Maryland Scenarios Project

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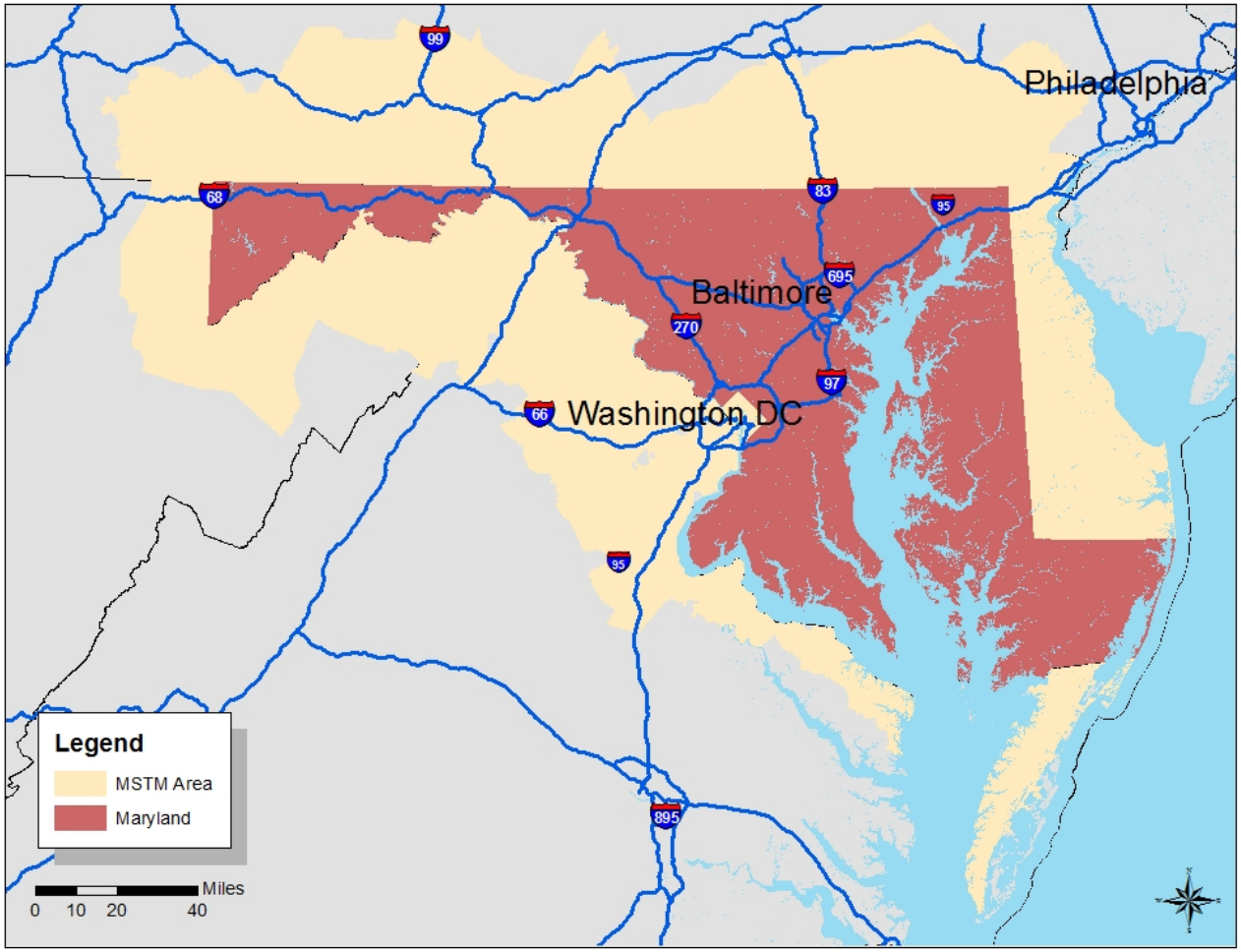
OBJECTIVES

- To analyze impacts of transportation network and land use changes on
  - system performance
  - travel behavior

- Provide information to Maryland DOT on impacts of alternative land use and transportation policies

