TALKING FREIGHT WEBINAR

April 19, 2017

Best Practices in Incorporating Land Use and Demographic Trends Into Freight Trip Demand Analysis

TRIPGEN

FREIGHT/ LAND USE TRAVEL DEMAND EVALUATION

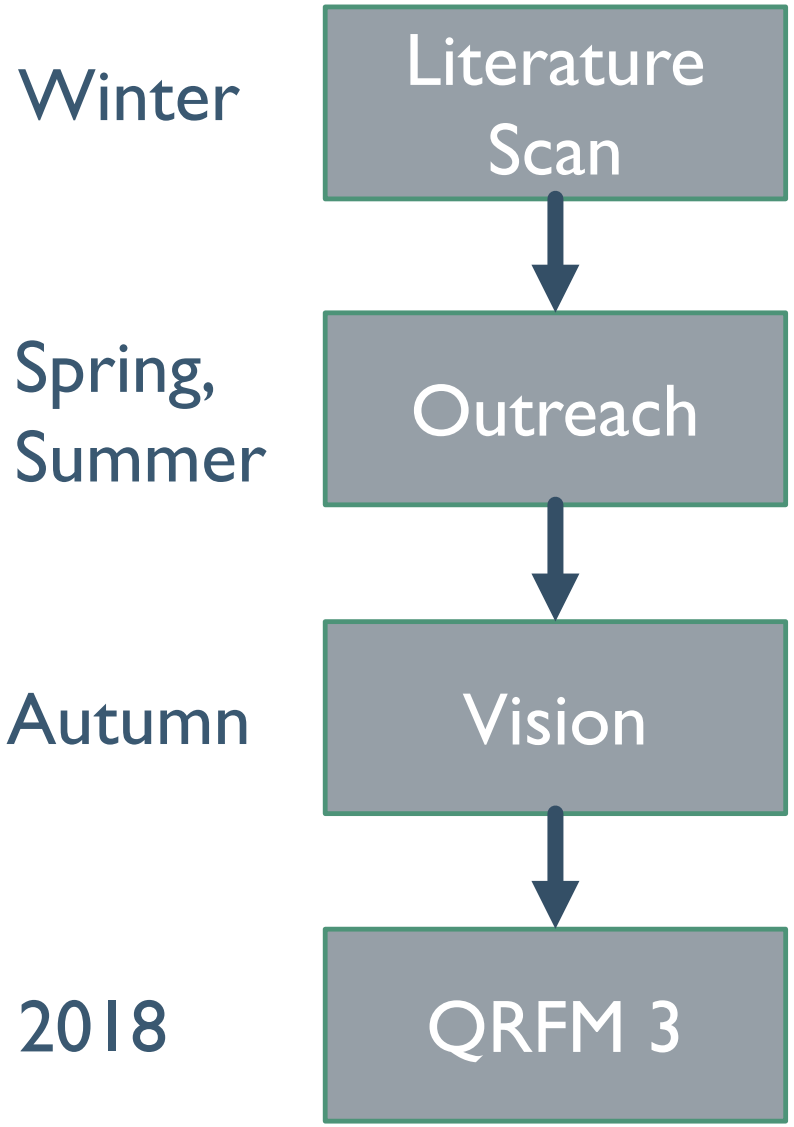
U.S. Department of Transportation Federal Highway Administration

leidos

RENAISSANCE PLANNING

PROJECT PURPOSE AND SCHEDULE

- Provide practitioners with freight travel demand evaluation tools
  - Quick Reference Freight Manual (QRFM) Update
  - Other options?
- Final Product Vision: Actionable strategic plan that would include QRFM and parallel CoP activities



POLL QUESTIONS

WHAT ARE THE MOST IMPORTANT FREIGHT DEMAND PROCESS GAP TO FILL IN (SELECT ALL THAT APPLY)

FREIGHT GENERATION
FREIGHT TRIP GENERATION
SERVICE TRIP GENERATION
TRUCK TRAFFIC FLOW ESTIMATES
TRIP DISTRIBUTION
URBAN TRUCK TRIP TOURING
NON-FREIGHT (SERVICE) TRIP TOURING OPERATIONS
BEHAVIORAL-BASED SUPPLY CHAIN MODELING
CHANGING DEMOGRAPHICS

