Win-Win Transportation Emission Reduction Strategies

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Ancient Plagues

Modern Plagues

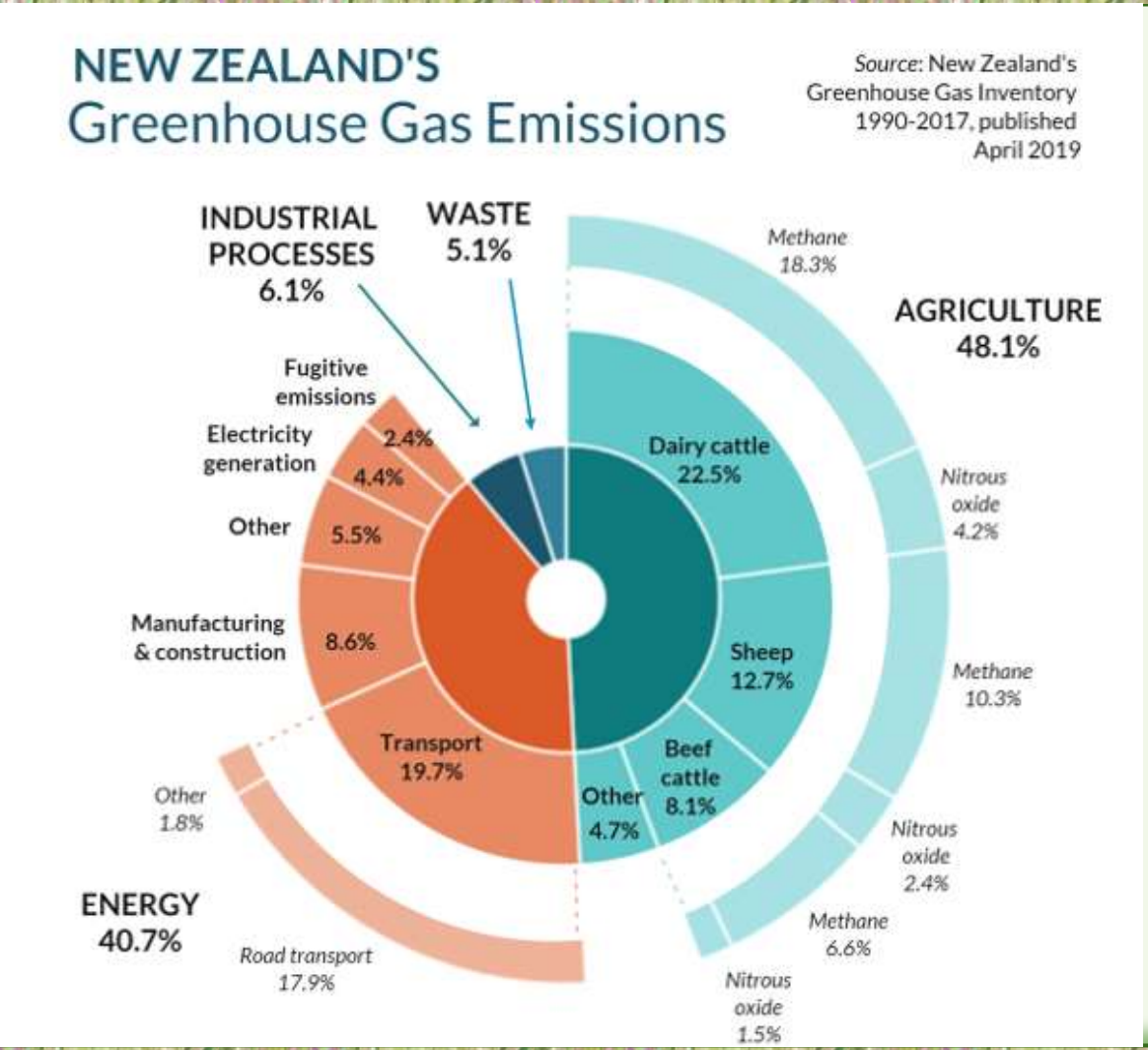
1. Traffic congestion.
2. Parking problems.
3. Traffic accidents.
4. Noise and air pollution.
5. Inadequate mobility options for non-drivers, and chauffeuring burdens.
6. Unaffordability and inequity.
7. Sedentary living (inadequate physical activity).
8. Social isolation.
9. Ugly streetscapes.
10. Fear of crime.

Why Transportation is Important

- 60-90 daily minutes
- 15-25% of household budgets
- Affects economic opportunities
- Affects development costs
- Affects local economic productivity
- Affects health and safety
- Streets are the public realm: the face of a community
- Noise and air pollution, including climate emissions.