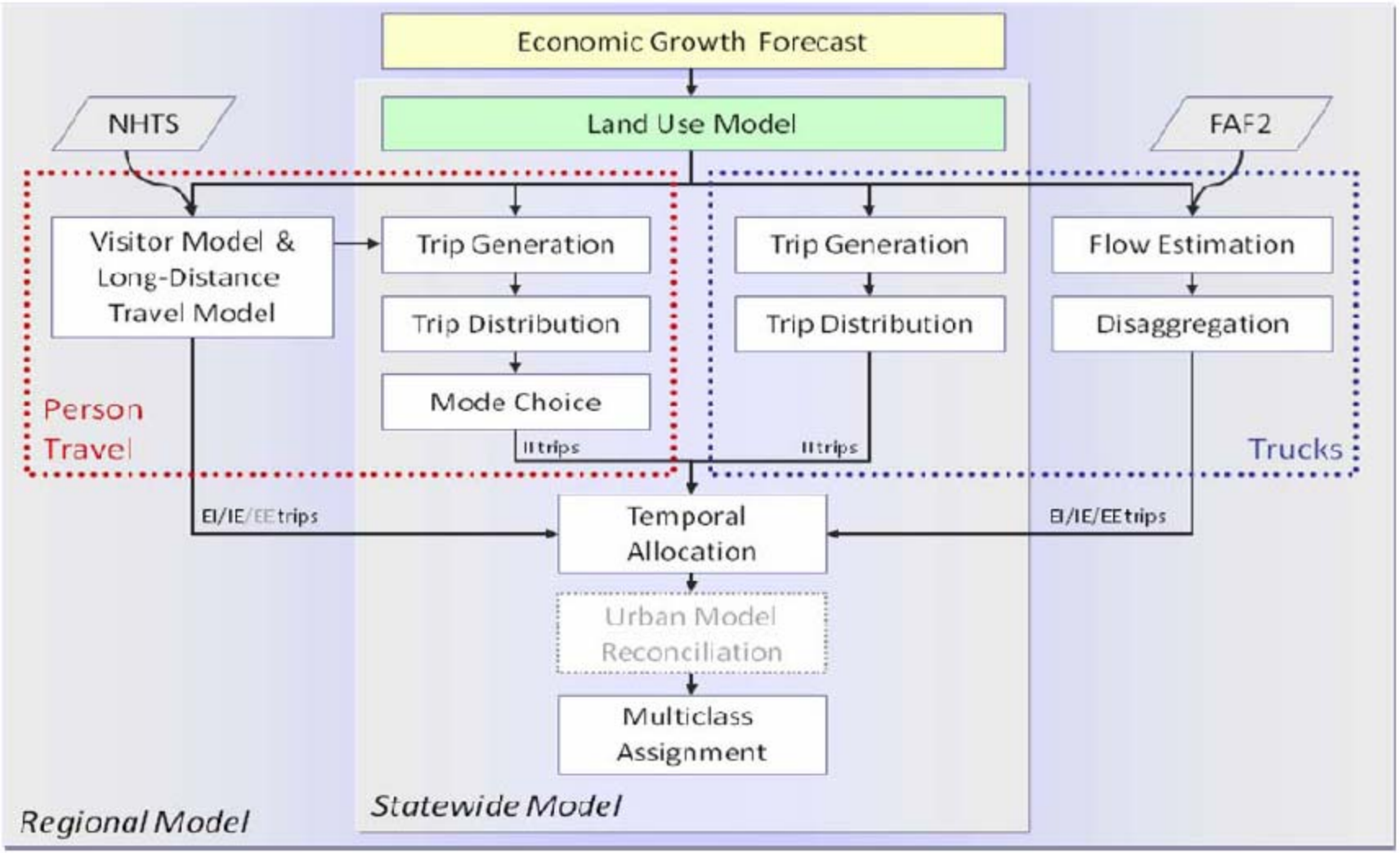
MSTM Study Area



Characteristics

- Links: 166,150
- Lane miles: 800,000 (1,287,475 KM)
- Transit Lines: 999
- Zones: 1607
- Highway Types: 20
- Households: 4.8 million
- Employment: 6.79 million
- Area:29123 Miles sq (75428 km sq)

MSTM Model Components



Scenario Review

TRANSPORTATION SCENARIOS	Description
Baseline (CLRP)	2030 transportation network • Includes purple line and ICC
Truck Diversion (TD)	Removing long-distance trucks from the network
Improved Transit Service (TRNS)	Improving existing transit service by • Reducing fare 50% • Reducing fare and headway 50%
Express Toll Lanes (ETL)	Adding toll roads to Baltimore and Washington Beltways and I-95 corridor • 15, 30 and 60 cents/mile tolls on two additional lanes

Scenario Review (cont'd)

LAND USE SCENARIOS	Description
Baseline (CLRP)	• Cooperative forecast • Reflects future growth and transportation investments
Buildout (BLD OUT)	• Reflects projections for HH and EMP under current zoning conditions
Transit Friendly Development (TFD)	• Strategically locates future HH and EMP growth around selected transit areas -one quarter to PTA -one quarter to OTA
Market Driven Change (MDC)	• Macro-economic trends • Reflects continuation of economic trends and local realization in MD
High Energy Price (HEP)	• Macro-economic trends • Reflects impacts of increased gas price in addition to MDC conditions

Combination Scenarios

Land Use Scenarios	Transportation Alternatives			
	CLRP	Improved Transit (TRNS)(*)	Express Toll Lanes (ETL)(**)	Truck Diversion (TD)
Baseline (CLRP)	✓	✓	✓	✓
Buildout (BLD OUT)	✓	✓	✓	-
Transit Friendly (TFD)	✓	✓	✓	-
Market Driven Change (MDC)	✓	✓	✓	-
High Energy Price (HEP)	✓	✓	✓	-

(*) Reduce headway and fare by 50%

(**) ETL 15 cents per mile scenario

Highway Usage, Vehicle Miles Traveled (VMT)

	VMT (vehicle miles, in millions)		
	CLRP	**Improved Transit (TRNS)**	**Express Toll Lanes (ETL)**
Baseline (CLRP)	193.97	191.94	194.28
Buildout (BLD OUT)	215.74 (11.22%)	213.62 (11.30%)	216.32 (11.35%)
Transit Friendly (TFD)	191.73 (-1.15)		
Market Driven Change (MDC)	194.05 (0.04%)	191.99 (0.03%)	194.31 (0.02%)
High Energy Price (HEP)	142.23 (-26.68%)	140.19 (-26.96%)	142.27 (-26.77%)

