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Evaluating Transportation Affordability

How Planning Can Better Respond to Demands for Lower Cost Travel

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Transportation affordability is an important but often overlooked goal. This report describes why and how to incorporate it into planning analysis and decision-making.

Abstract

Affordability refers to the costs of goods relative to incomes, and households' ability to purchase necessities such as food, housing and healthcare. *Transportation affordability* refers to households' ability to purchase the travel needed to access goods and activities within their budget limits. Transportation affordability is an important but often overlooked planning goal. Experts recommend devoting no more than 15% of household budgets to transportation or no more than 45% to housing and transport combined; most North American households spend more than these limits. Driving is far more costly than other modes, so true affordability requires improving affordable modes and creating compact, multimodal communities where it is easy to access services and activities without driving. There is evidence of significant latent demand for lower-cost travel options. Planning decisions often involve trade-offs between different types of affordability and between affordability and other goals, so it is important to apply comprehensive analysis that accounts for all impacts. There are many possible ways to improve affordability, some of which provide large co-benefits. This report provides practical guidance for evaluating transportation affordability impacts and achieving affordability goals.

A summary of this report was published in the *ITE (Institute of Transportation Engineers) Journal*, "Evaluating Transportation Affordability," June 2025 (http://vtpi.org/ITEJ-eta-Jun2025.pdf).

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Executive Summary

Affordability refers to the costs of goods relative to incomes, and households' ability to purchase necessities such as food, housing and healthcare. *Transportation affordability* refers to households' ability to access basic goods and activities within their budget limits. Transportation affordability is an important but often overlooked planning goal.

Unaffordable transportation creates problems: it forces lower-income families to forego desired travel and opportunities, use inferior (inconvenient, uncomfortable and sometimes dangerous) travel options, or spend more than affordable on mobility as illustrated to the right. It causes travellers to feel fear and embarrassment. Described more positively, affordable transportation increases opportunity, freedom and happiness.

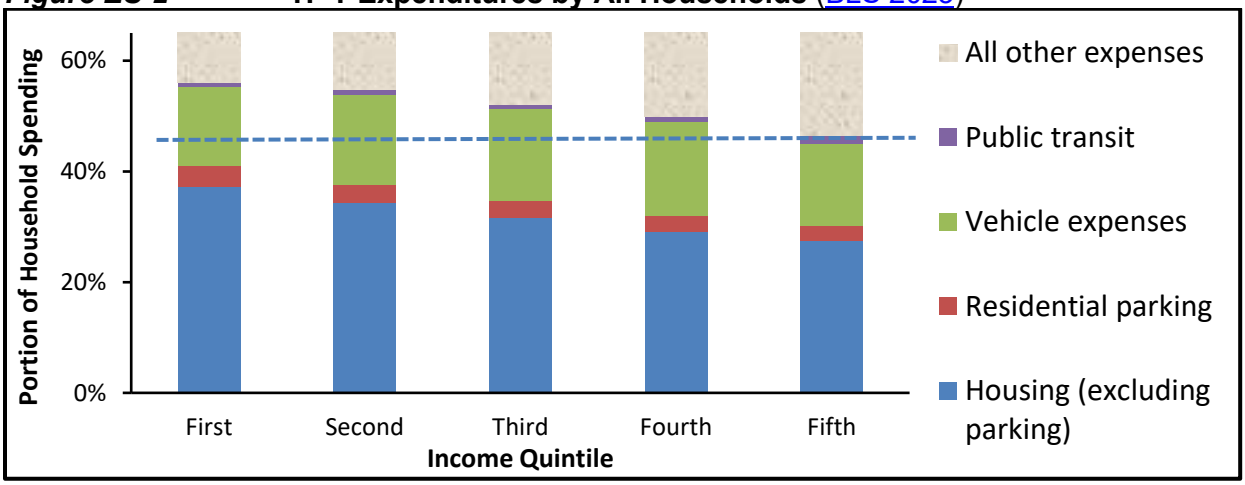
Figure ES-1 **Problems of Unaffordable Transportation**

Unaffordable transport is inefficient and unfair.

There are various ways to evaluate affordability. Experts recommend that households spend no more than 45% of their budgets on housing and transportation combined, which recognizes the trade-offs that families often face between housing and travel expenses. A typical family that spends 30% of its budget on housing can afford to spend up to 15% on transportation. Of course, every household has unique needs and abilities; some can spend more than these limits, but others can afford less, and even people who can normally afford transportation may benefit from having more affordable options that they or their loved-ones could use if needed in the future.

The following figures show the portion of household spending devoted to housing and transportation (H+T) by income quintile (fifth of all households). Most households spend more than 45%, indicated by the dashed line, which is more than is considered affordable. This is high by international standards.

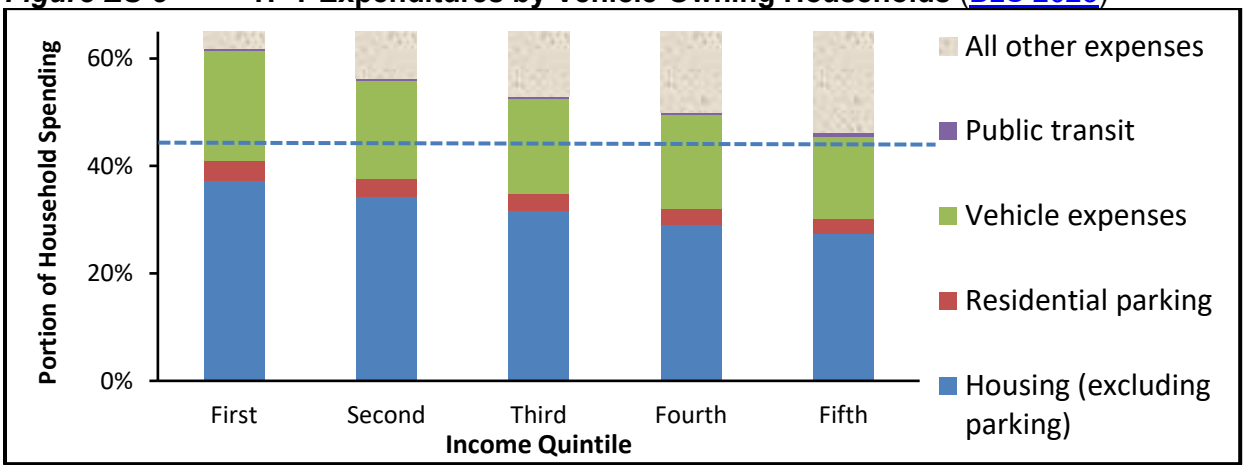
Figure ES-2 **H+T Expenditures by All Households** (BLS 2023)



This figure compares household expenditures by income quintile (fifth of all households). Most spend more than is considered affordable (45% of budgets, indicated by dashed line).

Low-income vehicle-owning households typically spend more than 20% of their budgets on transportation and more than 60% on H+T combined, as illustrated below.

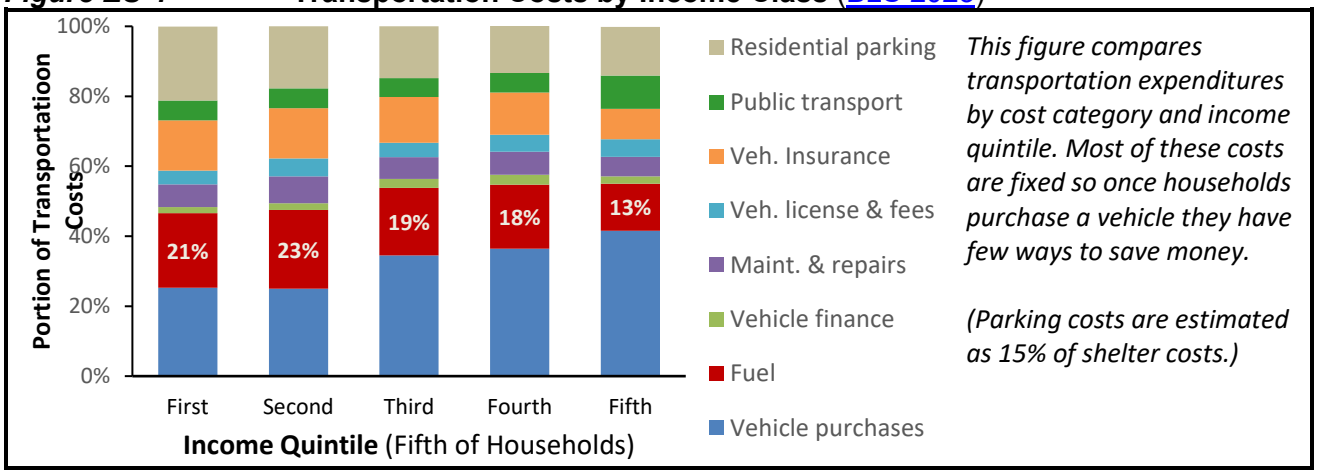
Figure ES-3 **H+T Expenditures by Vehicle-Owning Households** (BLS 2023)



Most lower-income vehicle-owning households spend more than is affordable on housing and transportation.

The figure below compares U.S. household transportation expenditures by cost category and income class. Although fuel costs (red) tend to receive the most attention, they are a modest portion of the total. Most (70-80%) vehicle costs are fixed (not significantly affected by the amount a vehicle is driven), so once a household purchases a vehicle it has few ways to reduce these costs.

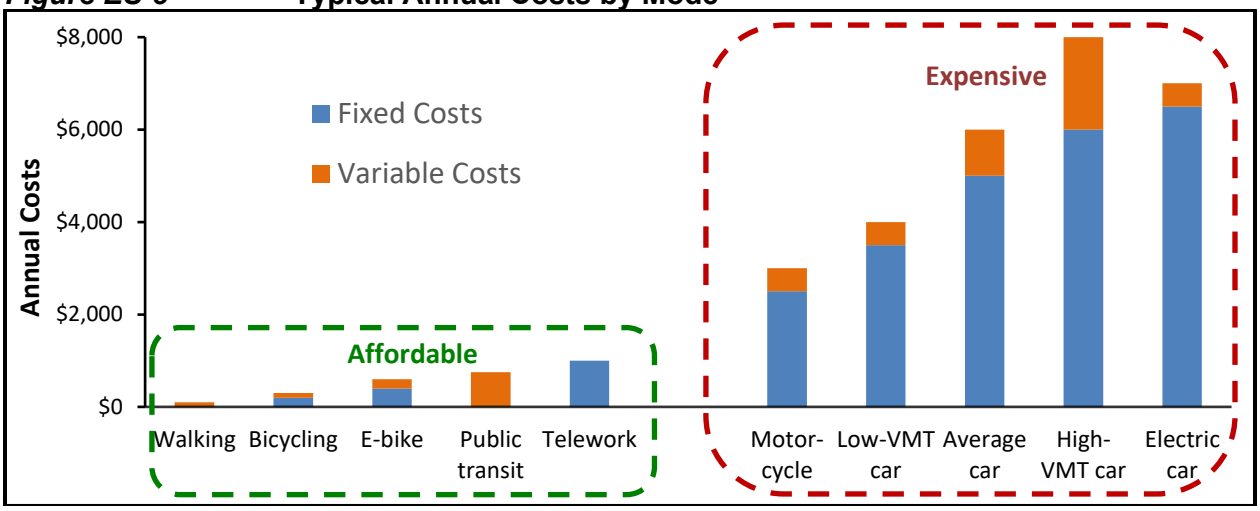
Figure ES-4 **Transportation Costs by Income Class** (BLS 2023)



This indicates that many lower income households face severe transport costs and risks. They tend to bear particularly high vehicle loan, insurance and repair costs, their vehicles tend to be unreliable, and many live in areas with inadequate non-auto options. This can cause absenteeism and tardiness, missed appointments, limited childcare and school options, and poor access to affordable food. If they lose their job or driving privileges, or their vehicle fails or crashes they can face disaster: lost income, no vehicle, no travel options, ongoing payments, poor credit rating and sometimes disabilities.