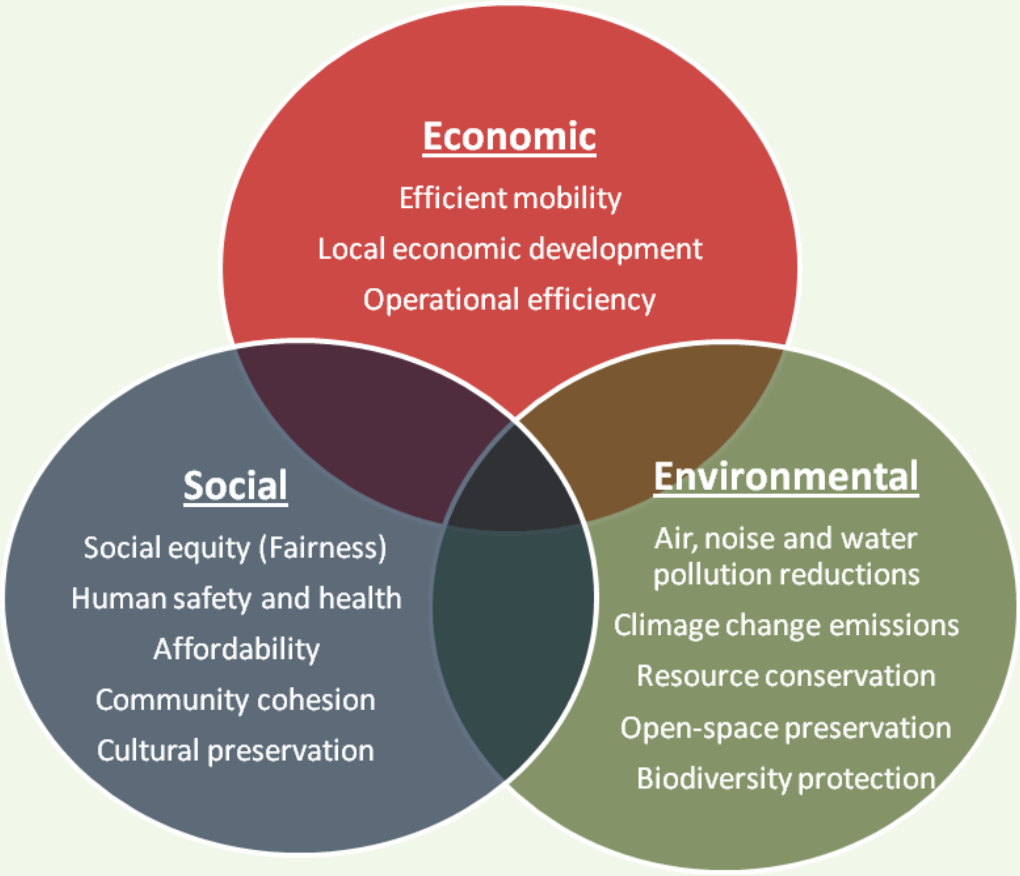
Transport GHG Emissions

Transportation causes about 20% of total emissions and 40% of non-agriculture emissions in New Zealand.



Sustainable Planning

Sustainability emphasizes the integrated nature of human activities and therefore the need to coordinate planning among different sectors, jurisdictions and groups.



Sustainabile Transportation?

- Efficient vehicles or efficient transport systems?

- Is a transport system sustainable if all vehicles are electric powered?

Electric Power Does Not:

- Reduce traffic congestion
- Reduce accidents
- Reduce roadway costs
- Reduce parking facility costs
- Reduce vehicle ownership costs
- Improve mobility for non-drivers
- Improve social equity
- Improve public fitness and health
- Reduce sprawl
- Protect threatened habitat

Impact Evaluation

Planning Objectives	Expand Roadways	Efficient and Alt. Fuel Vehicles	Efficient Modes & Smart Growth
Reduce traffic congestion	✓		✓
Roadway cost savings			✓
Parking cost savings			✓
Consumer cost savings			✓
Improve mobility options			✓
Improve traffic safety			✓
Energy conservation		✓	✓
Pollution reduction		✓	✓
Land use objectives			✓
Public fitness & health			✓

Win-Win Strategies

Improve Mobility Options	Pricing Reforms	Land Use Policy Reforms	Implementation Programs
• Walking and bicycling improvements • Public transit service improvements • High occupancy vehicle priority • Rideshare and ride-hailing improvements • Carsharing services • Complete streets	• Distance-based vehicle insurance and registration fees • Efficient parking pricing • Efficient road pricing • Reduce fuel subsidies • Fuel tax increases • Public transit fare reforms	• Integrated transport and land use planning • Smart Growth development policies • Reduce parking requirements • Efficient parking management • Complete streets • Location-based fees and taxes	• Multi-modal and least-cost transport planning • Commute trip reduction programs • Freight transport management • Mobility management marketing • Tourist transport management

Valuing Multi-Modalism

An efficient and equitable transportation system is diverse so users to choose the best mode for each trip:

- Walking and cycling for local errands
- High quality public transit when travelling on busy corridors
- Automobile travel when it is truly most efficient, considering all impacts

Current planning does a poor job of valuing this diversity.

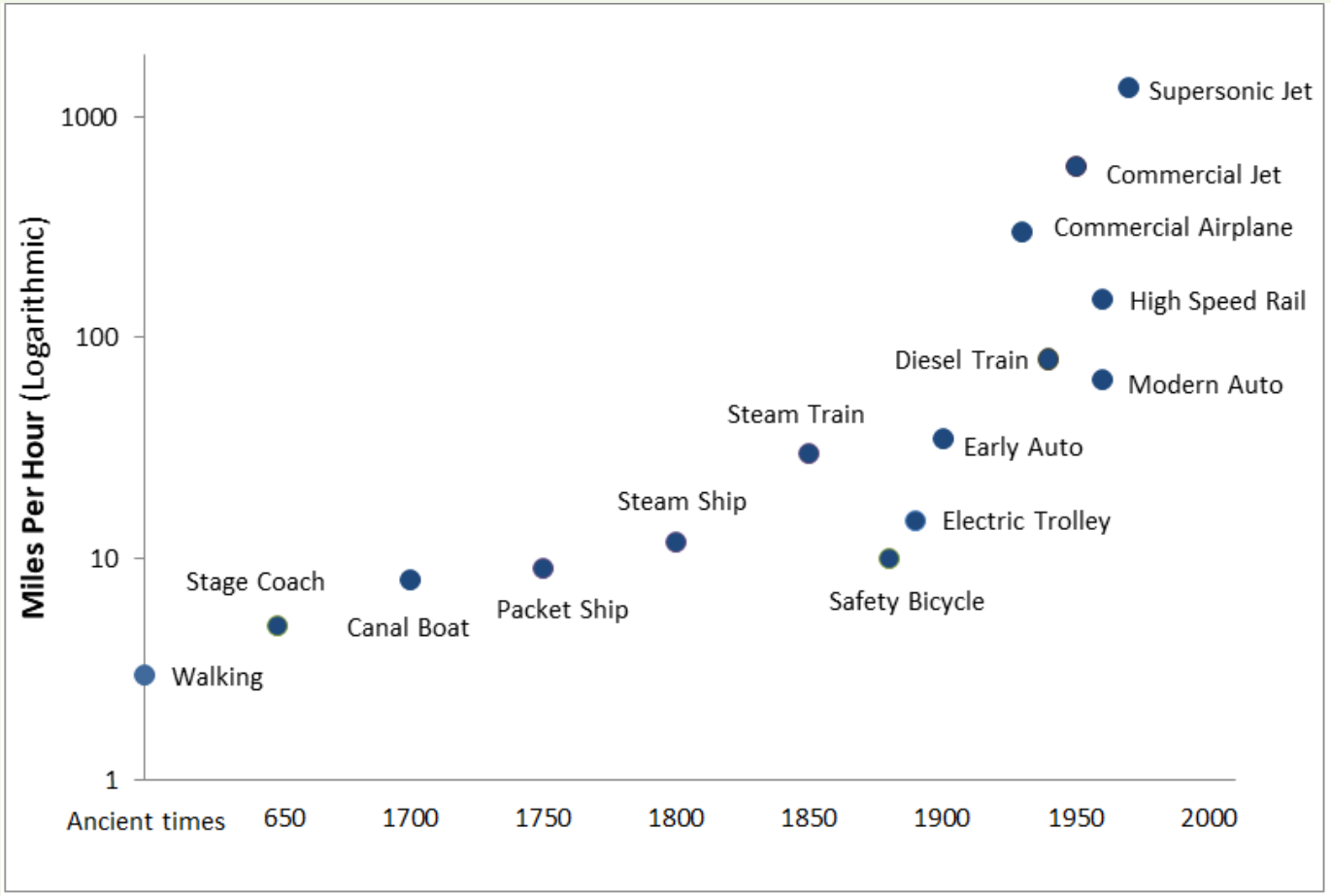
"A developed country is not where the poor drive cars, it is where the rich use public transportation"

- Enrique Peñalosa, Bogota Mayor

Newer Was Faster

For most of transportation history, newer modes were faster.