Impacts on Trips By Mode – Land Use Alternatives

Land Use Alternatives

- HEP
  - Reduces SOV
  - Increases HOV, BUS and RAIL
- TFD
  - Reduces SOV (HOV also declineduces)
  - Increasing BUS and RAIL
  - Less impact than HEP

Transportation Alternatives

- Transit improvements (-TRNS combinations)
  - further reduction in SOV and HOV
  - increase in BUS and RAIL share

Impacts on Trips by Mode Transportation Alternatives

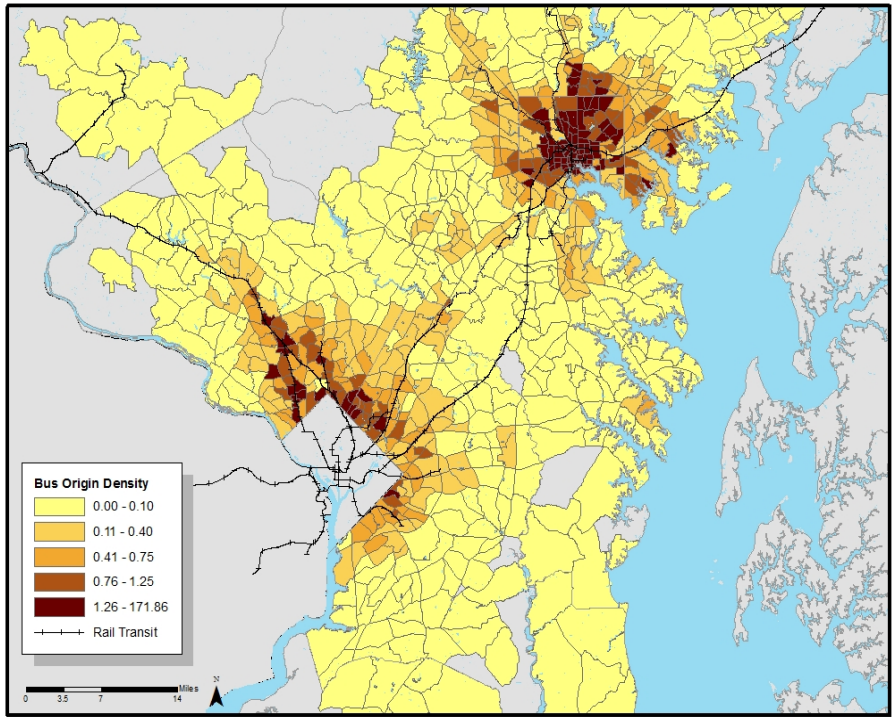
- **Transit Improvements**
  - Reduces SOV and HOV trips
  - Increases bus and rail shares
- **Reduce Long Distance Trucks**
  - Minimal impact
- **Express Toll Lanes**
  - Reduces congestion
  - Small impact on mode choice

SELECTED BEHAVIORAL ANALYSES

Comparison of Bus and Rail Trip Densities (CLRP)

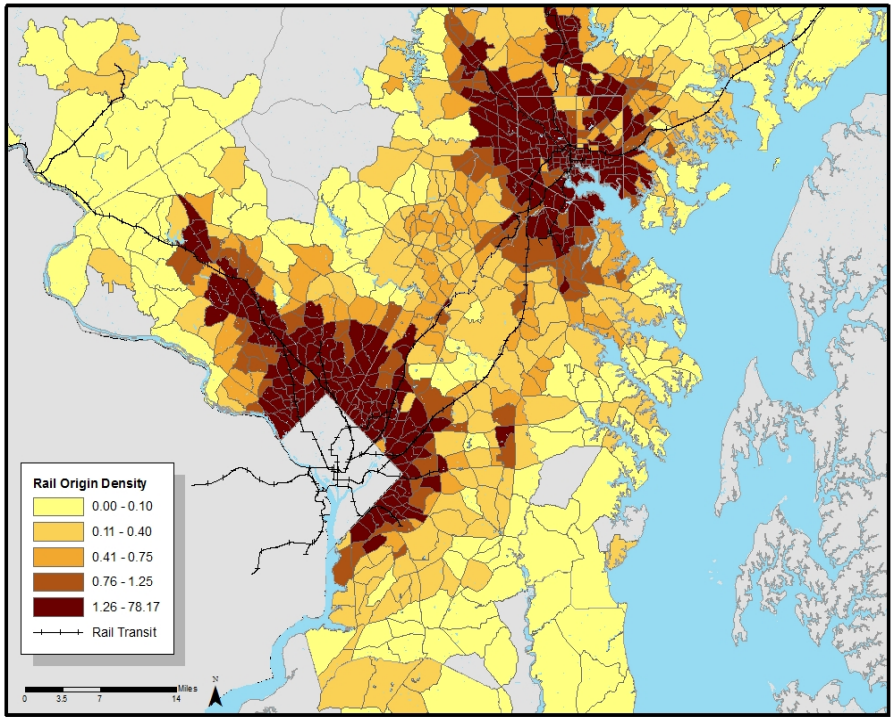
Origin

(BUS trip density)



Origin

(RAIL trip density)

