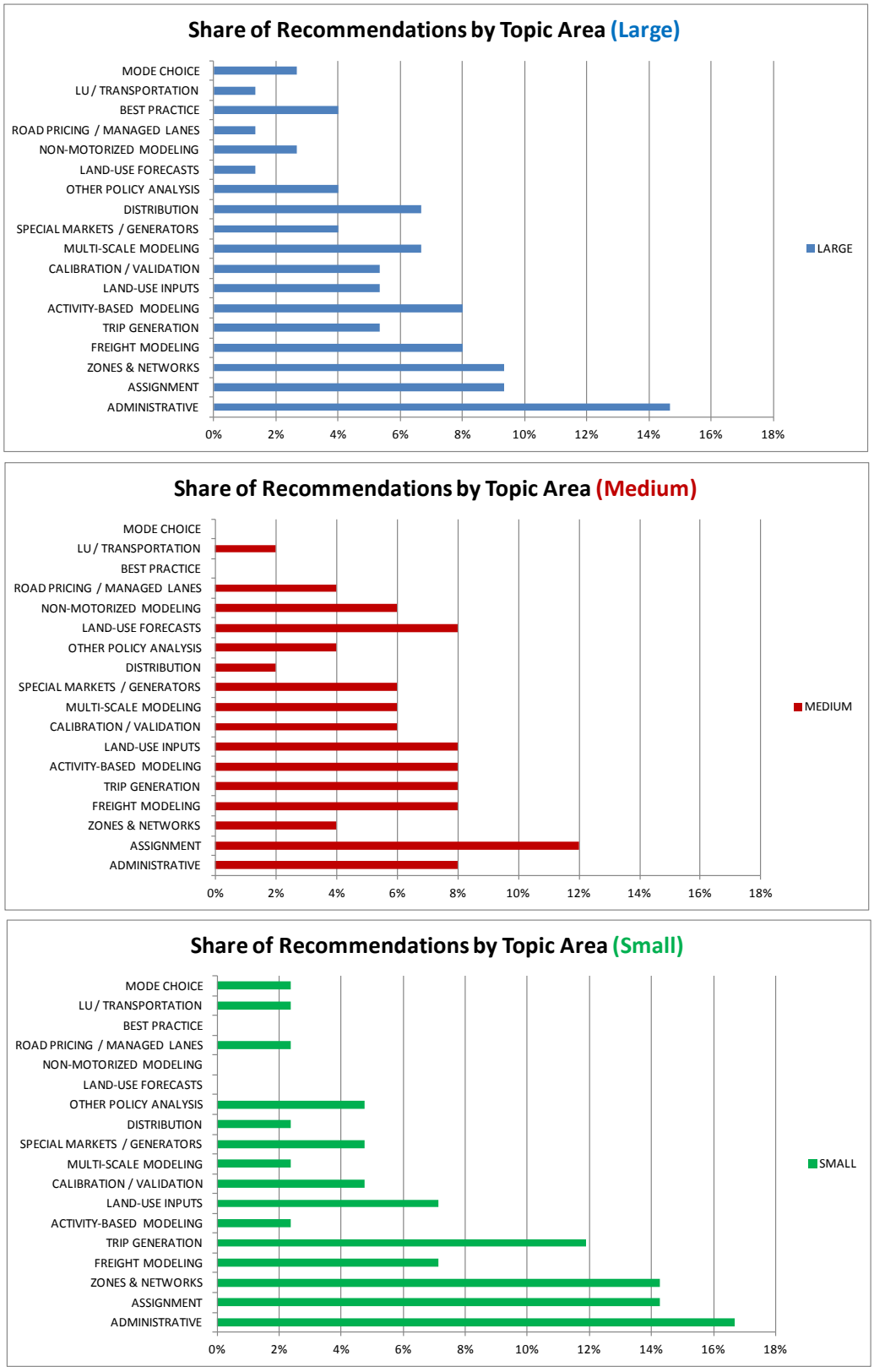



**Figure 12 Panel Recommendations by Topic Area by Agency Size**

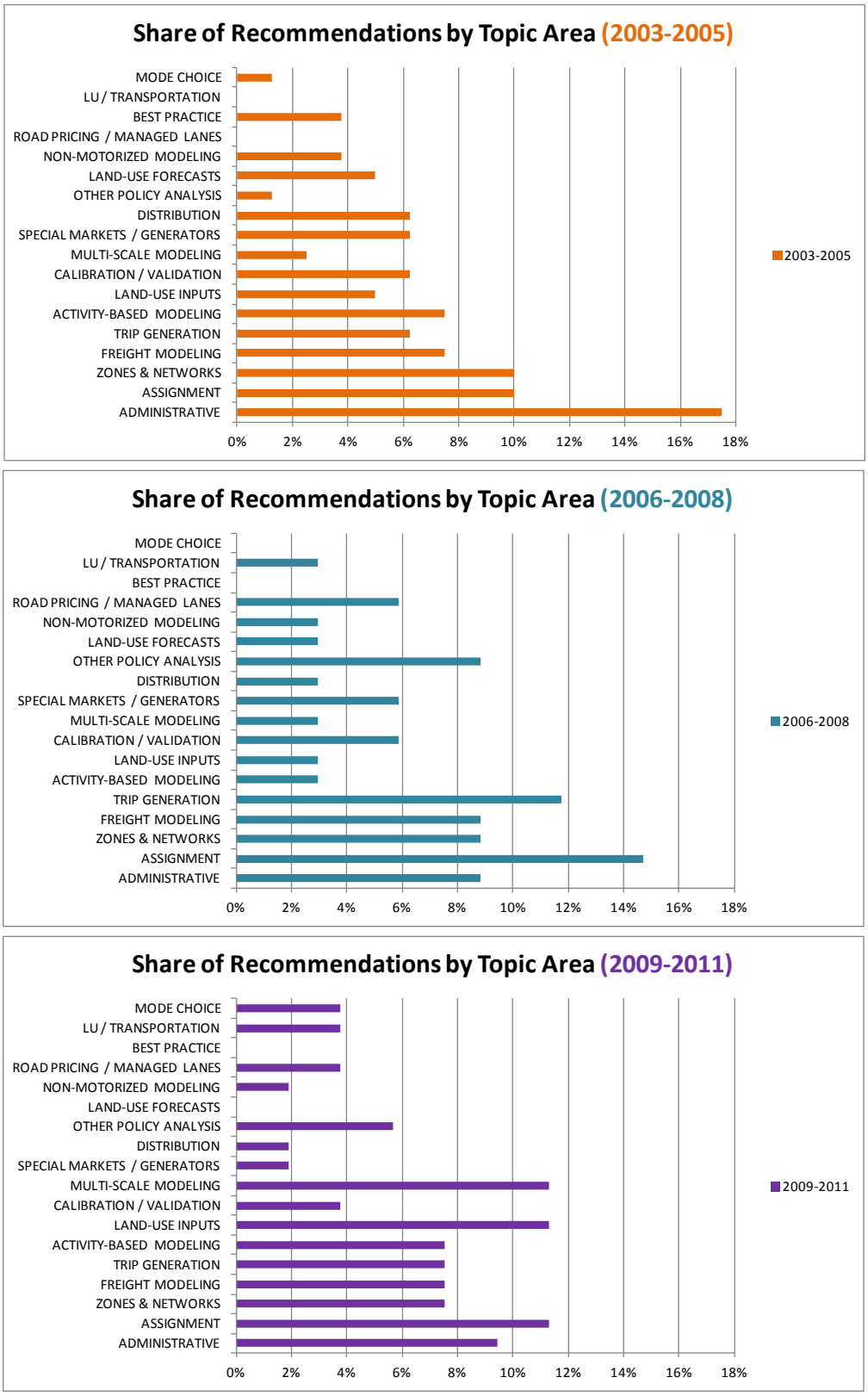



**Figure 13 Panel Recommendations by Topic Area by Calendar Year**

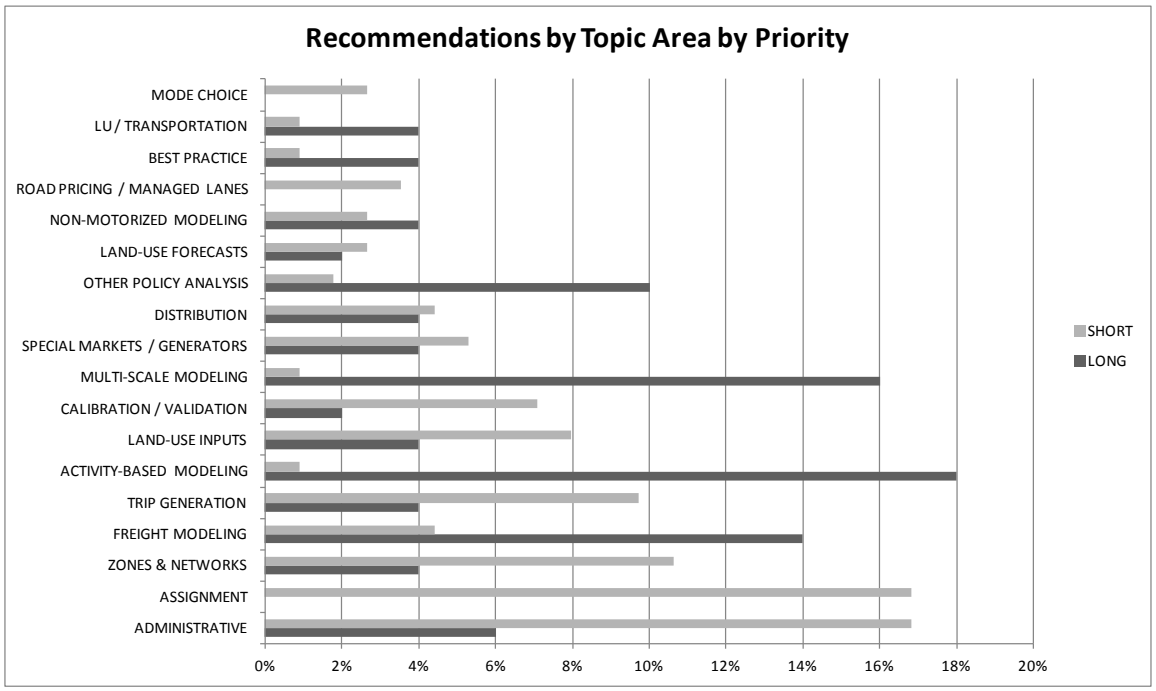



**Figure 14 Panel Recommendations by Topic Area by Priority**

A few key findings emerge based on this review of the recommendations delivered to the host agency by the peer review panels:

1) Most of the panel recommendations are centered on increasing the detail of the existing travel modeling tools (e.g. geographic, market segmentation, time of day, land use types, mode choice sets, etc.)

2) In general the peer panels seem to be recommending the same kinds of improvements regardless of agency size. However, some topic area recommendations are more prevalent in certain sized agencies. For example, a higher share of the recommendations made during small-size agency reviews pertain to administrative items, assignment techniques, and spatial input data (zones & networks) than at medium and large agencies. In addition, recommendations related to multi-scale modeling (subarea, microscale, simulation) are more common at medium and large size agencies than small size agencies. This is not surprising given that small agencies typically lack the staff and resources for multi-scale and multi-resolution modeling.

3) In general, the same kinds of recommendations have been made over the years the program has been active with no clear chronological trends. Modeling concepts important almost ten years ago are still important and frequently discussed today. However, some topic area recommendations have become more prevalent over time. For example, recommendations pertaining to activity-based modeling, DTA, and microsimulation have been more frequent since 2009 which is to be expected since these advanced techniques are becoming more widely adopted.

4) More of the panel recommendations tend to be identified as shorter-term priorities and often involve increasing the detail of the existing modeling tools and procedures (spatially, temporally, more detailed input data, etc.)

5) The inclusion of freight/commercial modeling, transitioning to activity-based demand modeling, dynamic traffic assignment (DTA), microsimulation and land-use modeling frequently appear as long-term panel recommendations.

## *4.3 Summary of TMIP Peer Reviews*

As described in the preceding section, the same set of generalized topic areas were identified to categorize both the technical questions posed to the panel by host agencies and the model improvement recommendations presented to the host agency by the peer review panel. In many cases the peer panels respond directly to certain questions posed the agency with their final recommendations. To provide an overall summary, the technical questions and the panel recommendations were merged and evaluated together.

