



Think  Forward

SERPM 8 Project Update

presented to
RTTAC-MS

presented by
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January 31, 2018

Outline

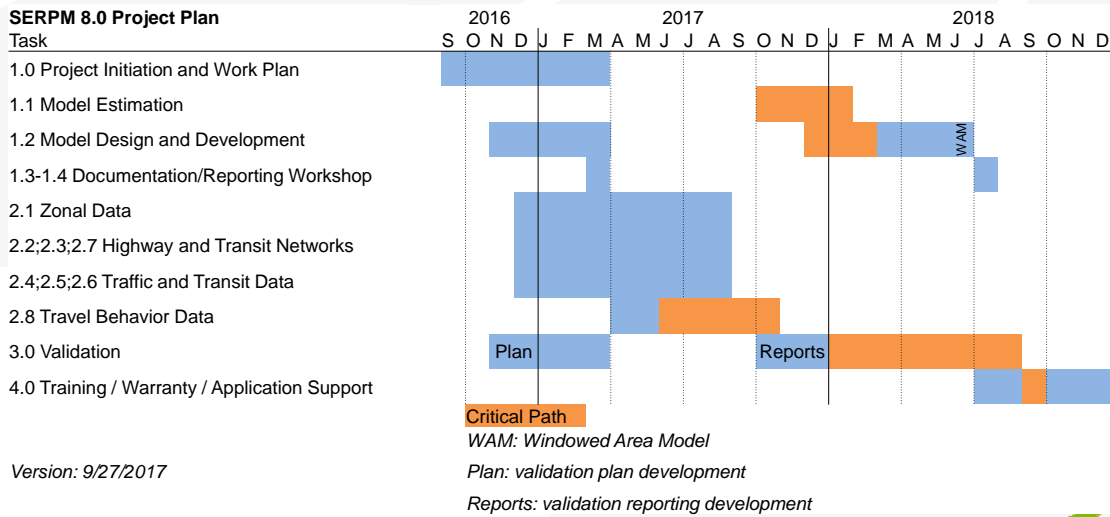
- Schedule / Next Steps
- ABM estimation summary*
- Non-ABM component approaches
 - » Cruiseport*
 - » External trips*

*RTTAC-MS Action Item

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Project schedule



Next steps

- Update 2015 input data with latest comments
 - » Zonal data
 - » Highway network
 - » Transit network
- SERPM 8 implementation
 - » ABM software
 - » Cube catalog
- Next TWO: Validation

ABM Estimation Summary



Summary of survey data analysis

- Smaller than expected sample size
 - » ~2,000 households, ~4,000 persons, ~20,000 trips
- Lower than expected trip rates
- Presented a challenge to continuity across SERPM versions to adapt these findings into model components that address tour or trip frequency
 - » Instead, we focused on using the survey for other components

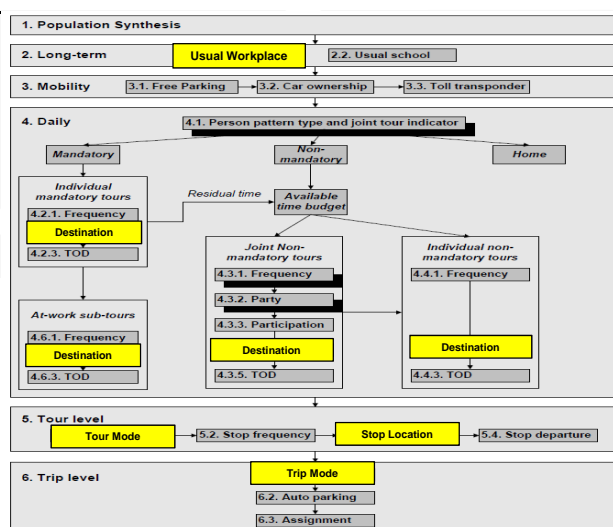


Components that have been re-estimated

- Workplace location choice
- Tour destination choice (non-mandatory, at-work, joint)
- Tour mode choice
- Stop location choice
- Trip mode choice

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Summary of re-estimated components



Yellow color highlights components that have been re-estimated

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Key model estimation results