Various factors affect transportation affordability. Walking, bicycling, e-bikes, public transit and telework (telecommunications that substitute for physical travel) are much more affordable than automobile travel, as illustrated below, so transport cost increase with auto ownership and use.

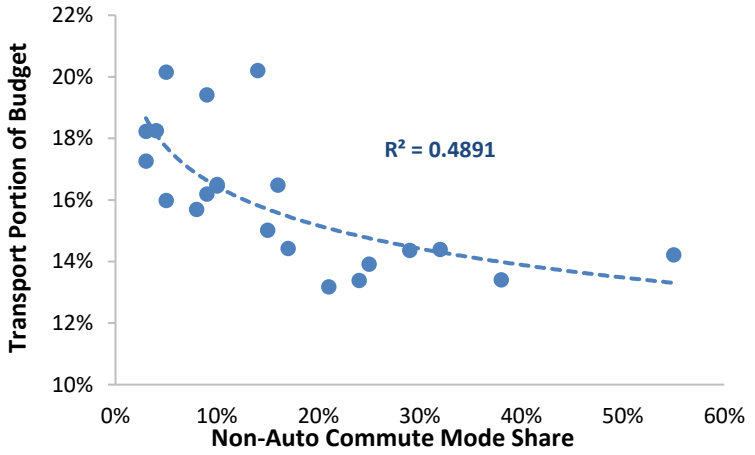
Figure ES-5 **Typical Annual Costs by Mode**



Walking, bicycling (including e-bikes) and public transit are much more affordable than automobile travel. Most vehicle costs are fixed so vehicle owners save little from marginal reductions in annual mileage.

Multimodal communities have much more affordable transportation. The following graph shows that modest increases in non-auto mode shares tend to provide large savings.

Figure ES-6 **Transport Spending Versus Non-Auto Mode Shares** (BLS 2023; ACS 2022)



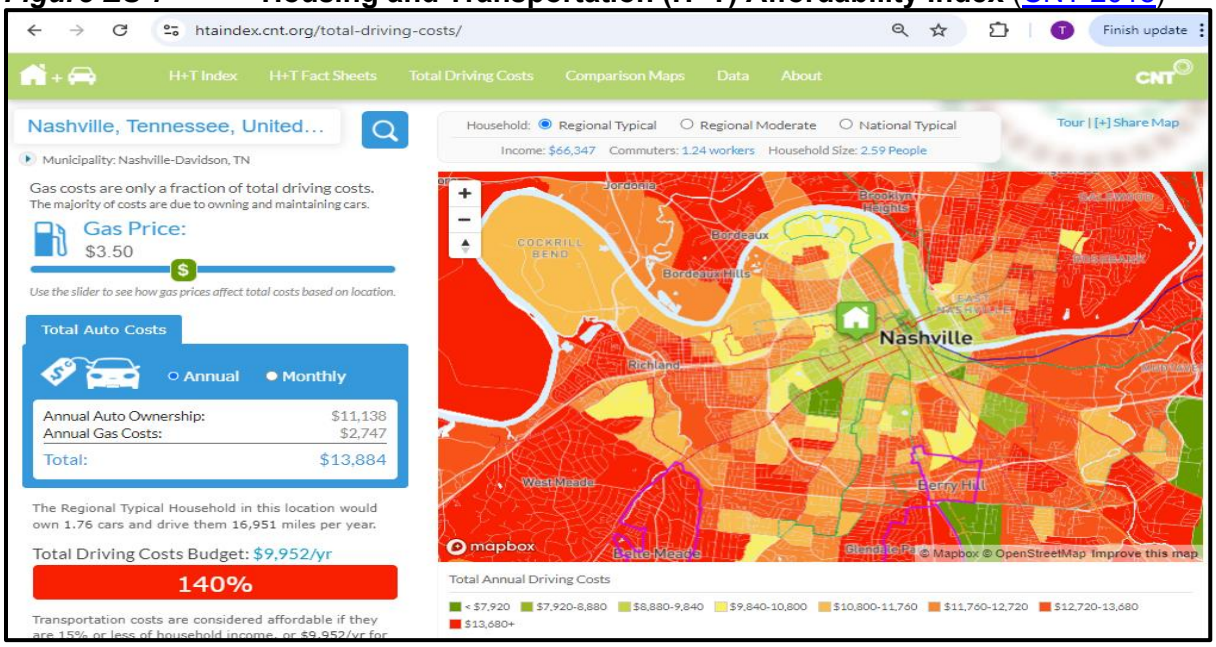
The portion of household budgets devoted to transportation tends to declines as non-auto commute mode shares increase. A shift from low (less than 10%) to medium (20-30%) non-auto mode shares is associated with large increases in transportation affordability.

(Based on analysis of the 22 urban regions with individual data in the U.S. Consumer Expenditure Survey.)

North American households spend a much larger portion of their budgets on transportation (15-20%) than in peer countries (5-10%). Travel cost reductions can significantly increase families' discretionary budgets (residual funds after paying for necessities), and therefore their economic freedom and resilience. For example, owning one less vehicle typically saves $4,000 in vehicle expenses and hundreds of dollars in annual housing costs if parking is unbundled, which can typically increase a low- or moderate-income family's discretionary spending by about a third.

Central, multimodal neighborhoods tend to have lower transportation costs than in urban fringe areas, as illustrated in the map below. As a result, central areas are usually most affordable overall.

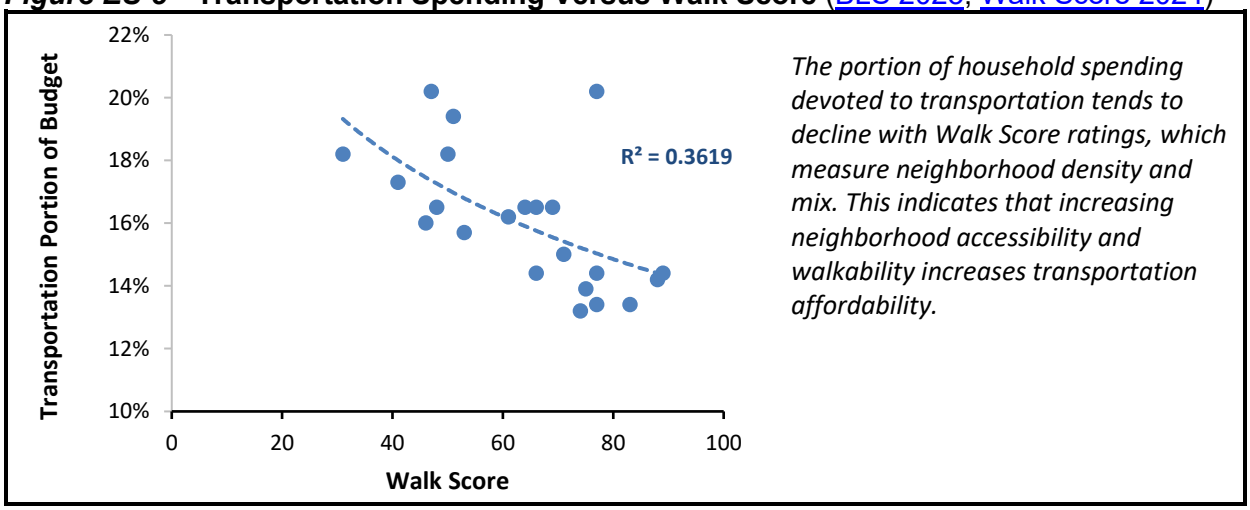
Figure ES-7 **Housing and Transportation (H+T) Affordability Index** (CNT 2018)



This map shows household transportation costs in the Nashville region. The most affordable areas, shown in green, tend to be central, multimodal neighborhoods where residents can minimize driving.

Transportation affordability increases with Walk Score ratings, as illustrated below. This indicates that more compact and multimodal neighborhoods significantly increase transportation affordability, in addition to other benefits including more independent mobility for non-drivers, better public fitness and health, increases economic resilience (resident's ability to respond to economic shocks such as reduced income, illness or a vehicle failure), and reduced traffic congestion, crashes and pollution.

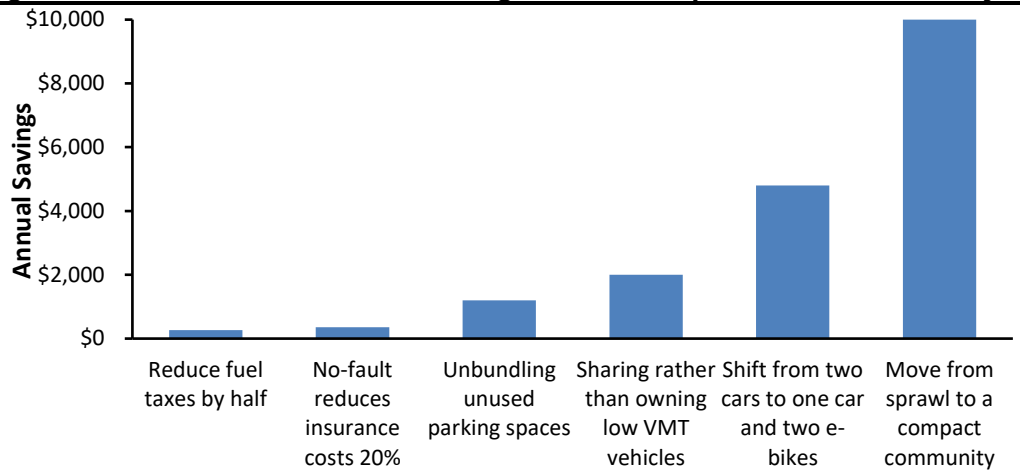
Figure ES-8 **Transportation Spending Versus Walk Score** (BLS 2023; Walk Score 2024)



The portion of household spending devoted to transportation tends to decline with Walk Score ratings, which measure neighborhood density and mix. This indicates that increasing neighborhood accessibility and walkability increases transportation affordability.

There are many possible ways to increase transportation affordability, some of which are better overall than others. Some strategies simply shift costs to other sectors. For example, low fuel taxes and user fees increase general taxes to pay roadway costs not borne by users. "Free" parking increases housing costs (for residential parking) and the price of goods (for customer parking). No-fault insurance reduces crash victim compensation. By making driving cheaper such underpricing increases traffic problems, and by reducing non-auto travel demands they reduce travel options for non-drivers. Most vehicle cost reduction strategies provide modest savings; strategies that reduce vehicle ownership and parking costs provide much larger savings and benefits, as illustrated below.