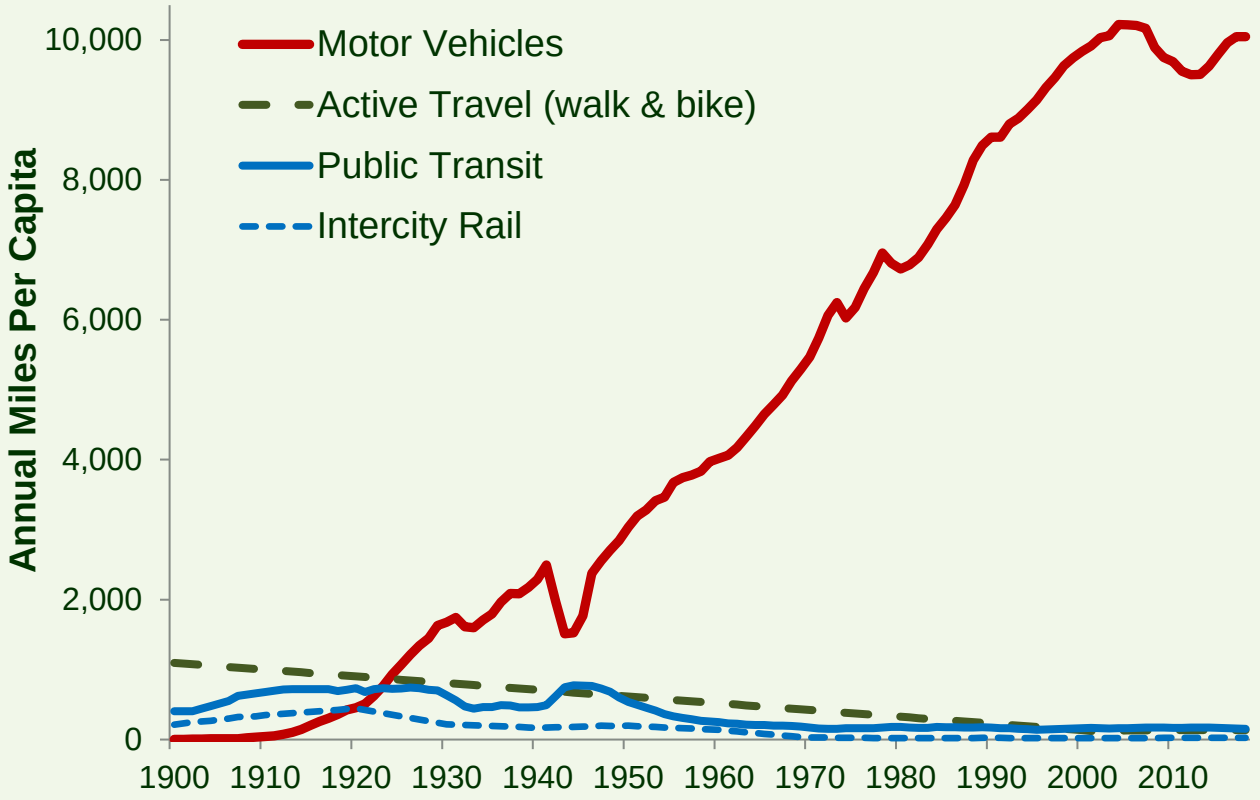
Note that this graph shows speed on a logarithmic scale so small increases in height indicate large increases in speed.



Travel Trends

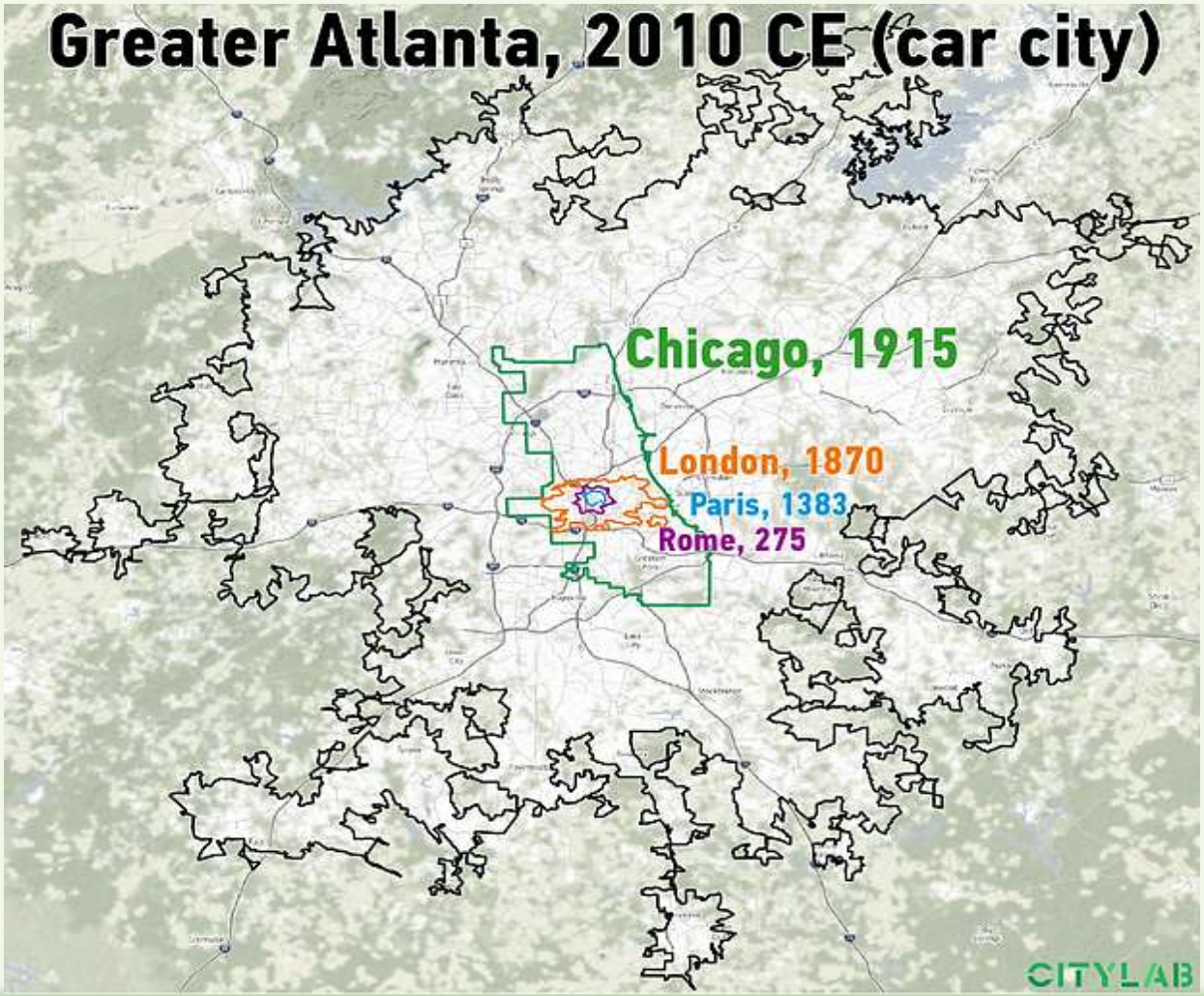
Before 1900 people relied primarily on walking, averaging about 1,000 annual miles, with occasional bicycle and rail trips.

