COG/TPB GEN3 TRAVEL MODEL

Status report from COG/TPB staff

Feng Xie
TPB Transportation Engineer

Travel Forecasting Subcommittee
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Overview

- Status of Gen3 Model, Phase 3, development, which is led by TPB staff with on-call support from RSG and Baseline Mobility Group (BMG):

    - Model enhancements and bug fixes (status update)

    - Usability testing (status update)

        - Sensitivity testing

        - Preliminary LRTP performance analysis

- Next Steps

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Model Enhancements and Bug Fixes

- RSG investigated/addressed model issues that COG staff noticed during usability testing.
  - Overestimation of SOV trips and underestimation of HOV trips in tour/trip mode choice models: **Done - Much improved**
  - Underestimation of PM trip departures and overestimation of NT2 trip departures in tour/trip time-of-day choice models: **Done - Much improved**
  - Increase trip rates to better match the survey data: **Done - Much improved**
  - Reverse the global 15% increase of truck/CV trips in the Gen3 Model: **Done**
  - Revert to the SANDAG telecommute coefficients/constants in the DAP model to see more reasonable model responses: **Done – To be tested by COG staff**
  - Fix a model issue related to transit subsidy: **Done – To be tested by COG staff**
  - Suspicious traffic volume increases on screenlines #26 & #27: Investigated but **no action taken**
  - Possibly considering toll in the travel cost for commute trips: Investigated but **no action taken**
- RSG and COG staff found the latest model validation performance (dated May 9) largely satisfactory.
- The new model with all the recent model updates was tagged as Gen3/Ver. 1.0.4.

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Model Enhancements and Bug Fixes

- COG staff recently tested the transit fare subsidy model, which predicts the availability of transit subsidies to individual persons.
  - The current model, which was borrowed from the MTC model without being estimated or calibrated to local data, significantly understated the availability of employment-based transit subsidies in this region. Thus, in a hypothetical scenario, staff re-calibrated the model to increase the availability of transit subsidies to full-time workers.
  - Unexpectedly, although transit subsidy model parameters were updated due to the re-calibration, the final model outputs (e.g., total simulated VMT or total transit ridership) did not change. It was because the output from the transit fare subsidy model was NOT used to condition any of the downstream models.
- RSG instituted a fix in the mode choice models and re-calibrated them; COG staff then conducted a test run and updated the model validation statistics; The validation performance was found to be satisfactory.
- COG staff will rerun the transit subsidy test to see if the model response is reasonable.

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Model Enhancements and Bug Fixes

- COG staff included some standard model summaries in the model.

- Staff fixed an error-trapping issue in toll setting.

- Staff created the 2050 network shapefiles from the 2050 network and replaced the old 2045 network shapefiles in both Gen2 and Gen3 Models.

- Staff continued to review and update the Gen3 Model User's Guide.

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Usability Testing: Status of Sensitivity Tests

- Sensitivity tests were conducted in Phase 3 as part of usability testing, mainly aiming to:
  - Compare Gen2 vs. Gen3 Model responses in same or largely consistent scenario setup.
  - Showcase Gen3 Model's capability for in-depth analysis with disaggregate data.
- Staff conducted three sensitivity tests for 2025:
  - Adding one lane, per direction, on I-95 between the DC and Baltimore beltways (Done)
  - Imposing a hypothetical cordon pricing scheme in the CBD of DC (Done)
  - Increasing the telecommute frequency in the TPB Planning Area:
    - Staff ran a preliminary test and found an inconsistency between the change of telecommute frequencies in the input and the change of commute trips in the output.
    - Staff will rerun this test with the Gen3/Ver. 1.0.4 Model to see if the model response is more reasonable.
    - In the meantime, staff developed a Python script that automates the calibration of the telecommute frequency choice model.

Usability Testing: LRTP Performance Analysis

- The Long-Range Transportation Plan (LRTP) performance analysis assesses the performance of a long-range plan by comparing travel forecasts before and after the plan implementation.

- Recently, COG staff conducted a preliminary performance analysis of Visualize 2050 using the current Gen3 Model and compared the results with those from the Gen2 Model.

- The preliminary work focused on developing tools needed for the performance analysis in the following areas and identifying major differences between the Gen2 and Gen3 results.
  - Travel demand/supply statistics for the TPB Planning Area and its subareas
  - Person Miles of Travel (PMT) using reliable transportation modes
  - Resident VMT for TPB Planning Area and its subareas
  - Job accessibility maps

- COG staff plan to rerun the 2025 and 2050 scenarios using the Gen3/Ver. 1.0.4 Model and update the performance analysis.

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Next Steps

- With the new Gen3/Ver. 1.0.4 Model,
  - RSG and BMG staff will update the model documentation.
  - COG staff will:
    - Rerun the 2025 and 2050 models and update the usability testing results.
    - Rerun the 2025 telecommute frequency sensitivity test to see if the model response is more reasonable.
    - Rerun the 2025 transit subsidy test to see if the model response is more reasonable.
    - Perform plan performance analysis and document the results.
    - Perform additional sensitivity tests as needed.

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Feng Xie

TPB Program Manager, Model Development

(202) 962-3259

fxie@mwcog.org

mwcog.org

777 North Capitol Street NE, Suite 300

Washington, DC 20002

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