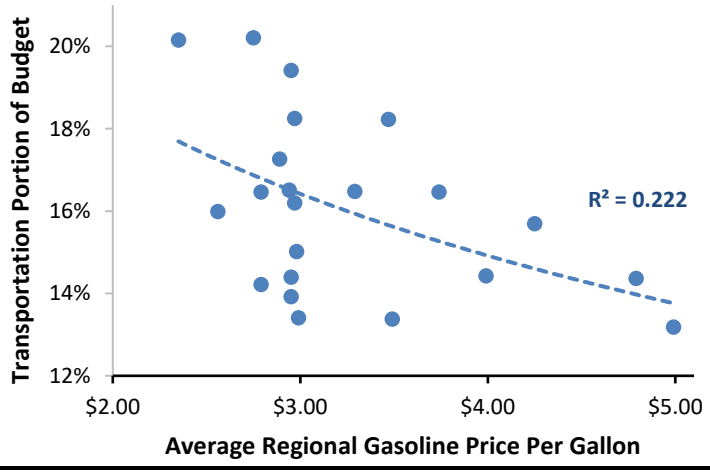
Figure ES-9 **Estimated Savings from Transportation Affordability Strategies**



Most vehicle cost reduction strategies provide a few hundred dollars in annual savings. Strategies that reduce vehicle ownership and unnecessary parking costs provide much larger savings.

The following graph shows that *lower* fuel prices are associated with *higher* household transportation expenditures. This analysis indicates that auto dependency – relying on driving for most travel – is unaffordable to most low-income and many moderate-income households.

Figure ES-10 **Transportation Spending Versus Fuel Price** (BLS 2023; Gas Buddy 2024)



The portion of household spending devoted to transportation tends to decline with regional fuel prices: higher prices are associated with more affordable transportation.

This suggests that higher fuel prices help create communities with more affordable travel options, and that citizens in more multimodal communities are willing to accept higher fuel prices.

The following table summarizes key factors that affect affordability analysis.

Table ES-1 **Summary of Transportation Affordability Analysis Factors**

Factor	Key Insights
Data sources	Affordability analysis should be comprehensive, considering housing, residential parking and transportation costs. Household budgets tend to be more stable than incomes and so provide a more accurate perspective of long-term wealth.
Long-term trends	Transportation costs increased significantly during the last century, and vehicle costs are likely to increase in the future due to their growing size and complexity.
By mode	Walking, bicycling and public transit are far more affordable than automobile travel. Household transportation costs decline significantly as non-auto mode shares increase.
Transportation cost components	Transportation involves many costs, including some, such as residential parking, that are often overlooked or underestimated in affordability analysis.
Fuel prices	Lower fuel prices increase total transportation costs and reduce affordability overall.
Income class and ability	Most low- and moderate-income households, and people with disabilities, spend more on housing and transportation than is affordable.
By location	Transportation costs increase with vehicle travel and sprawl. Residents of compact, multimodal neighborhoods tend to spend less on transport and housing combined.

Many factors can affect transportation affordability analysis. Lower-income households, people with disabilities, and residents of sprawled, automobile-dependent areas.

The most effective and equitable affordability strategies improve lower-cost modes, encourage vehicle sharing, encourage driving reductions, and create more compact and multimodal communities. In addition to affordability these strategies help achieve other community goals including more independence for non-drivers, improved public fitness and health, plus reduced congestion, infrastructure costs, traffic risks and environmental harms. Strategies intended to make driving more affordable by reducing road and parking fees tend to contradict other goals, and over the long run usually reduce affordability by increasing auto-dependency and sprawl.

There is evidence of significant latent demand for affordable mobility and accessibility options. Although few motorists want to give up driving altogether, surveys indicate that many would prefer to live in more compact and multimodal communities where they drive less, use affordable modes more, and spend less time and money on driving. Conventional planning does a poor job of responding to these demands. It is biased in ways that favor expensive travel over more affordable options, as summarized in Box 1.

Box 1 **Planning practices that favor expensive transport**

- Planning that prioritizes speed over affordability.
- Roadways designed to maximize traffic speed to the detriment of affordable modes.
- Undervaluing and underinvesting in affordable modes (walking, bicycling and public transport).
- Parking minimums that force households to pay for off-street parking, regardless of their demands.
- Restrictions on compact housing (townhouses and multifamily) in multimodal neighborhoods.
- High fixed, low variable vehicle price structure.

Reforming these biases is an important step in creating affordable and equitable transportation systems. The box to the right provides guidance for planning that better responds to transportation affordability goals.

Box 2 **Guidance for Affordable Transportation Planning**

- Include indirect costs such as residential parking.
- Consider both housing and transportation costs.
- Consider vehicle ownership as well as operating costs.
- Give special consideration to affordability for people with disabilities, low incomes and other unique needs.
- Identify latent demand for affordable travel options.

Current transportation price structures are another obstacle to affordability. Most vehicle costs are external or fixed, so motorists save little from reducing their vehicle travel. This price structure encourages motorists to maximize driving to get their money's worth from their vehicle spending. To correct this, policies should encourage vehicle sharing rather than ownership, and convert fixed costs into variable costs. For example, local governments can reduce parking mandates so residents are not forced to pay for costly parking spaces they don't need, and support neighborhood carsharing and mobility as a service (MaaS). Governments can apply pay-as-you-drive pricing that converts fixed fees, such as vehicle insurance, registration and taxes, into variable fees.

Box 3 lists multimodal affordable transportation strategies. These strategies tend to have synergistic effects; they become more effective and beneficial as more are integrated, for example, by implementing non-auto improvements, carsharing, TDM incentives parking policy reforms and more compact development so travellers have better travel options *and* incentives to use the most efficient possible. Together they can provide large savings and benefits, particularly for physically, economically and socially disadvantaged travellers.

Box 3 **Multimodal Affordable Transportation Strategies**

- Apply a sustainable transportation hierarchy in planning and funding. Align individual planning decisions to support strategic goals.
- Improve and encourage affordable modes including walking, bicycling, e-bikes, public transit, car-sharing and telework.
- Spend at least the portion of infrastructure budgets on affordable modes as their potential mode shares. For example, if walking and bicycling improvements would result in 20% active mode shares, they should receive up to that portion of funding for fairness sake, or more to achieve strategic goals and make up for past underinvestments.
- In economic evaluations give extra weight to improvements to affordable modes and benefits to lower-income travellers.
- Support vehicle sharing (carsharing and MaaS) and encourage households to right-size their vehicle fleets.
- Implement Smart Growth policies that create compact, multimodal neighborhoods where it is easy to use affordable modes.
- Increase affordable housing in multimodal neighborhoods.
- Apply complete streets policies to ensure that all streets accommodate affordable modes.
- Reform parking policies to increase efficiency. Unbundle and cash out free parking so non-drivers are no longer forced to subsidize parking facilities they do not need.
- Implement TDM incentives that encourage travellers to use affordable and resource-efficient modes when possible.

Conventional economics tends to assume that happiness requires more income. This study offers a different perspective; it investigates ways to reduce costs and therefore the money required to satisfy people's mobility needs. This is important and unique analysis. It should be of interest to policy makers, planners, advocates and anybody who wants more efficient and equitable transportation.

End of Executive Summary

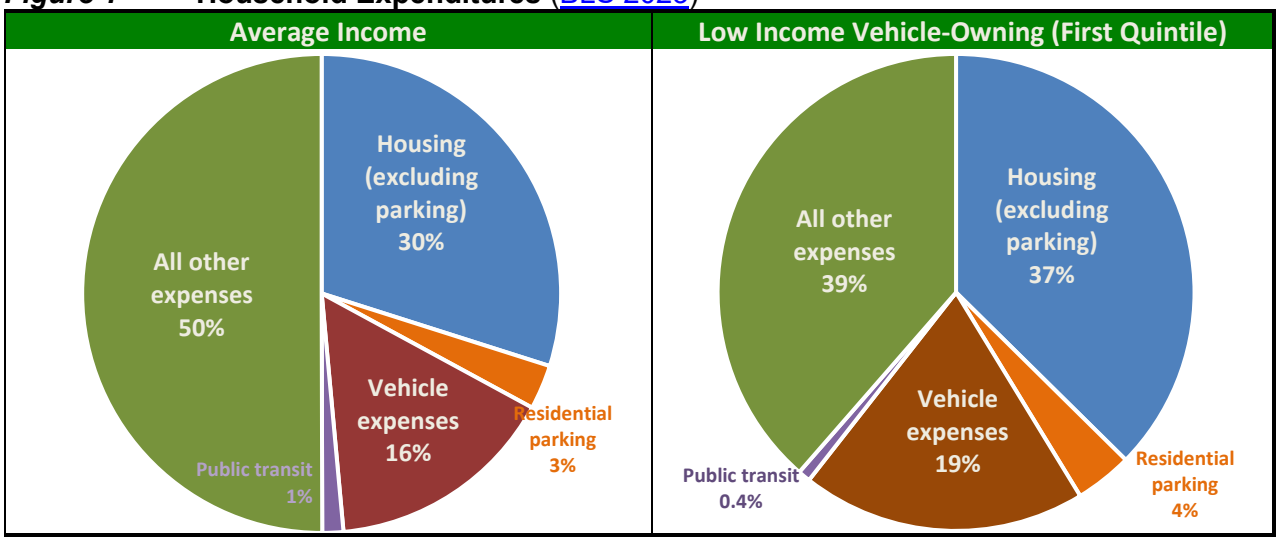
"Annual income twenty pounds, annual expenditure nineteen six, result happiness. Annual income twenty pounds, annual expenditure twenty pound ought and six, result misery."
- Charles Dickens (1849), *David Copperfield*

Introduction

Entertainer Will Rogers described Americans as the first people to drive themselves to the poorhouse. This is ironic because automobile travel is generally associated with affluence, but tragic because motor vehicle travel imposes large and diverse costs that really can lead to poverty. Improving transportation affordability can increase households' security, opportunity, freedom and happiness.

Affordability refers to the costs of goods relative to incomes, and households' ability to purchase necessities such as food, housing and healthcare. *Transportation affordability* therefore refers to households' ability to purchase the travel needed to access goods and activities while leaving enough money in their budgets to pay for other necessities. Previously, affordability was usually evaluated based on housing costs, since that is most households' largest expense, but experts now recommend also considering transportation costs, which rank second, as illustrated below. This recognizes that households often make trade-offs between housing and travel costs; a cheap home is not truly affordable if located in an isolated area where transport is expensive, and families can rationally pay extra for homes in accessible areas where they can minimize travel costs.

Figure 1 **Household Expenditures** (BLS 2023)



Most household spend more than 45% of their budgets on housing and transportation than is considered unaffordable. Low-income vehicle-owning households tend to be particularly burdened.

Household transportation costs vary widely depending on individual needs and community conditions. I can report from personal experience that a busy family can easily meet its basic travel needs for less than $1,000 annually if located in a compact, multimodal neighborhood, an order of magnitude less than what we would spend living in an auto-dependent, sprawled area. Planning decisions that affect housing and travel options, such as development regulations, transportation infrastructure investments, and roadway design can significantly affect household affordability.

Unaffordable transportation is harmful and unfair. It deprives many people of access to economic and social opportunities, forces them to use inconvenient and sometimes dangerous travel options, and requires them to spend an excessive portion of their budgets on travel. When families cannot afford food, housing or healthcare the ultimate cause is often excessive travel costs, including sometimes large and unexpected expenses. Many hard-luck stories begin with a vehicle failure, crash or traffic citation that leads to lost income, unpayable bills, medical expenses, disability and legal problems. Transport unaffordability often causes stress, fear, vulnerability, embarrassment and inferiority, and contribute to deaths of despair (Sterling and Platt 2022).

Figure 2 **Harms of Unaffordable Travel**

Unaffordable transportation harms people in various ways.

There are several possible ways to frame this problem. One perspective assumes that affordability requires cheaper automobile travel, with lower fuel taxes and road user fees, and even vehicle purchase subsidies, so more low-income travellers can afford to drive. However, those solutions tend to be inefficient and unfair because they increase total driving and associated costs, and harm non-drivers by reducing non-auto travel options. A better way to increase transportation affordability is to improve lower-cost modes and create compact communities where it is easy to get around without driving. This reduces costs and helps achieve other strategic goals.