Tour Mode Choice

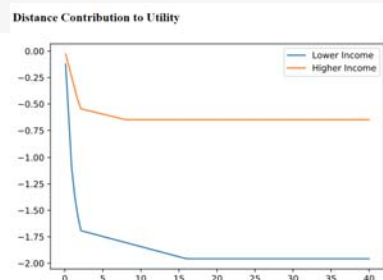
- Sensitivity to LOS (time/cost) and implied values of time reasonable
 - » Sensitivity levels to be tested during validation
- Higher income/more autos favors drive alone over transit, non-motorized
- Higher density makes non-motorized more likely

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Key model estimation results

Work Location Choice

- Part-time workers, females more sensitive to distance
- Intrazonal effect positive
- Size variable relationships (industry x occupation) maintained from SERPM 7

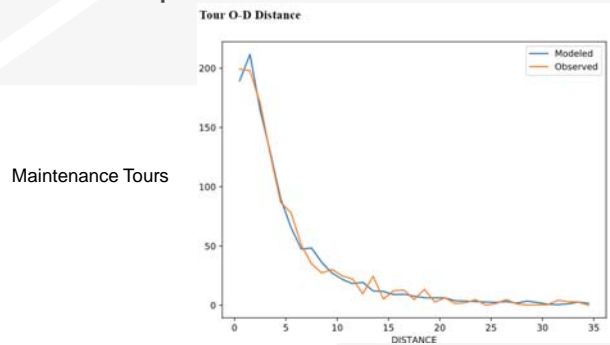


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Key model estimation results

Tour Destination Choice

- Size variables combinations of variables (e.g., employment by type, households), differ by tour purpose
- Intrazonal effects positive



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Key model estimation results

Stop Destination Choice

- Size variables combinations of variables, differ by tour purpose
- Intrazonal effects positive
- Effects on non-auto accessibility captured by:
 - » Mode choice logsum
 - » Transit availability for stop (if transit tour)
- Distance effects captured by:
 - » Diversion – Additional miles of travel required to make stop, over what is required to travel from the preceding activity to the subsequent activity, without making any stop
 - » Proximity – Closeness to preceding or subsequent activity

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Key model estimation results

Stop Mode Choice

- Sensitivity to LOS (time/cost) reasonable
 - » Sensitivity levels to be tested during validation
- A key indicator of *trip mode* is *tour mode*
 - » Most trip modes that are different from tour modes are auto trips on auto tours of a different mode (vehicle occupancy, toll vs. free)
- Some additional variables to make certain trip modes more or less likely based on tour mode



Estimation deliverable

- Documentation of model estimation (technical memo)
 - » Summary of estimation process
 - » Summaries of key model estimation results and interpretation
 - » Links to detailed model estimation results

We are requesting a motion today to approve the estimated models and proceed with implementation

SERPM School Tour Mode Choice

Parameters

Category	Parameter	Value	Std Err	t Stat	Null Value	
ASCA	ASCA_investor_toll	-25	Fixed value, never chosen			
	ASCA_wt_free	-0.5391	0.22	-2.45	0	
	ASCA_wt_toll	-25	Fixed value, never chosen			
	ASCA_wt_free	-0.7777	0.247	-3.15	0	
	ASCA_wt_toll	-25	Fixed value, never chosen			
	ASCA_wtch	-0.8221	0.452	-1.82	0	
	ASCA_wtch	-2.210	0.42	-5.22	0	
	ASCA_wtch_bus	-2.001	0.448	-4.47	0	
	ASCA_wtch	-25	Fixed value, never chosen			
	ASCA_wtch_dtw	-25	Fixed value, never chosen			
	ASCA_wtch_dtw	-25	Fixed value, never chosen			
	ASCA_wtch_dtw	-25	Fixed value, never chosen			
Lck	Cost	-0.001663	0.1 InVehicleTime + 0.12			
	InVehicleTime	-0.01385	0.00342	-4.05	0	
	NonMotorizedTime	-0.02078	0.00278	-7.46	0	
	FirstWaitTime_After7	-0.02078	0.00278	-7.46	0	
	FirstWaitTime_UpTo7	-0.02078	0.00278	-7.46	0	
	TransitTime	-0.04156	0.00278	-14.92	0	
	WalkAccEgTime	-0.04156	0.00278	-14.92	0	
	XWalkTime	-0.02078	0.00278	-7.46	0	
	Age	Age0to10	1.844	0.444	4.15	0
		SR2	1.125	0.32	3.51	0
		SR3	1.600	0.323	4.95	0
		SR4	-2.021	1.20	-1.67	0
SR5		0.2335	0.163	1.43	0	
SR6		0.5442	0.55	0.99	0	
HH_Income	HH_IncomeUpTo7	1.651	0.370	4.46	0	
	SchoolBus	1.480	0.47	3.16	0	
	NonMotor	0.9038	0.860	1.05	0	
	SR	1.033	0.680	1.52	0	
	SchoolBus	2.131	0.747	2.85	0	
	SR	0.5	Fixed value			
LogSums	muAuto	0.33	Fixed value			
	muAuto1	0.7	Fixed value			
	muNonMotor	0.5	Fixed value			
	muTransit	0.5	Fixed value			
	muWalk	0.5	Fixed value			
	muWalk_DA	-1	Fixed value			
Other	SchoolBusDistance_A_upTo10	0.1466	0.0544	2.69	0	
	SchoolBusDistance_B_10to20	-0.2019	0.0688	-2.93	0	
	SchoolBusDistance_C_20to30	0.01071	0.104	0.10	0	
	SchoolBusDistance_D_over30	0.1134	0.0688	1.65	0	

