Transportation Strategies and Analysis

CAMBRIDGE SYSTEMATICS

Transportation Strategies

Modeled in NEMS

- EV incentives
- Biofuels
- Price changes
  - Carbon
  - Fuels
  - VMT

Modeled in Transportation Tool

- Land use/smart growth
- Active transportation
- Travel demand management
- System operations/traffic flow
- Shared mobility
- Freight/intermodal
- Highway preservation
- Transit investment
- Electric buses

Transit Investment Strategies

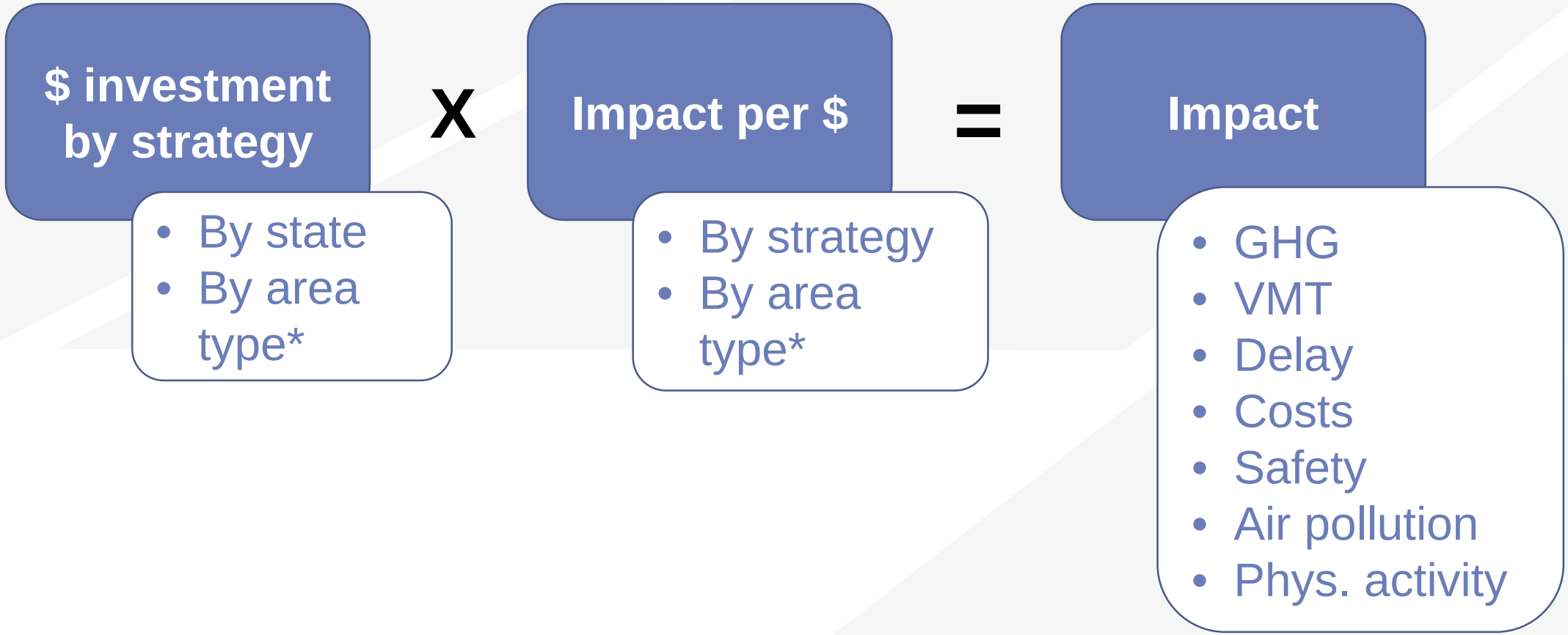
Urban & Intercity Transit Investment & Services

- Bus rapid transit
- Urban rail
- Commuter rail
- Intercity rail
- Bus service expansion
- Bus service efficiency

Transit State of Good Repair

- Bus
- Urban rail
- Commuter/intercity rail

Transportation Investment Strategy Tool - Modeling Approach



*Area type = urban, suburban, rural

Strengths & Limitations of Approach

Strengths

- Translates investment $ directly into GHG reductions
- Quantifies a range of benefits
- Considers differences in effectiveness by area type
- Uses data from TCI region where available

Limitations

- Not project-specific analysis
- Not based on geographic modeling
- Cost-effectiveness can vary widely within any given type of project

Strategy: Active Transportation

What is This?

- Investing in bicycle facilities, pedestrian improvements, and Complete Streets

Key Assumptions & Data Sources

- $ investment by facility type and area type
- Cost per mile
- New bicycle-miles traveled per new facility-mile (research/ modeling studies)
- Prior drive mode share of new cyclists

Strategy: Land Use/Smart Growth

What is This?

- Investments, incentives, and policy changes to encourage growth in transit-rich, walkable neighborhoods

Key Assumptions & Data Sources

- $ per household to shift to smart growth area (MA Chapter 40R incentives)
- VMT per capita by area type (travel surveys)

Strategy: Travel Demand Management

What is This?

- Programs and incentives to switch modes for commuting and other travel

Key Assumptions & Data Sources

- Cost-effectiveness of outreach from evaluations of TDM programs
- Modeling of mode shift incentives from EPA Commuter Model

Strategy: System Operations/Efficiency

What is This?

- Traffic flow improvements to reduce emissions from traffic congestion and delays

Key Assumptions & Data Sources

- Cost-effectiveness from the Moving Cooler study
- Fuel savings per hour of delay from TTI Urban Mobility report
- Accounts for induced demand effects

Strategy: Transit Expansion

What is This?

- Expansion of BRT and/or rail transit services (urban, commuter, intercity)

Key Assumptions & Data Sources

- Data from 13 project studies in TCI region (OR)
- New services have same ridership productivity & mode shift as existing regional transit services

Strategy: Transit Operations

What is This?

- Improving speed and reliability of bus services

Key Assumptions & Data Sources

- Cost per mile of routes improved
- Relationship between travel speed and ridership
- % of new bus riders who previously drove

Strategy: Transit State of Good Repair

What is This?

- Investing in existing transit to maintain reliability, capacity, and speed

Key Assumptions & Data Sources

- % ridership loss per year as system degrades
- % of lost riders who drive

Strategy: Highway Preservation

What is this?

- Investments to keep roadways functioning safely, reliably, and at expected levels of service

Key Assumptions & Data Sources

- Investment scenarios using FHWA HERS model
- Fuel consumption increase from road roughness and traffic delays

Strategy: Freight/Intermodal Investment

What is This?

- Investments in freight rail and intermodal infrastructure to encourage mode shift from truck to rail & water

Key Assumptions & Data Sources

- Cost-effectiveness from studies of projects and investment plans in TCI region

Economic Impacts

Primary Effect	Secondary Effect	Transit	Electric Vehicles	Land Use/ Smart Growth	Active Transportation	TDM	System Operations	Freight/ Intermodal
Reduced VMT	Vehicle Operating Cost Savings	✓		✓	✓	✓		
	Delay Reduction *(on-the-clock)*	✓		✓	✓	✓		
Delay Reduction *(on-the-clock)*							✓	
Vehicle Purchase Costs			✓					
Vehicle Operating Cost Savings			✓					
Modal Cost Savings								✓

Conclusions

- The transportation tool can tell us roughly what level of GHG reduction (and other benefits) to expect for a given revenue stream and investment mix
- Benefits of transportation investment are best measured across multiple metrics
  - Consider: economic benefits, mobility, health, quality of life
- There is quite a bit of variability in impacts across places and project types; specific investments should be evaluated on their own merits