There is evidence that many travellers want more affordable options, and will use them if they are convenient, comfortable and affordable. Surveys indicate that about half of households want to live in compact and multimodal neighborhoods where they can drive less, rely more on affordable modes, and save on travel expenses, but many cannot due to inadequate supply.

Despite its importance, transportation agencies seldom prioritize affordability: they collect little user cost data, lack measurable affordability objectives and seldom evaluate how their decisions affect overall affordability. If considered at all, affordability is usually evaluated based on individual expenses such as fuel prices or transit fares, although these are a small portion of total travel costs. Comprehensive analysis is important because planning decisions often involve trade-offs between different types of affordability, and between affordability and other goals. Better affordability analysis can help ensure that planning decisions reflect consumer demands and community goals.

This report investigates these issues. It defines transportation affordability, describes evaluation methods, and identifies affordability strategies. It explores these research questions:

- How should transportation affordability be defined and evaluated?
- How affordable is transportation?
- How does unaffordable transportation affect households?
- Do travellers demand more affordable options that they would use if available?
- What policies can improve transportation affordability.
- How well do transportation agencies respond to demands for more affordable travel?

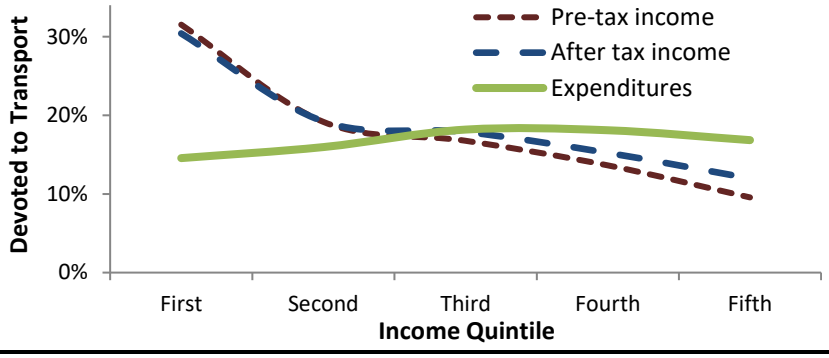
This should be of interest to policy makers, planners, affordability advocates, and anybody who wants more affordable transportation options.

Defining and Measuring Affordability

Affordability refers to the costs of goods relative to incomes, and households' ability to purchase necessities such as food, housing and healthcare. *Transportation affordability* therefore refers to households' ability to purchase the travel needed for basic mobility while leaving enough money to pay for other essential. Although everybody likes to save – even wealthy people want cheaper limousine and jet travel – affordability mainly concerns low- and moderate-income households since they face the greatest challenges meeting their basic needs. Affordability should be evaluated as a *potential*, the lowest costs that people could reasonably spend to meet their travel needs under various circumstance such as being unable to drive. A test of unaffordability is whether travellers would use cheaper options if they were available, for example, if walking, bicycling or public transit travel were improved.

Affordability can be measured in several ways (Guerra and Kirschen 2016; Plyushteva 2023; Murphy, Gould-Werth and Griffin 2021). Costs can be compared with *gross* (pre-tax) or *net* (after tax) incomes, or *expenditures* (budgets). Incomes often fluctuate; households often save (spend less than incomes) when their incomes are high and rely on savings or debt when incomes are low, for example when reducing work to study, travel, care for children, have a disability or retire. The figure below illustrates this. Incomes tend to reflect short-term and expenditures long-term financial conditions, so incomes and expenditures can be considered lower- and higher-bound indicators.

Figure 3 **Transportation Costs Relative to Income and Expenditures** (BLS 2023)



Affordability can be measured relative to incomes or expenditures. Many lower-income households spend more and higher-income households spend less than they earn during a year. Expenditures are therefore a better indicator of long-term wealth.

Affordability was previously defined as households spending no more than 30% of their budgets on housing, but since they often face trade-offs between housing and travel costs experts now define it as spending no more than 45% on housing and transportation (H+T) combined (CNT 2018; HUD 2019). This recognizes that cheap housing is not truly affordable if located where travel is expensive and households can spend more than considered affordable for homes with low travel costs. This suggests that households can typically spend up to 15% of their budgets on transport; less if their housing expenses exceed 30% and more if housing is cheaper. Of course, every household has unique needs and abilities; some can spend more than these guidelines, but others must spend less to avoid stress.

Affordability can also be evaluated based on the *discretionary* (or residual) budget households have left after purchasing necessities such as food, housing and transportation. Small transportation cost savings can significantly increase discretionary budgets. For example, owning one less vehicle typically saves $4,000 in vehicle costs plus about 10-15% in housing costs if parking is unbundled, which increases a low-income family's discretionary budget 41%, from $14,916 to $21,007, and a moderate-income family's budget and 28%, from $23,187 to $29,697.

Expenditure Data Sources

Various sources provide expenditure data. The most useful are comprehensive surveys such as the U.S. *Consumer Expenditure Survey* (summarized in the table below), Statistics Canada's *Survey of Household Spending*, the European Union's *Structure of Consumption Expenditure*, and the OECD's Consumer Spending website. These reflect lower-bound transportation costs because motorists often underestimate infrequent expenditures such as repairs, insurance and parking fees (Andor, et al. 2020), and some expenses, such as residential parking, at-home electric vehicle charging, and uncompensated crash damages, are not usually categorized as transport costs.

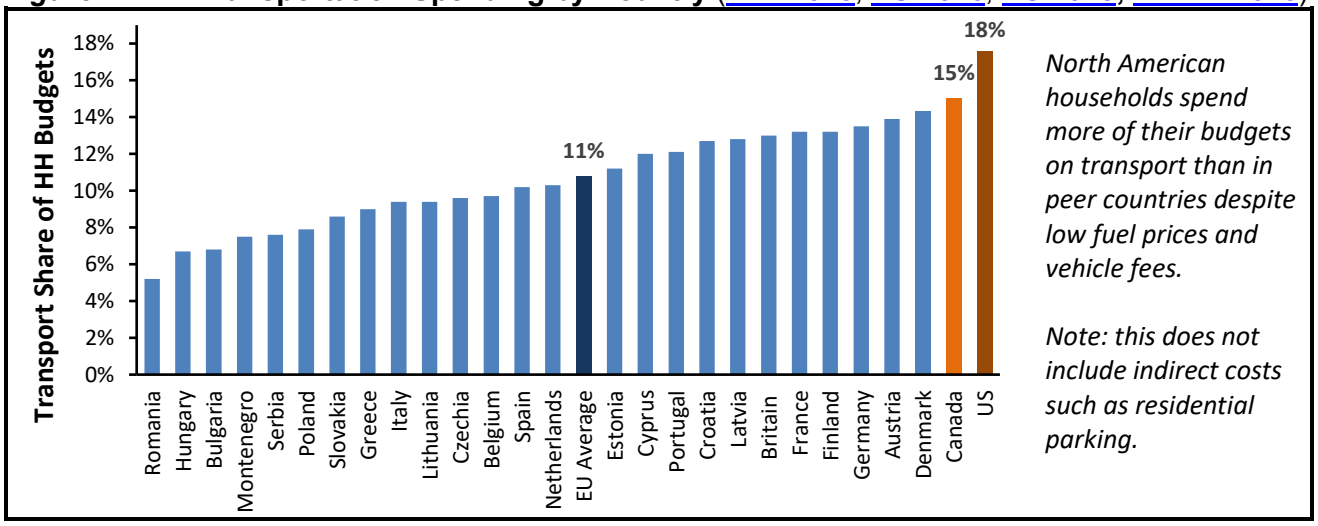
Table 1 **U.S. Household Transportation Expenditures** (BLS 2023)

Category	First	Second	Third	Fourth	Fifth	*All HHs*
Vehicle purchases	$1,576	$2,373	$4,828	$6,683	$12,214	$5,539
Gasoline and other fuels	$1,324	$2,134	$2,700	$3,369	$3,936	$2,694
Vehicle finance	$109	$184	$358	$525	$627	$361
Maintenance and repairs	$408	$731	$867	$1,207	$1,657	$975
Vehicle rental, license & fees	$252	$480	$574	$883	$1,480	$734
Vehicle Insurance	$894	$1,370	$1,826	$2,217	$2,561	$1,775
Public transportation	$354	$537	$755	$1,027	$2,802	$1,096
Total transportation	*$4,917*	*$7,809*	*$11,908*	*$15,911*	*$25,277*	*$13,174*

This table shows transportation expenditures by income quintile (fifth of all households). (HH = households)

Transportation costs vary widely; their relative standard error (RSE) is 2.47, much higher than the 1.18 for housing, indicating that some households spend much more than average on transport (BLS 2023). U.S. and Canadian households spend a larger portion of their budgets on transport than in peer countries, as illustrated below. These values do not include indirect costs, such as residential parking, so total transportation costs are actually higher than these statistics indicate.

Figure 4 **Transportation Spending by Country** (BLS 2023; EU 2020; SC 2023; Walker 2023)



The U.S. *National Household Travel Survey* includes affordability-related questions concerning unmet mobility needs and excessive financial costs; these burdens tend to be higher among people with low income, minorities and non-drivers, particularly in rural areas (Espeland and Rowangould 2024).

Some data sources report both housing and transportation spending, including the *Consumer Expenditure Survey* (BLS various years), *Smart Location Mapping* (USEPA 2024), the *Location Affordability Index* (HUD 2019), and the *H+T Affordability Index* (CNT 2018). Although residential parking is usually considered a housing cost, it is better categorized as a transportation cost since those facilities exist to serve vehicles. Off-street parking, including driveways, typically represents 10-20% of housing costs (Gabbe and Pierce 2016; Jo 2022; Litman 2020).

Some expenditure sources are biased or incomplete. For example, cost of living indices such as *Numebo*, *International Cost of Living* and *Expatistan* compare typical professional household expenses in various cities to determine fair wages for employees that relocate. The often-cited claim that "2/3 of the U.S. Population Now Lives Paycheck to Paycheck" is a a misrepresentation of an ambiguous survey question; the survey actually finds that only 19% of households have trouble paying bills (Krauss 2024). Automobile association cost estimates reflect the types of vehicles their members own, which are newer and more expensive than fleet averages. For example, the American Automobile Association (AAA) estimates that a typical new vehicle cost more than $12,000 annually, about twice the average expenditures reported by household spending surveys.

Long-Term Trends

Historical travel costs can be estimated from various sources (Litman 2024b). Before 1900, walking was the primary travel mode, so the main expense was shoe leather. Horse, carriage, boat and train travel were more expensive but infrequently used. Trolley fares were typically 5¢ when workers earned one to three dollars per day, so trolley commuting cost 3-10% of income. A 1901 survey of workingmen's families' expenditures had no category for travel (see below), indicating that most moderate-income households spent an insignificant amount on transportation.