Model Estimation Statistics

Statistic	Aggregate/Per Case
Number of Cases	401
Log Likelihood at Convergence	-455.37 (-1.14)
Log Likelihood at Null Parameters	-611.60 (-1.62)
Rho Squared w.r.t. Null Parameters	0.261
Log Likelihood at Constants Only	-531.22 (-1.32)
Rho Squared w.r.t. Constants Only	0.143

Utility Functions



Model validation overview

- Will be done according to model validation plan
- **All demand components validated by running model and comparing results to best observed data sources**
 - » **Components not reestimated**
 - » **Components newly estimated**
- Highway and transit assignment validation
- Sensitivity and temporal validation

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Cruiseport Model

Cruiseport analysis objectives

- Appropriately consider demand generated by cruise passengers
- Model within the context of SERPM analysis timeframe (i.e., average weekday)
- Given demand levels, have appropriate level of sophistication
- Take advantage of existing demand data (and consider its limitations)
- Consider resource constraints (i.e., project schedule, model run time)

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Data analysis

- Average number of cruises and passengers by day of week for each port
- Port Everglades survey
- Streetlight data on person travel to and from port TAZs
 - » Distribution of trips by direction (other end of port trips)
 - » Time of day
 - » NOTE: Cruise passenger travel not distinguished from other port related travel
- Demand disperses relatively quickly in various directions away from the ports

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Potential model approach

1. Estimate number of vehicle trips by cruise passengers for each port, based on average demand
 - » More cruises/passengers on Mondays and Fridays, therefore use Tuesday-Thursday demand
 - » Assume one auto vehicle trip for every two passengers, to and from port
2. Assume cruise passenger travel has same distribution from ports as other travel generated by ABM
 - » Streetlight data does not provide demand separately for cruise passengers
 - » Allows the simple approach of factoring rows/columns of vehicle trip tables
3. Assume passengers arrive in mid-day period and depart in a.m. peak period
 - » Cruises typically arrive in port around 7:00 a.m. and depart around 5:30 p.m. (passengers required to be on board well in advance)

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Demand Levels by Port

- Port of Palm Beach
 - » One cruise arrives/departs every other day with about 2,400 passengers (every other day);
 - » Therefore **600** vehicle trips each way
- Port Everglades
 - » Average Tuesday-Thursday demand is about 5,400 passengers
 - » Therefore **2,700** vehicle trips each way
- Port of Miami
 - » Average Tuesday-Thursday demand is about 3,000 passengers
 - » Therefore **1,500** vehicle trips each way

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Additional Analysis Can Be Done as Needed

- Demand levels can be factored up for studies that require peak day (i.e., Monday/Friday) demand
- Studies that require analysis of transportation network near a port can be done using subarea analysis
 - » Demand disperses relatively quickly in various directions away from the ports

