The Benefits of Rail Transit

Todd Litman
Todd Litman

• Founder & Executive Director
Victoria Transport Policy Institute
Victoria, British Columbia, Canada

• Authored
  – Online TDM Encyclopedia
  – Transportation Cost and Benefit Analysis: Techniques, Estimates and Implications
  – Rail Transit In America: Comprehensive Evaluation of Benefits.
The Benefits of Rail Transit in Shaping Communities

by Todd Litman
Victoria Transport Policy Institute
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Sustainability

- Sustainability emphasizes the integrated nature of human activities and therefore the need for coordinated planning among different sectors, jurisdictions and groups.

- Sustainability planning is to development what preventive medicine is to health: it anticipates and manages problems rather than waiting for crises to develop.
Keeping The Earth In Balance
Paradigm Shifts

- **Growth** - expanding, doing more.

- **Development** - improving, doing better.

- **Mobility** - physical movement.

- **Accessibility** - obtaining desired goods, services and activities.
What is “The” Transportation Problem?

- Traffic congestion?
- Road construction costs?
- Parking congestion or costs?
- Excessive costs to consumers?
- Government costs?
- Traffic crashes?
- Lack of mobility for non-drivers?
- Poor freight services?
- Environmental impacts?
- Inadequate physical activity?
- Others?
Current Transport Planning

Current planning tends to be reductionist: each problem is assigned to a single agency with narrowly defined responsibilities. For example:

- Transport agencies deal with congestion.
- Environmental agencies deal with pollution.
- Welfare agencies deal with the needs of disadvantaged people.
- Public health agencies are concerned with community fitness.
- Etc.
Reductionist planning can result in public agencies implementing solutions to one problem that exacerbate other problems facing society, and tends to undervalue strategies that provide multiple but modest benefits.
Put another way, more comprehensive planning helps identify “Win-Win” strategies: solutions to one problem that also help solve other problems facing society.

Ask:
“Which congestion-reduction strategy also reduces parking costs, saves consumers money, and improves mobility options for non-drivers.”
Transit Benefits

- Mobility Benefits - When transit provides increased mobility for non-drivers.
- Efficiency Benefits - When transit substitutes for an automobile trip.
- Economic Benefits - When transit stimulates economic development.
- Land Use Benefits - When transit provides a catalyst for more efficient development patterns.
Building Livable Communities with Transit

Rail Transit Study

130 U.S. cities

Transit Commute Mode Share

"Large Rail"

"Small Rail"

Bus
Rail

New York
Washington DC
Boston
San Francisco
Chicago
Philadelphia
Baltimore
Pittsburgh
Seattle
Atlanta
Buffal NY
New Orleans
Cleveland
Portland
Los Angeles
St. Louis
Miami
Denver
Dallas-Fort Worth
Sacramento
San Diego
San Jose
Salt Lake City
Building Livable Communities with Transit

Transit Ridership

Per Capita Ridership

Commute Mode Split

Relative to "Bus Only" Cities

- Large Rail
- Small Rail
- Bus Only
Per Capita Transit Ridership

City Population (Thousands)

Annual Per Capita Transit Passenger-Miles

- Large Rail
- Small Rail
- Bus Only
Automobile Travel

- Large Rail
- Small Rail
- Bus Only

Per Capita Annual Vehicle-Miles
Building Livable Communities with Transit

Congestion Costs

- Large Rail
- Small Rail
- Bus Only

Cities:
- Los Angeles
- New York
- Chicago
- Philadelphia
- Miami
- San Francisco
- Dallas

Annual Dollars Per Capita vs. City Population (Thousands)
Building Livable Communities with Transit

Transit Operating Costs

Operating Expenses Per Passenger-Mile

- Bus
- Heavy Rail
- Commuter Rail
- Light Rail

Large Rail
- $0.25
- $0.50
- $0.75
- $1.00

Small Rail
- $0.25
- $0.50
- $0.75
- $1.00

Bus Only
- $0.25
- $0.50
- $0.75
- $1.00
Building Livable Communities with Transit

Traffic Fatalities

Traffic Fatalities Per 100,000 Population vs. Annual Per Capita Transit Passenger-Miles

- Large Rail
- Small Rail
- Bus Only

Traffic Fatalities Per 100,000 Population

0 2 4 6 8 10 12 14

0 200 400 600 800 1,000 1,200

Annual Per Capita Transit Passenger-Miles

Large Rail  Small Rail  Bus Only
Building Livable Communities with Transit

Smart Growth Safety Impacts

Annual Traffic Deaths Per 100,000 Population

- Most Sprawled
- Smartest Growth

U.S. Crash Rates

Traffic Fatalities Per 100,000 Pop.

