
National Capital Region Transportation Planning Board

Metropolitan Washington Council of Governments
777 North Capitol Street, N.E., Suite 300, Washington, D.C. 20002-4290

Highlights of the July 19, 2013 meeting of the Travel Forecasting Subcommittee

Held at the Metropolitan Washington Council of Governments, from 9:30 AM to 12:00 PM

Status of highlights: Approved on 9/20/13

Meeting attendees

- Shweta Dixit (George Mason University)
- Michael Hewitt (MWAA)
- Tony Hofmann (Michael Baker Corp.)
- Eric Jenkins (M-NCPPC, Prince George's Co.)
- Wendy Jia (WMATA)
- Bob Josef (RK&K)
- Dial J. Keju (Frederick Co.)
- David Kline (Fairfax County DOT)
- Yuanjun Li (M-NCPPC, Montgomery Co.)
- Feng Liu (Cambridge Systematics)
- Xuemei Liu (Cambridge Systematics)
- David Roden (AECOM Consult, Inc.)
- Krishna Patnam (AECOM Consult, Inc.)
- Amir Shahpar (AECOM Consult, Inc.)

COG/TPB staff in attendance

- William Bacon
- Anant Choudhary
- Joe Davis
- Bob Griffiths
- Wanda Hamlin
- Charlene Howard
- Hamid Humeida
- Ron Milone
- Mark Moran
- Jane Posey
- Clara Reschovsky
- Rich Roisman
- Meseret Seifu
- Dusan Vuksan
- Feng Xie

The meeting was chaired by Wendy Jia of WMATA.

1. Introductions and approval of meeting highlights from the previous meeting

The highlights from the May 17, 2013 meeting of the TFS were approved without change.

2. Presentation of the draft FY 2013 report from the consultant-assisted project for development of the TPB travel model

This item was presented by David Roden of the AECOM staff. He distributed copies of his presentation to the subcommittee. AECOM has been under contract to COG during FY 2013 to assist staff in research and development activities relating to the TPB's travel forecasting methods and practice. The activities undertaken during the fiscal year have been established among three primary task orders:

Task Order 7: Meetings and General Support

Task Order 8: Traffic Assignment (including improvements to HOT-lane modeling, HOV modeling and speed validation)

Task Order 9: Mode Choice and Transit Modeling (including the migration to PT-based transit skimming and fare development procedures and the implementation of the ModeChoice application program)

Mr. Roden stated that the draft final report describes the work that was accomplished for each of the three task orders. His presentation of AECOM's documented accomplishments included several key items that TPB staff will consider as potential refinements to the existing Version 2.3 travel modeling process.

- AECOM developed a prototype process that refines HOV trip tables resulting from the current mode choice model. The process considers differences in SOV and HOV time skims as a basis for refining HOV demand associated HOV-priority facilities on a zonal i/j basis. The new HOV model has been calibrated against HOV counts on I-95 and I-395.
- AECOM has tested procedures for integrating the process of HOT-lane toll "searching" as an integrated part of the model application process. The process makes use of toll-choice distribution (or diversion) curves as a means of allocating highway trips among HOT and general purpose lanes. The procedures will require further testing, but they indicate the possibility that the existing process for developing HOT lane toll values can be simplified and streamlined.
- AECOM has successfully developed a PT-based process for building a multi-modal transit network and for creating transit level-of-service matrices. The consultant has also identified further network coding refinements that will need to be implemented before PT can be brought into production, however.
- AECOM has created a new program executable for calibrating and applying a mode choice model (called ModeChoice), and they have successfully replicated the TPB's existing application process that was implemented with the existing AEMS application program. The ModeChoice program offers practical improvements over the existing program such as faster running times and the ability to constrain mode-specific constants developed in the model calibration.