WITHIN THE LAST YEAR, HOW MANY TIMES HAVE YOU REFERENCED THE QRFM II?
0
1-2
3-4
5-6
7+

FREIGHT/ LAND USE TRAVEL DEMAND EVALUATION

PURPOSE OF LITERATURE REVIEW SCAN

- Identify key documents
- Define state of practice
- Guide outreach

FOUNDATIONAL RESOURCES

- NCHRP Report 739: Freight Trip Generation and Land Use (2012)
- NCFRP Report 26: Subnational Commodity Flow Data (2013)
- NCFRP 37: Commodity Flow Microdata for Tripgen (2016)
- NCHRP Report 750 Volume 1: Scenario Planning for Freight Transportation Infrastructure Investment
- SHRP2 C20 Final Report / Strategic Plan (2013), with individual implementation studies 2016 and 2017

KEY SUPPLEMENTARY LITERATURE

- NCFRP 25: Freight Data Sharing (2013)
- ITE Trip Generation Handbook, Third Edition (2014)
- NCHRP Project 08-96: Integration of Freight Considerations into Smart Growth Design (2016)
- Selected additional papers with useful case studies

ITERATIVE R&D, APPLICATIONS

- Applications focus 2007 - 2012
  - NCHRP Syntheses
  - NCHRP Reports
- Research focus 2012 onward: land use and demographics
  - NCHRP 08-96
  - SHRP2 C20


Forecasting Metropolitan Commercial and Freight Travel

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

NCHRP SYNTHESIS 384

Forecasting Metropolitan Commercial and Freight Travel

A Synthesis of Highway Practice

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SUBJECT AREAS
Planning and Administration, and Freight Transportation

Research Sponsored by the American Association of State Highway and Transportation Officials in Cooperation with the Federal Highway Administration