Figure 5 **1901 Workingmen's Family Expenditures** (DCL 1907, p. 195)

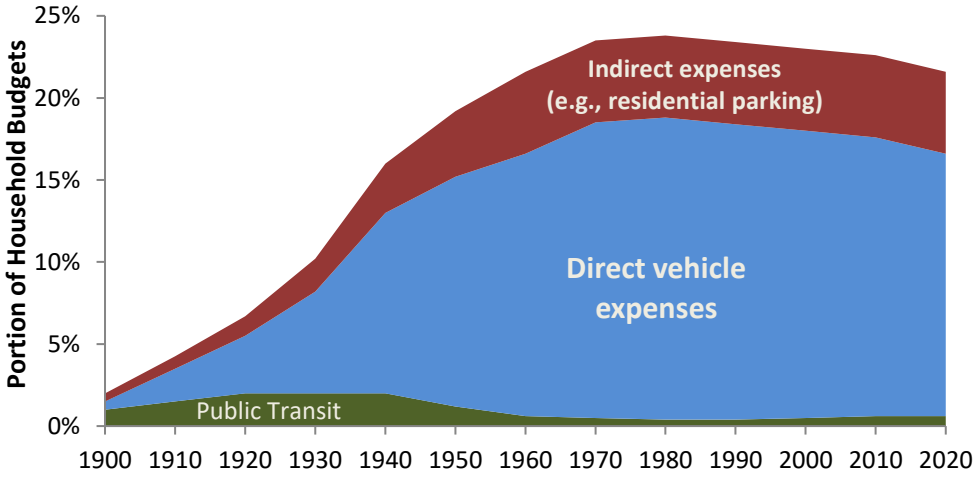
AVERAGE EXPENDITURE OF 2,567 WORKINGMEN'S FAMILIES FOR EACH OF THE PRINCIPAL ITEMS ENTERING INTO COST OF LIVING, AND PER CENT OF AVERAGE TOTAL EXPENDITURE, 1901.

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

This 1901 household expenditure survey had no category for transportation, indicating that prior to the automobile age travel expenses were insignificant for most working-class families.

As vehicle ownership increased so did their costs, as illustrated below. The portion of household budgets devoted to transport peaked about 1980 and subsequently declined slightly but remains over 20%. Similar patterns occur when other countries motorize (Rivas, Serebrisky, and Suárez-Alemán 2018). As modern vehicles become more technologically complex their purchase and repair costs, and therefore insurance costs, are increasing (Davis 2024; Del Mastro 2023; Lawray 2024).

Figure 6 **Transport Spending Trends** (Johnson, Rogers and Tan 2001; Litman 2024b)



Household transportation expenses increased as motor vehicle travel grew. They peaked about 1980 and subsequently declined slightly but still average over 20% of household spending.

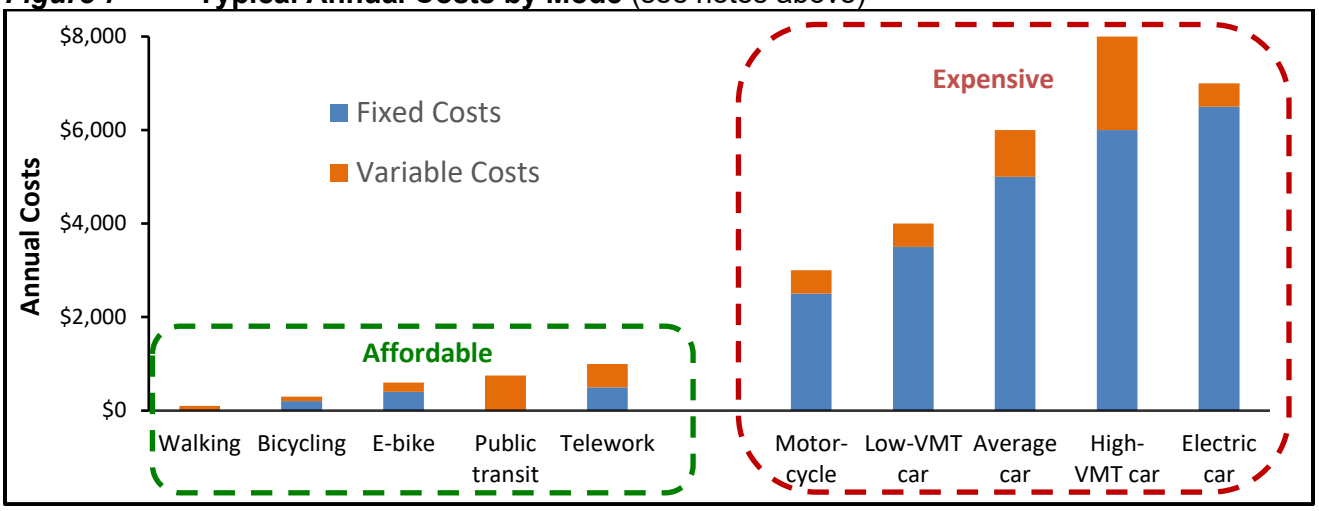
Travel Modes

Below are estimates of various modes' costs:

- Frequent walkers may spend up to $100 extra on shoes but this is a higher-bound estimate since shoes are often replaced before wearing out for fashion's sake, are lost, or chewed by pets.
- Utilitarian bicycles typically cost $1,000, or $100 annually over a ten-year life, plus $200 annually for maintenance and repairs, although less for maintain-it-yourselfers. E-bikes typically cost about twice those amounts. These are higher-bound estimates because many households have bicycles for recreation, so utilitarian trips impose minimal extra costs.
- Active travel (walking and bicycling) increases calorie consumption but since most North Americans weigh more than optimal and enjoy eating this is usually a benefit rather than a cost, and active travel can substitute for special exercise activities, reducing health club costs.
- Frequent transit users typically spend $500 to $1,000 annually for passes, and less frequent users spend less by paying per trip.
- Telework (telecommunications that substitute for physical travel, such as telecommuting, online shopping, video conferences, and e-medicine) requires suitable equipment and internet services that can cost up to $1,000 annually compared with what households would otherwise spend.
- Motorists typically spend about $6,000 to own and operate an automobile (excluding residential parking costs), ranging from $4,000 for low annual VMT to $8,000 for high VMT vehicles. They may spend less some years but more others due to mechanical failures, crashes or traffic citations. Increasing vehicle size and complexity reduces the supply of affordable vehicles; experts now recommend budgeting at least $20,000 to purchase a first car (Dragicevic 2025).
- Motorcycles typically cost about half as much as automobiles.
- Electric vehicles have low fuel costs (typically a quarter to half of comparable fossil fuel vehicles, depending on charging conditions), but higher purchase, tire and repair costs.

The figure below compares these expenses.

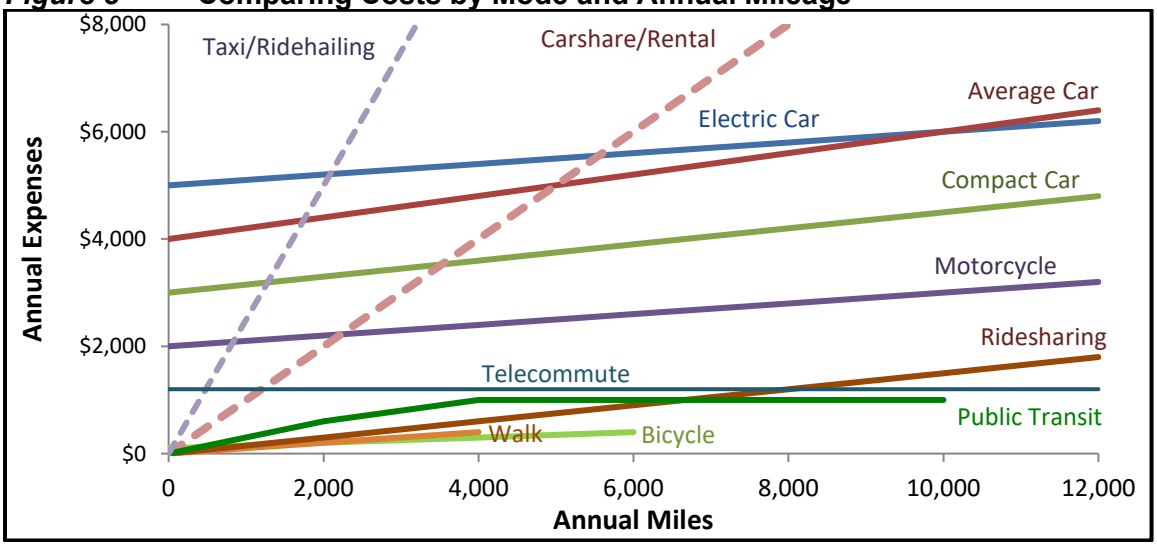
Figure 7 **Typical Annual Costs by Mode** (see notes above)



Walking, bicycling and public transit are much more affordable than automobile travel. Most vehicle costs are fixed so motorists save little when they reduce their annual vehicle-miles travelled (VMT).

Most vehicle costs are fixed. Depreciation, financing, insurance, fees, scheduled maintenance and residential parking are not significantly affected by annual mileage. The figure below compares typical cost curves: motor vehicles have high fixed and low variable costs (they start high but have a low slope), so driving has the lowest variable costs for most trips. This cost structure encourages motorists to maximize their driving to get their money's worth from their investments.

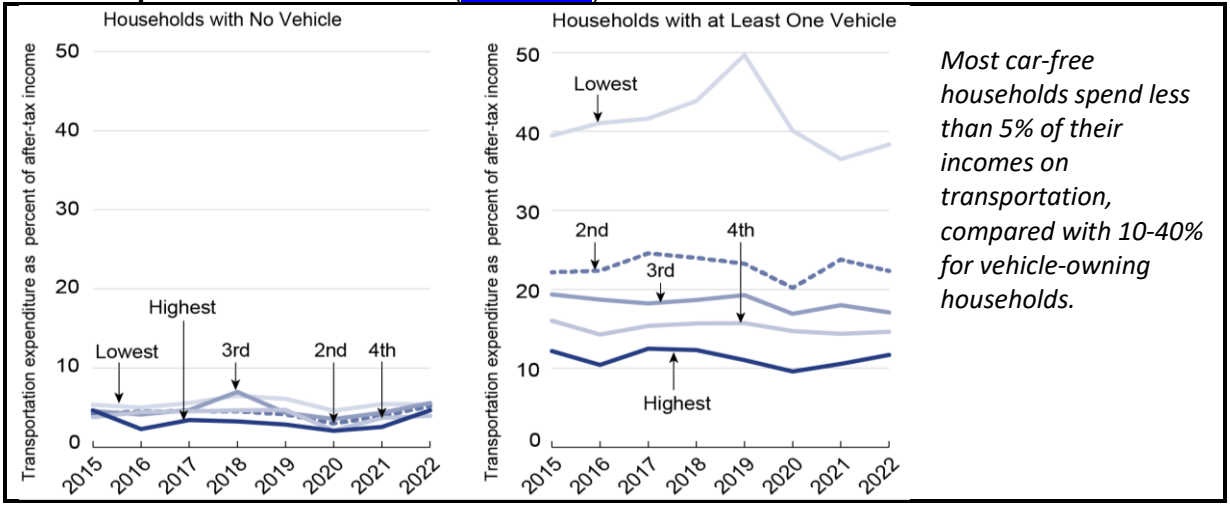
Figure 8 **Comparing Costs by Mode and Annual Mileage**



Walking, bicycling and public transit are most affordable but relatively slow and so are suitable for lower-annual-mileage lifestyles. Motor vehicles have high fixed and low variable costs (their cost curves start at a positive cost value and have low slopes) making driving seem inexpensive for individual trips.

As a result of these cost differences, vehicle owning households spend a far larger portion of their budget on transportation than car-free households, as illustrated below.