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Summary

- Cruiseport passenger trips generated based on Tues-Thurs cruise schedule
- Distribution patterns following ABM simulated trips
- HOV2 mode arriving in MD, departing in AM

We are requesting a motion today
to approve the proposed cruiseport
model approach

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External Model



Data sources

➤ Surveys

- » Streetlight OD data
- » SunPass toll data
- » License plate survey data

➤ Models

- » NCHRP 716, Table 4.6
 - External trip distribution by facility type (3 types)
- » Model derived from license plate survey data (LP model)



Validation check

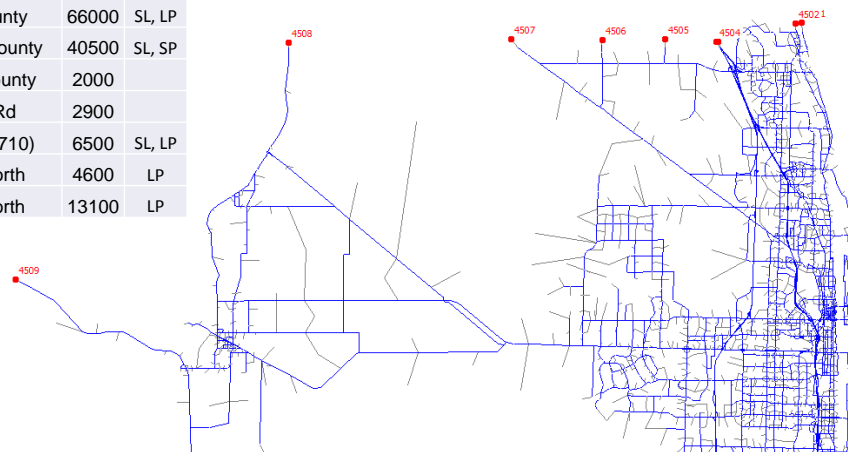
- Distribution by external station to super districts
 - » Shares (not total #'s) of external trips
 - » Bi-directional
- Data Issues
 - » Streetlight may be biased towards shorter trips (e.g., stopping at highway rest area)
 - » License plate survey may be biased towards longer trips
 - Assumes that trip has a home end
 - Assumes that trips originating from outside region have similar distribution
 - » Turnpike data is limited to north Palm Beach super-districts

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External stations

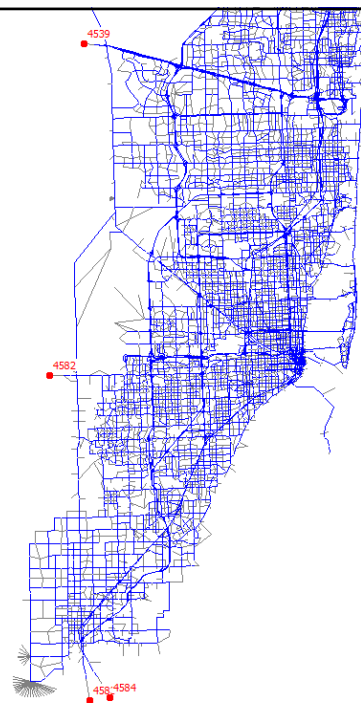
TAZ	Description	ROAD	AADT	Data
4501	Collector	A1A Martin County	2350	
4502	Art/not near fwy	US-1 Martin County	27500	LP
4503	Freeway	I-95 - Martin County	66000	SL, LP
4504	Freeway	FL TPK - Martin County	40500	SL, SP
4505	Collector	Access Martin County	2000	
4506	Collector	Pratt-Whitney Rd	2900	
4507	Collector	BeeLine Hwy(SR710)	6500	SL, LP
4508	Collector	US 98/SR 15 North	4600	LP
4509	Art/not near fwy	US 27/SR 80 North	13100	LP