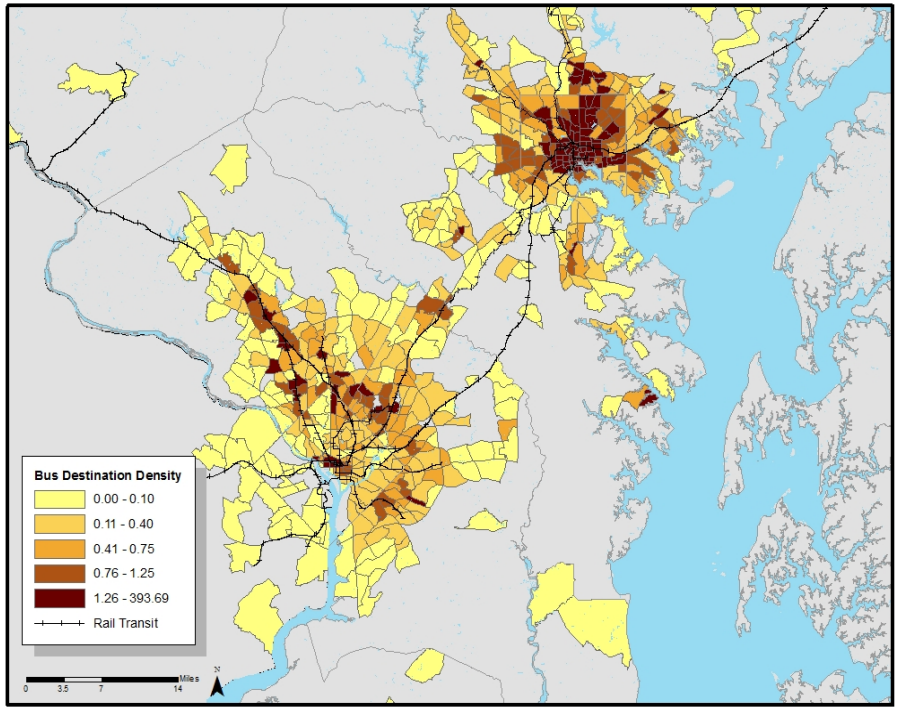


Origin densities are consistent with housing densities

Comparison of Bus and Rail Trip Densities (CLRP)

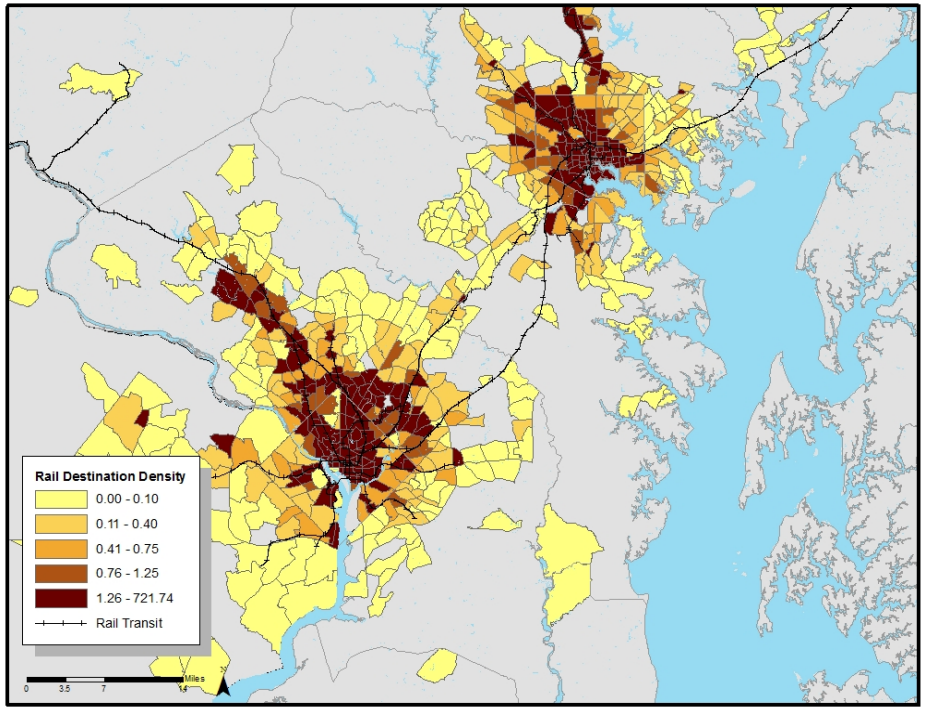
Destination

(BUS trip density)



Destination

(RAIL trip density)