Motor vehicle travel grew steadily during the Twentieth Century. It now averages about 10,000 annual miles per adult.



Automobile Travel Causes Sprawl

Ancient Rome and Paris were compact walking cities. London and Chicago expanded along rail lines, with walkable, transit-oriented neighborhoods. Greater Atlanta is a sprawled, automobile dependent city where it is difficult to live without a car.



Household Transportation Costs

A 1901 household expenditure survey had no category for transportation, indicating that prior to the automobile age, transportation expenses were insignificant for most families.

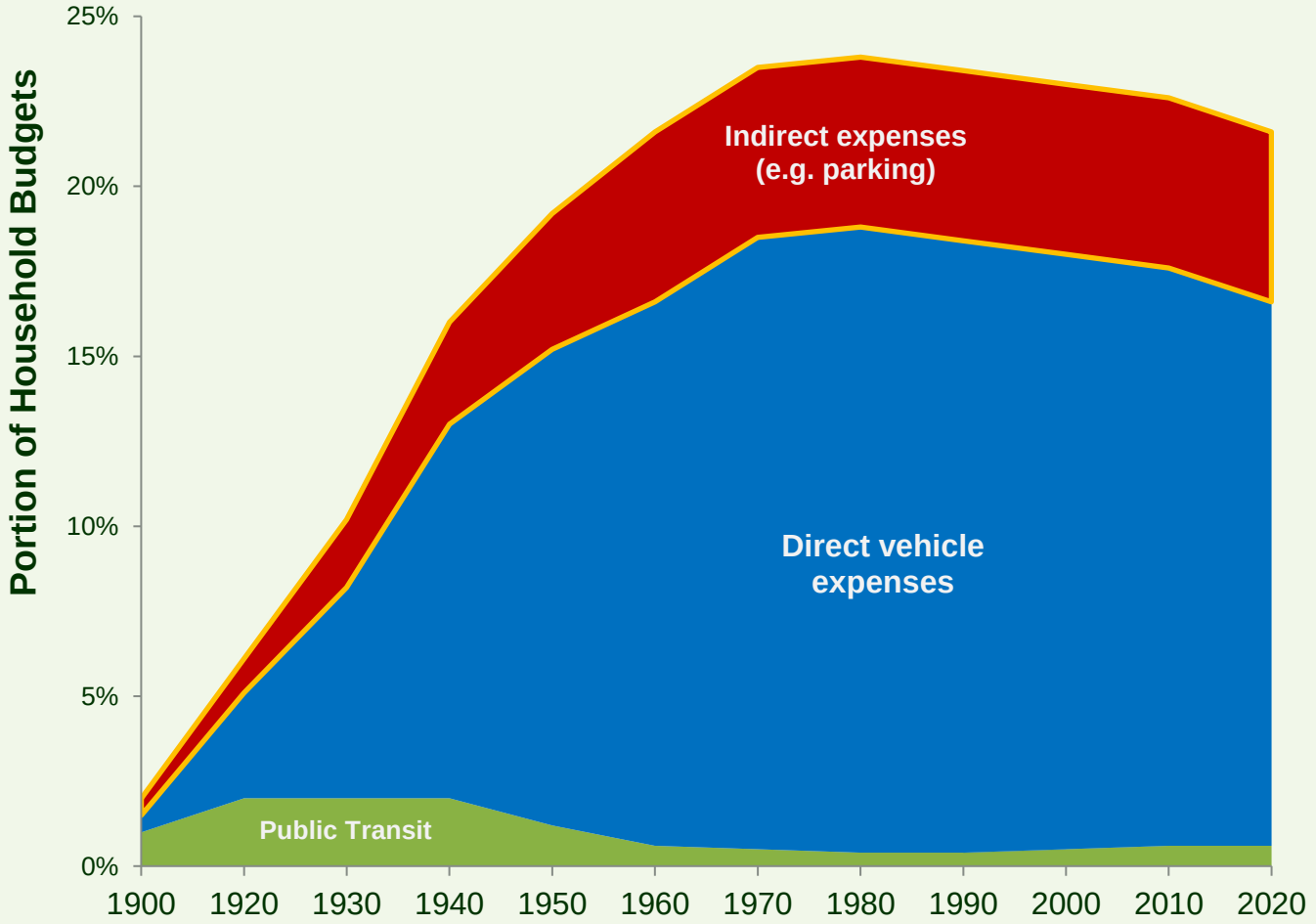
Now, a typical household devotes 15-25% of its budget to transportation, including public transport, vehicles and residential parking.

AVERAGE EXPENDITURE OF 2,567 WORKINGMEN'S FAMILIES FOR EACH OF THE PRINCIPAL ITEMS ENTERING INTO COST OF LIVING, AND PER CENT OF AVERAGE TOTAL EXPENDITURE, 1901.