### 4.3.1 Major Topic Areas – Questions & Recommendations

This section of the report serves to identify which major topic areas were discussed among all twenty-eight peer reviews. A major topic area is assumed to have been discussed at length if there was at least one technical question posed during the review or if a panel recommendation was made during the peer review about the topic.

Figure 15 illustrates the percent share of questions and recommendations by topic area sorted from smallest to largest. Figure 9 disaggregates the data presented in Figure 15 by agency size. Figure 17 disaggregates the data presented in Figure 15 by year. The yearly data was again grouped into three ranges: 2003-2005, 2006-2008, and 2009-2011. Note, the same axis category order and axis scaling are applied to each figure to facilitate comparisons down the page.

Figure 15, Figure 16, and Figure 17 help visualize and emphasize two important findings from the earlier technical question and panel recommendation summaries:

1) The kinds of questions and recommendations discussed during the TMIP peer reviews are germane to agencies of all sizes - large, medium, and small agencies alike. For example, adding detail to geographic input data such as traffic analysis zone structures, as well as roadway and transit networks was identified in agency reviews of all three sizes.

2) The kinds of questions and recommendations discussed during TMIP peer reviews have remained somewhat constant since the program's inauguration. For example, time of day modeling was an important topic in the reviews conducted in 2004 and 2005 and was equally important in 2008 through 2011.

Continued tracking of the TMIP peer review program trends and themes along the dimensions which have been presented in this report will be very beneficial moving forward. TMIP is now and should continue to develop tools that can streamline the assessment/evaluation of the peer review program.

