Introduction to Travel Demand Modeling

“essentially all models are wrong, but some are useful” - George E. P. Box
Agenda

• Travel Demand Modeling
  – Why update the EDC model?
  – Land Use Policy Programmatic Update
  – What is a travel demand model?
  – Micro vs Macro
  – Four Step Process
  – What the model can and can not do

• Land Use Forecasting
  – Achievable Development
  – 2035 Projections
  – 2035 Land Use Forecast

• Questions and Answers
Why update the EDC model?

• Latest model version developed in 1998
• New software packages are available
• Planning horizon has changed
• Development patterns have changed
• Doesn’t maximize the use of GIS
• Concern about output
What is a travel demand model?

- Tool for understanding human behavior
- Forecasts trips onto transportation facilities
- Part of the planning process
The completely over-simplified basics of travel demand modeling

• Assumptions
  – people + jobs = trips
  – trips = traffic volumes/riders

• Application
  – Forecast people + jobs 20-30 years out
  – Estimate demand/test improvements/

• Primary use is to forecast future travel
The not-so-simplified flow chart

Kimley-Horn Standard TDM Development Process Diagram
Micro vs Macro
Micro vs Macro
“Four Step” Model

Trip Generation

Trip Distribution

Mode Split

Trip Assignment
What the macro model can do

- Evaluate road widening and road additions
- Evaluate new interchanges
- Analyze the impacts of transportation plans
- It can show impacts of large developments
- It can forecast corridor volumes
- It can be used as a basis for micro
- It can test alternative land use plans
Macro model can not do well

- Evaluate new turn lanes at intersection (micro)
- Model small or local roads very well (micro)
Are travel demand models perfect?

NO!

... but, it is

THE BEST DECISION MAKING TOOL CURRENTLY AVAILABLE FOR REGIONAL TRAVEL DEMAND FORECASTING
Why are travel demand models not perfect?

- Merely a statistical replication of human behavior that assumes...
  - everyone acts rationally
  - demographic forecasts are reasonable
  - existing conditions are accurately reflected
  - external factors are known and under our control
Land Use Overview

Project

- Achievable Development
- 2035 Housing Projection
- 2035 Land Use Forecast
- 2035 Employment Projection
- Travel Demand Model

No-Project

- Achievable Development
- 2035 Housing Projection
- 2035 Land Use Forecast
- 2035 Employment Projection
- Travel Demand Model
Market Areas

1 - El Dorado Hills
2 - Cameron Park/Shingle Springs/Rescue
3 - Diamond Springs
4 - Placerville/Camino
5 - Coloma/Gold Hill
6 - Pollock Pines
7 - Pleasant Valley
8 - Latrobe
9 - Somerset
10 - Cool/Pilot Hill
11 - Georgetown/Garden Valley
12 - Tahoe Basin
13 - American River
Achievable Development

Achievable Development is an estimate of the reasonably expected intensity of development that is anticipated for a particular land use or parcel given known opportunities, constraints, and assumptions.
Achievable Development

Available Land

Existing

Existing Plus Commitments

Achievable Development
Achievable Development: Determining Capacity

- Pending applications
- Expired commitments
- Prior analysis/design
- Adjacent land use
- Aerial imagery and topography
- Historically densities for similar project types
- Historical densities given regulations
Achievable Development: Determining Capacity

• Restrictions to land division
• Prior mapping
• Other restrictions or limitations
Achievable Development: Other considerations

- Exclude Tahoe Basin
- Placerville provides its own
- Treat Camino/Pollock Pines as Rural Center
- Assume Williamson Act is constant
- Consider higher Multi-Family densities
- Use GP not zoning
- Consider mixed-use
2035 Projections: Housing

- Real Estate Market Research
- Historical Population Rates
- Historical Population Patterns
- Validate 2035 Population Projection
- Convert Population to Housing
- 2035 Housing Projection

Department of Finance → MPO

2035 Market Area Housing Projection

4 3 6 3 4 4 = 24
2035 Projections: Population
2035 Projections: Population

- 2035 Projections:
  - Population: 225K
  - 149K
2035 Projections: Population

- Projections for the year 2035:
  - 149,000
  - 187,000
  - 225,000

Graph shows population growth from 1995 to 2035 with data points from various sources.
2035 Projections: Population

The graph illustrates the projected population growth from 1995 to 2035. The population is expected to reach 225,000 by 2035, starting from 109,300 in 1995. Key projections include:

- 200,000 people in 2025
- 187,000 people in 2020

Various sources are used for these projections, such as El Dorado County TDM, 1999, El Dorado County, 2001, Department of Finance, 2001, SACOG, 2001, SACOG, 2008, SACOG, 2012, US Census Bureau, Decennial Census.
2035 Projections: Employment

- Related to new housing
- Regional economic growth
- Highway 50 commute
- Already approved projects
- Establish a jobs-to-household ratio
2035 Land Use Forecast: Housing

Inputs

2035 Market Area Housing Projection

Achievable Development

Existing Plus Commitments

Output

2035 Land Use Forecast

Travel Demand Model

2035 Traffic Analysis Zones

2035 Traffic Analysis Zone Data

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2035 Land Use: Considerations

- General Plan and State legislation
- Historical trends
- Proximity to infrastructure and site access
- Project status
- Growth patterns
- Proximity to major corridors
- Proximity to other uses and services
Questions and Answers