


Planning for Express Lanes



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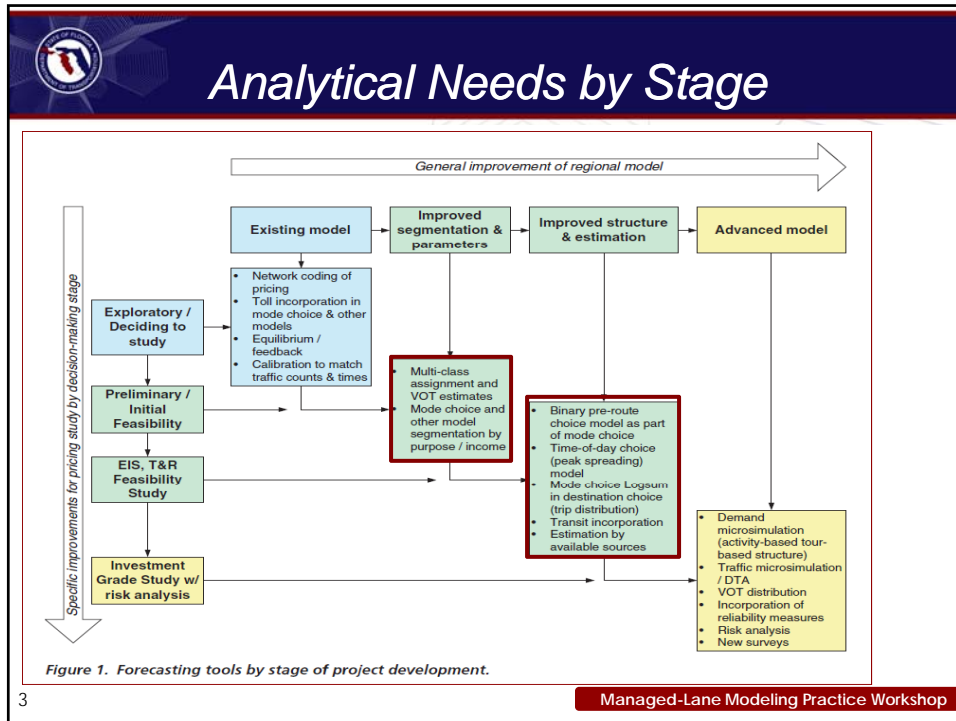


Topics

- Overview of TRB Special Report #722
- Experience from Colorado
- Strategic Direction for Demand Models

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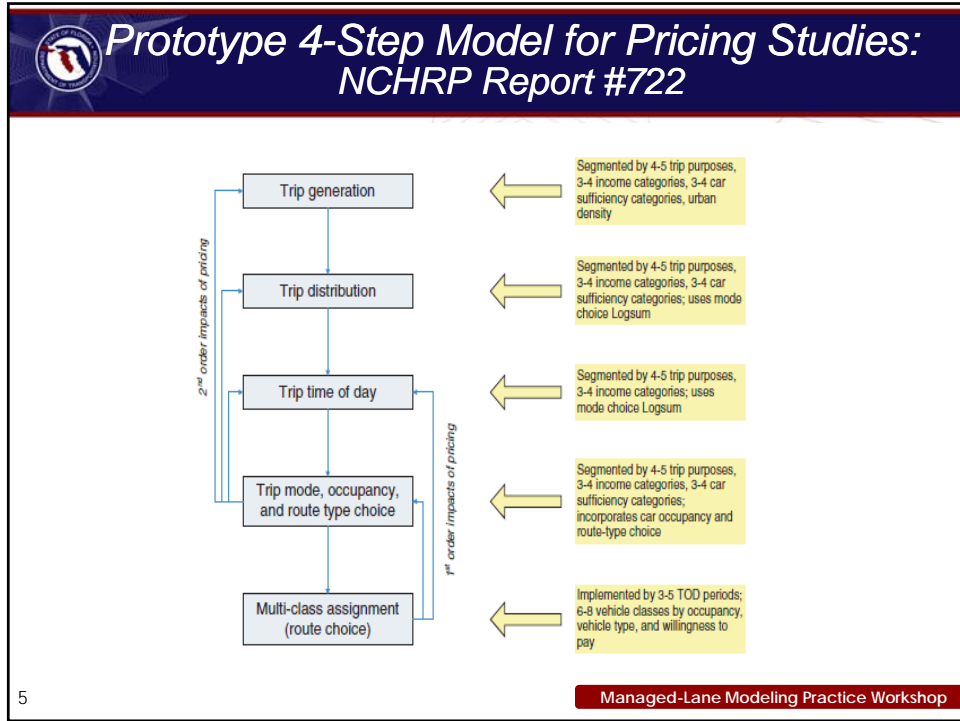
NCHRP Report 722: Assessing Highway Pricing and Tolling