Per Capital Annual Vehicle Mileage (thousands)
Household Transport Costs

- Portion of Total Household Expenditures Devoted to Transport
- Per-Capita Annual Transit Passenger-Miles

- San Diego
- New York
- Baltimore

Legend:
- Large Rail
- Small Rail
- Bus Only
High quality transit provides about $500 annually per capita in consumer cost savings.
### Annualized Transportation Costs

<table>
<thead>
<tr>
<th></th>
<th>Automobile</th>
<th>Public Transport</th>
<th>Non-motorized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads</td>
<td>$500</td>
<td>Roads $50</td>
<td>Shoes $50</td>
</tr>
<tr>
<td>Parking</td>
<td>$1,500</td>
<td>Fares $600</td>
<td>Paths $30</td>
</tr>
<tr>
<td>Fuel</td>
<td>$1,500</td>
<td>Subsidies $150</td>
<td>$80</td>
</tr>
<tr>
<td>Vehicle</td>
<td>$3,500</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$8,000</td>
<td>$800</td>
<td></td>
</tr>
</tbody>
</table>

**Total:** $8,000
Building Livable Communities with Transit

“A Heavy Load” Report

Share of Income Spent on Housing and Transportation

Households $20,000 – $35,000

- In Central City: 54% Transportation, 32% Housing
- Near Other Employment Center: 66% Transportation, 31% Housing
- Away from Employment Center: 70% Transportation, 33% Housing

Households $35,000 – $50,000

- In Central City: 39% Transportation, 23% Housing
- Near Other Employment Center: 49% Transportation, 26% Housing
- Away from Employment Center: 51% Transportation, 25% Housing
1,000,000
households in
the region
saving $1,000
annually on
vehicle
expenses
shifted to
general
consumer
goods creates
6,000 additional
regional jobs.
Property Value Impacts

Many consumers value new urbanist features. This increases property values and tax revenues. Proximity to a rail transit station typically increases property values 5-15%.
A more diverse transportation systems helps achieve equity objectives:

- A fair share of public resources for non-drivers.
- Financial savings to lower-income people.
- Increased opportunity to people who are physically, socially or economically disadvantaged.
- Basic mobility.
What Gets People Moving?

Transit and walking are complementary. People who ride transit tend to walk more, and are more likely to achieve the basic amount of physical activity (about 20 minutes daily) required for health.
Land Use Impacts On Travel

- Most Sprawled:
  - Automobile: 80
  - Transit: 10
  - Walk: 5

- Mixed:
  - Automobile: 50
  - Transit: 5
  - Walk: 10

- Most Urban:
  - Automobile: 40
  - Transit: 10
  - Walk: 10

Dyaily Minutes of Travel
Transport and land use planning often involves trade-offs between different forms of access. Current planning practices tend to bias decisions toward automobile dependency and away from a more balanced and multi-modal transport system.
Building Livable Communities with Transit

Supported by Professional Organizations

- Institute of Transportation Engineers.
- American Planning Association.
- American Farmland Trust.
- Federal, state, regional and local planning and transportation agencies.
- International City/County Management Association
- National Governor’s Association
- Health organizations.
- And much more...
Summary - Quality Transit

Cities with high quality transit have:

- Four times the per capita transit ridership.
- A fifth lower per capita vehicle mileage.
- 30-50% lower per capita congestion costs.
- A third lower per-capita traffic fatality rates.
- A fifth smaller portion of household budgets devoted to transport, savings about $500 annually per capita.
- A third lower transit operating costs.
- 58% higher transit service cost recovery.
- More money circulating in the local economy.
- More per capita walking.
- Higher property values.
- Improved environmental performance.
## Comparing Benefits

