Quantifying Greenhouse Gas Emissions From Transit

DRAFT APTA Recommended Practice

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APTA Guidance

- Provide standardized way for transit agencies to quantify GHG impacts
- Accessible to all types of agencies
- Collective effort by APTA working group
- Public review version available soon

Why Quantify Emissions?

- Reporting to The Climate Registry
- Support internal efforts
- Communicate transit's benefits
- Potential funding

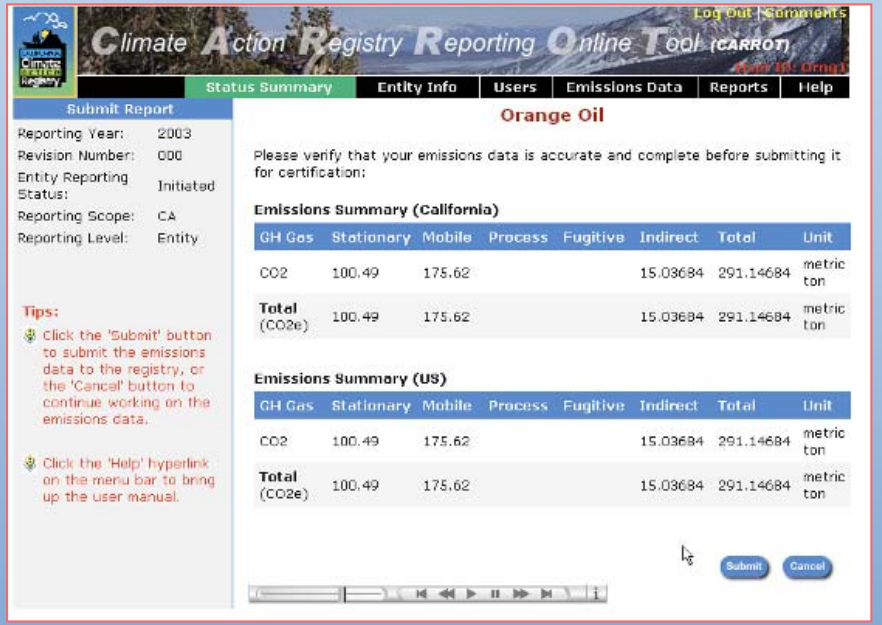
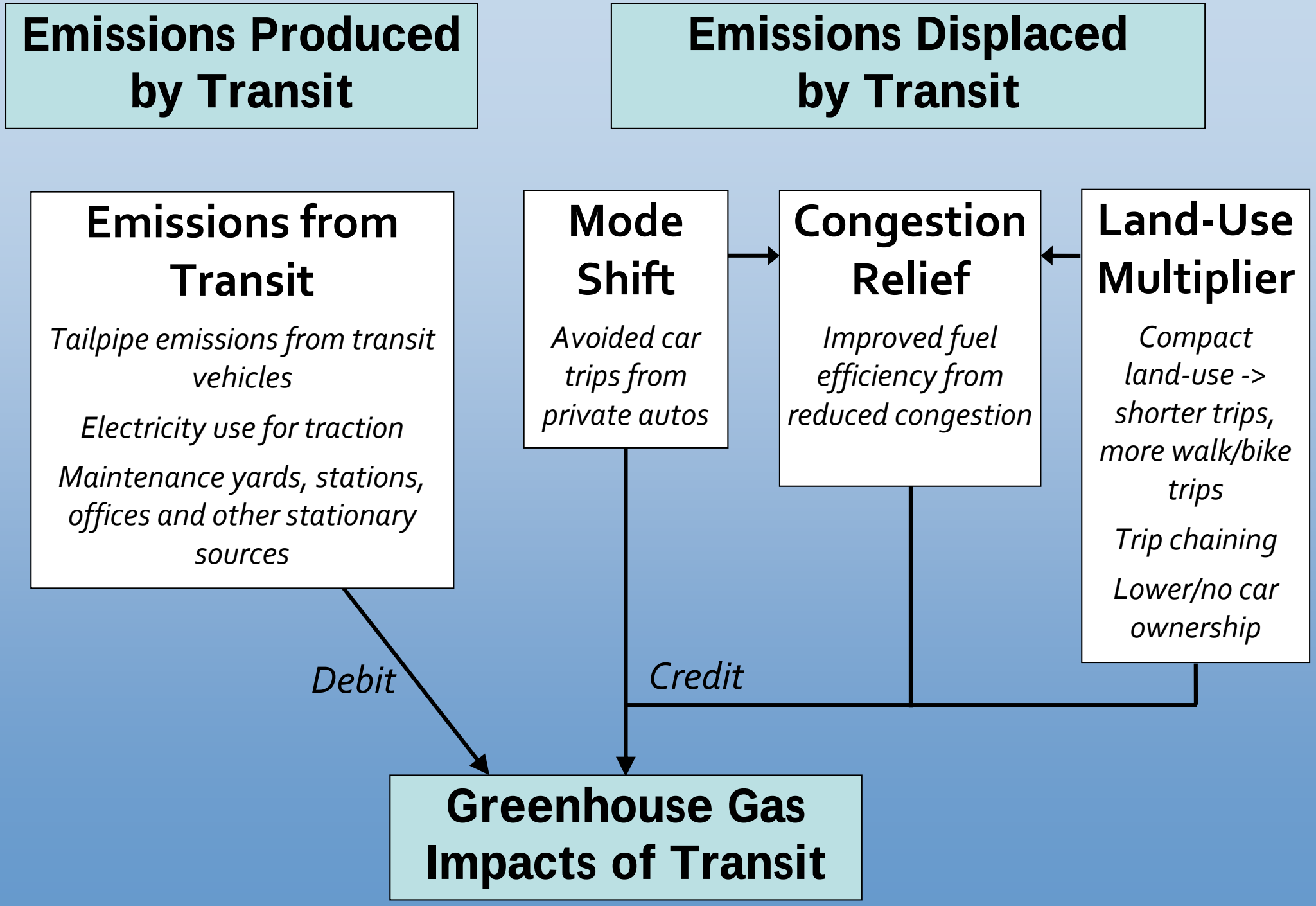