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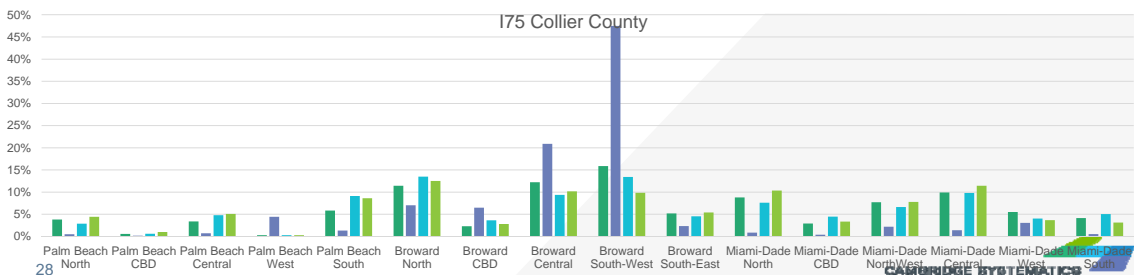
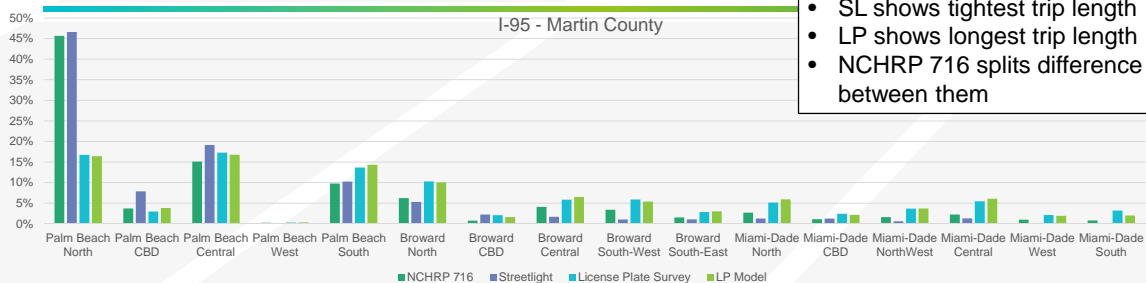
External stations

TAZ	Description	ROAD	AADT	Data
4539	Freeway	I75 Collier County	19400	SL, LP
4582	Art/not near fwy	US41 Collier County	5700	SL, LP
4583	Art/not near fwy	US1-Monroe County	16100	SL, LP
4584	Collector	Card Sound Rd	3300	LP

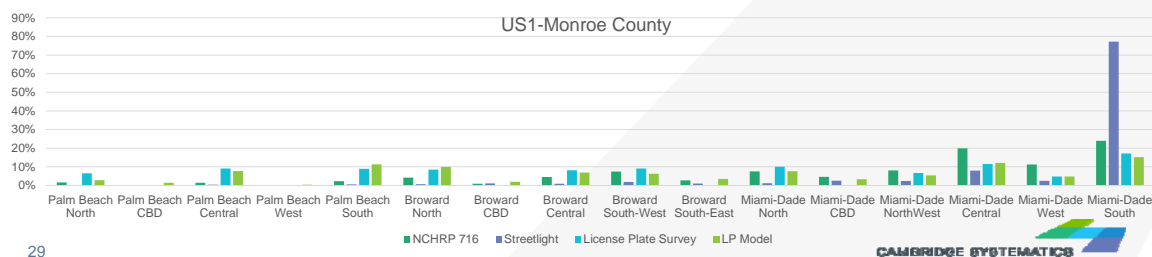
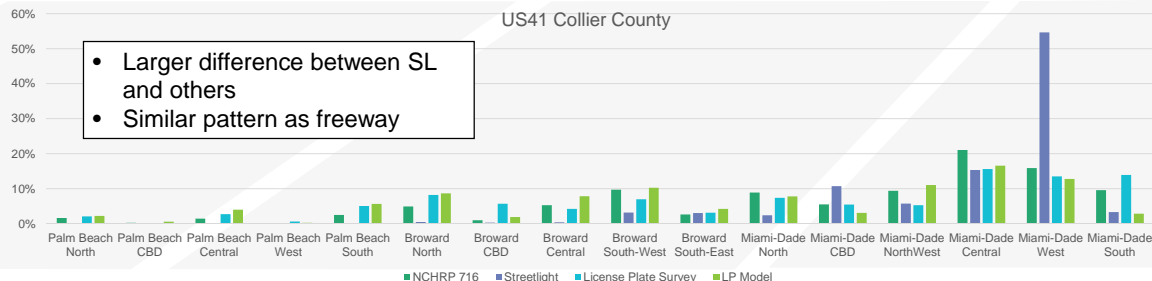