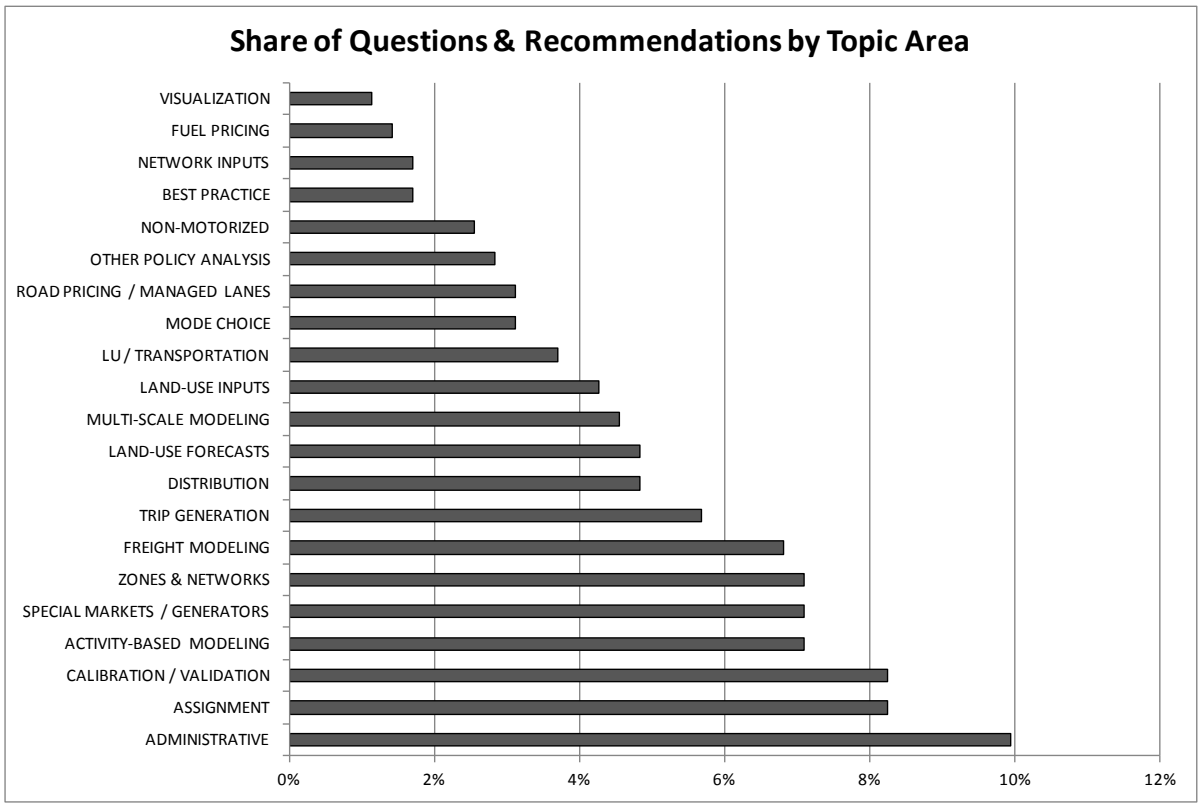



**Figure 15 Share of Questions and Recommendations by Topic Area**

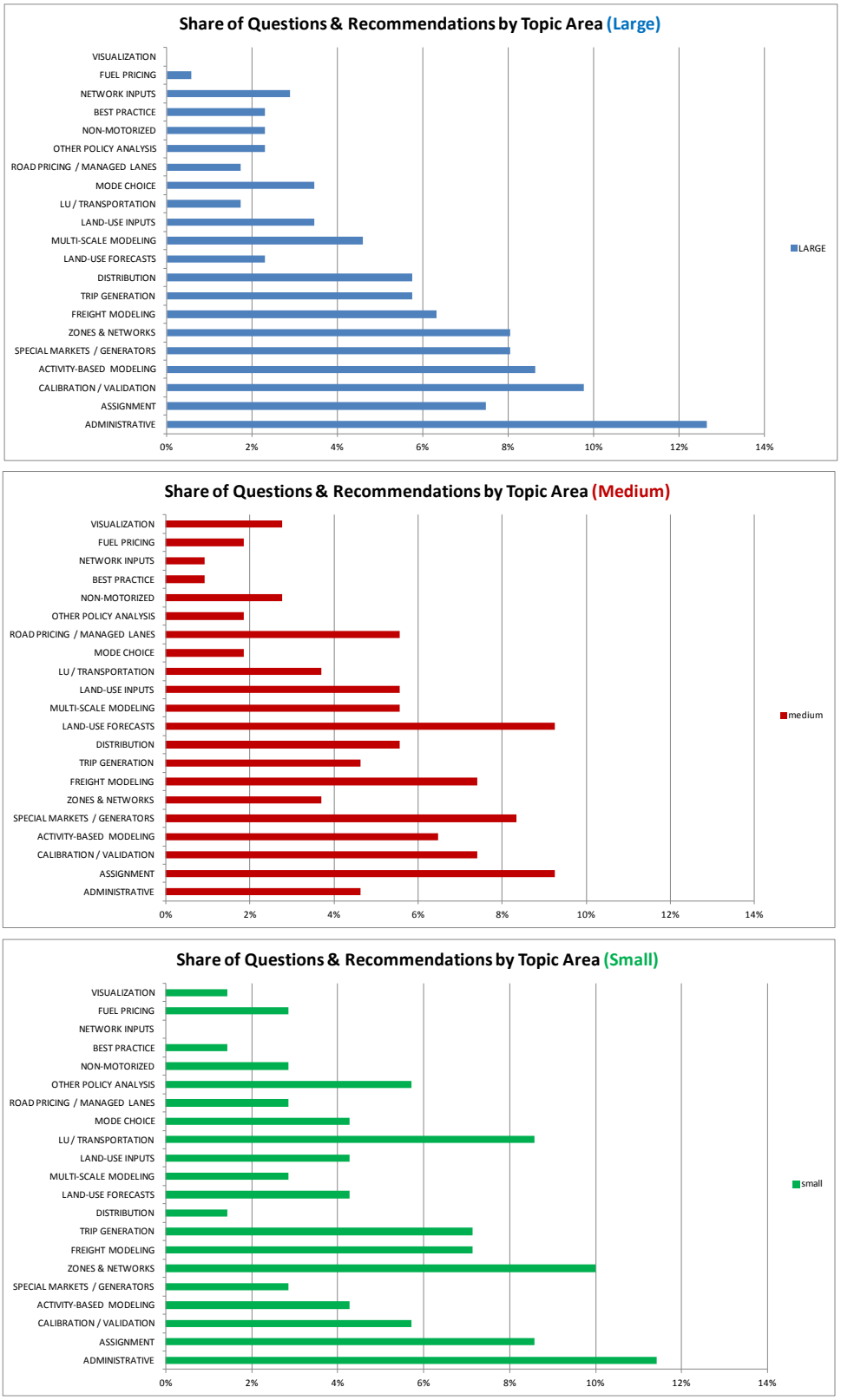



**Figure 16 Share of Questions and Recommendations by Topic Area by Agency Size**

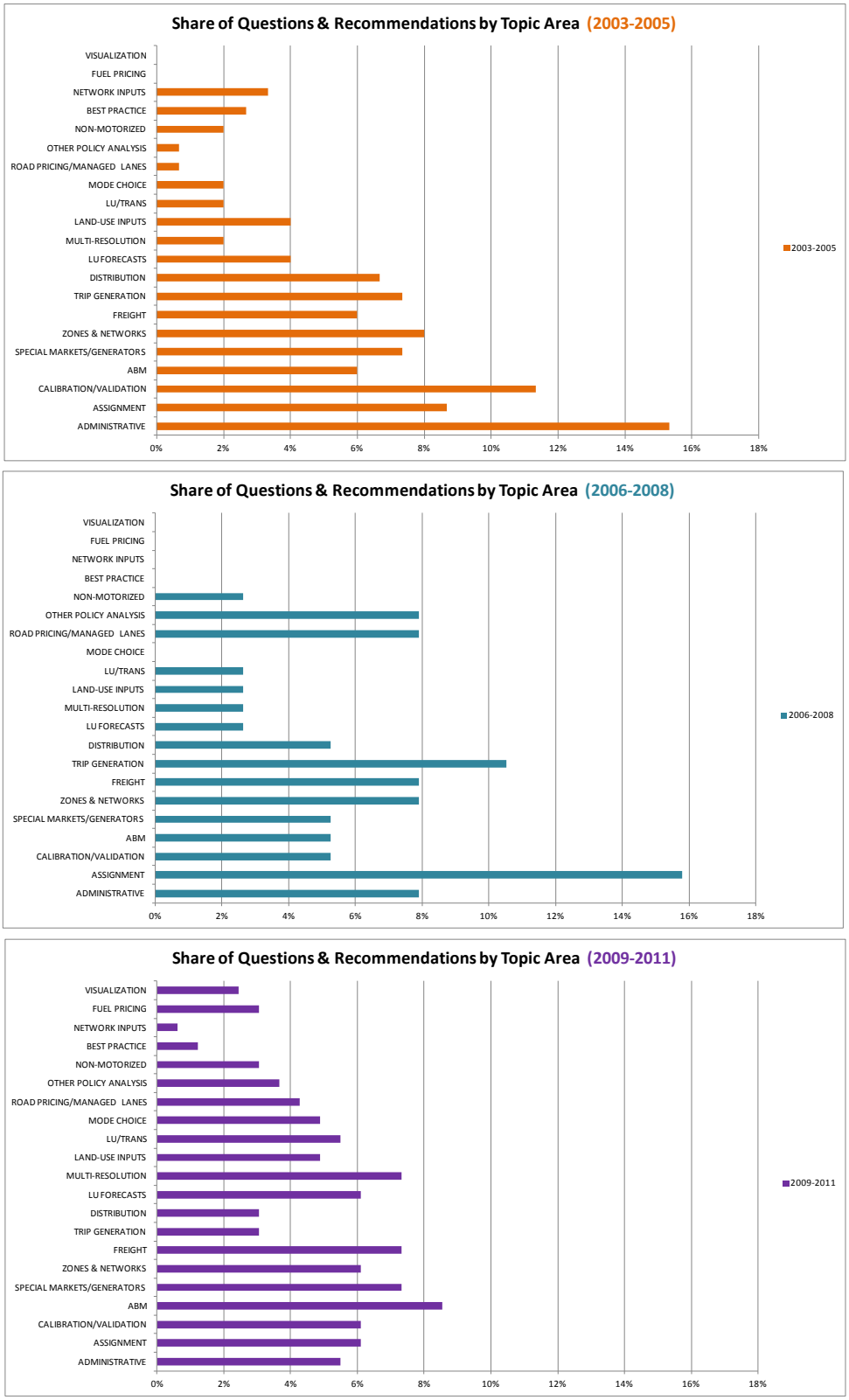



**Figure 17 Share of Questions and Recommendations by Topic Area by Calendar Year**

# 5.0 Effectiveness of TMIP Peer Review Program

The TMIP peer reviews yield many interesting and valuable insights for the host agency. In the preceding sections of this report, the major themes discussed at each of the peer reviews have been described and quantified. This evaluation and assessment also sought to review the overall effectiveness of the TMIP peer review program and whether it is advancing and promoting the overall TMIP goals.