TRANSPORTATION RESEARCH BOARD
WASHINGTON, D.C.
2008
www.TRB.org

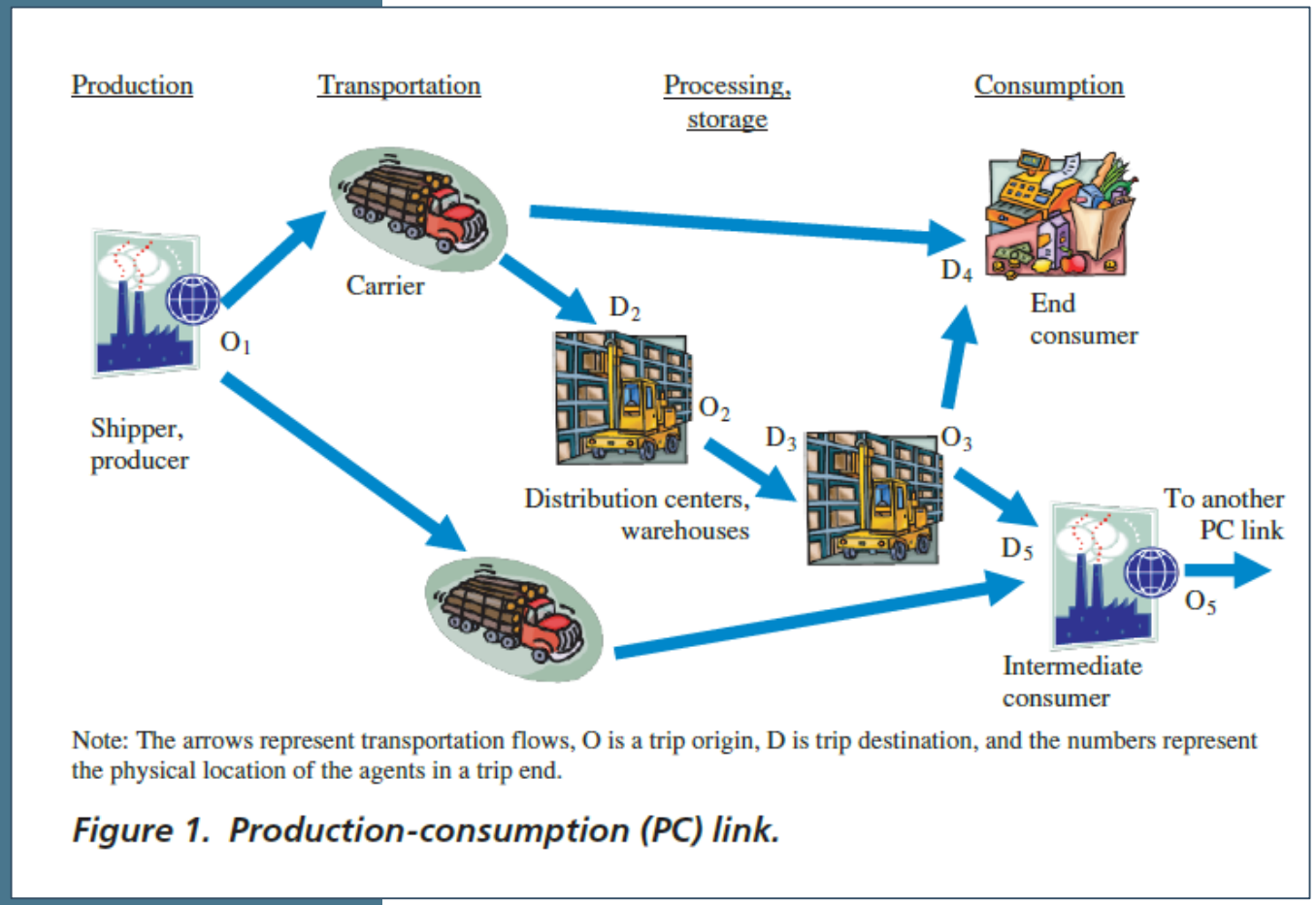
ITERATIVE R&D AND APPLICATIONS

- QRFM II focus:
  - types of models (Chapters 3-7)
  - applications (Chapters 8-11)
- Plentiful application updates practice-ready
- Activity based models just emerging

QRFM topics	Applications	Continuing R&D
Chapters 3 – 7 on models working towards research conclusions in SHRP2 C20: 3. Simple factor 4. Four step 5. Commodity 6. Hybrids	NCFRP Report 37	SHRP2 C20 models
Chapters 8 – 11 on application ready for updates from recent research reports: 8. Validation 9. Existing Data 10. Data Collection 11. Application issues	NCFRP Report 25 NCFRP Report 26 NCHRP Report 739 ITE Tripgen Handbook SHRP2 C20 cases Other studies	

KEY "WITHIN" QRFM FINDINGS

- Shift from land-use based models to econometric models and activity-based models
- Better data; greater details
- Incorporation of service trip generation (STG) in addition to freight generation (FG) and freight trip generation (FTG)