Image: California Climate Action Registry


Emissions Produced by Transit
Emissions Displaced by Transit
Emissions from Transit
Tailpipe emissions from transit vehicles
Electricity use for traction
Maintenance yards, stations, offices and other stationary sources
Mode Shift
Avoided car trips from private autos
Congestion Relief
Improved fuel efficiency from reduced congestion
Land-Use Multiplier
Compact land-use -> shorter trips, more walk/bike trips
Trip chaining
Lower/no car ownership
Debit
Credit
Greenhouse Gas Impacts of Transit

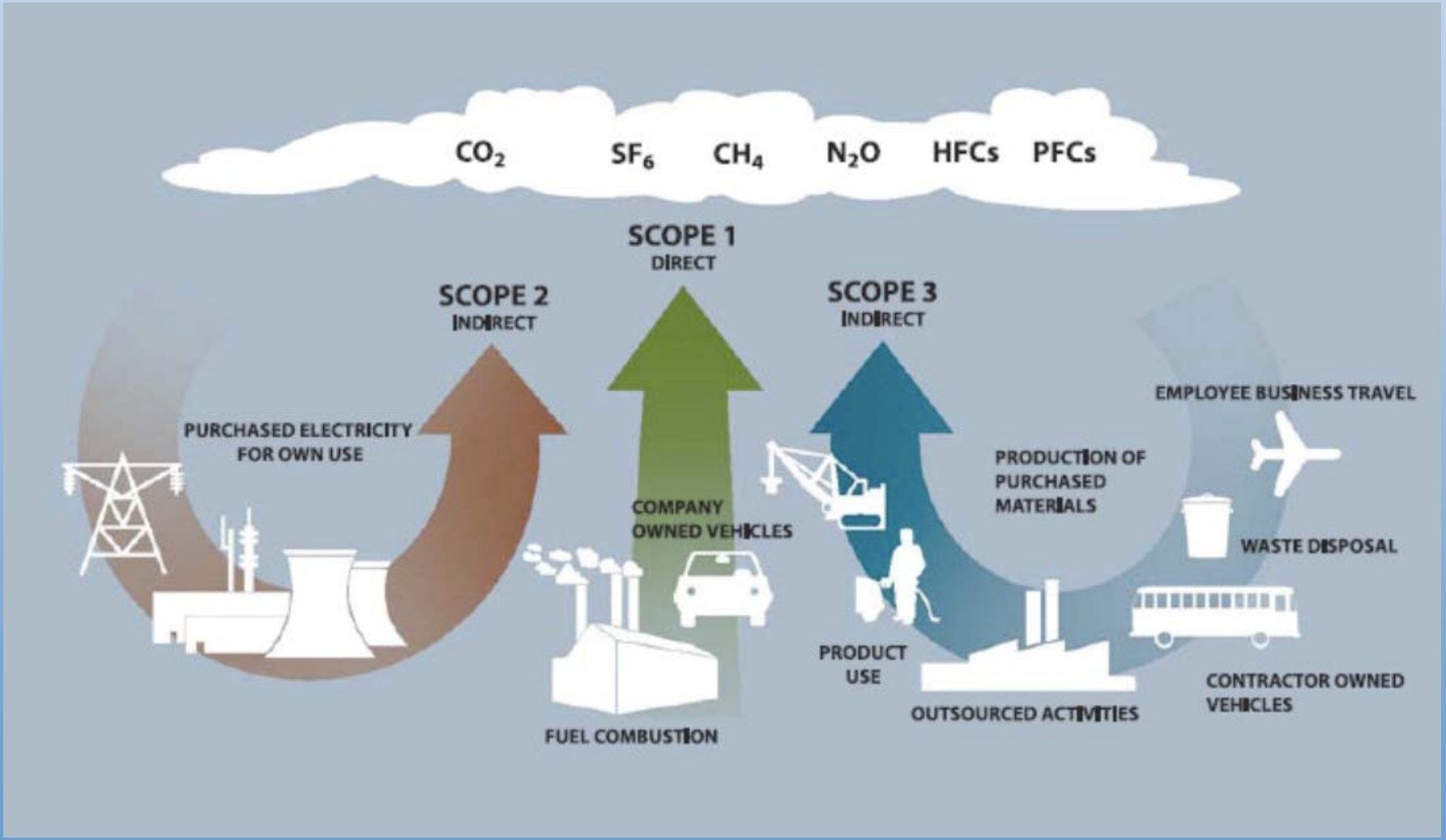
Debit Side:

How to quantify emissions from transit

Emissions from Transit

- Consistent with existing guidance
  - Climate Registry General Reporting Protocol
  - Local government protocol
- Give guidance on transit-specific issues
  - What emissions are covered
  - Data sources (mainly NTD)

Emission Scopes



Source: The Climate Registry General Reporting Protocol

What to Include?

- Emissions from:
  - Directly operated and contract services reported to NTD
  - Includes paratransit and vanpools
  - Non-revenue vehicles
  - Stationary and fugitive sources

- Most capital projects are Scope 3

Sources of Emissions

Source	Scope	Santa Barbara MTD		AC Transit	
		Tons CO_2-e	%	Tons CO_2-e	%
Mobile Combustion	1	5,687	95%	64,379	93%
Stationary Combustion	1	27	0.5%	1,965	3%
Process Emissions	1	0	0%	0	0%
Fugitive Emissions	1	1	0%	0	0%
Purchased Electricity	2	264	4%	2,568	4%
Purchased Steam	2	0	0%	0	0%
Purchased Heat/Cooling	2	0	0%	0	0%
Total		5,979	100%	68,912	100%

Credit Side:

How to quantify emissions saved

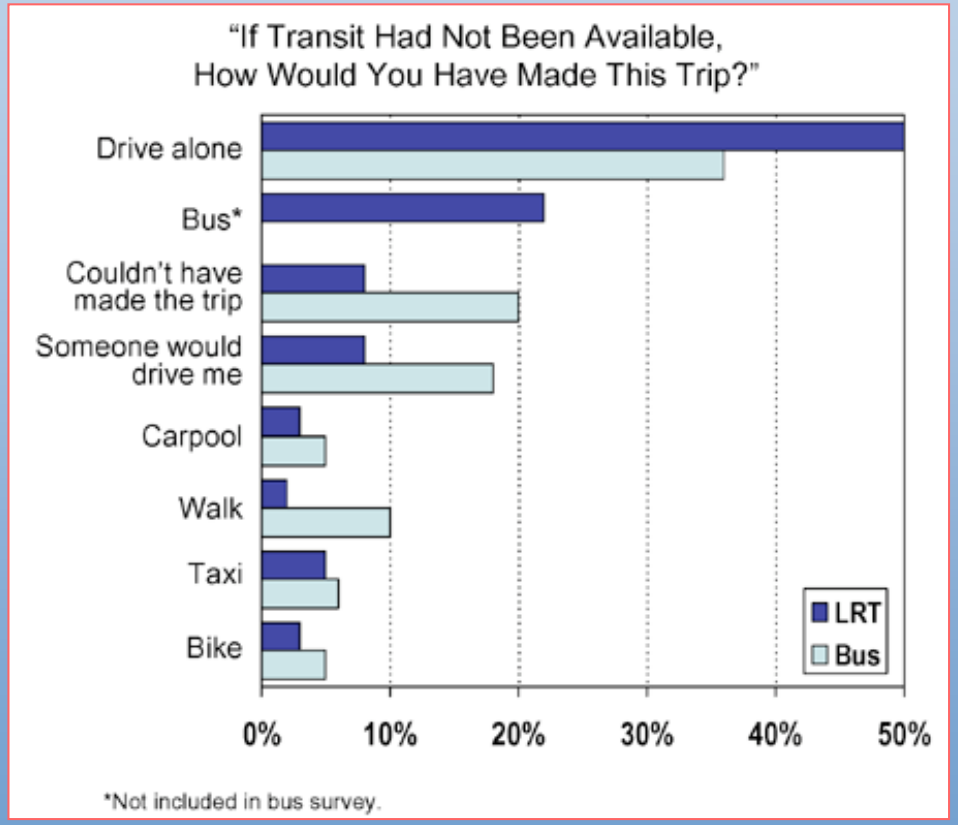
Mode Shift to Transit

- Apply mode shift factor to transit passenger miles
- Tiered options

A. Model based

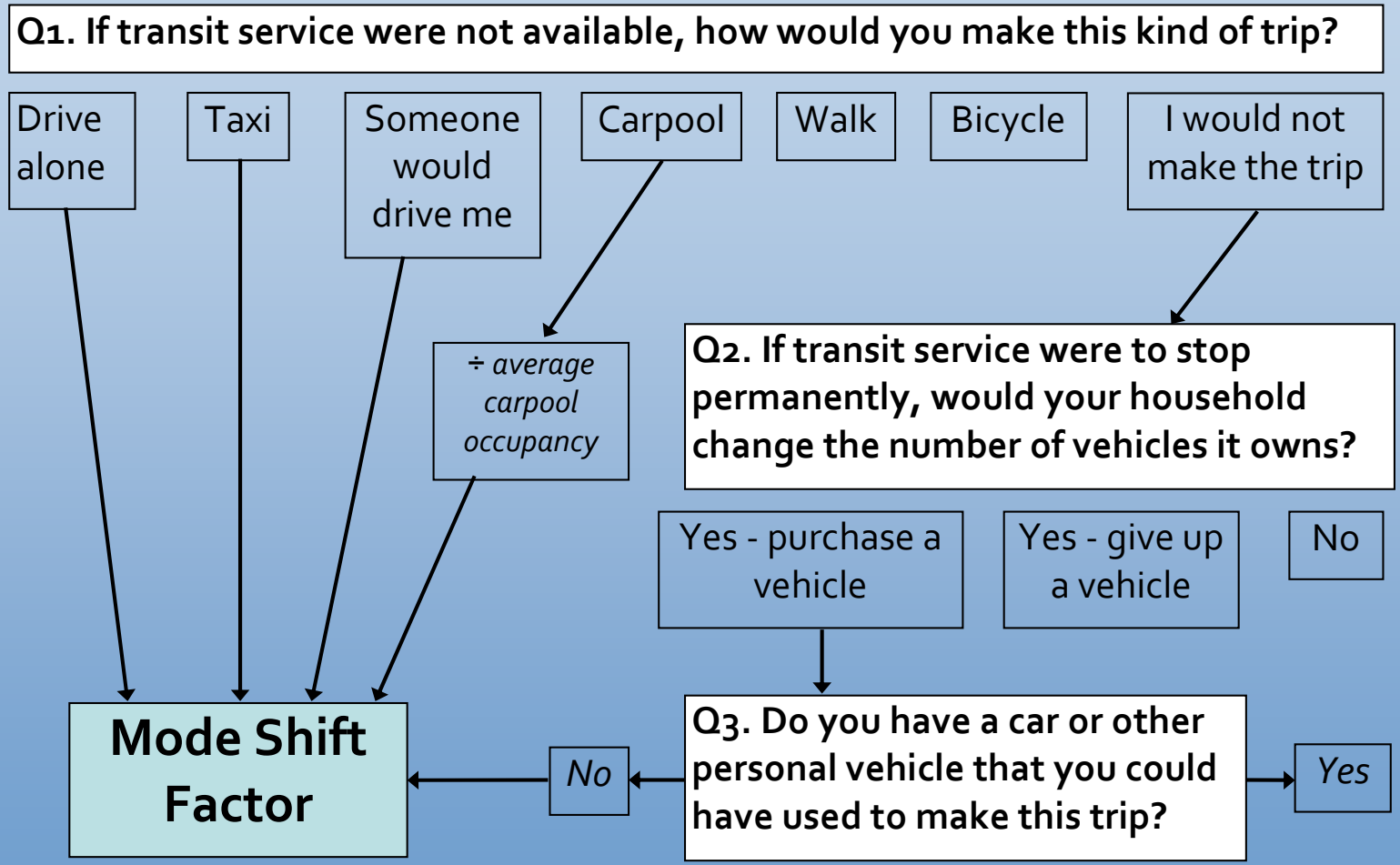
B. Survey based

C. Defaults by agency type



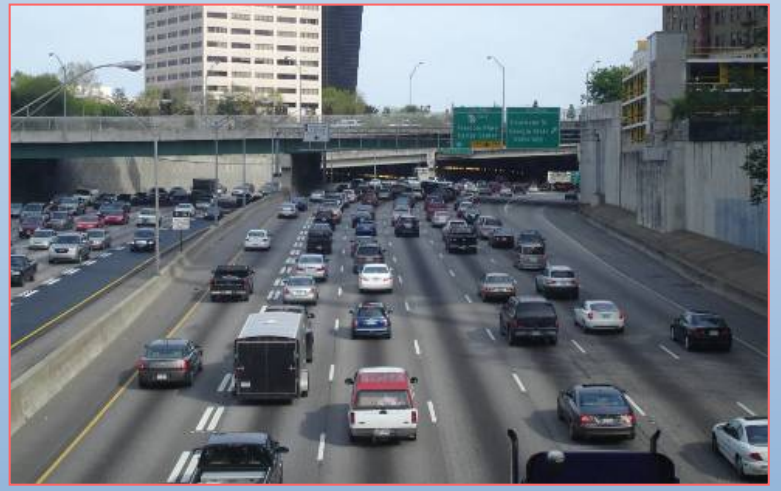
Source: Met Council, Minneapolis

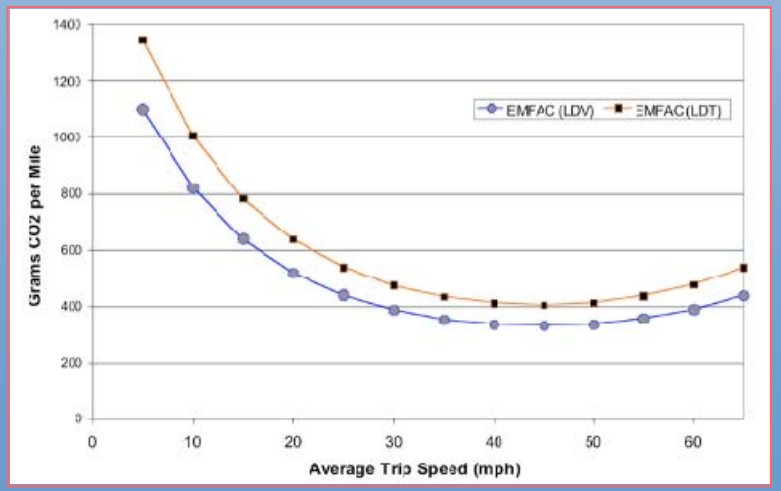