The effectiveness of the TMIP peer review program was evaluated using two different sources:

1) The past TMIP evaluation and synthesis reports, and
2) Direct feedback from recent host agency participants.

## *5.1 Past TMIP Evaluation and Synthesis Reports*

As described in Section 4.1 of this report, three synthesis reports have been conducted since the TMIP peer review program was inaugurated in 2003. Table 5 below summarizes the peer reviews conducted from 2003 to 2007 which were examined and summarized in these synthesis reports.

1) *TMIP Peer Review Program Synthesis Report* dated November 2004 was prepared by the Volpe National Transportation Center (Volpe, 2004). This synthesis report summarized the first seven peer reviews conducted between 2003 and 2004.
2) *TMIP Peer Review Program Synthesis Report 2* dated September 2005 was prepared by the Texas Transportation Institute (TTI, 2005). This synthesis report summarized the next five peer reviews conducted between 2004 and 2005.
3) *TMIP Peer Review Program Evaluation Report* dated April 2009 was prepared again by the Volpe National Transportation Center (Volpe, 2009). This evaluation report summarized the four peer reviews conducted between 2005 and 2007. In addition, this report also interviewed four past host agency participants (DRCOG, SCAG, SEMCOG, BMC) to address the program's overall effectiveness.

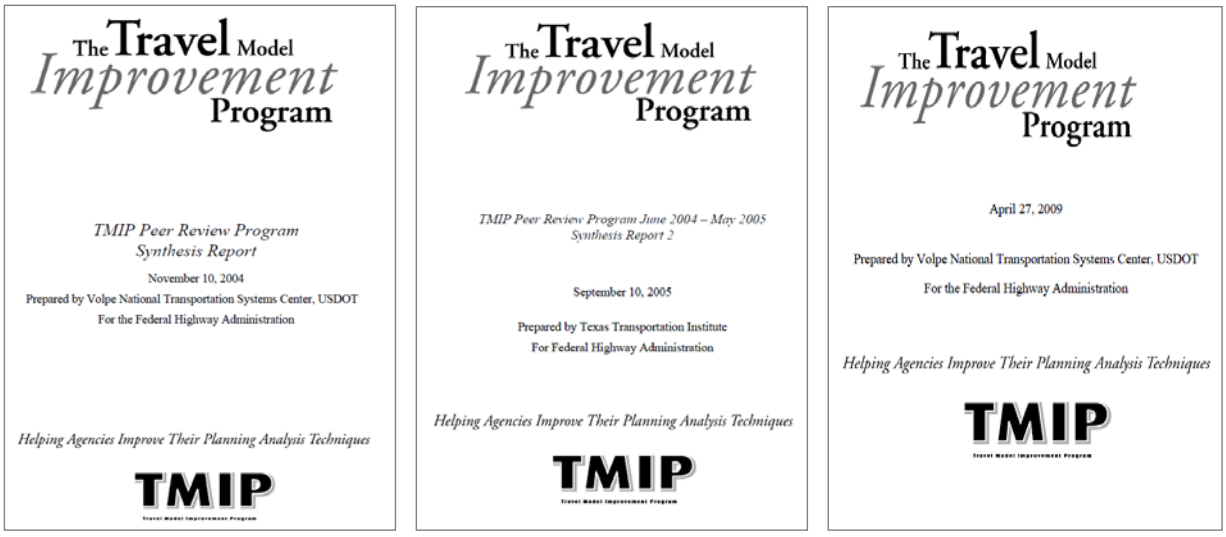



**Figure 18 Past TMIP Synthesis & Evaluation Reports**

**Table 5: Past TMIP Peer Reviews (*2003-2007*)**

| City | State | Agency | Year | Synthesis & Evaluation |
|---|---|---|---|---|
| Louisville | Kentucky | OKI | 2003 | 2004_Volpe |
| Anchorage | Alaska | AMATS | 2004 | 2004_Volpe |
| Atlanta | Georgia | ARC | 2004 | 2004_Volpe |
| | Iowa | IaDOT | 2004 | 2004_Volpe |
| | North Carolina | NCDOT | 2004 | 2004_Volpe |
| Denver | Colorado | DRCOG | 2003, 2004 | 2004_Volpe, 2009_Volpe |
| Los Angeles | California | SCAG | 2003, 2004, 2006 | 2004_Volpe, 2009_Volpe |
| San Francisco | California | MTC | 2004 | 2005_TTI |
| Colorado Springs | Colorado | PPACG | 2005 | 2005_TTI |
| Memphis | Tennessee | MATA | 2004, 2006 | 2005_TTI |
| Detroit | Michigan | SEMCOG | 2004 | 2005_TTI, 2009_Volpe |
| Baltimore | Maryland | BMC | 2004, 2005 | 2005_TTI, 2009_Volpe |
| Newark | New Jersey | NJTPA | 2005 | 2009_Volpe |
| San Diego | California | SANDAG | 2005 | 2009_Volpe |
| St. Louis | Missouri | EWGCG | 2006 | 2009_Volpe |
| Boise | Idaho | COMPASS | 2007 | 2009_Volpe |

The reader is encouraged to review the past TMIP peer review synthesis and evaluation reports for detailed summaries of the peer reviews conducted during the period. The past synthesis reports document the technical recommendations, suggest proposed improvements to the peer review program, and provide feedback collected from a subset of agency participants. Those findings will not be re-iterated here. However, it is worth emphasizing some of the major themes that were expressed in all three synthesis/evaluation reports especially as they relate to the effectiveness of the TMIP peer review program.

The overall effectiveness of the TMIP peer review program as documented in the past synthesis/evaluation reports centered on a few primary elements. Effectiveness was judged based on:

1) Planning the peer review,
2) Participant satisfaction, and
3) Panel and host agency recommendations.

### 5.1.1 Planning the Peer Review

The authors emphasized the importance in proper planning of the peer review. Host agencies were encouraged to ensure sufficient lead time since planning, preparing for, and then convening the peer review takes a substantial amount of time and effort. The host agency must develop a charge to the peer panel, set the meeting schedule and agenda, select panel members, provide background material, develop presentation materials, and plan/coordinate all the multi-day meeting logistics.