<table>
<thead>
<tr>
<th>Planning Objective</th>
<th>Expand Road Capacity</th>
<th>Public Transit Improvements</th>
<th>Mobility Management</th>
<th>Smart Growth Land Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestion reduction</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×/✓</td>
</tr>
<tr>
<td>Roadway cost savings</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>×/✓</td>
</tr>
<tr>
<td>Parking savings</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>×/✓</td>
</tr>
<tr>
<td>Consumer cost savings</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Transport diversity</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Improved traffic safety</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reduced pollution</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Energy conservation</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Efficient land use</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Improved fitness &amp; health</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

✓ = Supports Objective  
× = Contradicts Objective
Comparing Costs

<table>
<thead>
<tr>
<th>Category</th>
<th>Average Annual Cost Per Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Ownership</td>
<td>$0</td>
</tr>
<tr>
<td>Crash Damages</td>
<td>$500</td>
</tr>
<tr>
<td>Parking Subsidies</td>
<td>$1,000</td>
</tr>
<tr>
<td>Vehicle Operation</td>
<td>$1,500</td>
</tr>
<tr>
<td>Roadway Costs</td>
<td>$2,000</td>
</tr>
<tr>
<td>Residential Parking</td>
<td>$2,500</td>
</tr>
<tr>
<td>Traffic Congestion</td>
<td>$3,000</td>
</tr>
<tr>
<td>Pollution Emissions</td>
<td></td>
</tr>
<tr>
<td>Roadway Land Value</td>
<td></td>
</tr>
<tr>
<td>Fuel Externalities</td>
<td></td>
</tr>
<tr>
<td>Traffic Services</td>
<td></td>
</tr>
</tbody>
</table>
Motorists Benefit Too

More diverse transportation is no more “anti-car” than a healthy diet is anti-food. Motorists have every reason to support it:

- Reduced traffic and parking congestion.
- Improved safety.
- Improved travel options.
- Reduced chauffeuring burden.
- Positive incentives.
- Often the quickest and most cost effective way to improve driving conditions.
## Bus Versus Rail

<table>
<thead>
<tr>
<th>Bus</th>
<th>Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexibility. Bus routes can change and expand when needed.</td>
<td>Greater demand.</td>
</tr>
<tr>
<td>Requires no special facilities.</td>
<td>Greater comfort.</td>
</tr>
<tr>
<td>More suitable for dispersed land use.</td>
<td>More voter support.</td>
</tr>
<tr>
<td>Several routes can converge onto one busway</td>
<td>Greater maximum capacity.</td>
</tr>
<tr>
<td>Lower capital costs.</td>
<td>Greater travel speed and reliability, where rail transit is grade separated.</td>
</tr>
<tr>
<td>Is used more by transit dependent people.</td>
<td>More positive land use impacts.</td>
</tr>
<tr>
<td></td>
<td>Less air and noise pollution.</td>
</tr>
<tr>
<td></td>
<td>Rail stations tend to be more attractive facilities than bus stations.</td>
</tr>
</tbody>
</table>
Increased Ridership Increases Benefits

How do we convince people who drive luxury cars to shift mode?
Encouraging Transit Use

• Quality service (convenient, fast, comfortable).
• Low fares.
• Support (walkable communities, park & ride facilities, commute trip reduction programs).
• Parking pricing or “cash out”.
• Integrated with special events.
• Convenient information.
• Positive Image.
Smart Growth (Density, Design, Diversity)

- More **compact**, infill development.
- **Mixed** land use.
- Increased **connectivity**.
- Improved **walkability**.
- **Urban villages**.
- Increased transportation **diversity**.
- Better parking **management**.
- Improved **public realm**.
- More **traffic calming** and speed control.
“Great Rail Disasters”

• Fails to account for additional factors such as city size, changes in population and employment.

• Misrepresents causation when evaluating the positive relationship between congestion and rail transit development – ignores the tendency of cities to establish new rail transit systems when traffic congestion problems are increasing.

• Ignores significant costs of automobile transportation.

• Presents outdated cost and ridership data as current.

• Ignores many rail transit benefits.
Las Vegas is rated high and New York is rated low, based on their proportionate transit ridership growth rates.
This analysis does not mean that every rail transit project is cost-effective, or that rail is always better than bus or highway improvements.

It does indicate that rail transit can provide significant benefits if implemented in appropriate conditions with supportive transport and land use policies.
“Comprehensive Evaluation of Rail Transit Benefits”
“Evaluating Public Transit Benefits and Costs”
“Evaluating Rail Transit Criticism”
“Win-Win Transportation Solutions”
“Online TDM Encyclopedia”
and more...

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