“...it would be unrealistic to assume fixed time-of-day and peak-hour factors (for) dynamic pricing...**The traffic assignment should be implemented for 3–5 time-of-day periods, characterized by different levels of congestion and may also be differentiated by toll rates**”

“ evaluation of... managed lanes in congested areas is closely focused on understanding the effects of **congestion, queuing, facility access/spacing, and other operational characteristics**. Such aspects are not considered in a static assignment model. There is a need for **some guidance on how to incorporate a project’s unique operational characteristics/limitations into the travel demand forecasts and subsequent use for pricing analysis.**

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Mode Choice and Assignment: Possible Aggregation Approach


Purpose	Occupancy	Approximate VOT	Trip tables by occupancy and VOT					
			SOV \$6-12	SOV \$15-30	HOV2 \$12-24	HOV2 \$30-60	HOV3+ \$18-36	HOV3+ \$45-90
Commuting – low income workers	SOV	\$10	X					
	HOV2	\$10×2=\$20			X			
	HOV3+	\$10×3=\$30					X	
Commuting – medium income workers	SOV	\$15		X				
	HOV2	\$15×2=\$30				X		
	HOV3+	\$15×3=\$45						X
Commuting – high income workers	SOV	\$20		X				
	HOV2	\$20×2=\$40				X		
	HOV3+	\$20×3=\$60						X
Work-based sub-tours	SOV	\$30		X				
	HOV2	\$30×2=\$60				X		
	HOV3+	\$30×3=\$90						X
University / school tours	SOV	\$6	X					
	HOV2	\$6×2=\$12			X			
	HOV3+	\$6×3=\$18					X	
Non-mandatory tours – low income	SOV	\$8	X					
	HOV2	\$8×2=\$16			X			
	HOV3+	\$8×3=\$24					X	
Non-mandatory tours – medium income	SOV	\$10	X					
	HOV2	\$10×2=\$20			X			
	HOV3+	\$10×3=\$30					X	
Non-mandatory tours – high income	SOV	\$12	X					
	HOV2	\$12×2=\$24			X			
	HOV3+	\$12×3=\$36					X	

Challenges

- Typically more segmentation at choice level
- Toll users assigned to both tolled and non-tolled routes

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Planning for Express Lanes: Experience from Colorado

- **C470 and US 36 Corridors**
- **Planning Considerations**
 - Potential Markets and their “willingness to pay”
 - Work, non-work
 - Geographic orientation and duration of travel
 - Behavioral response
 - Primary: route choice
 - Secondary: mode, destination, time of day
- **Planning Insights**
 - Distribution of benefits and revenue potential
 - Traveler response to tolling strategies
 - Logical termini and span of operations