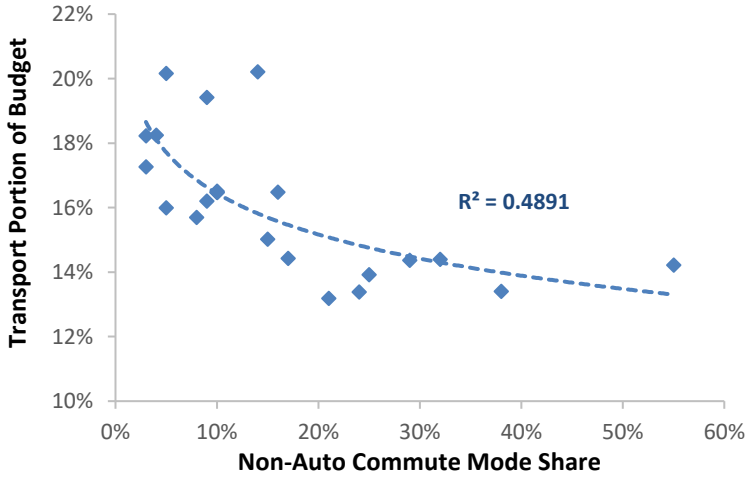
Figure 9 **Portion of After-Tax Income Spent on Transportation by Vehicle Ownership and Income Quintile** (BTS 2024)



Most car-free households spend less than 5% of their incomes on transportation, compared with 10-40% for vehicle-owning households.

Of course, modes vary in function. Active modes are most suitable for shorter trips. Public transit serves limited areas. Non-auto modes may be unsuitable for transporting heavy or dirty items, pets or people with special needs. Many travellers cannot or should not drive and will use non-auto modes if they are convenient and affordable. Most households rely on multiple modes: The study, *The Multimodal Majority?* (Buehler and Hamre 2015) found that during a typical week about 7% of Americans rely entirely on non-auto modes, 65% use a car plus another mode one to five times, and 25% use non-auto modes at least seven times. The following two figures show that relatively small increases in non-auto travel are associated with large savings.

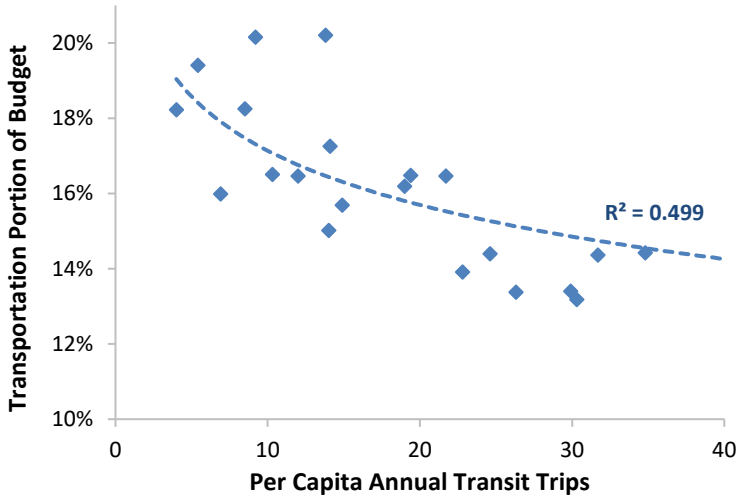
Figure 10 **Transportation Spending Versus Mode Shares** (BLS 2023; ACS 2022)



The average portion of household budgets devoted to transportation declines in urban regions as non-auto commute mode shares increase. A shift from low (less than 10%) to medium (20-30%) non-auto mode shares is associated with large reductions in household spending on transportation. (Based on analysis of the 22 urban regions with individual data in the U.S. Consumer Expenditure Survey.)

The figure below shows that an increase from under five to more than 20 average annual transit trips per capita reduces the portion of household budgets devoted to transportation from more than 18% to less than 10%, indicating that high quality public transit leverages large household transportation savings by providing a catalyst for compact and walkable transit-oriented development (Dong 2022).

Figure 11 **Transportation Spending Versus Transit Travel** (BLS 2023; APTA 2023)

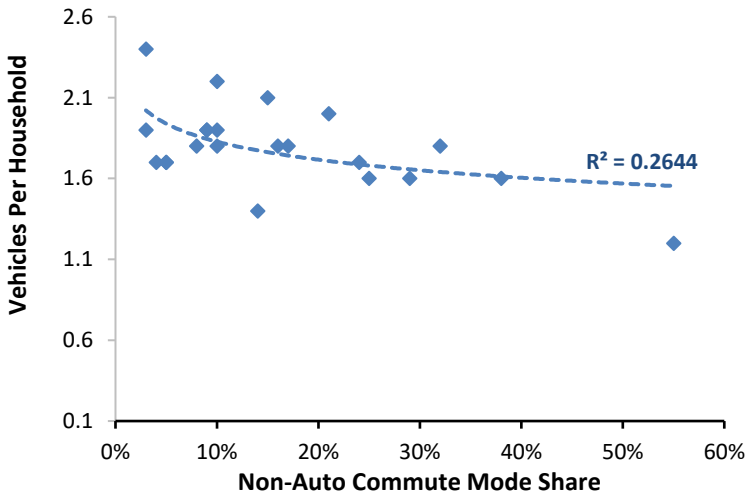


The portion of household budgets devoted to transportation declines as transit travel increases. High quality transit is a catalyst for compact, multimodal transit-oriented development that leverages large reductions in vehicle ownership and use, providing large savings and benefits.

Note, New York's 112 annual transit trips per capita is beyond the graph's scale.

These large savings partly result from vehicle ownership reductions, as illustrated below.

Figure 12 **Non-Auto Mode Versus Vehicle Ownership** (BLS 2023)

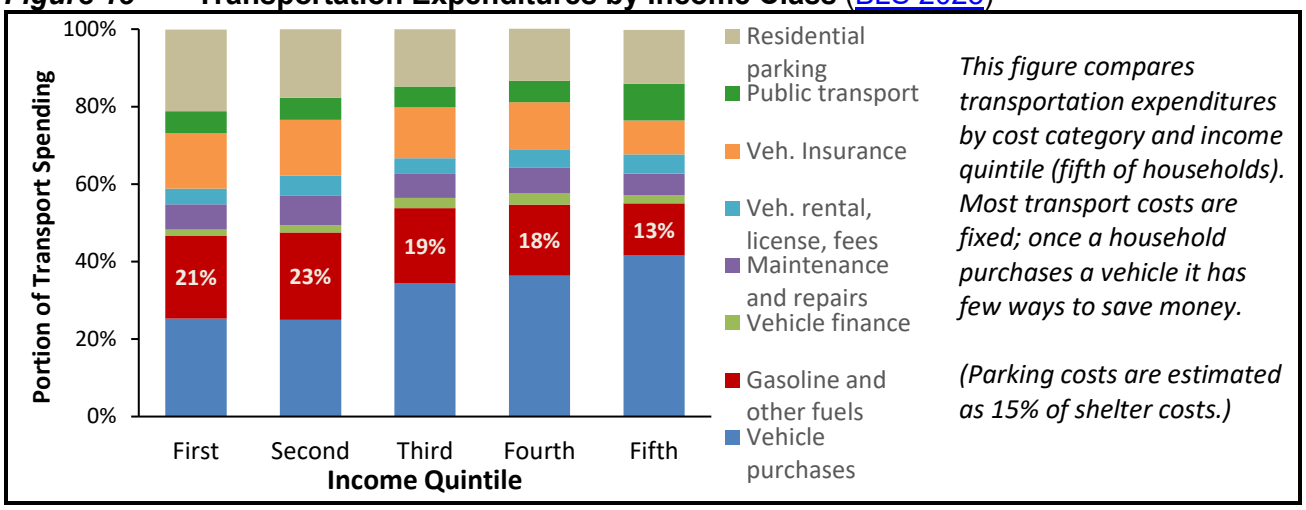


As non-auto commute mode shares increase in a region the average number of vehicles per household decline. This helps explain the large reduction in transportation costs with relatively small increases in non-auto mode shares.

Cost Components

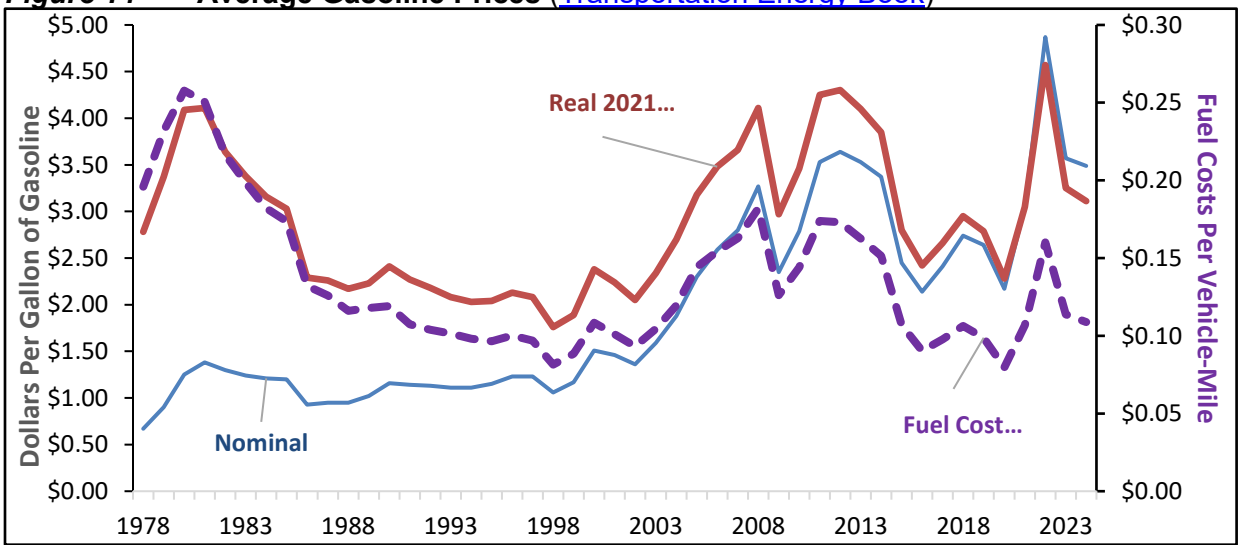
The figure below compares transportation expenditures by cost category and income quintile (fifth of households). Although fuel costs tend to receive the most attention, they are a modest portion of the total. Most (70-80%) vehicle costs are fixed, not significantly affected by the amount a vehicle is driven, so once a household purchases a vehicle it has few ways to save money.

Figure 13 **Transportation Expenditures by Income Class** (BLS 2023)



During the last half-century real (inflation-adjusted) fuel prices declined and fuel economy increased, making driving cheaper (see graph below), but vehicle costs are likely to increase in the future. Vehicles are becoming larger and more technologically complex, which is increasing purchase, fuel and repair costs (Del Mastro 2023), and climate change is increasing storm, hail and wildfire damages which are increasing vehicle insurance costs (Lowrey 2024; Sheets 2024).