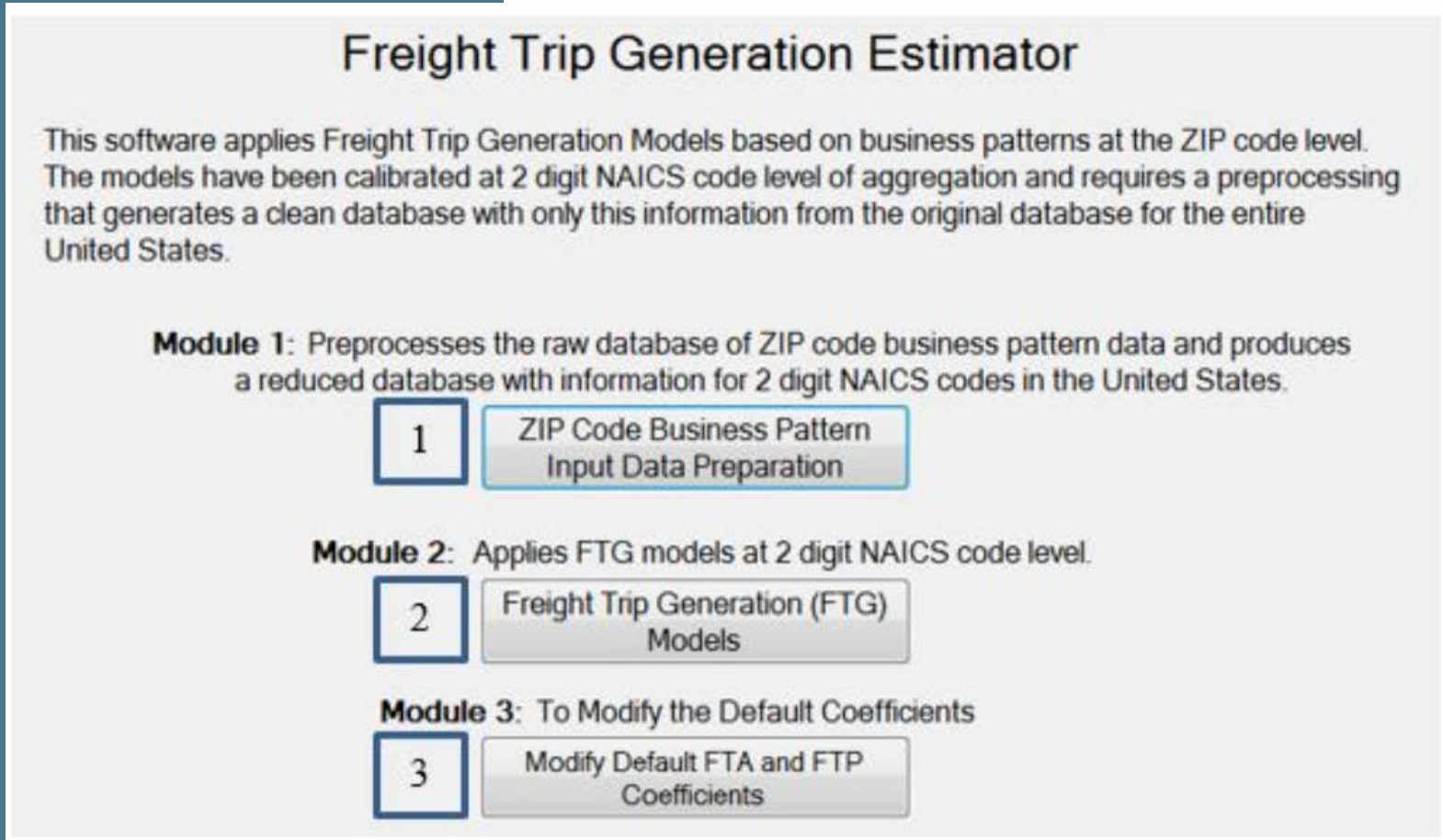
Note: The arrows represent transportation flows, O is a trip origin, D is trip destination, and the numbers represent the physical location of the agents in a trip end.

Figure 1. Production-consumption (PC) link.

The production-consumption link graphic has become an icon for the complexity of goods movement chain in evaluating STG and FTG.

KEY “WITHIN” QRFM FINDINGS

- NCFRP Report 37 shift to NAICS code basis
- Context-sensitive (ZIP code) freight trip generation software under development