Mr. Moran informed the subcommittee that TPB staff has reviewed the draft report and has already worked with AECOM to implement several edits to the report during early July. He encouraged the Subcommittee to provide further review and comments to TPB staff within the next 30 days. The AECOM report will be considered heavily in the formulation of future short- and long-term activities in the Models Development program.

Mr. Milone commented that calibrating an HOV model to counts on existing HOV-priority facilities is a difficult task given that one cannot assume all existing HOVs are travelling on HOV lanes. HOVs exist on both the HOV lanes and on the general purpose lanes, so classification counts on both sets of lanes should ideally be measured. What's more, SOV-hybrid vehicles are currently allowed to use HOV priority lanes: one cannot assume that HOV lanes serve HOV vehicles only. Mr. Griffiths added that

many of COG's HOV counts reflect a single day, and may not reflect the large variability that happens day to day.

3. Validation of the Version 2.3 travel model to year-2010 conditions

This item was presented by Ronald Milone of the TPB staff. Presentation slides were distributed. Mr. Milone informed the subcommittee that the Version 2.3 Travel Model validation effort that began last fall has now been completed. The validated model, Version 2.3.52, has been applied as part of the recent air quality assessment of the 2013 CLRP. As the TPB formally approved the air quality conformity findings (Resolution R1-2014) and the 2013 CLRP (Resolution R2-2014) on July 17, the Version 2.3.52 travel model is now the regionally adopted forecasting process for the Washington, D.C. region. The validation effort has been documented in Appendix D of the Air Quality Conformity report.¹

Mr. Milone discussed the process and objectives of the travel model validation and also reviewed Vehicle-Miles-of-Travel (VMT) trends that have been observed since the Version 2.3 model was calibrated in 2007. U.S. VMT reached maximum levels during 2007 (about 3 trillion miles annually), and has since fallen back to just under 3 trillion miles for the past five years. U.S. VMT per capita has been in decline since about 2004. Given the constant yearly growth in national VMT that has been observed for the past several decades, the sustained "leveling off" of vehicle-miles travelled in recent years is unusual. A review of local travel monitoring data for the TPB planning area indicates that VMT has remained essentially constant between 2005 and 2011. By contrast, the regional population has grown by about 7% over the same period. Consequently, VMT per capita in the region has declined by about 6% between 2005 and 2011. Mr. Milone pointed out that current highway demand is clearly lower now than it was during 2007 when the Version 2.3 model was originally calibrated. The reasons for decreased travel likely include the slowing economy and the increasing adoption of new technologies that obviate the need for travel (internet-commerce and telecommuting, for example). It has been suggested that travel preferences of younger population segments are moving away from auto use to alternative modes. TPB staff is mindful that these types of observed trends must be monitored carefully.

Mr. Milone reviewed the changes that have been implemented to the travel model and presented performance results of the validated model. Primary changes to the model include the use of time penalties on network links crossing the Potomac River and adjustments to the non-motorized share model used in the trip generation model. Facility type coding in the highway network has also been revisited as part of the validation effort. He pointed out that interstate facilities in and near the District of Columbia are now coded as expressways in an attempt to more accurately reflect true operating conditions of such facilities. He noted that improvements in model performance have been attained particularly with respect to Potomac River crossings and VMT simulated in the District of Columbia. Both of these measures were previously over-simulated.

¹ Air Quality Conformity Determination of the 2013 Constrained Long Range Plan and the FY2013-2018 Transportation Improvement Program for the Washington Metropolitan Region, COG/TPB, 7/17/2013; http://www.mwcog.org/transportation/activities/quality/Conformity/2013/2013_Conformity_Report.pdf

Mr. Milone stated that TPB staff is preparing a transmittal package of the Version 2.3.52 model for agencies interested in applying the model for local project planning work. The package will be ready in August and will include application-ready inputs for the years 2010, 2015, 2017, 2020, 2025, 2030, and 2040. Staff is also nearing completion of user's guide for the 2.3.52 model. In September, staff plans to review the global results of the recently adopted air quality conformity work.