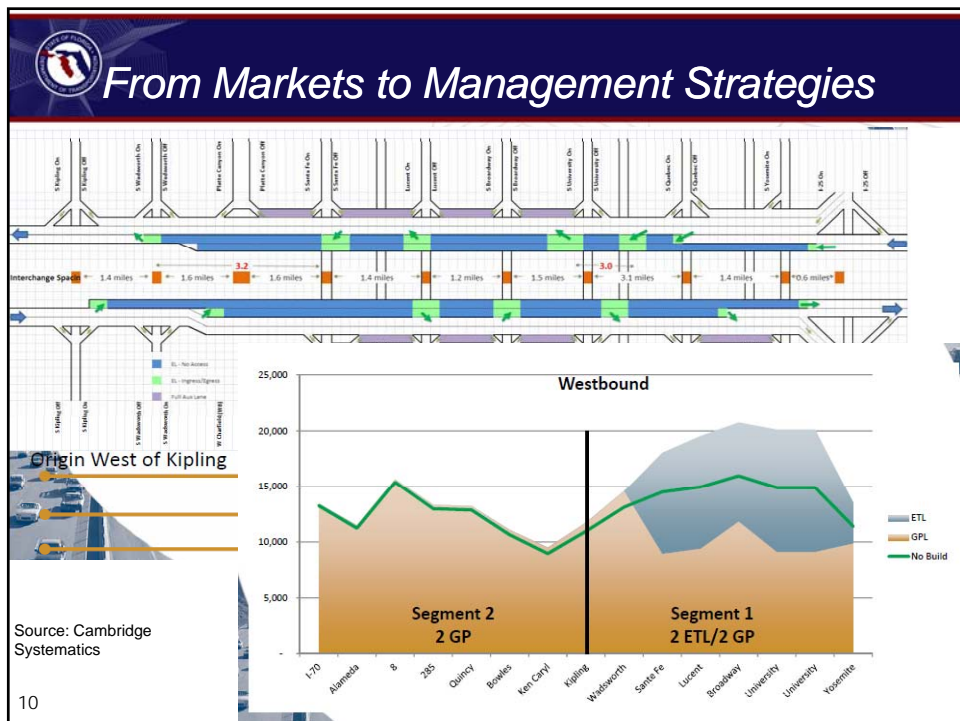
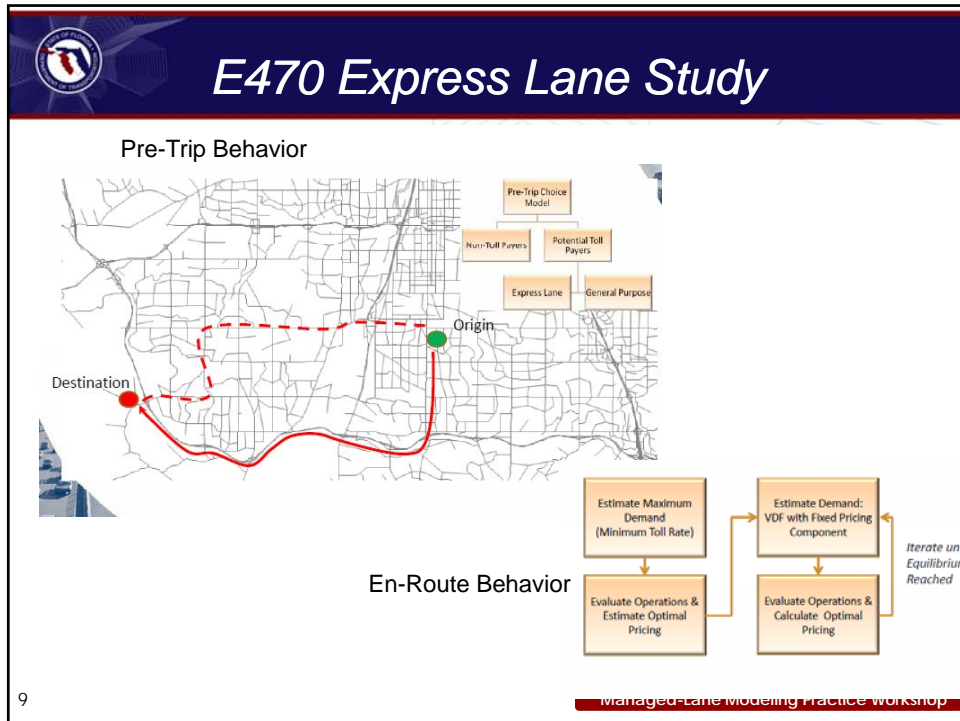
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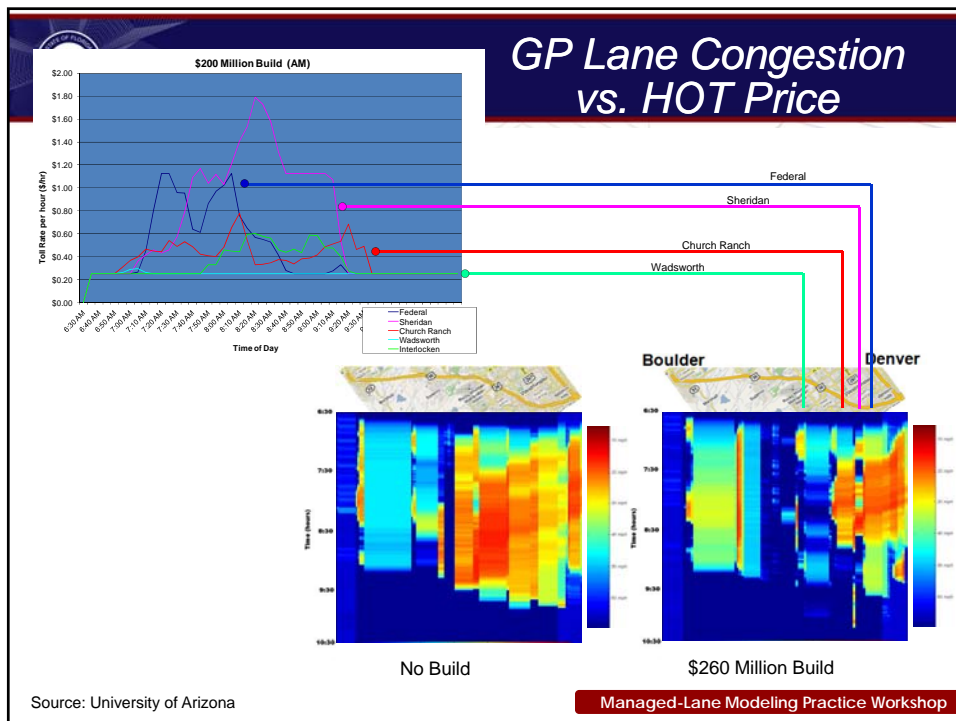
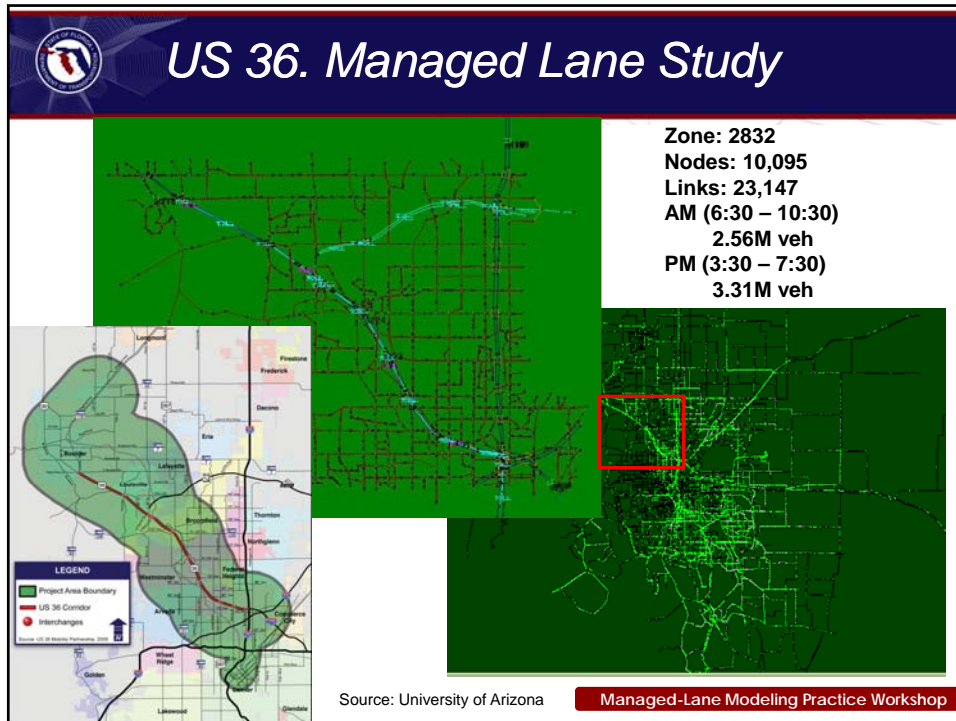


