

# TPB Travel Demand Model, Version 2.2

Presentation to the  
TPB Technical Committee

Ron Milone

March 7, 2008



# Version 2.2 Model Background

- Oversight: Travel Forecasting Subcommittee (TFS)
- Conventional four-step trip based model
- Replaces Version 2.1D#50
- Supported most recent conformity work
- Model is adjusted, not re-estimated
- TPB is responding to model requests
- Documentation available on the web...



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# V2.2 Feature #1

## New commercial vehicle model

- A recommendation from last model review
- Previously included in the NHB purpose
- Empirically developed, based on a 2005 roadside survey (144 locations)
- Standard generation/distribution approach used with count based adjustments
- Commercial trip regional total:
  - 1,193,000 trips out of 20,757,000 (in 2005)
  - 5.7% of total vehicles in modeled area



# Version 2.2 Feature #2

## External traffic forecasts moderated

- External traffic forecasts are prepared at 46 locations as a model input
- Previous assumption: 3.0% ann. growth, globally
- Updated assumption: 1.1%-3.0% growth depending on location (1.8% average) based on:
  - historical growth trends at stations
  - Analysis of the future capacity at individual stations
  - Socio-economic growth between 2000 and 2030
- Regional external traffic in 2030 reduced by 30% from 2.95 million to 2.08 million trips per day



# Version 2.2 Feature #3

## Freeway queuing delay function

- One of several measures used to address a small number of hyper-loaded links in the highway network
- Queuing delay function is combined with the volume-delay formulation in traffic assignment
- Allows for explicit accounting of intersection-related delay, which is very relevant to highway path choices



# Version 2.2 Feature #4

## Reduced number of adjustment factors

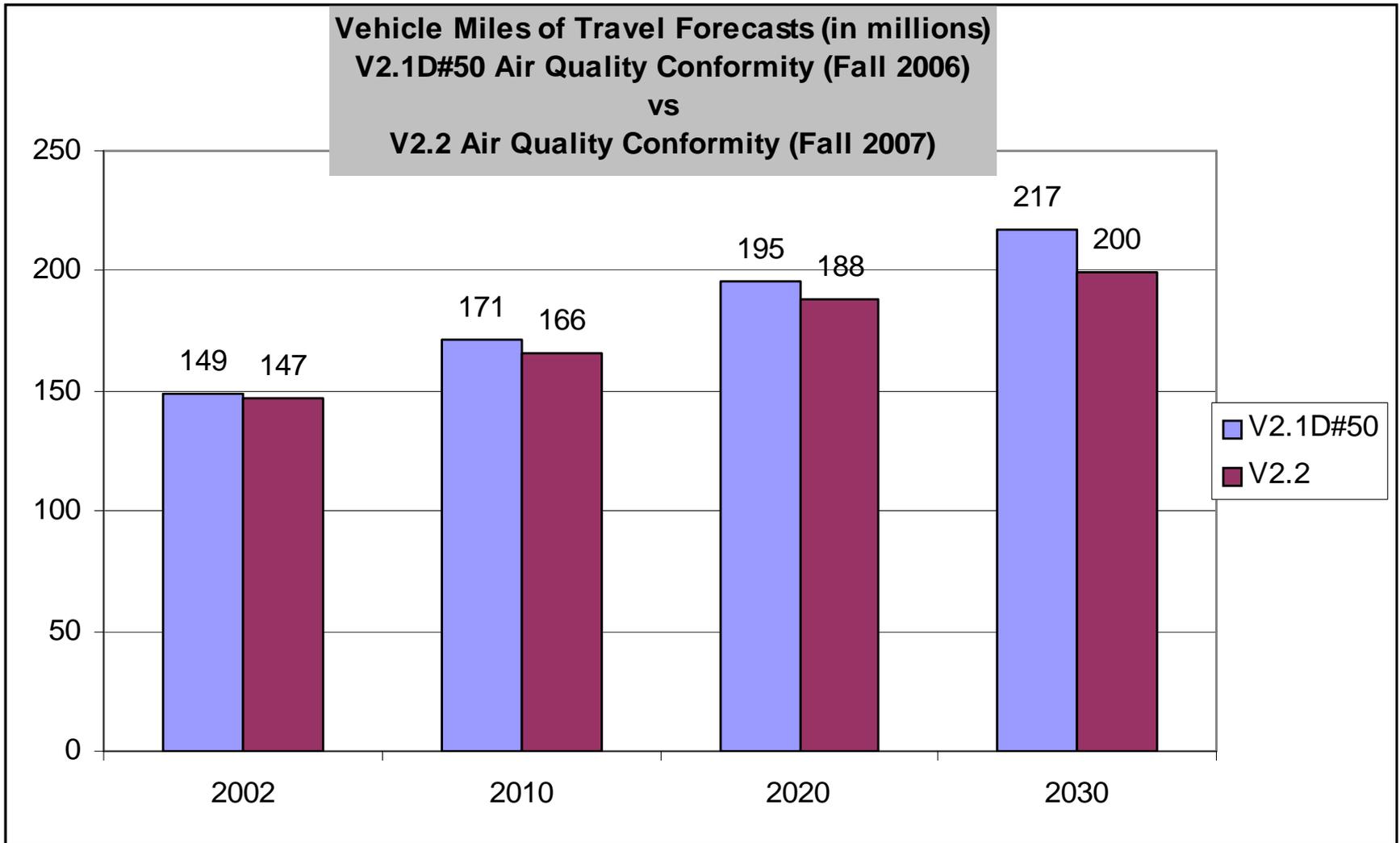
- Trip distribution: Bridge penalties, non-work K-factors (23 removed in all)
- HBW K-factors reduced from (29 to 11) but CBD-related Ks retained and considered necessary
- Mode choice: All non-work geographic transit and car occupancy adjustments in mode choice
- Performance implications of less adjustments: 'looser fitting'