Mode Shift Factor



Congestion Relief

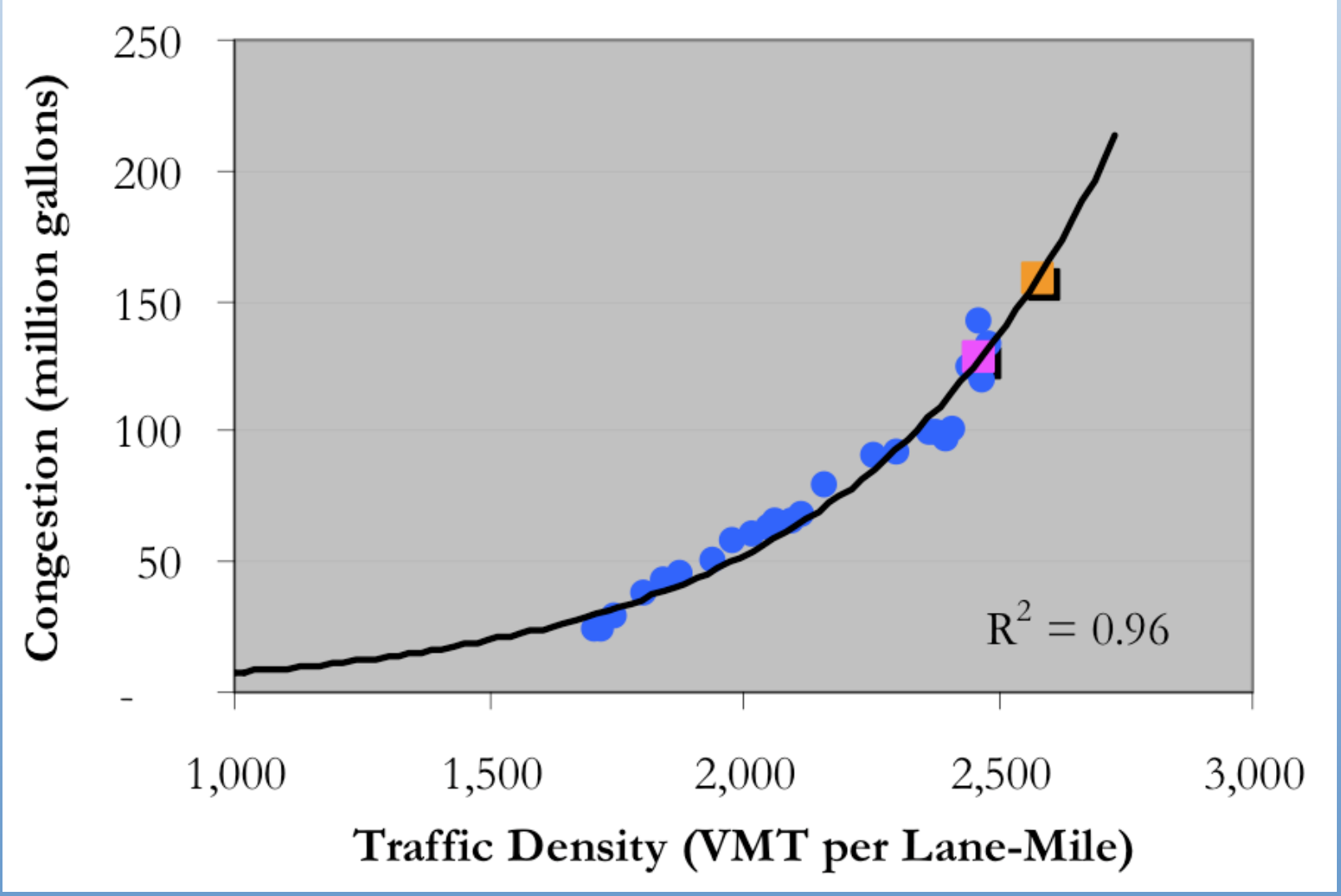
- Mode shift to transit reduces congestion
- Improves efficiency of remaining vehicles
- Approaches
  - Extrapolate from TTI
  - Regional models





Source: Ewing et. al. 2008

Congestion Relief



Thanks to Justin Antos

Land-Use Multiplier

- Accounts for:
  - Reduced trip length
  - Bike, ped trips
  - Trip chaining
  - Lower car ownership
- Challenge: chicken and egg

Study	Cities	Land-Use Multiplier	Methodological Issues
Pushkarev & Zupan (1982)	Large U.S. metro areas	4	Correlation only
Newman & Kenworthy (1999)	32 global cities	5 to 7	Correlation only
Holtzclaw (2000)	SF Bay Area	1.4 to 9	Correlation only
Neff (1996)	U.S. urban areas	5.4 to 7.5	Assumes fixed travel-time budgets
ICF (2008)	Entire U.S.	1.9	Accounts only for LU effects *caused* by transit

Recommended Approach

- Preferred approach: regional study
- Alternative: default multiplier of 1.9
  - Multiply mode shift benefit by 1.9
  - Conservative approach for many regions

Summary

- Standardized way to quantify GHG impacts
- Based on accepted protocols
- Gives credit for the credit side - emissions reduced
- Simple calculations understate the benefits

For More Information

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This presentation:

www.stanford.edu/~adammb/MillardBall_Railvolution2008.pdf