The authors also stressed that the host agency must provide specific information to the peer panel well in advance of the peer review meetings on the details of the model (documentation) as well as the objectives of the meeting (charge to peer panel). This can also be a time consuming exercise.

However, panel members must arrive at the meeting with a good understanding of the technical details so valuable meeting time is not spent simply explaining model trivialities or other mundane aspects of the travel model system. To fully take advantage of and engage the peer panel, good model and model development documentation are critical for an effective peer review.

The authors also observed that the most effective peer reviews often began with discussions among senior staff, policy makers, and other model stakeholders on the status of the current modeling tools and procedures as well as initiatives to be explored in the near and long term. A peer review can help make senior managers and policy-makers more aware of the strengths and weaknesses associated with an agency's modeling tools, ultimately enabling them to make better informed decisions about allocating resources to travel model improvement initiatives.

### 5.1.2 Participant Satisfaction

Both the TTI (2005) synthesis report and the Volpe (2009) evaluation report present findings and feedback elicited from previous peer review host agency participants. Overwhelmingly, agency satisfaction in the program is very high. Almost universally, the peer reviews met or exceeded the agencies' expectations and the peer panels were characterized as collegial, technically skilled, and generally interested in helping the host agency while promoting improved techniques and methods.

The primary agency motivation for wanting to participate in a TMIP peer review is to get an independent assessment of the agency's travel modeling tools and procedures by a group of respected technical leaders. That said, the professional and peer networking opportunities that are made available and fostered through the TMIP peer review program are just as important as the actual technical assessments. The information, skills, and expertise that are shared and transferred among practitioners during TMIP peer reviews are tremendously important. It is an opportunity to exchange different viewpoints and different solutions to complex behavioral and computational problems. This knowledge sharing is critically important as advanced tools and techniques become more widely adopted, and agency staff are simultaneously asked to do more with less.

### 5.1.3 Panel and Agency Recommendations

The authors of the past TMIP synthesis reports devote significant time to addressing whether or not panel recommendations were actually implemented by the host agency. There are a lot of issues surrounding whether or not an agency implemented a list of short and long-term panel recommendations. Available staff time and resources, the agency's current priorities, planning objectives and responsibilities as well as whether the agency was in total agreement with the peer panel are just a few of the reasons recommendations may or may not have been fully implemented. In our judgment, the percent of recommendations that were implemented is therefore not a great measuring stick for assessing the effectiveness of the program.

Host agency participants interviewed during this synthesis and evaluation effort often recommended more guidance, technical assistance, and involvement in all phases of the peer review process by TMIP staff both before and after the peer review meeting. As described earlier, hosting a peer review requires a good deal of effort on the part of the host agency, especially at medium and small size agencies with few or no dedicated modeling staff. The Volpe (2009) evaluation report in particular documented and proposed a more active involvement by TMIP staff.

## *5.2 Recent Host Agency Participant Feedback*

A number of TMIP peer reviews have now been conducted since the last evaluation report was prepared by Volpe in 2009. Since 2008, twelve additional peer reviews have been convened throughout the U.S. Table 6 below presents the peer reviews that have been conducted since the preparation of the last evaluation report.

**Table 6: Recent TMIP Peer Reviews (*2008-2011*)**

| City | State | Agency | Year |
|---|---|---|---|
| Logan | Utah | CMPO | 2008 |
| Davenport | Iowa | BRC | 2008 |
| St. George | Utah | DMPO | 2008 |
| Dubuque | Iowa | ECIA | 2008 |
| Sacramento | California | SACOG | 2008 |
| Austin | Texas | CAMPO | 2009 |
| Philadelphia | Pennsylvania | DVRPC | 2009 |
| Omaha | Nebraska | MAPA | 2010 |
| Burlington | Vermont | CCMPO | 2011 |
| Chattanooga | Tennessee | CHCNGA-TPO | 2011 |
| Monterey | California | AMBAG | 2011 |
| New York | New York | NYMTC | 2011 |

A set of ten questions was submitted to the modeling contact person at each of the recent host agency participants identified in Table 6 above. The interview questions are identical to those developed by Volpe in 2009, with one exception. The same questions were used in order to draw out the commonalities that might exist across all the agency responses instead of among only the most recent agency reviews conducted since 2008. **Appendix B** contains the list of questions submitted to each agency.

Responses were received from six of the recent host agencies that were contacted. Table 7 indicates which agency staff responded with feedback on their agency's TMIP peer review experience.

**Table 7: Agency Respondents**

| City | State | Agency | Year |
|---|---|---|---|
| Logan | Utah | CMPO | 2008 |
| Davenport | Iowa | BRC | 2008 |
| St. George | Utah | DMPO | 2008 |
| Austin | Texas | CAMPO | 2009 |
| Philadelphia | Pennsylvania | DVRPC | 2009 |
| New York | New York | NYMTC | 2011 |

### 5.2.1 Recent Host Agency Participant Satisfaction

All six agencies that responded to the set of interview questions expressed very high satisfaction in the TMIP peer review program and indicated they would recommend participation in the program to other agencies as well. Some respondents expressed an interest in participating in another peer review once the agency has had an opportunity to implement some of the recommended advancements identified in the model improvement roadmaps developed by the peer panels. In addition, one individual expressed an interest in actually participating on a peer review panel in the future. These two facts alone testify to the effectiveness and participant satisfaction in the program.

Interestingly, one participant said,

*"I would highly recommend involvement in the program.* ***Small*** *agencies with limited technical capabilities are likely to greatly benefit from the program."*

However, another respondent indicated that,

*"It is recommended that any* ***large*** *agency/MPO with a complex region take advantage of this program. The larger MPOs with complex and diverse transportation regions will benefit most from this program."*

Clearly, agency staff who have participated in recent TMIP peer reviews feel they are equally valuable to agencies of all sizes.