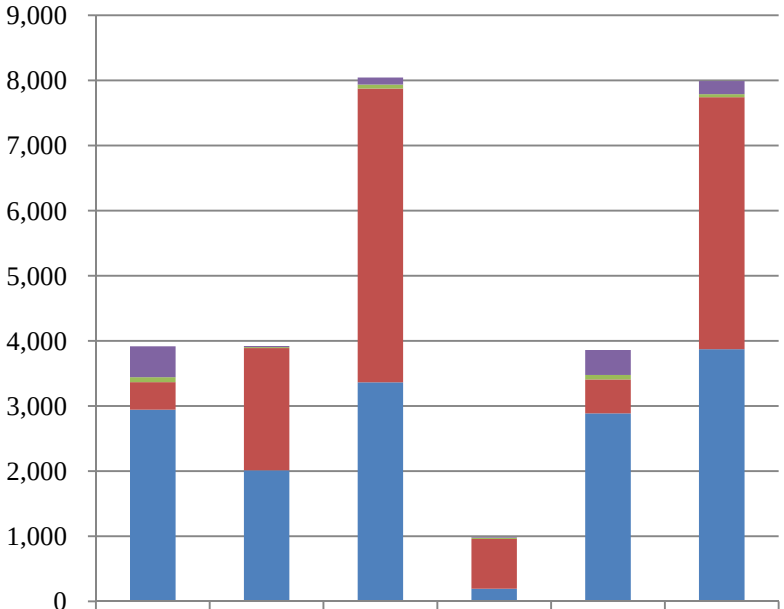


Destinations are consistent with employment densities

Trips Distribution in CLRP

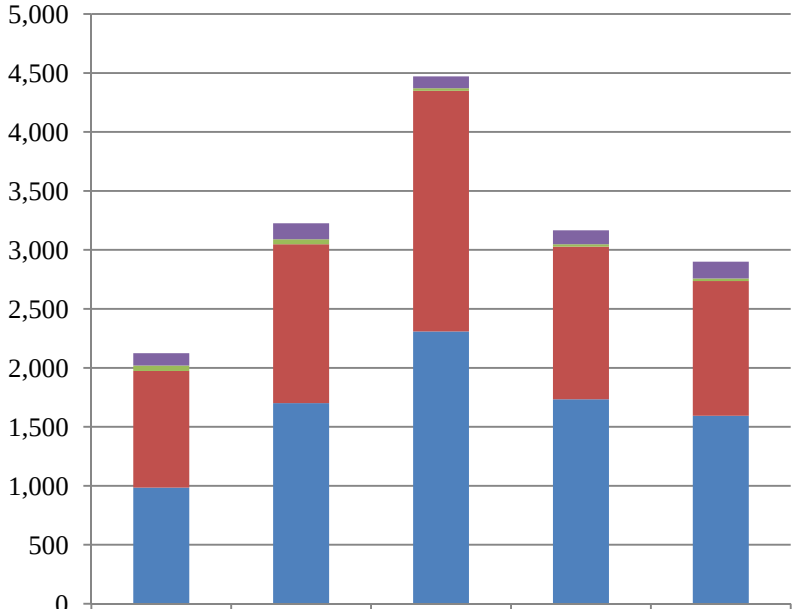
Trips Distribution Among Modes (in thousands)

By Purpose



	HBW	HBS	HBO	HBSC	NHBW	OBO
rail	476	17	109	11	383	199
bus	76	14	60	16	70	48
hov	421	1,879	4,513	765	521	3,869
sov	2,945	2,012	3,364	195	2,887	3,874