KEY “WITHIN” QRFM FINDINGS

- ITE recommended practice on truck surveys

Table 12.7 Questionnaire Elements for Truck Data Collection Survey

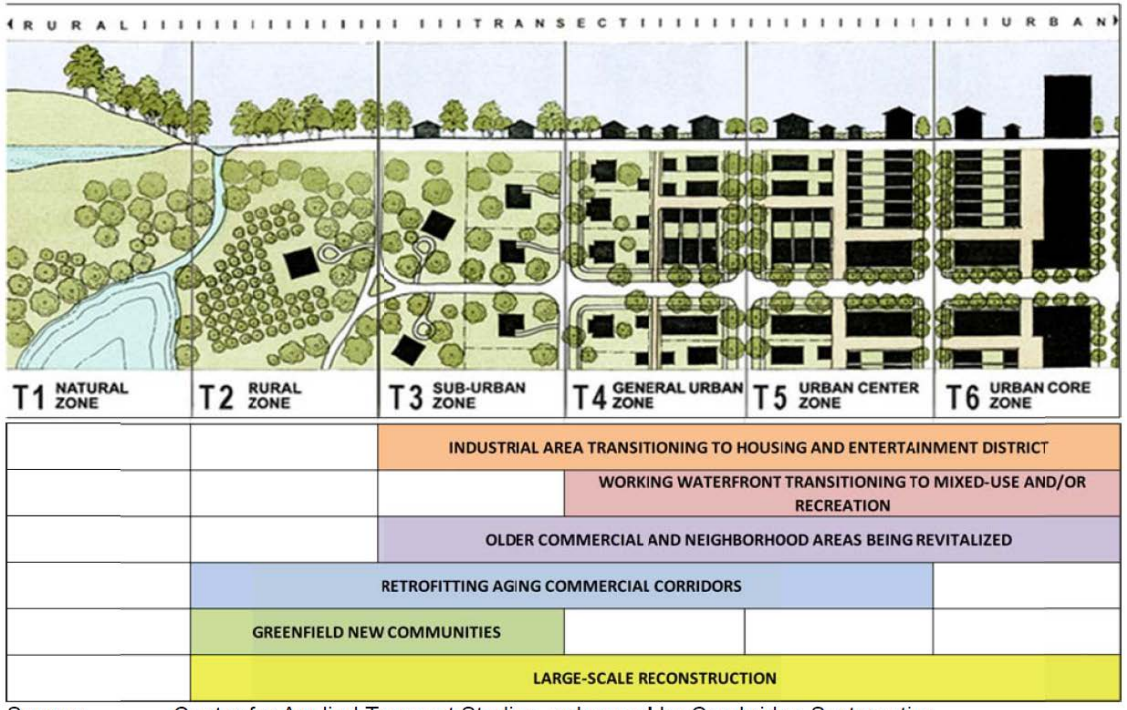
Topic	Interviewer Instructions/Explanation
Business Description	Primary business activity(ies)—to be converted into single industry sector designation for commodities using the 43 categories available in the Standard Classification of Transported Goods. Note other activities that generate freight.
Number of Employees	Current number of full-time and part-time employees at the site. If response is only available for multiple locations in the region, note this aggregation and record other data elements as aggregates.
Shipments by Mode	How the site receives and ships most of its goods—clearly indicating if the goods are being received (inbound) or being shipped (outbound).
Deliveries Received by Mode	Average number of deliveries received weekly. If interviewee can only provide monthly or annual numbers, convert these figures to weekly data in post-processing procedures.
Shipments Generated by Mode	Average number of shipments generated weekly. If interviewee can only provide monthly or annual numbers, convert these figures to weekly data in post-processing procedures.
Size of Shipment	For each mode used for inbound and outbound activities and whether most of these shipments are “less than full load” or “full load.” For containers, indicate size of container (such as 20 ft. or 40 ft.).
Weight of Shipment	Normal weight of a full shipment (not including vehicle weight) inbound and/or outbound by all modes. Containers assumed as truck trip, but indicated separately as container on truck.
Size of Facility	Size in square feet under roof. Indicate outdoor space used as separate information.
Annual Volume of Shipments	Total number of shipments inbound/outbound for most recent year.

Source: From Thompson, J., K. Yarbrough, M. Anderson, G. Harris, and K. Harrison. “Approach to Collecting Local Freight Information.” In *Transportation Research Record: Journal of the Transportation Research Board, No. 2160,* Figure 1, p. 163. Copyright, National Academy of Sciences, Washington, DC, 2010. Reproduced with permission of the Transportation Research Board.

“BEYOND” QRFM CONCEPTS

- Land Use Context
- Reliability
- Scenario Planning
- Megaregions

Figure 2.7 Relationship of Each Smart Growth Classification to the Rural-to-Urban Transect