One meeting attendee observed that Citilabs (the vendor of the Cube software which is currently used to apply the regional travel model) recently hosted a webinar that addressed the use of Cloud-computing technology. He asked if TPB staff is planning to adopt this new technology as a means of allowing external users access to the regional model. Mr. Milone stated that staff is aware of the new technology, but there are no immediate plans to implement it in the near future, in part due to the added cost.

4. Ex-post evaluation of COG/TPB transit forecasts

This item was presented by Ron Milone and was concerned with an informal research effort undertaken by TPB staff in response to an information request that was received from WMATA last March. The genesis of this research began on March 20 when the TPB was briefed by staff on an overview of the COG Cooperative Forecasting process. The briefing included an analysis on how well past land activity forecasts compared with actual land activity for the year 2010. WMATA subsequently contacted TPB staff members to request that they expand this type of analysis to assess how well past transit ridership forecasts have compared with actual ridership. In response, TPB staff conducted a short analysis that attempted to provide such an assessment.

TPB staff used a Long-Range Plan report that was published in September 1994 (about 19 years ago) to obtain a transit ridership forecast for the year 2010. The travel model applied in 1994 was executed using the Round 5.1 Cooperative Forecasts and the Long Range Plan (LRP) that was adopted in 1991 and later amended in 1993.

Mr. Milone stated that the TPB travel model applied in 1994 was quite different than the current Version 2.3.52 model that is in use today. The 1994 travel model did not produce total daily transit ridership for the region, but rather, was constrained to yield Home-Based-Work (HBW) transit travel only. What's more, the travel model produced only "linked" transit trips instead of boardings. The number of regional (linked) HBW transit trips forecasted by the travel model for the year 2010 was 802,000.

While the number of observed HBW transit trips for the region is not available from a single data source, TPB staff was able to derive a reasonable observed trip figure using available 2010 Metrorail boarding counts, previous transit on-board survey data, and a simple analogy-based approach. The resulting observed (linked) HBW transit trips resulting from the analogy method amounted to 781,200, which was within about 3% of the forecasted ridership. Staff found this estimated-to-observed comparison to be quite remarkable.

Mr. Milone added that the travel model applied in 1994 did not account for many factors that are relevant to the actual ridership, since these factors were not known in 1994. For example:

- The model did not account for major system improvements such as the DC Circulator Bus system or the New York Avenue (NoMa-Gallaudet) Metrorail station
- The model did not account for the extensive employer-based transit subsidies (the “SmartBenefit” program) that effectively resulted in substantial commuter fare reductions, particularly for federal employees
- The model did not know about the lingering effects of the economic recession that began in 2008
- The 2010 land activity forecasts used by the model included many forms of error that would influence the number of transit trips and the transit trip pattern. The land activity forecasts under-estimated households in the “core” jurisdictions. The forecasted jobs were substantially over-estimated in Montgomery County and in Prince George’s County, and und-estimated in Fairfax County.

Despite these unknown factors, the forecast was still within 3% of the actual 2010 ridership. Mr. Milone then reviewed the numerous improvements that have been implemented to the regional travel demand model since 1994. Many of the improvements he cited have contributed substantially toward improved transit ridership forecasts, compared to the methods used in 1994.

The analysis provided a rare opportunity for TPB staff to analyze forecasts that were prepared almost 20 years ago with an actual ridership figure. Mr. Milone added that uncertainty is an inherent part of the forecasting process and it is important to understand that error exists in the model inputs, as well as in the model itself. He added that TPB staff works hard at refreshing model inputs each year, in order to improve the quality of travel forecasts.

5. Round-table discussion

This item was deferred to the next meeting.

6. Other business

The next proposed meeting of the TFS is Friday, September 20, 2013 from 9:30 AM to 12:00 noon. The meeting was adjourned around noon.

*** The meeting highlights were prepared by Ron Milone and Mark Moran ***