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Freeways (except Turnpike)



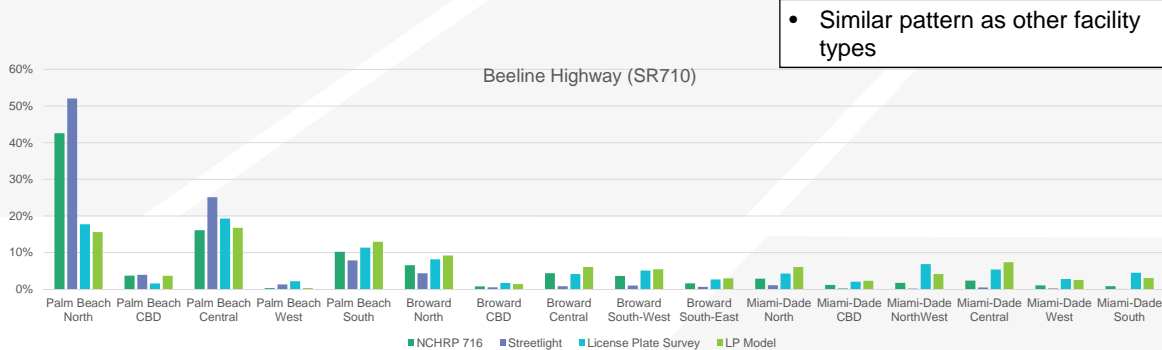
Arterial (not near freeway)



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Collector

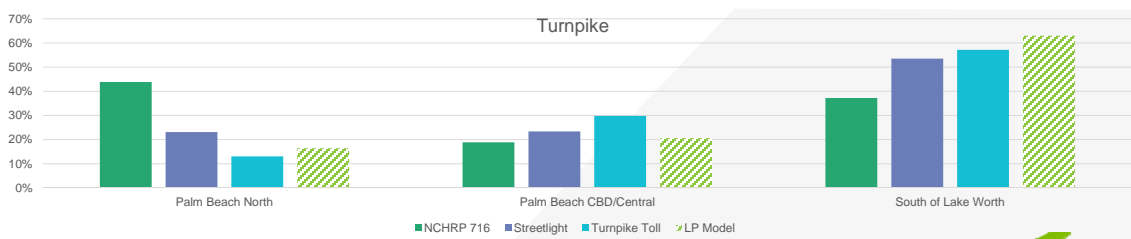
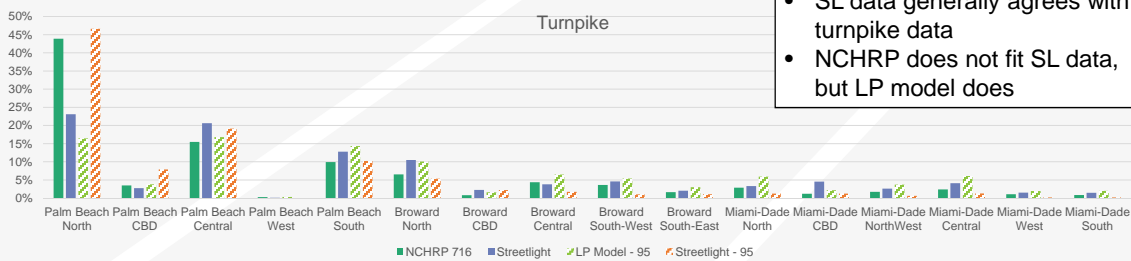


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Turnpike

- SL shows a different pattern between Turnpike and 95
- SL data generally agrees with turnpike data
- NCHRP does not fit SL data, but LP model does



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Summary and recommendation

➤ Summary

- » Streetlight data may accurately represent first stop on trip
 - Ending external trip at first stop (e.g. rest area) underestimates VMT
- » LP survey/model shows substantially different distribution than SL or NCHRP
 - I-95 is similar to SL Turnpike
 - Assumption of symmetry may overstate VMT
- » NCHRP 716 balances two data sets
 - Does not capture turnpike restricted access

We are requesting a motion today to approve this plan to update the external models

➤ Recommendation

- » Maintain NCHRP 716 model for all external stations except turnpike
- » Segment turnpike as a different station type
- » Calibrate turnpike model to SL data

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