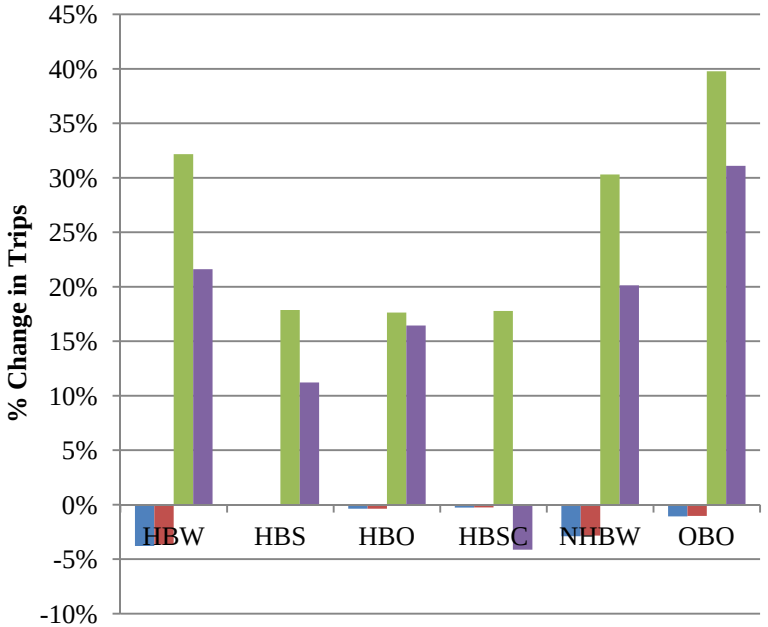
By Income

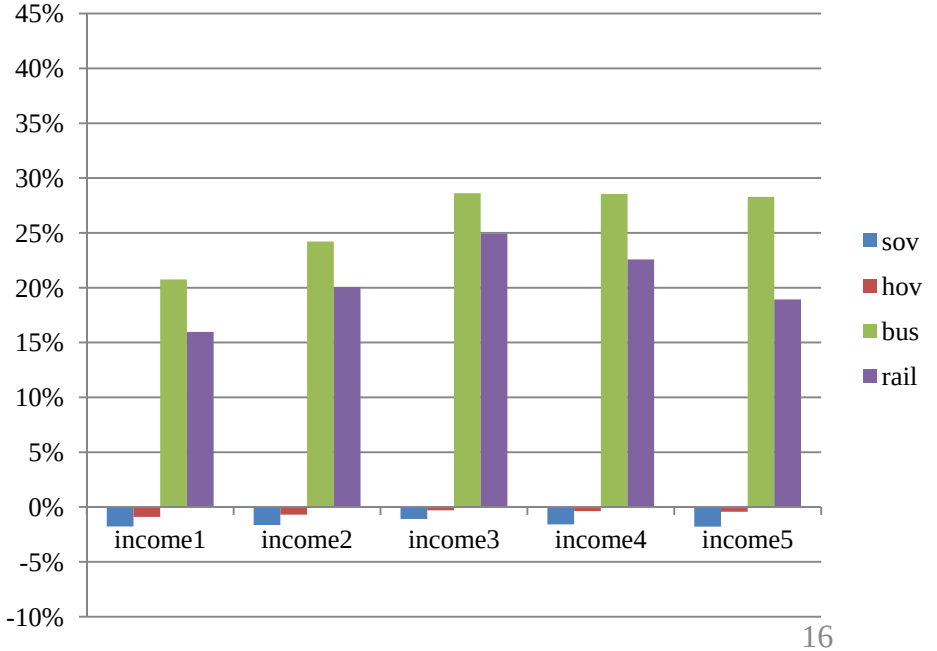


	income1	income2	income3	income4	income5
rail	105	136	101	118	142
bus	45	41	21	20	22
hov	989	1,347	2,040	1,295	1,142
sov	985	1,701	2,309	1,733	1,593

CLRP-TRNS, Conclusions

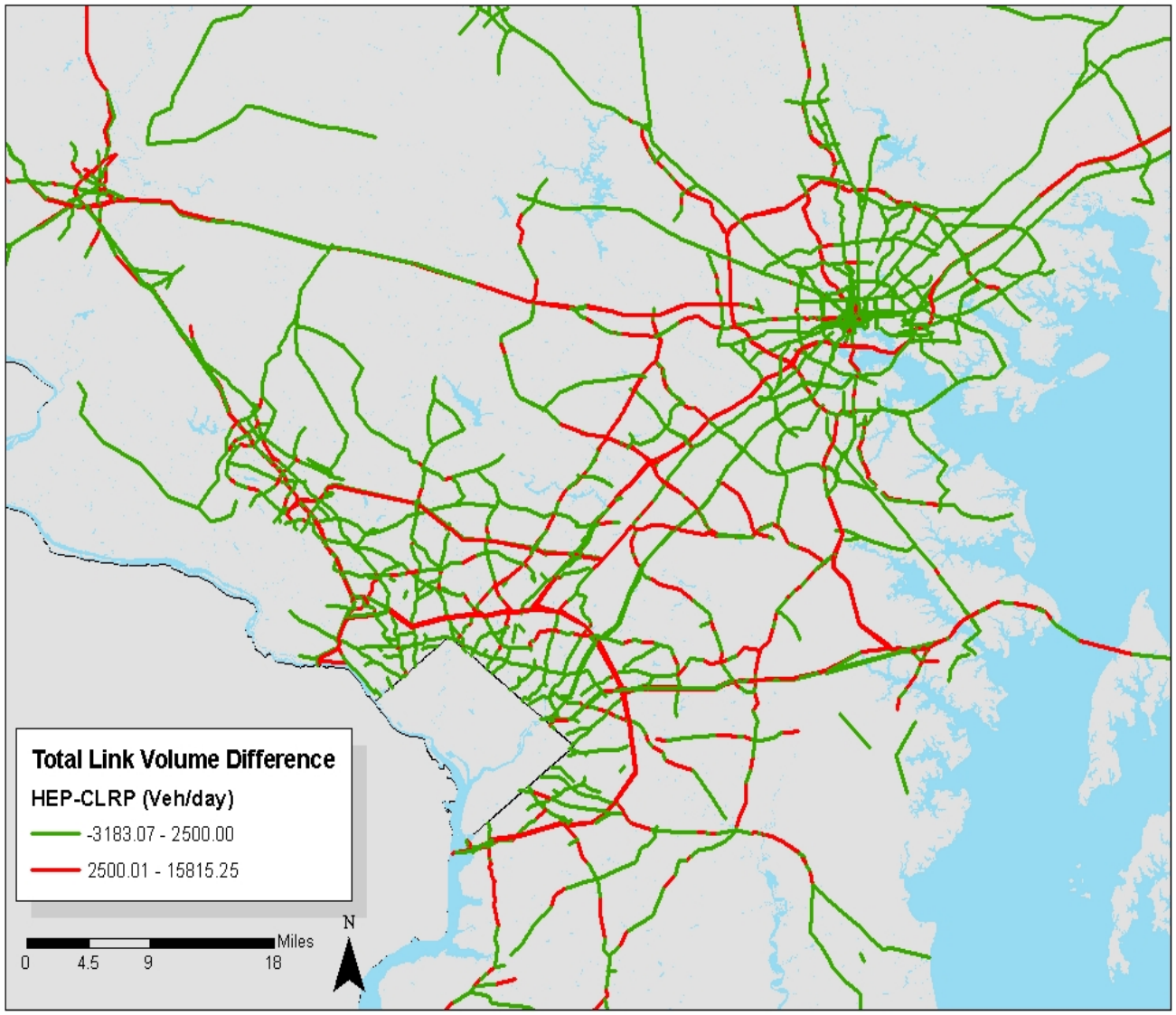
- Increases transit trips, more for work trips
- Reduce HOV and SOV trips for all purposes and income levels
- Minimal highway impact, large transit impact