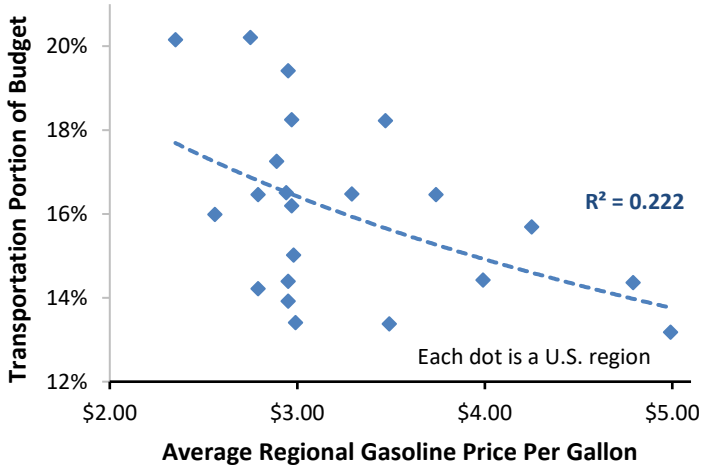
Figure 14 **Average Gasoline Prices** (Transportation Energy Book)



Although nominal fuel prices increased and real (inflation-adjusted) prices fluctuated during the last half-century, increased fuel economy made driving cheaper per vehicle-mile than in the 1970s and 1980s.

An interesting finding is that total household transportation spending tends to *decline* with regional fuel prices, as illustrated below. This suggests that higher fuel prices encourage governments to provide, and travellers to choose, more affordable transportation options, or that governments can more easily raise fuel taxes in regions where residents drive less.

Figure 15 **Transportation Spending Versus Fuel Price** (BLS 2023; Gas Buddy 2024)



The portion of household spending devoted to transportation tends to decline with regional fuel prices: higher prices are associate with more affordable transportation in a region.

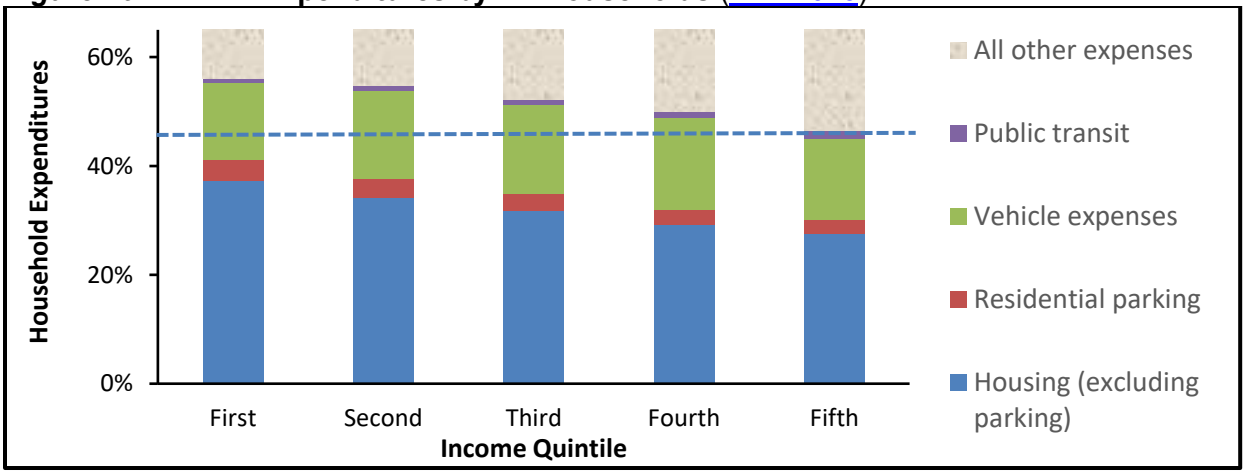
This suggests that higher fuel prices help create communities with more affordable travel options, or that citizens in more multimodal communities are willing to accept higher fuel prices.

In addition to financial expenses, transportation imposes non-market costs, such as the delay, risk, noise and pollution that motor vehicle traffic imposes on non-drivers, and the emotional stress, fear, vulnerability, shame, and inadequacy that excessive costs impose on lower-income travellers, which creates disparities between drivers and non-drivers. Improving non-auto modes can reduce these disparities, increasing social equity.

By Income Class and Travel Ability

The following figures show housing and transportation (H+T) expenditures by income quintile (fifth of households). Most households spend more than considered affordable, indicated by the dashed line.

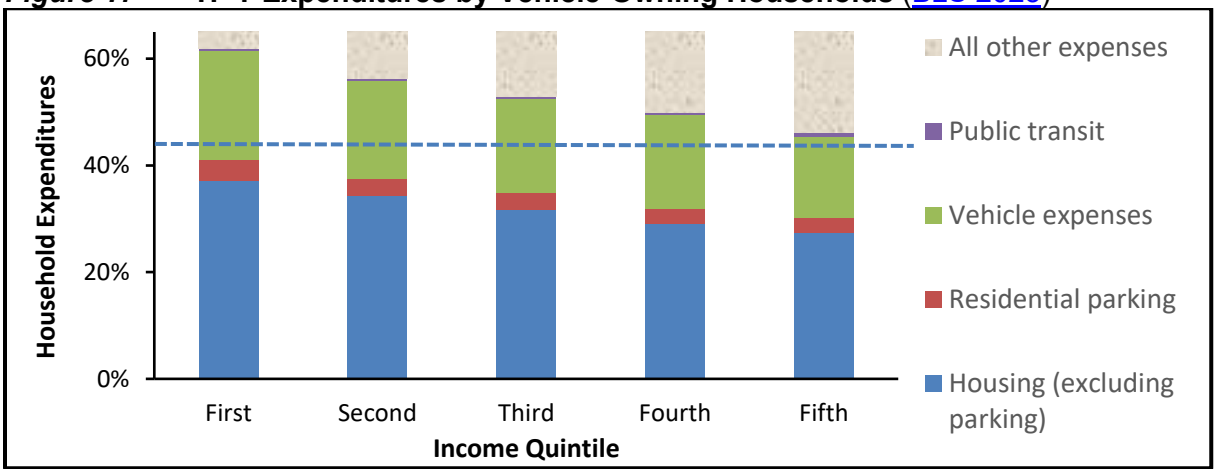
Figure 16 **H+T Expenditures by All Households** (BLS 2023)



This figure compares household expenditures by income quintile (fifth of all households). Excepting the wealthiest quintile, most households spend more than is considered affordable (45% of budgets).

These cost burdens are particularly high for low-income vehicle-owning households, which typically spend more than 20% of their budgets on transportation and more than 60% on housing and transportation costs combined, leaving less than 40% for all other goods.

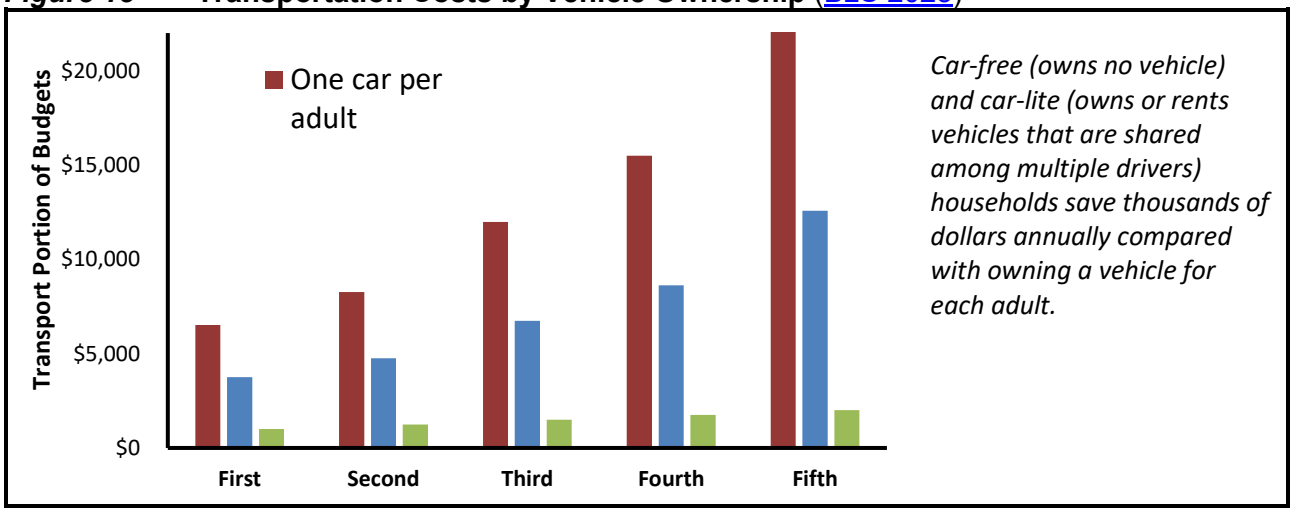
Figure 17 **H+T Expenditures by Vehicle-Owning Households** (BLS 2023)



Most low- and moderate-income vehicle-owning households spend more than is considered affordable on housing and transportation (45% of budgets, indicated by dashed line).

Transportation cost reductions can significantly increase households' discretionary spending ability (residual spending after paying for necessities), and therefore their economic freedom and resilience. For example, owning one less vehicle typically saves $5,000 in vehicle costs plus 15% in housing costs if parking is unbundled, which increases discretionary spending ability 48%, from $14,916 to $22,007 for first income quintile households and 33%, from $23,187 to $30,876, for second quintile households. The following figure illustrates potential savings from reducing car ownership.

Figure 18 **Transportation Costs by Vehicle Ownership** (BLS 2023)



The table below calculates maximum affordable transport spending after housing expenses are paid. The lowest income quintile households can only afford $1,256 and the second quintile can only afford $3,359, which is less than the typical $4,000 annual costs of a low-annual-mileage car. This indicates that many lower-income households own vehicles that they cannot afford.

Table 2 **Money Left for Transportation after Paying Housing Costs** (BLS 2023)

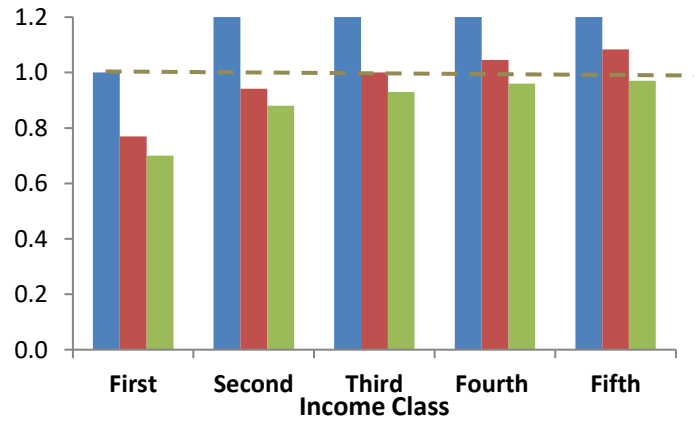
	First	Second	Third	Fourth	Fifth
Total household expenses	$33,776	$48,923	$65,487	$87,922	$150,093
45% H+T budget	$15,199	$22,015	$29,469	$39,565	$67,542
Current housing costs	$13,943	$18,656	$22,674	$27,951	$43,897
Remaining for transportation	$1,256	$3,359	$6,795	$11,614	$23,645
Affordable vehicles	0.3	0.8	1.2	2.0	Multiple
Actual vehicle ownership	1.0	1.6	1.9	2.3	2.6

Most first and second quintile households own vehicles that they cannot afford.

About 30% of U.S. households can be described as working poor, or *asset-limited, income-constrained, and employed* (ALICE) (UFA 2020). These groups often face mobility problems: inadequate and unreliable travel can lead to tardiness or absenteeism, missed healthcare and social service appointments, limited childcare and school options, and poor access to affordable food (Lewis 2024). They tend to own older, less reliable vehicles (Foohey 2021). Many pay high interest rates (nearly half have subprime credit ratings) for no-credit loans to purchase vehicles with remote engine shut-offs used if payments are late; their loan payments average $383 per month (Egan 2020). A typical low-income motorist has $200-500 monthly loan payments, $50-150 insurance premiums, $100-300 monthly fuel expenses, plus maintenance and repair costs, totaling $400 to $1,000 per month. A full-time worker must earn an additional $3-6 per hour to offset the additional costs of automobile commuting; if they lose their job, vehicle or driving privileges they face the worst of all worlds: reduced income, no vehicle, ongoing payments and declining credit rating.