### 5.2.2 Recent Host Agency Recommendations

The recent host agency respondents provided a number of recommendations to improve the TMIP peer review program going forward. Some of the recommendations that were common among the recent host agency responses are presented below:

1) The production of the final report took too long and was delivered in some cases months after the peer review meeting.
2) An in-depth review of the "guts-of-the-model" before the actual TMIP peer review by an outside group of consultants proved to be very valuable as it enabled the assembled experts to focus on model improvement recommendations.
3) The vast range of experience among the peer panels is the program's greatest asset. The TMIP peer review program should continue to select a good mix of practitioners with diverse backgrounds and avoid an over-reliance on consultants as peer panel members.
4) The host agencies expected a different level of engagement than was provided by TMIP staff. TMIP was primarily just the funder of travel reimbursements while agency staff did most all the heavy lifting in planning and performing the review. Technical assistance with structuring the review agenda, helping to develop information necessary for preparation prior to the review and follow-up after the review was desired.

It is notable that these recommendations elicited from recent host agencies who participated in reviews conducted between 2008 and 2011 echo the sentiments of past agency participants. Specifically, that efforts conducted before the review help to ensure a more productive review; the composition of the peer panel is critically important to the success of the review; and finally, that host agencies desire a greater level of involvement by TMIP staff in the review process before, during, and after the in-person review.

# 6.0 Conclusions

This assessment and evaluation took a wide-angle view of the TMIP Peer Review Program by reviewing all twenty-eight of the peer reviews conducted since the program's inception. To summarize the achievements of the program, the reviews conducted between 2003 and 2011 were categorized along a number of different dimensions: by year, geography, agency size, peer panel composition and by motivating factors. The findings of this categorization reveal that the program has performed a well-balanced mix of reviews among large, medium, and small-sized agencies and has done a good job attracting panelists with diverse backgrounds and varied expertise.

The assessment also examined the peer reviews conducted to date to draw out the salient generalized lessons, observed model limitations, and suggested recommendations, as well as general policy and modeling trends. The report illustrates the broad patterns present in the practice of travel modeling that were realized from examining all twenty-eight peer reviews.

The major trends and themes were identified by isolating the specific technical questions posed by the host agency to the peer panel as well as the prioritized model improvement recommendations presented to each host agency by the peer panels. The technical questions and recommendations were grouped into major topic areas in order to quantify what topics have been most discussed over the years.

A few key findings emerged from this in-depth look at the TMIP peer reviews:

1) Most of the technical questions are centered on modeling guidelines, data collection/preparation and observed best practices which are to be expected since the peer reviews are primarily model assessment exercises.
2) The large and medium sized agencies typically submit more technical questions for the panel to respond to directly than do smaller-sized agencies.
3) The host agencies in general seem to be asking the same kinds of questions regardless of agency size with no clear chronological trends.
4) Most of the panel recommendations are centered on increasing the detail of the existing travel modeling tools (e.g. geographic, market segmentation, time of day, land use types, mode choice sets, etc.)
5) The peer panels in general seem to be recommending the same kinds of improvements regardless of agency size with no clear chronological trends.
6) More of the panel recommendations tend to be identified as shorter-term priorities and often involve increasing the detail of the existing modeling tools and procedures. (spatially, temporally, more detailed input data, etc.)
7) The inclusion of freight/commercial modeling, transitioning to activity-based demand modeling, dynamic traffic assignment (DTA), microsimulation and land-use modeling frequently appear as long-term panel recommendations.

Finally, the assessment examined past TMIP synthesis reports and elicited feedback from recent host agency participants to evaluate the effectiveness of the TMIP peer review program. Participant satisfaction is very high, and overwhelmingly, agency staff and participants thoroughly benefited from participation in the program. There is almost universal agreement that participating in the program has helped advance the modeling tools and procedures utilized by the host agency.

## *6.1 TMIP Peer Review Program Improvements*

A list of recommendations for improving the TMIP peer review program has been compiled based on a comprehensive and in-depth review of the twenty-eight peer reviews conducted since 2003, a review of past TMIP synthesis/evaluation reports, as well as 'user-experience' feedback elicited directly from past agency participants. Note, the recommendations below are not in priority order.

a. Convene three to four peer reviews per year and more actively promote the program during years when interest appears low.

b. Promote the program in parts of the country where TMIP peer review program participation has not yet occurred.

c. Continue to attract peer panelists with a diverse set of backgrounds and varied expertise without becoming too reliant on representatives from particular industry sectors and/or particular individuals. The peer networking and knowledge sharing offered by the program is perhaps more important than the technical assessments.

d. Continue promoting equal participation among large, medium, and small-sized agencies.

e. Consider ways to make peer review meeting materials available to a broader audience beyond just the final report.

    a. Record and make available the peer review meeting sessions themselves (via web-conferencing tools if agencies agree)

    b. Post meeting materials such as PowerPoint presentation slideshows, meeting agendas, model documentation and panel recommendations along with final report on the TMIP website

f. Consider having the TMIP program play a more active role before, during and after the peer review if budget permits.

    a. Technical assistance with structuring the review agenda, developing information necessary for preparation prior to the review, and follow-up after the review

    b. Develop templates that can be used by host agencies to streamline the TMIP peer review application, planning and preparation processes

    c. Review and help create the peer review agenda so it is clear and it is reasonable to expect that the agenda can be covered in the allotted meeting time.

g. Consider having the TMIP program review and comment on published documentation to ensure it is reasonably thorough, prior to agreeing to sponsor a peer review.

h. Consider incorporating a "Preliminary Model Assessment" phase as the first phase of the TMIP peer review process which takes place in advance of the meetings with the peer panel if budget permits. The preliminary assessment would provide the "independent eye" often cited by host agencies and could identify if the model is appropriate for the host agency's intended applications. The preliminary assessment would also help shine a light on elements of the travel modeling tools and procedures most deserving time and discussion during the formal in-person review.

# Appendix A Major Topic Areas

Appendix A contains the major topic areas used to group and categorize the technical questions posed by host agency staff to the peer panels and the recommendations provided by the peer panels to the host agencies. The topic area is described along with a sample question and/or recommendation assigned to the topic and the specific TMIP peer review and date.

**ACTIVITY-BASED MODELING** – general topic area for categorizing discussions related to activity-based modeling. "Should we consider transitioning into an activity-based or tour-based model? If so, should we maintain parallel tracks of modeling? Also associated cost?" (AMBAG, 2011).

**ADMINISTRATIVE** – general topic area for categorizing discussions related to computing, staff training, developing transferable tools, interagency coordination, etc. "Specialist vs. Generalist – should we have people doing MPO coordination and then let them be end users? Should we have our specialists build all MPO models, some internally some with consultants? Why is it important for specialists?" (NCDOT, 2004).

