

Overview of BMC Travel Demand Model

November 10, 2010



Baltimore Metropolitan Council



Background I

- BMC maintains a Four-Step Travel Demand Model
 - Trip Generation
 - Trip Distribution
 - Mode Choice
 - Trip Assignment



Background II

- Six Baltimore Region Jurisdictions
 - Baltimore City
 - Anne Arundel County
 - Baltimore County
 - Carroll County
 - Harford County
 - Howard County

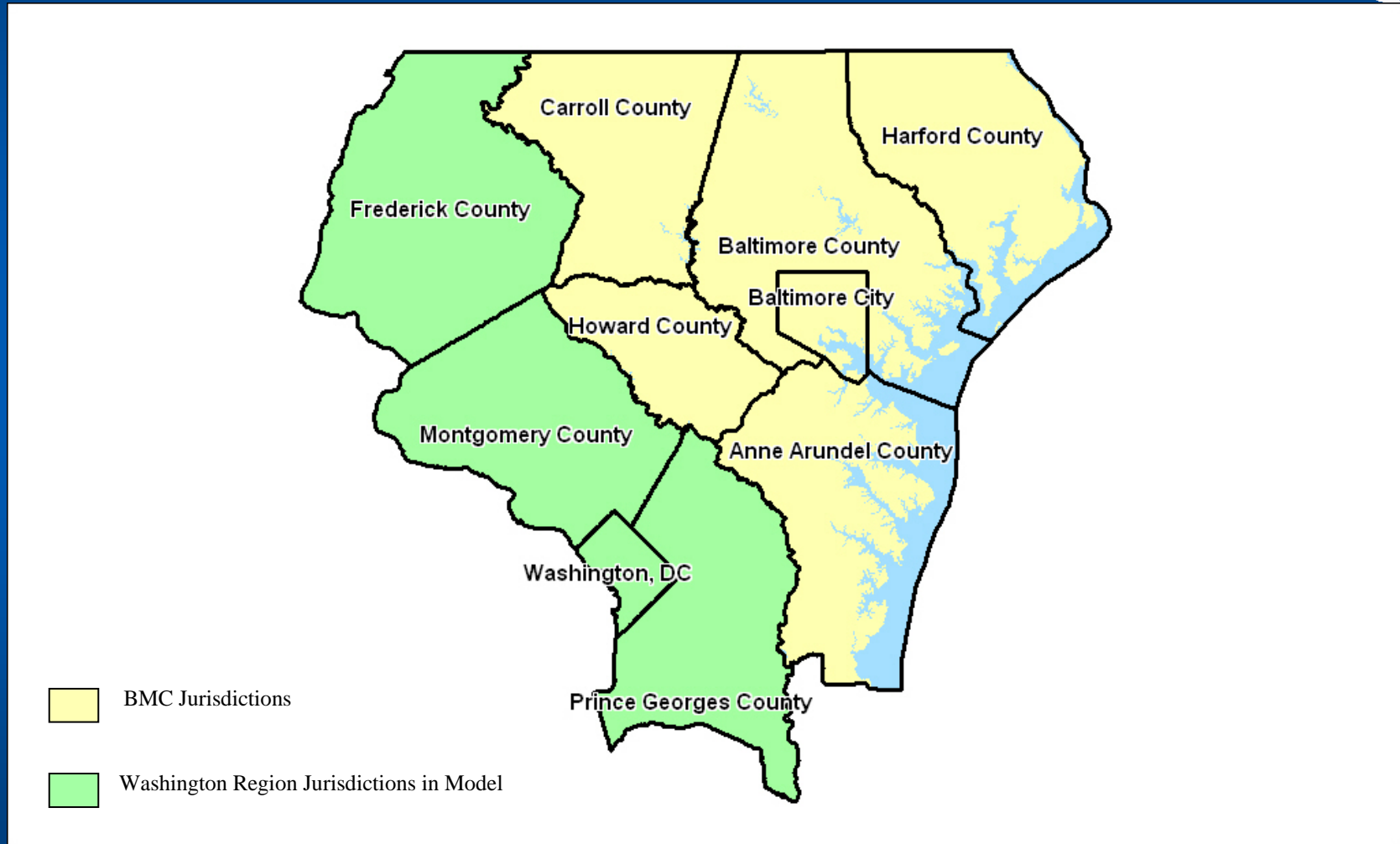


Background III

- Four Washington Region Jurisdictions
 - Washington, DC
 - Montgomery County
 - Prince George's County
 - Frederick County
- Washington Jurisdictions Used to Improve Baltimore Region Model



Background IV



Trip Purposes I

- Seven Primary Personal Purposes
 - Home-based Work (HBW)
 - Home-based School (SCH)
 - Home-based Shop (HBS)
 - Home-based Other (HBO)
 - Journey-to-Work (JTW)
 - Journey-at-Work (JAW)
 - Other-based Other (OBO)



Trip Purposes II

- Commercial Vehicles (CV)
- Medium Trucks (MT)
- Heavy Trucks (HT)
- External Trips by Direction for Work, Non-Work, CV, MT, and HT trips (IXW, IXN, IXC, IXM, IXH, XIW, XIN, XIC, XIM, XIH)
- Through Trips (XX)



Trip Generation I

- Productions
 - HBW, JTW, JAW, IXW
 - Households by Workers and Income
 - SCH, HBS, HBO, OBO, IXN
 - Household by Size and Income
 - CV, MT, HV
 - Employment (Retail, Industrial, and Office Separately)
 - Households



Trip Generation II

- Attractions
 - HBW
 - Total Employment
 - SCH
 - School Enrollment
 - HBS
 - Households and Retail Employment



Trip Generation III

- Attractions
 - HBO
 - Households, Retail Employment, and Other Employment
 - JTW
 - Households, Retail Employment, and Non-retail Employment
 - JAW
 - Households, Office Employment, Other Employment, Total Employment (if CBD)



Trip Generation IV

- Attractions
 - OBO
 - Households and Retail Employment
 - CV, MT, HT Set to Productions
 - XIW Combines External HBW, JTW
 - XIN Combines External SCH, HBS, HBO, JAW, OBO



Trip Generation V

- Total Person Trips Are Generated
- External Trips Then Separated
- Non-motorized Trips Calculated
- Attractions Scaled to Match Productions by Region
- NHB Productions Set to Attractions



Trip Distribution

- Composite Time (Includes Tolls and Transit Time) Used
- Friction Factors
- K Factors



Mode Choice

- Peak (HBW, JTW) and Off-Peak (Other Purposes)
- Hierarchy of Modes (Commuter Rail, Rail, Commuter Bus, Bus Supermodes)
- Types of Access (Walk, Kiss and Ride, Park and Ride)
- Nested Logit Model Applied



Trip Assignment I

- Four Time Periods
 - AM Peak (6:30 – 9:30 a.m.)
 - Midday (9:30 a.m. – 3:30 p.m.)
 - PM Peak (3:30 p.m. – 6:30 p.m.)
 - Night (6:30 p.m. – 6:30 a.m.)
- Fixed Increment Loading Based on Equilibrium Assignment



Trip Assignment II

- Two Feedback Loop to Recalculate HBW and JTW Trip Distribution and Mode Choice
- Transit Assignment by Period (Peak and Off-Peak), Access Mode, and Transit Supermode



Databases

- Master Highway Network
- Household Travel Surveys
 - 1993 Household Travel Survey
 - 2001 Household Travel Survey (NHTS)
 - 2007-2008 Household Travel Survey w/MWCOG
- Transit Surveys
 - 1996 On-board Survey
 - 2007-2008 On-board Survey



For More Information

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