Items of expenditure.	Expenditure based on all families.	
	Average.	Per cent of total expenditure.
Food	$326.90	42.54
Rent	99.49	12.95
Mortgage:		
Principal	[a] 8.15	1.06
Interest	[b] 3.98	.52
Fuel	32.23	4.19
Lighting	8.15	1.06
Clothing:		
Husband	33.73	4.39
Wife	26.03	3.39
Children	48.08	6.26
Taxes	5.79	.75
Insurance:		
Property	1.53	.20
Life	19.44	2.53
Organizations:		
Labor	3.87	.50
Other	5.18	.67
Religious purposes	7.62	.99
Charity	2.39	.31
Furniture and utensils	26.31	3.42
Books and newspapers	8.35	1.09
Amusements and vacation	12.28	1.60
Intoxicating liquors	12.44	1.62
Tobacco	10.93	1.42
Sickness and death	20.54	2.67
Other purposes	45.13	5.87
Total	768.54	100.00

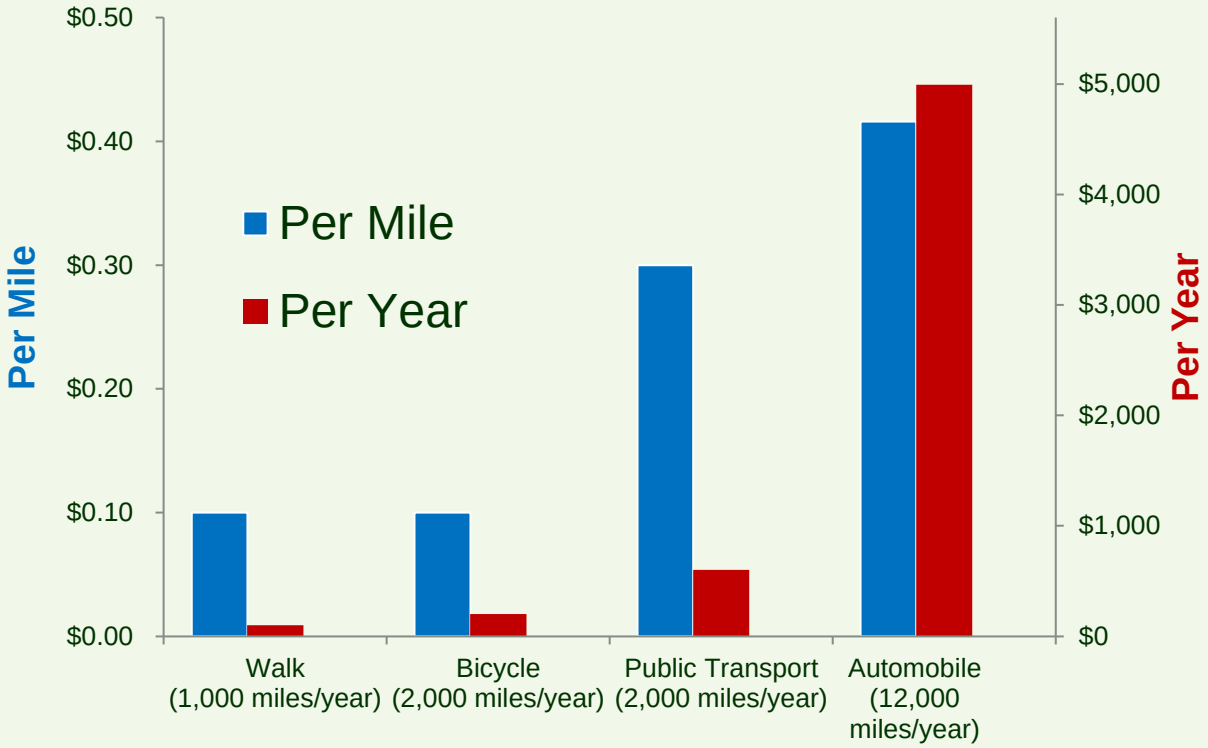
Household Transportation Cost Trends

Household transportation expenses increased significantly as motor vehicle travel grew.



Typical User Costs Per Mile and Year

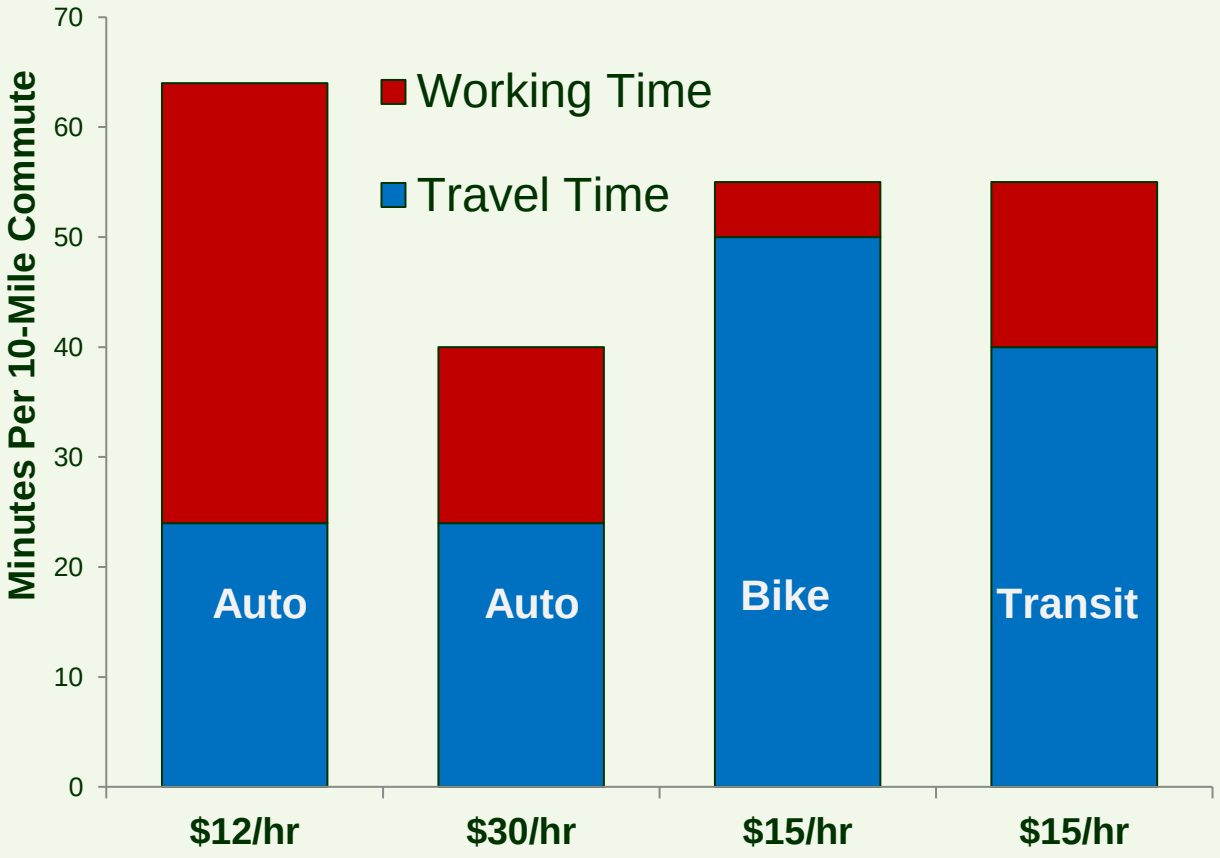
Automobile travel tends to be somewhat more costly per mile, and far more costly per year because automobile ownership increases annual mileage.