Source: Center for Applied Transect Studies, enhanced by Cambridge Systematics

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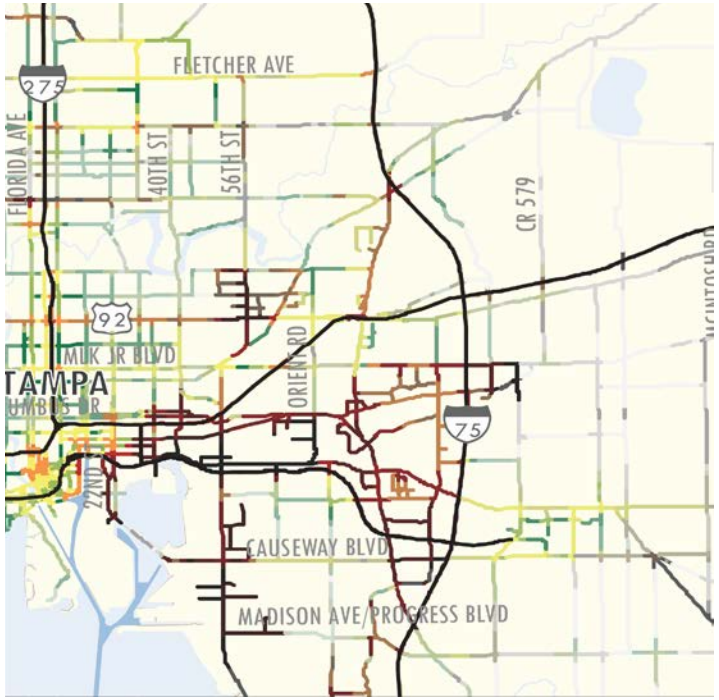

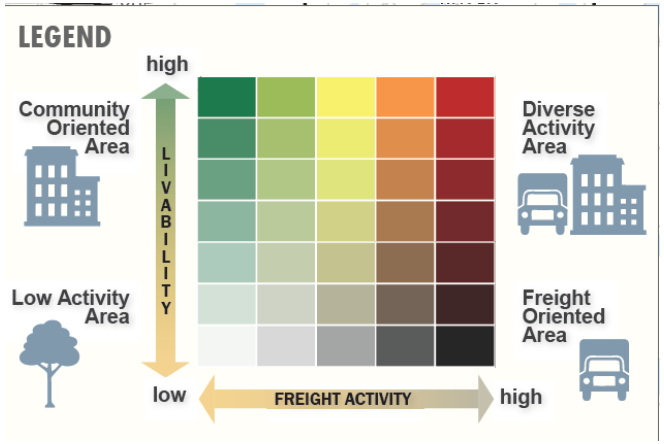

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Table 7-5: Summary of WTP Estimation by User Group and Commodity Type

Type	Sub-groups	Value of Time		Value of Reliability		RR (based on shipment)	RR (based on tonnage)
		Per Shipment-Hour	Per Ton-Hour	Per Shipment-Hour	Per Ton-Hour		
All		37.0	1.53	55.0	3.81	1.5	2.5
User Group	Carriers	12.0	0.50	29.0	3.0	2.41	6.0
	Shippers with Transportation	22.0	1.0	177.0	22.0	8.0	22.0
	Shippers without Transportation	277.0	23.0	75.0	5.13	0.3	0.22
	3PL	-		51.0		-	-
Commodity Group	Agriculture and Food	22.0	1.50	74.0	4.38	3.4	2.9
	Heavy Manufacturing	30.0	1.75	25.0	2.25	0.8	1.3
	Paper, Chemicals & Non-durable manufacturing	40	2.75	17.0	1.38	0.4	0.50
	Petroleum & Minerals	21	4.3	24.0	10.2	1.1	2.4
Product Type	Perishable	28	0.63	79	4.38	2.8	7.0
	Non-Perishable	23.0	1.43	56	3.14	2.4	2.20

