Addressing Regional Issues through Modeling Approaches – Updates from other Regions

Expert Review Panel Meeting

October 31, 2003

Vision Phase – General Overview

- **Inventory of Regional Model Implementations (Task 1)**
  - **San Diego (Data Management)**
  - **Houston (Mode Choice)**
  - **Honolulu (UrbanSim2)**
  - **Edmonton**
  - **Portland Metro**
    - Trip Based Model System
    - Tour-Based Model System
  - **Stockholm**
  - **San Francisco Tour-Based Model System**
  - **Columbus Tour-Based Model System**

Vision Phase – General Overview (Continued)

- Task 2 - Model Enhancement List
- Task 3 – Structural & Functional Enhancments
- Task 4 – Socio-Economic Model Coordination
- Task 5 – Data Inventory & Assessment
- Task 6 – Functional/Structural Enhancement Evaluation/Prioritization
- Task 7 – Cost Estimation & Analysis

Sensitivity of Land Use Patterns to Transportation

- Integrated Land Use/Transport Models
  - Mode Choice logsums influencing residential location choice, work location choice, allocation of activities, land values, etc. (TLUMIP)
- Accessibility model (UrbanSim)
- Land price model (UrbanSim)
- Residential and employment location choice models (UrbanSim)

Sensitivity of Transportation to Land Use

- Dynamically changing development patterns (UrbanSim, TLUMIP)
- Explicit modeling of land use, densities, intensities (UrbanSim, TLUMIP)
- On Transportation Behavior
  - Density, Design, Diversity (Portland PEF)
  - Neighborhood connectivity, vitality, safety (SFCTA)
- Induced Demand
  - Accessibility in Trip Generation
    - Edmonton use of LogSum term
    - SFCTA and Portland tour-based Model accessibility terms in day-pattern choice
    - MORPC

Sensitivity To Price Signals

- Economic/Land-use models
- Land Development (UrbanSim Land Price Model)
- Parking Cost
  - Average Zonal Values (San Diego, Houston, ….)
  - Location Choice & Segmentation (SFCTA & MORPC)
- Income-specific cost parameters
- Mode-specific costs
  - Tolls vs. Fare vs. Auto operating costs
  - Estimation problems with traditional (RP) surveys

Modeling Low Share Alternatives

- Nested Logit Mode Choice Model Structures
  - Sequential Model Systems – San Diego, Edmonton, Houston
  - Tour-Based Micro-simulation models – SFCTA, MORPC
- Telecommute Option
  - Tour Generation – MORPC
- Non-Motorized Travel Options (Walk & Bicycle)
  - Supply Side Measurement (Edmonton)
- Transit
  - Parking capacity restraint / vehicle capacity restraint
- Mode-switching for trips on tours - SFCTA

Richer Depiction of the Modeled World

- Tour-Based Models with Full Sample Enumeration
  - Tracking full travel itineraries through day for sample
  - Full list of household/person variables
  - Joint Household Travel
- Advanced Practice Trip-Based Models
  - Market Segmentation – Trip purposes, socio-economic segments
- Treatment of time
  - Peak and off-peak (HGAC, Edmonton)
  - Multiple time periods (SFCTA, Portland tour-based, MORPC)
  - Continuous hazard-based duration models (TLUMIP)
- Transportation Supply Side Measurement
  - SANDAG detailed transit stop database and walk market accessibility
  - Portland ramp metering functions

Representation of Non-System Policy Changes

- Socio-economic Change
  - Household submodels
- Land-use policy (UrbanSim)
  - Large-scale development projects
  - Growth boundaries, zoning, environmental constraints
- Taste Variation
  - TLUMIP Generation 4 ??
- Travel Demand Management
  - Does anyone consider this?
  - Tour-based micro-simulation models are promising…

Improved Accuracy of:

- Transit Demand Estimation
  - Path choice versus Behavioral Choice
    - Houston v. Portland
  - Capturing Non-Included Behavior
- Roadway Use & Congestion
  - Volume-Delay Functions (Portland)
  - Network fidelity (SANDAG, SFCTA)
- Non-Traditional Travel Destination Choice
  - Market Segmentation &
  - Logit Destination Choice with Mode Choice Logsums
- Special travel markets
  - Airports\Visitors\Special Events