Effective Commute Speeds

Effective speeds, measures time spent travelling plus time spent working for money to pay travel expenses.

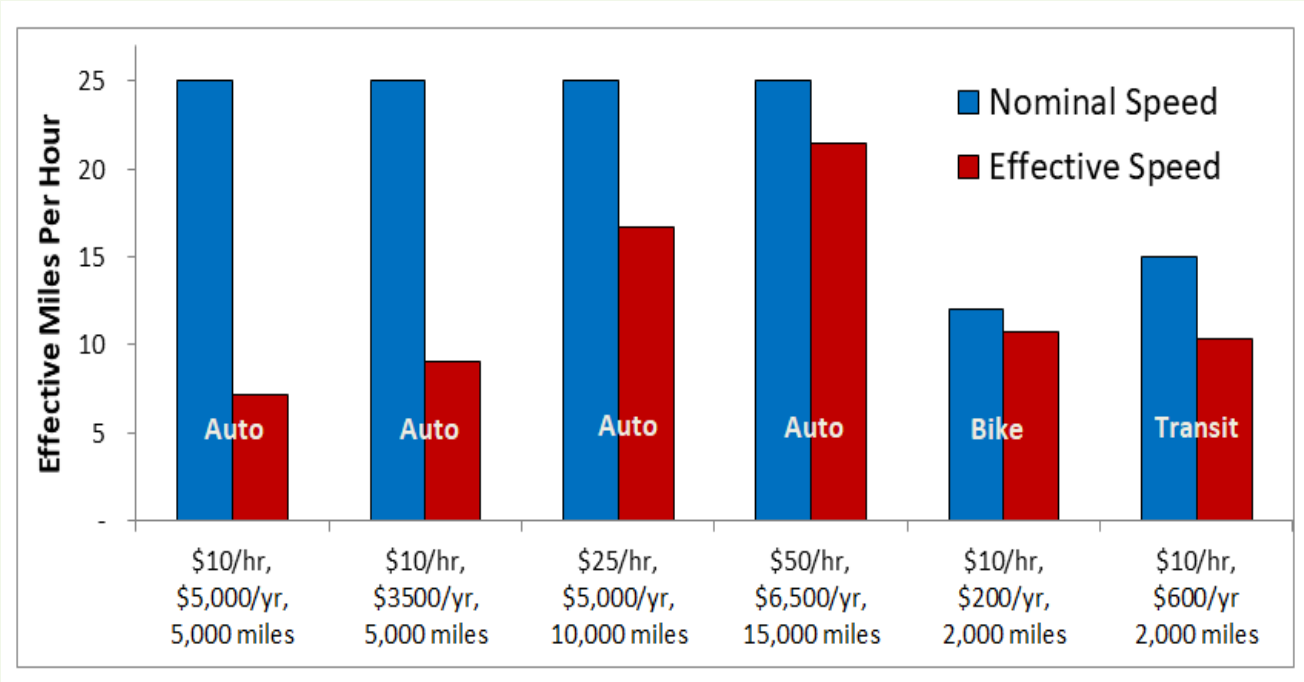
Many lower-wage motorists spend more time earning money to pay their travel expenses than they spend travelling. Bicycling and transit are generally faster than driving overall.



Nominal Versus Effective Speed

Effective speeds are much lower than nominal speed for lower-wage motorists.

This indicates that policies which favor faster but expensive modes over slower but cheaper modes are regressive. Planning that evaluates transportation quality based on nominal rather than effective speeds harms poor people.



Mode Shifts

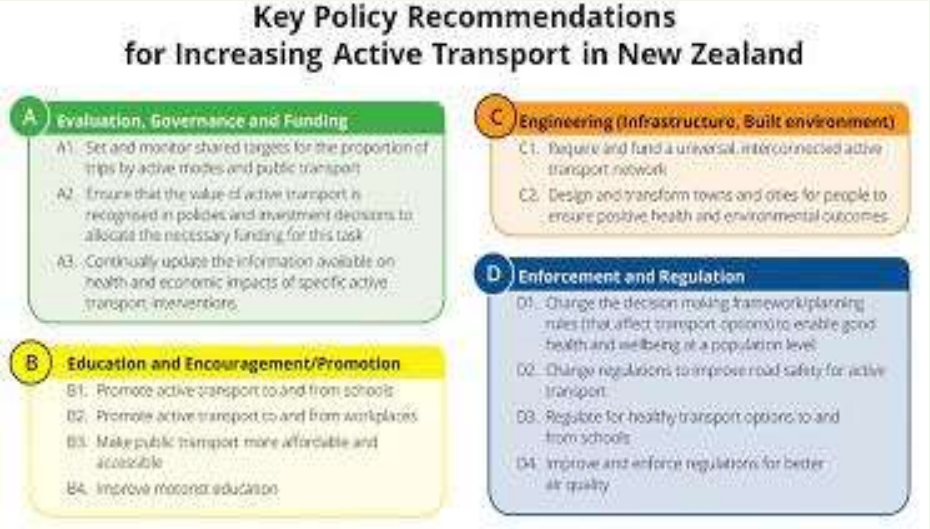
How can we convince people who drive luxury cars to shift mode?

Attracting Discretionary Riders

- Quality service (convenient, fast, comfortable and attractive).
- Convenient user information and payment systems.
- Affordable fares.
- Integration with other modes (walking, bicycling, ridehailing, taxi, etc.).
- Incentives such as commute trip reduction programs and parking cash out.
- Positive image. Pride in use.