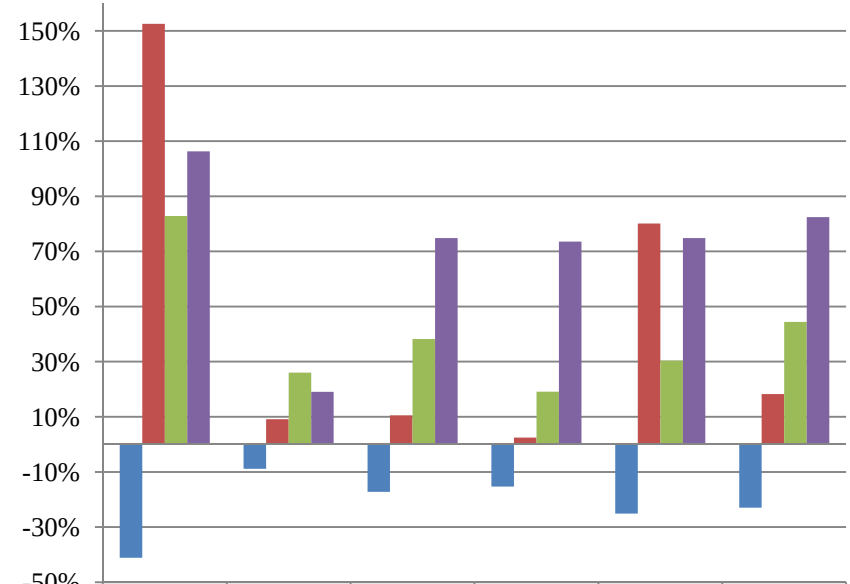
HIGH ENERGY PRICE

Difference in Total Link Volume between HEP and CLRP



Analysis of HEP by Purpose

% Change in Mode Share w.r.t CLRP



	HBW	HBS	HBO	HBSC	NHBW	OBO
SOV	-41%	-9%	-17%	-15%	-25%	-23%
HOV	153%	9%	11%	2%	80%	18%
BUS	83%	26%	38%	19%	30%	44%
RAIL	106%	19%	75%	74%	75%	82%

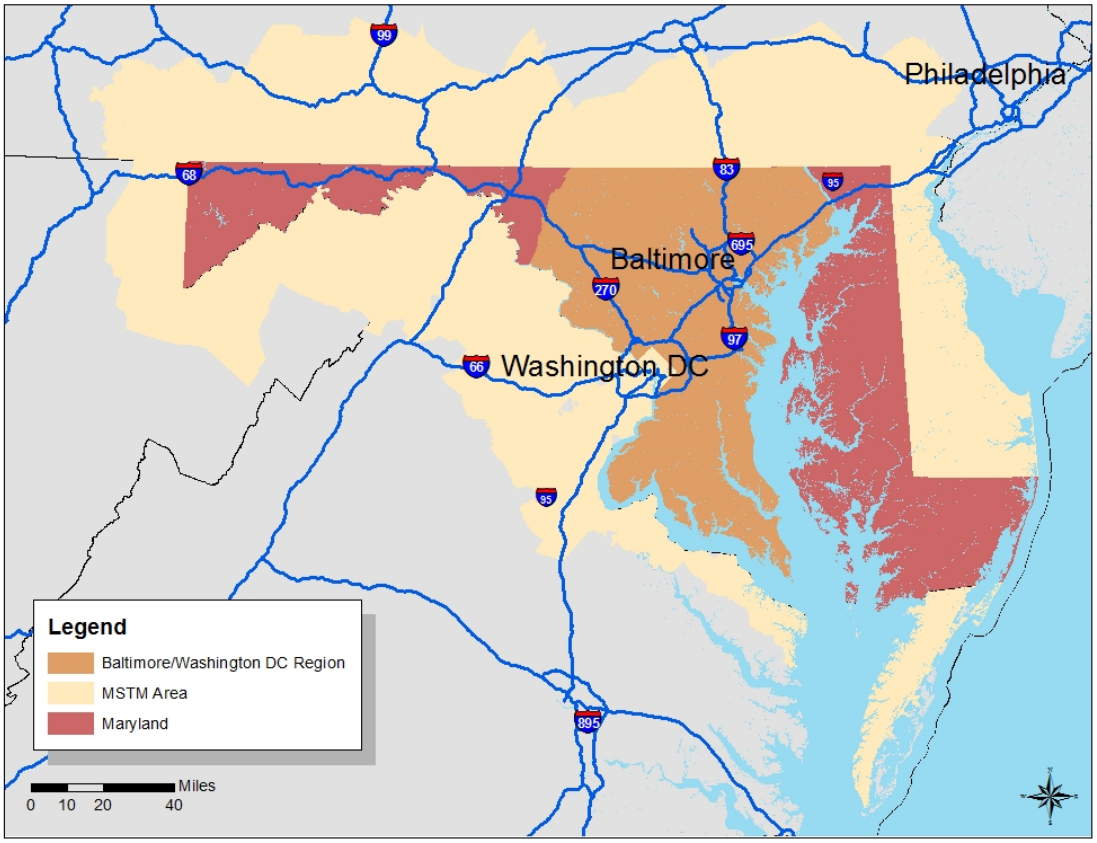
- Increases
  - Transit and HOV
- Reduces
  - SOV for all purposes
- Greatest impact on work trips
  - Largest shift is to RAIL and to HOV
  - Largest decline in SOV