DrCOG Regional Travel Model: FOCUS

- **Strengths:**
 - Sophisticated Time-of-Day sub-model sensitive to travel times
 - Trip Distribution & Mode Choice sub-models sensitive to changes in travel times
 - Highly disaggregate with many trip purposes
 - Potential for trip rescheduling due to congestion dynamics
- **Challenges**
 - Static User Equilibrium Assignment route choice algorithm
 - Toll/non-toll choice not represented

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Potential Behavioral Responses

traveler choice	duration of expected behavioral change				HOT Lane	
	short-term (exception)		long-term (habit)			
	"rarely"	"occasionally"	"often"	"every day"	Legend	
lane						critical
route						secondary
dep. time						tertiary
mode						minor
cancel/chain						no effect

Macro
Meso
Micro

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Considerations

- **Every corridor/project setting is unique**
 - Congestion
 - Path competition
 - Mode competition

- **Anticipate analytical needs “early on” for later stages of the analysis**
 - Temporal and spatial fidelity
 - Number of scenarios to be evaluated
 - Interplay between models/model components

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Source: Cambridge Systematics

Breakthrough Directions for Demand: NCHRP 722

The diagram illustrates a process flow for demand modeling. At the top, three boxes represent input factors: 'Planning, organizational, institutional, financial and legislative factors', 'Synthesis of existing practices and research directions', and 'Mining available data sets'. These feed into three main stages: 'General framework for making pricing decisions' (linked to NCHRP 08-57), 'Operational modeling tools' (linked to SHRP 2), and 'Behavioral analysis of responses to congestion and pricing'. Bidirectional arrows connect these stages, with labels 'Model as decision supporting tool' and 'Mathematical description of behavior'.

- Heterogeneity of road users with respect to their VOT and willingness to pay.
- Proper incorporation of toll road choice in the hierarchy of travel choices
- Accounting for reliability of travel time associated with toll road systems
- More comprehensive modeling of time-of-day choice
- More comprehensive modeling of car occupancy related decisions
- More advanced traffic simulation procedures and better ways to integrate with travel demand models.

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