**ASSIGNMENT** – general topic area for categorizing discussions related to the vehicle assignment step of the travel modeling system. This category was also used for discussion related to time of day modeling and temporal resolution. "Are there refinements to the highway and transit networks and assignment processes, to better reflect true level-of-service by time-of-day, and to better capture variation in responses to time, distance and cost?" (SACOG, 2008).

**BEST PRACTICE** – general topic area for categorizing discussions related to observing industry best practices. "Are there any additional improvements CCMPO should consider to maintain a model consistent with current best practices?" (CCMPO, 2010).

**CALIBRATION / VALIDATION** – general topic area for categorizing discussions related to calibration and validation of travel modeling systems. "Should the highway re-validation process (only highway component) delay the development of the transit and nonmotorized components?" (CHCNGA-TPO, 2011).

**DISTRIBUTION** – general topic area for categorizing discussions related to the distribution step of the travel modeling system including discussions pertaining to destination choice modeling. "Gravity vs destination choice – Why would you want to do destination choice? When?" (NCDOT, 2004).

**FREIGHT MODELING** – general topic area for categorizing discussions related to freight and commercial vehicle modeling. "What recommendations are there to improve the commercial vehicle model?" (NYMTC, 2011).

**FUEL PRICING** – general topic area for categorizing discussions related to fuel pricing. "How can the effects of gas prices or parking cost be better implemented into the agency's model stream?" (AMBAG, 2011).

**LAND-USE FORECASTS** – general topic area for categorizing discussions related to developing land-use forecasts and land use modeling more generally. "What recommendations are there for improving our demographic allocation model and developing a new land-use forecasting model, including the software options available and their various strengths and weaknesses?" (MAPA, 2010).

**LAND-USE INPUTS** – general topic area for categorizing discussions related to developing socio-economic demographic input data for travel modeling systems. "Where should we get housing & employment data instead? What do other areas use?" (NCDOT, 2004).

**LU / TRANSPORTATION** – general topic area for categorizing discussions related to the integration of land use and transportation policies and/or modeling. "What accessibility measures should flow from the TDM to the LUM? How can intrazonal travel, transit, pedestrian, and bicycle accessibility be measured and fed into the LUM?" (CHCNGA-TPO, 2011).

**MODE CHOICE** – general topic area for categorizing discussions related to the mode choice step of the travel modeling system. "What is the relationship between land-use density and the impact on transit use?" (AMATS, 2004).

**MULTI-SCALE MODELING** – general topic area for categorizing discussions related to sub-area modeling, interfacing regional, meso-scale, and micro-scale models. Discussions pertaining to Dynamic Traffic Assignment (DTA) and microsimulation were categorized in this topic area. "CCMPO has a license for the PTV suite of the VISUM modeling program and VISSIM micro-simulation software. We would like to use this for corridor level analysis in conjunction with our existing TransCAD regional model and would be interested in recommendations regarding the general interaction between regional models and microsimulation tools as well as specific thoughts regarding the use of TransCAD and PTV software." (CCMPO, 2010).

**NETWORK INPUTS** – general topic area for categorizing discussions related to the development of spatial network inputs for the travel model system. "Capacities – should we use hourly and factor to daily?" (NCDOT, 2004).

**NON-MOTORIZED MODELING** – general topic area for categorizing discussions related to non-motorized modeling (walk/bike). "With our limited resources and equipment, how can we improve our non-motorized data collection process in a manner that will support travel demand modeling?" (CHCNGA-TPO, 2011).

**OTHER POLICY ANALYSIS** – general topic area for categorizing discussions related to a variety of policy analyses not well categorized with the other main topic areas. "How to address sustainability within the context of the regional model?" (NYMTC, 2011).

**ROAD PRICING / MANAGED LANES** – general topic area for categorizing discussions related to pricing and managed lanes, high-occupancy lanes (HOV) and high-occupancy toll lanes (HOT). "Assessment of the reasonableness of HOV/toll traffic forecasting capabilities." (AMBAG, 2011).

**SPECIAL MARKETS / GENERATORS** – general topic area for categorizing discussions related to special travel markets, the treatment of special generators, as well as visitor and airport modeling. "How should we model travel at our military base, universities, and other special locations?" (MAPA, 2010).

**TRIP GENERATION** – general topic area for categorizing discussions related to the trip generation step of the travel modeling system. This topic area was also used to classify discussion relating to expanding and/or adding detail to the market segmentation of aggregate models (purposes, more cross-classification variables) "What cross-classification data is used most often and which data is proven to generate the most reliable Productions &Attractions?" (IaDOT, 2004).

**VISUALIZATION** – general topic area for categorizing discussions related to visualization techniques for sharing travel model results with diverse group of stakeholders, policy makers, senior managers, and lay persons. "Recommendations on visualization techniques and performance measures for better communications to stakeholders." (CCMPO, 2010).

**ZONES & NETWORKS** – general topic area for categorizing discussions related to the travel analysis zone structures and networks (highway, transit) used in travel modeling systems. The topic area was also used to categorize discussions pertaining to increasing the spatial resolution of travel modeling systems. "Are there "model measurement errors" associated with expanding the zone system that are avoidable or unavoidable?" (MTC, 2004).

# Appendix B Interview Questions

Appendix C contains the list of ten questions sent to recent TMIP peer review host agency participants to elicit feedback on the agency's peer review experience.

1) What were the key motivations that led you to request a peer review?
2) What were the major outcomes you were hoping for from the peer review?
3) How effective was the peer review in achieving those outcomes? (What worked well? What did not work well?)
4) Did you make any changes to your model or modeling process based on the recommendations of the peer review panel? If so, what were the changes? Are you satisfied with the results?
5) Are there recommendations that you did not implement? If so, why not?
6) How well suited were the panelists in addressing your needs? (What worked well? What did not work well?)
7) How effective was the meeting format in addressing your objectives? Would you recommend any changes to the format? (What worked well? What did not work well?)
8) What suggestions do you have for improving the effectiveness of the various components of the peer review program? (e.g., the application process, choice of panelists, peer review session, peer review report, etc.)
9) What advice do you have for other agencies interested in participating in the peer review process? What agencies would benefit most from participation? What can agencies do to ensure that they receive the most value from participation?
10) Do you have any thoughts/concerns related to the TMIP Peer Review Program more generally?

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