“BEYOND” QRFM CONCEPTS

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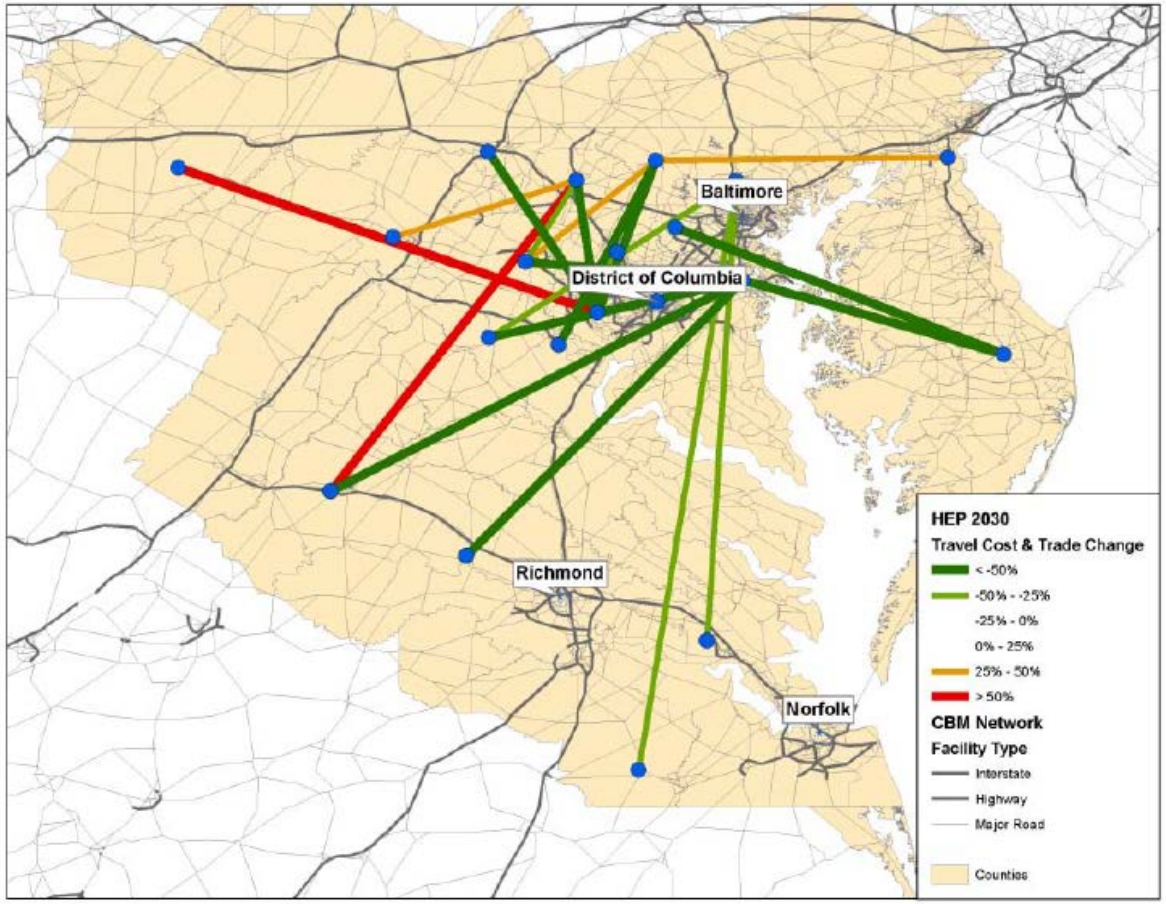


FIGURE 6 Impact of High Energy Prices on Freight Costs

NOTABLE GAPS

- Linking cost of congestion to value pricing
- Leveraging private sector decision making approaches
- Improving data scalability and transferability