HEP, General Conclusions

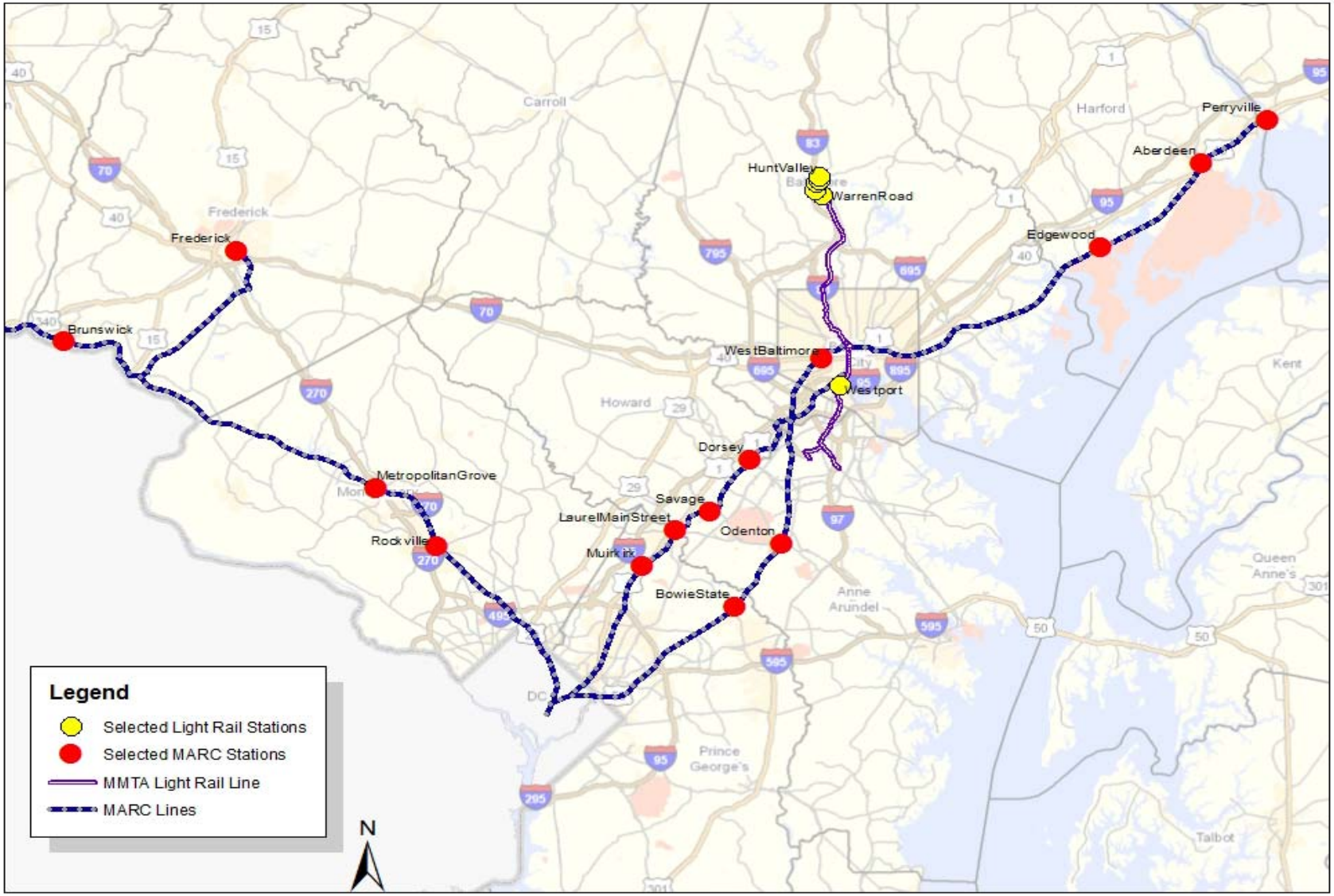
- Changes due to
  - New land use patterns
  - Change in travel behavior
- Reduces total number of trips
- Increases transit share, larger for RAIL
- Increases HOV share
- Transit and HOV share increase for all income groups and purposes
- Greatest change in SOV (decline) and HOV (increase) share for work trips

TRANSIT FRIENDLY DEVELOPMENT

Transi Friendly Development Region



TFD Scenario Station Locations



TFD, General Conclusions

- Reduces total number of trips
- Reduces average trip length in the designated areas
- Transit share increases for all income groups and purposes
- Reduces SOV and HOV share
- Greatest decline in SOV

  and HOV share is for work trips

Summary of Findings - Transportation

- **Changes in transit service**
  - Work trips most responsive
  - Upper income groups respond more
  - Bus has larger portion of low income
  - Trip purpose important in determining mode
  - Similar response for all land use alternatives

Summary of Findings – Land Use

- **HEP**
  - Reduces total trips
  - Shortens trips
  - Reduces SOV for all income groups and purposes

- **TFD**
  - Increases transit usage up to 20%
    - All purposes and modes
  - Shortens trips
  - Attractive as destination from non-TFD areas
  - Response in Baltimore and Washington similar

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