# Version 2.2 Special Modeling Approach used for HOT Lanes

- Multiple model applications are necessary for simulating HOT lane scenarios
  - An initial run is executed with the HOT lane facility simulated as an HOV-priority facility (hypothetical). HOV level of service (LOS) matrices developed and saved.
  - HOT lane toll rates by segment and time-period are estimated through trial and error runs of the traffic assignment
  - A final run utilizes the HOV LOS matrices developed in Step 1 with the toll rates developed in Step 2

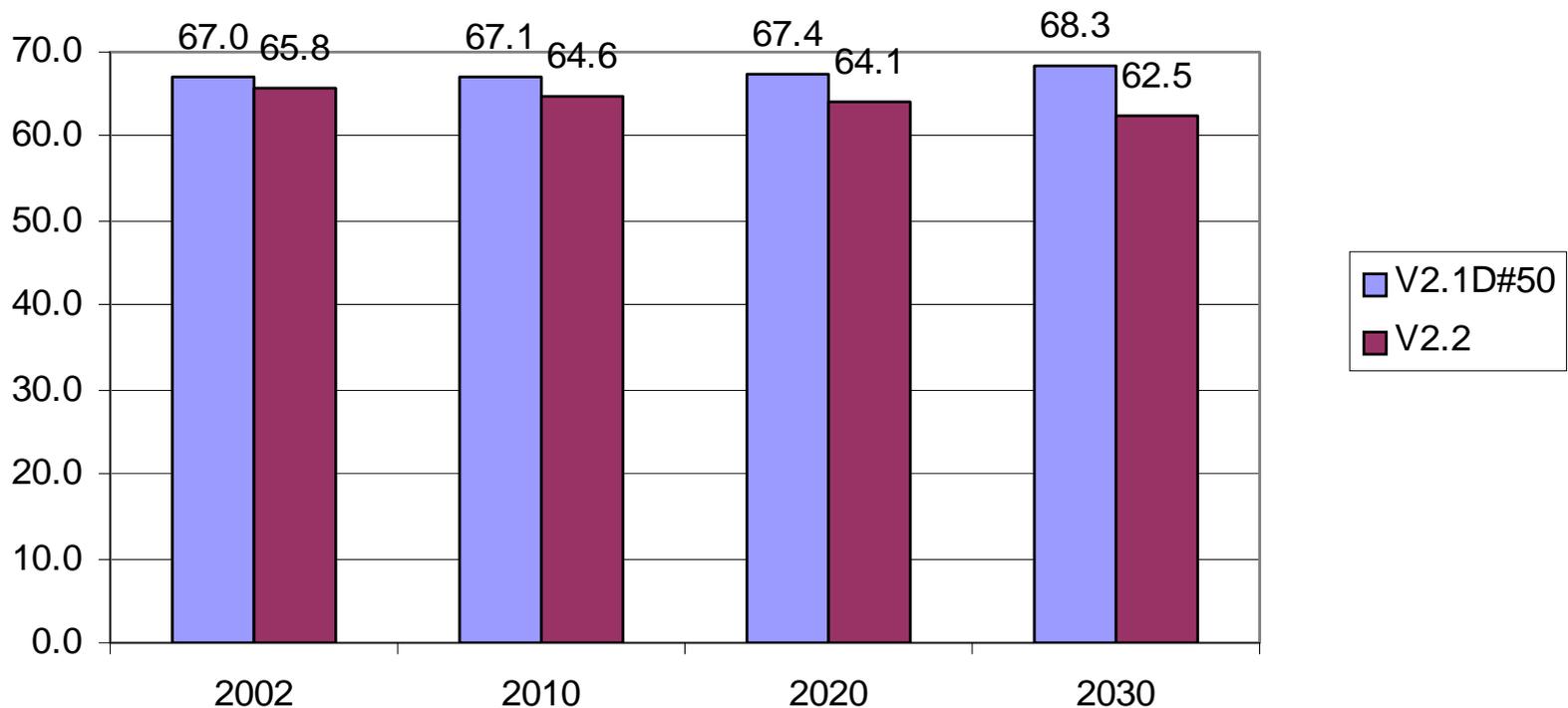




*Note: V2.1D#50 model results are based on Round 7.0a Cooperative Forecasts;  
V2.2 model results are based on Round 7.1 Cooperative Forecasts*