Improve Active Transport

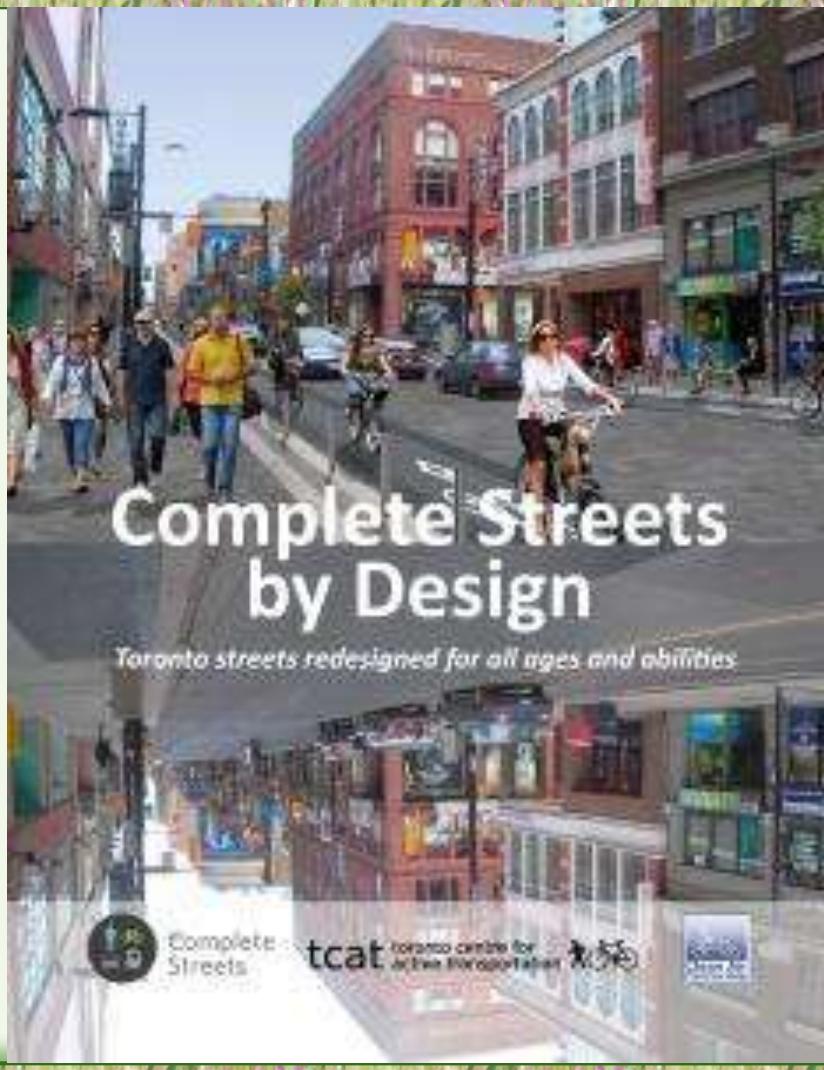
- Walking and bicycling play important roles in an efficient and equitable transport system. They can leverage large vehicle travel reductions.
- Local and regional governments are improving walking and bicycling conditions, but implementation is slow due to planning biases.
- Comprehensive walking and bicycle improvements are inexpensive, typically costing an additional $50-100 annual per capita.



"Development of key policy recommendations for active transport in New Zealand: A multi-sector and multidisciplinary endeavour" (Mandic, et al. 2020)

Complete Streets

A Complete Street is designed for all activities, abilities, and travel modes. Complete Streets provide safe and comfortable access for pedestrians, cyclists, transit users and motorists, and a livable environment for visitors, customers, employees and residents in the area.

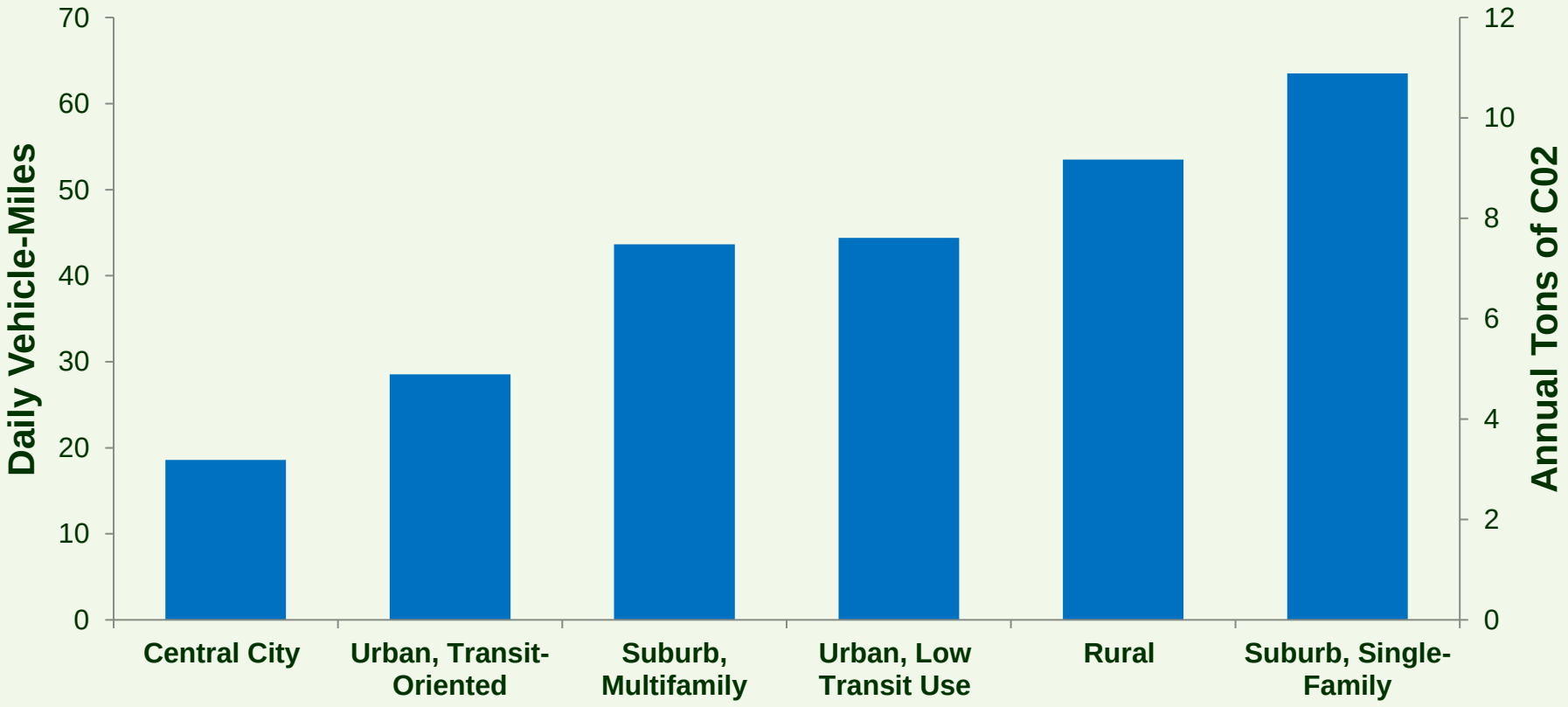


Encourage Transit-Oriented Development

- Transit Oriented Development (TOD, also called *Smart Growth* and *New Urbanism*) refers to development policies that create compact, walkable neighborhoods along frequent transit corridors. This maximizes the number of jobs and homes located in areas where residents can reduce their driving.