CLOSING GAPS – SHRP2 C20

Studies being finished

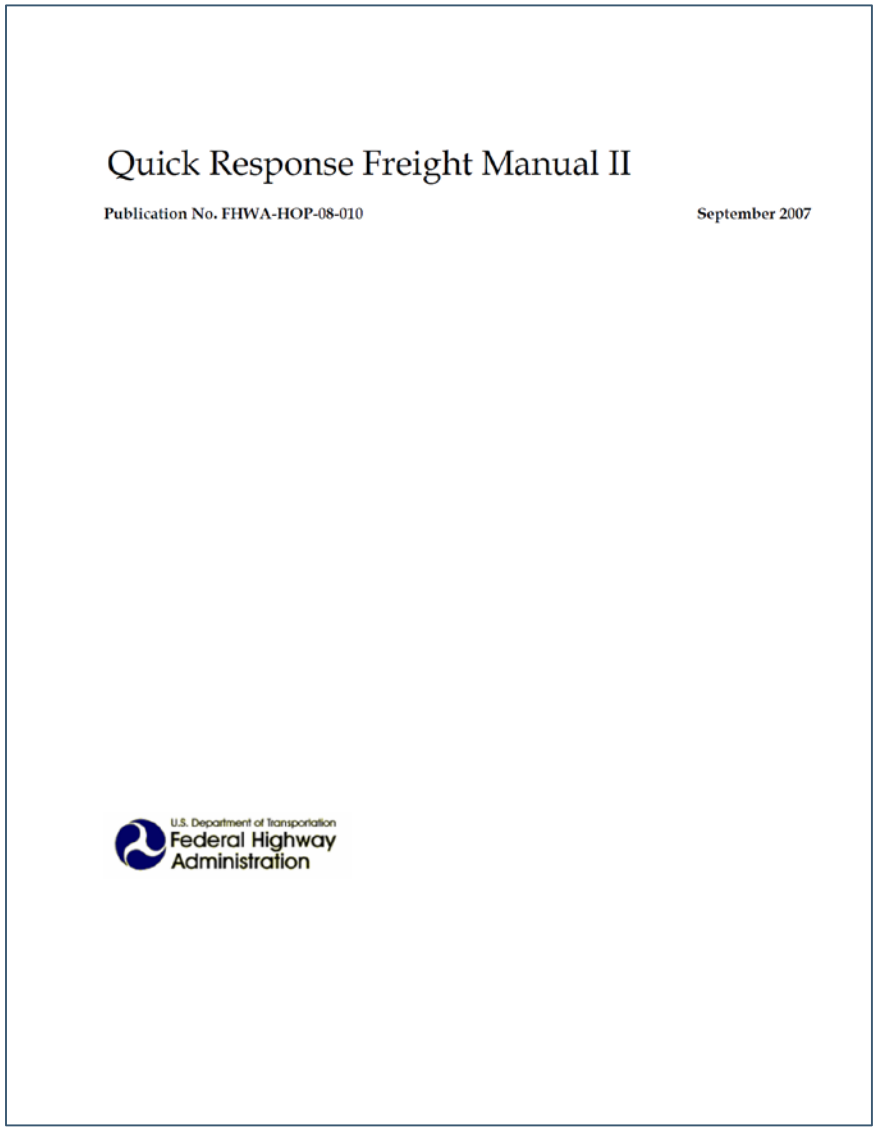
- Four focused on modeling
- Seven focused on data

Several expected to yield direct applicability to QRFM

State	Recipient	Project Type	Project Status	QRFM Applicability	Notes
FL	Florida Department of Transportation	Data	Complete	Yes	The project successfully developed a methodology for estimating fuel consumption based on local factors such as land use, socio-economic, roadway and traffic inputs.
NY	Capital District Transportation Committee	Data	Complete	Yes	Land use data was used in this project to develop freight trip generation models.
SD	South Dakota Department of Transportation	Data	Complete	Yes	This project developed a methodology to integrate new sources of data (including agricultural land use data) beyond conventional, historical traffic counts to make more reliable decisions and to improve transportation system performance.
AZ	Maricopa Association of Governments	Modeling	Substantially Complete	Maybe	Land use data was used to assist in developing model components of this project.
MD	Maryland State Highway Administration	Modeling	Substantially Complete	Maybe	Land use data was used to assist in develop model components of this project.
NC	City of Winston-Salem	Data	Complete	Maybe	This project developed a freight facility database that can be useful in identifying areas of high freight concentration for the purposes of informing land use planning, economic development or transportation improvement priorities.
OR	Metro (Portland) Metropolitan Planning Organization	Modeling	In Progress	Maybe	Land use data is to be used to assist in develop model components of this project.
WA	Washington State Department of Transportation	Data	Complete	Maybe	This project looked to use interviews and questionnaires to collect information on characteristics of business and likely behavioral responses (route and mode choice) to various conditions and support truck trip modeling by collecting truck count data at food distribution facilities under a variety of land use scenarios.
MO	Mid-America Regional Council	Data	Complete	Case study potential	Low applicability potential
PA	Delaware Valley Regional Planning Commission	Data	Complete	Case study potential	This project enhanced DVRPC's freight data clearinghouse and plotted major freight facilities in the Philadelphia region, but land use data was not a major project input or output.
WI	Wisconsin Department of Transportation	Modeling	Complete	Case study potential	Low applicability potential

WE NEED YOUR HELP

- What are <u>your</u> knowledge gaps?
- How can better information best be delivered to you?



MOVING FORWARD

- Talking Freight – April 19
- Second web conversation – June date **TBD**: Let us know how this event can best benefit you
- Peer exchange July
- Develop vision
- Implement products (QRFM 3, others)