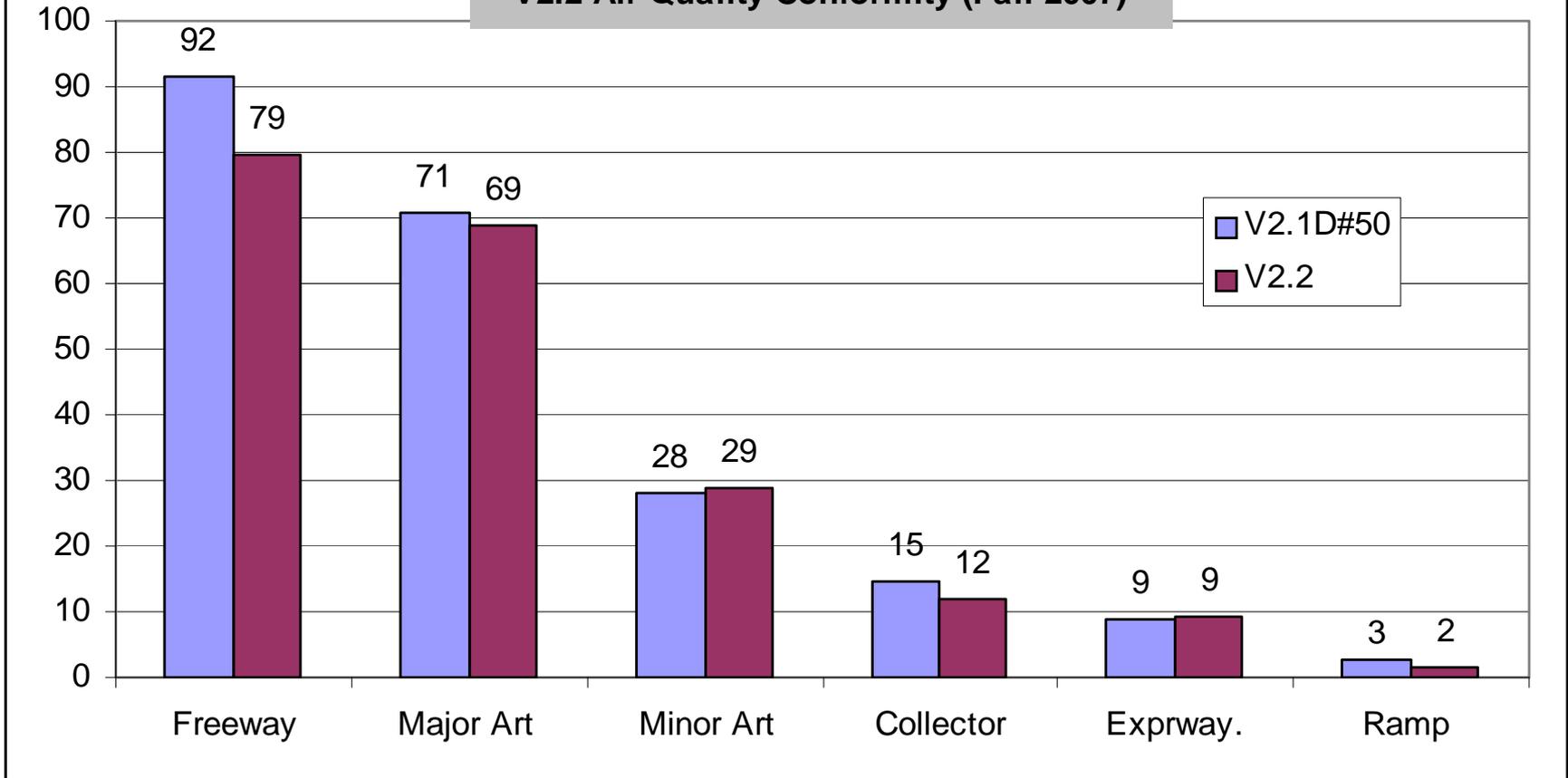
**VMT per Household Forecasts  
V2.1D#50 Air Quality Conformity (Fall 2006)  
vs  
V2.2 Air Quality Conformity (Fall 2007)**



*Note: V2.1D#50 model results are based on Round 7.0a Cooperative Forecasts;  
V2.2 model results are based on Round 7.1 Cooperative Forecasts*



**2030 VMT by Facility Type (millions)  
V2.1D#50 Air Quality Conformity (Fall 2006)  
vs  
V2.2 Air Quality Conformity (Fall 2007)**



*Note: V2.1D#50 model results are based on Round 7.0a Cooperative Forecasts;  
v2.2 model results are based on Round 7.1 Cooperative Forecasts*



# Conclusions

- Version 2.2 model is now 'on-line'
- TPB is currently responding to 10 requests
- Version 2.2 represents an improvement in the TPB's travel forecasting practice
  - Less adjustment factors used
  - Freeway queuing delay is now addressed
  - More realistic external traffic assumptions used
- Version 2.2 will continue to be monitored and refined, as is the case with any production model
- TPB's models development activities are continuing: Version 2.3 is in progress