- TOD residents own fewer vehicles and drive 20-60% less than comparable households in automobile-dependent areas.

Compact Development Reduces Emissions



Compact neighborhood households drive less, produce lower emissions, and impose lower transport costs. Allowing any that wants to locate in a compact, transit-oriented neighborhood achieves transport emission reduction goals. (Salon 2014)

Parking Management

- **3-5** parking spaces per vehicle, costing **$500-3,000** each or **$2,000 to $8,000** total per vehcile-year.
- May parking space are worth more than the vehicles they serve.
- Most parking is unpriced.
- For every dollar motorists spend to purchase a car they expect somebody to spend about a dollar to subsidize its parking.

A Fair Share for Everyone

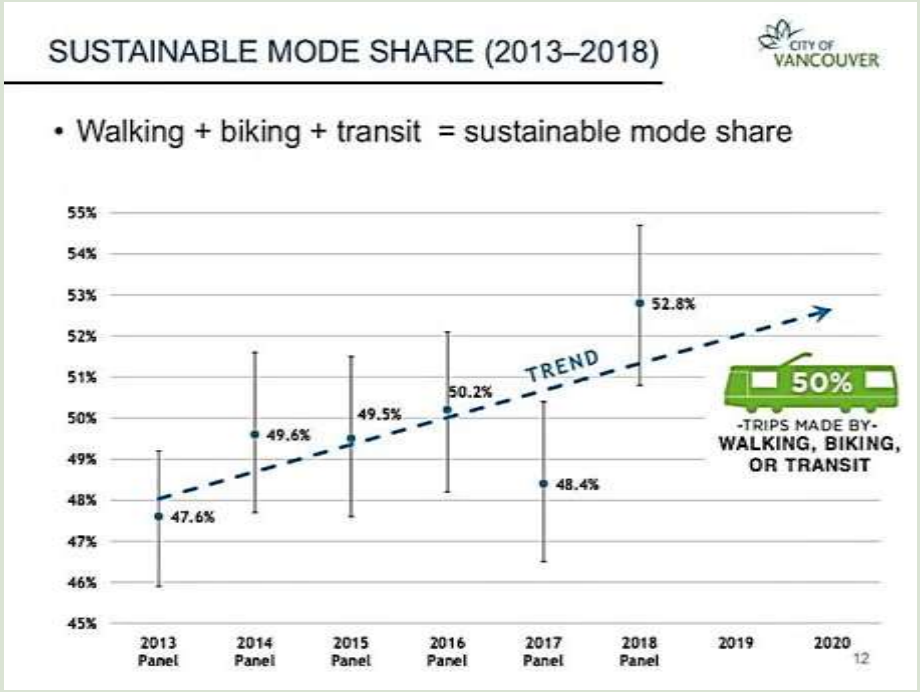
For fairness sake (**horizontal equity**), communities should invest at least as much on affordable modes as on automobile trips, and for vertical equity sake, we should be willing to spend even more to help physically and economically disadvantaged travellers.

I want my infrastructure dollars spent on more roads and parking facilities.

I want my infrastructure dollars spent on increased public transit services, better vehicles and stations, and improved walking and bicycling conditions.

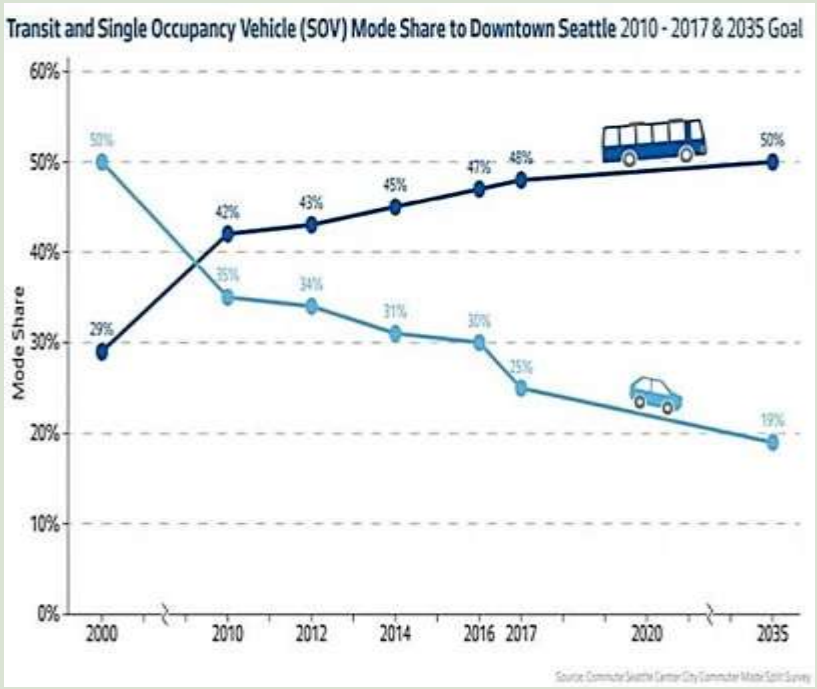
Success Stories

Vancouver 2018 Transport Panel Survey



Between 2013 and 2018, Vancouver citywide walking, bicycling and transit mode shares increased from 48% to 53%, due to multi-modal planning and TDM incentives.

Seattle Center City Commute Survey



Between 2000 and 2017, downtown Seattle's transit mode share increased from 29% to 48%, and auto mode share declined from 50% to 25%, due to transit improvements and TDM incentives.

Potential Advocacy Partners

Benefit	Potential Partners
Traffic congestion reduction	Transportation agencies, motorists
Parking congestion reductions	Local transport agencies, motorists, developers, businesses and economic development associations
Improved public safety and health	Transportation agencies, public health agencies and advocacy organizations
Basic mobility for non-drivers and increased affordability	Social service organizations, advocacy groups for seniors, low-income and people with disabilities
Local economic development and increased real estate values	Business and economic development organizations, developers and real estate industries
Energy conservation and emission reductions	Environmental and economic development organizations
Improved service	Current and potential transit users

"Win-Win Transportation Emission Reduction Strategies"

"Generated Traffic: Implications for Transport Planning"

"Distance-based Charges: A Practical Strategy for More Optimal Pricing"

"Evaluating Active Transport Benefits and Costs"

"Healthy Community Transportation Planning"

"Evaluating Smart Growth Benefits"

"Online TDM Encyclopedia"

and more...

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