Although most U.S. households own at least one vehicle and there are about as many vehicles as adults overall, lower-income households have low ownership rates. A third of the lowest income quintile households are car-free and many are "vehicle deficit" meaning they have fewer vehicles than drivers (Blumenberg, Brown and Schouten 2020). These households often rely on non-auto modes.

Figure 19 **Vehicle Ownership Rates** (BLS 2023)



Although about 90% of U.S. households own at least one vehicle and there are about as many vehicles as adults, vehicle ownership rates are much lower in lower-income households. A third of the lowest income quintile households are car-free and many are vehicle deficit (fewer vehicles than drivers).

Lower income motorists use various strategies to minimize their expenses, they purchase older vehicles and minimal insurance, and maintain their own vehicles when possible, but many expenses and difficult to reduce and practices such as deferring maintenance and driving underinsured impose risks. Of course, those households must consider these costs and risks justified, but not necessarily optimal; many motorists could be better off overall if they had better non-auto travel options.

About 12% of U.S. residents are people with disabilities (PwD) that limit their ability to travel (CDC 2024). Their household poverty rate is three times higher than households with no disabilities, and less than half are drivers compared with 69% of non-disabled people (Brumbaugh 2018). They often rely on non-auto modes and are particularly vulnerable to obstacles such as inadequate information, intermodal connections and walking conditions. Many spend thousands of dollars annually on mobility devices. Public transit and special mobility services have low fares but often limit where, when and how much they can travel. Private wheelchair accommodating taxies are expensive and often limited in availability. A vehicle modified to accommodate wheelchairs typically costs $6,000 to $12,000 annually to own and operate. The table below compares typical costs for mobility options for PwD.

Table 3 **Transportation Costs for People with Disabilities (PwD)**

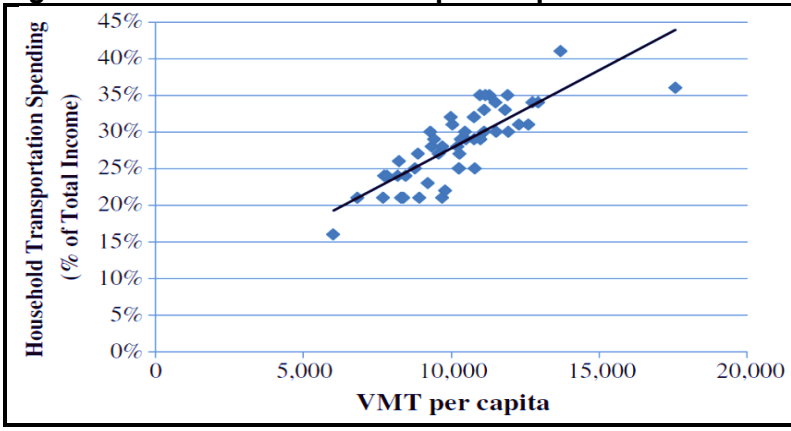
Transportation	Typical Costs	Service Quality
Manual wheelchair	$200-400 annual	Slowest and most limited in range.
Electric wheelchair	$1,000-2,000 annual	Slow. Limited in range.
Conventional public transit	$2 to $4 per trip	Limited in time and destinations
Mobility services	$2 to $6 per trip	Limited in time and number of trips.
Wheelchair accommodating taxi	$2 to $6 per mile	Somewhat limited in availability
Private van with wheelchair lift	$6,000-12,000 per year	Requires driver.

Wheelchairs and public transit services are relatively inexpensive but limited in range. Accessible taxis and private vehicles are expensive and unaffordable for low-income households.

By Location

Location factors that affect travel affect transportation costs. The figure below shows the positive relationship between vehicle miles traveled (VMT) and transportation expenditures among U.S. states.

Figure 20 **Household Transport Expenditures Versus VMT** (Garceau, et al. 2013)

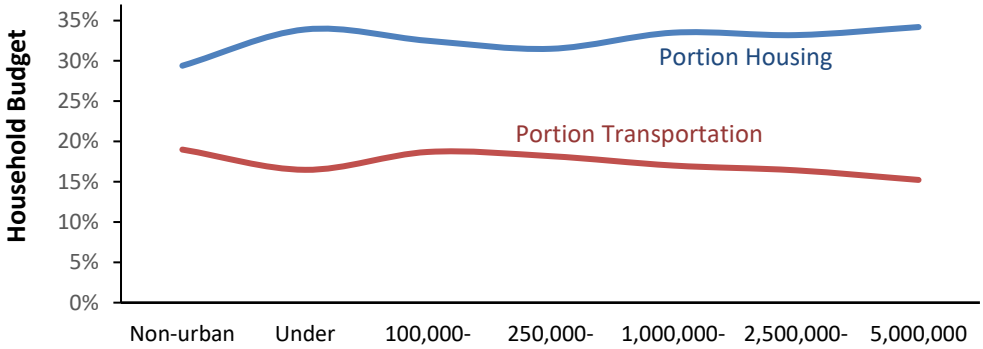


The portion of household income devoted to transportation increases with per capita vehicle miles traveled (VMT). Each dot represents a U.S. state.

The study, *Measuring Urban Sprawl and Validating Sprawl Measures* (Ewing and Hamidi 2014) found that household spending on housing is higher, and transportation spending is lower, in compact communities: each 10% increase in their compactness index is associated with a 1.1% increase in housing costs and a 3.5% decrease in transport costs. Since travel expenditures decline faster than for housing, compact development increases affordability overall. Larson, Yezer and Zhao (2022) found that land use regulations that restrict lower-priced housing types (multiplexes, townhouses and low-rise apartments) significantly increase commuting costs. Makarewicz, Dantzler and Adkins (2020) found that residents of transit-oriented communities have more affordable transportation. Mattson (2020) found that household transportation expenditures are lower for households in multifamily housing and in older neighborhoods that are more accessible and multimodal.

The graph below shows how expenditures vary by location. Housing costs are higher, but travel costs are lower in larger, denser and more multimodal, urban areas. This suggests that the greatest affordability occurs with affordable housing in compact, multimodal neighborhoods.

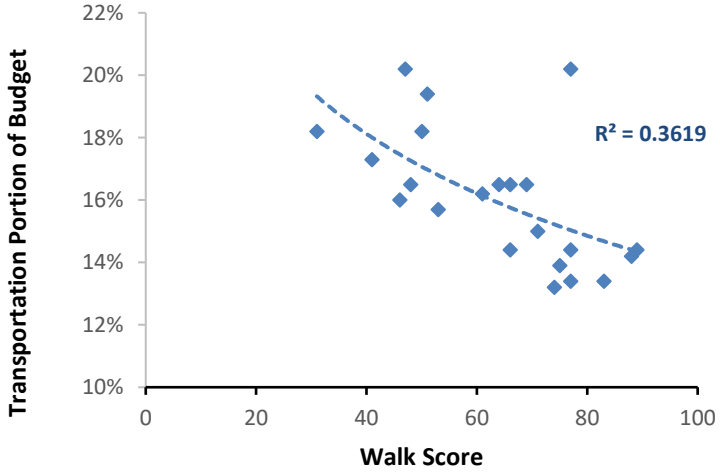
Figure 21 **Housing and Transportation Costs by City Size** (BLS 2023)



The portion of household spending devoted to housing is higher but the portion devoted to transportation is lower in larger urban areas.

Transportation spending declines with Walk Score ratings, which indicate local density and mix.

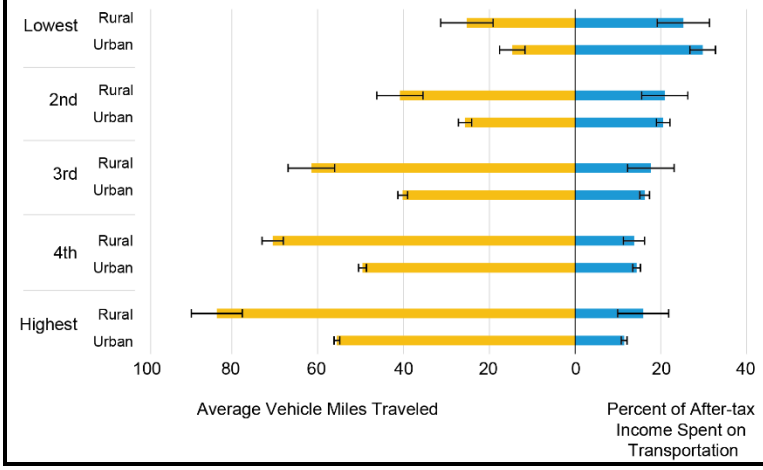
Figure 22 **Transportation Spending Versus Walk Score** (BLS 2023; Walk Score 2024)



The portion of household spending devoted to transportation tends to decline with Walk Score ratings, which indicate local density and mix. This indicates that increasing neighborhood accessibility and walkability increases transportation affordability.

Rural residents have particularly high travel burdens including unmet mobility needs (unable to travel due to inadequate options) and excessive financial burdens (Espeland and Rowangould 2024). The portion of household spending devoted to transportation is higher in rural than urban areas, particularly for lower-income households, as illustrated below.

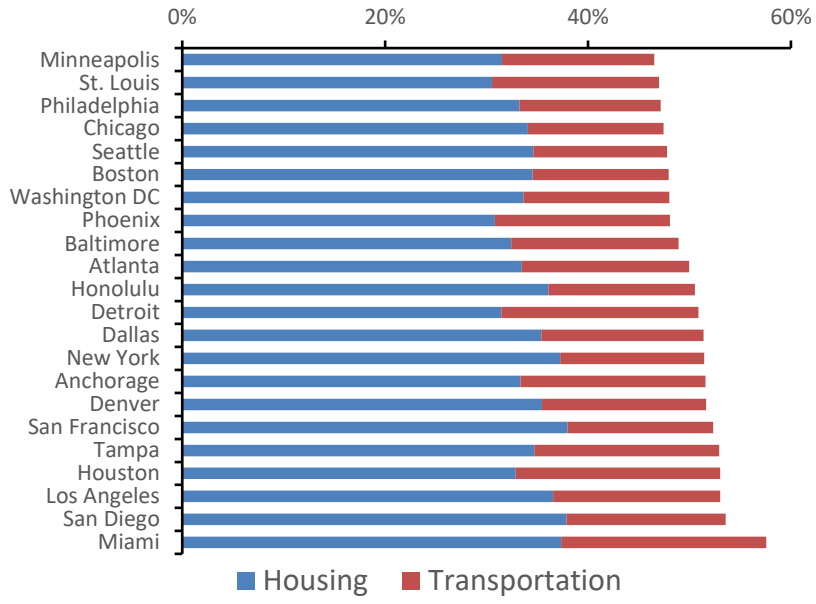
Figure 23 **Vehicle Travel and Transportation Expenditures** (BTS 2024)



The portion of household spending devoted to transportation tends to be particularly high for low-income rural households.

The BLS *Consumer Expenditure Survey* includes data on 20 urban regions. Some that are considered affordable due to low housing costs, such as Miami, Denver and Detroit are relatively expensive when transportation costs are also considered, and compact, multimodal cities such as Chicago, Seattle and Boston, are actually more affordable overall due to low travel costs (DiNapoli 2024).

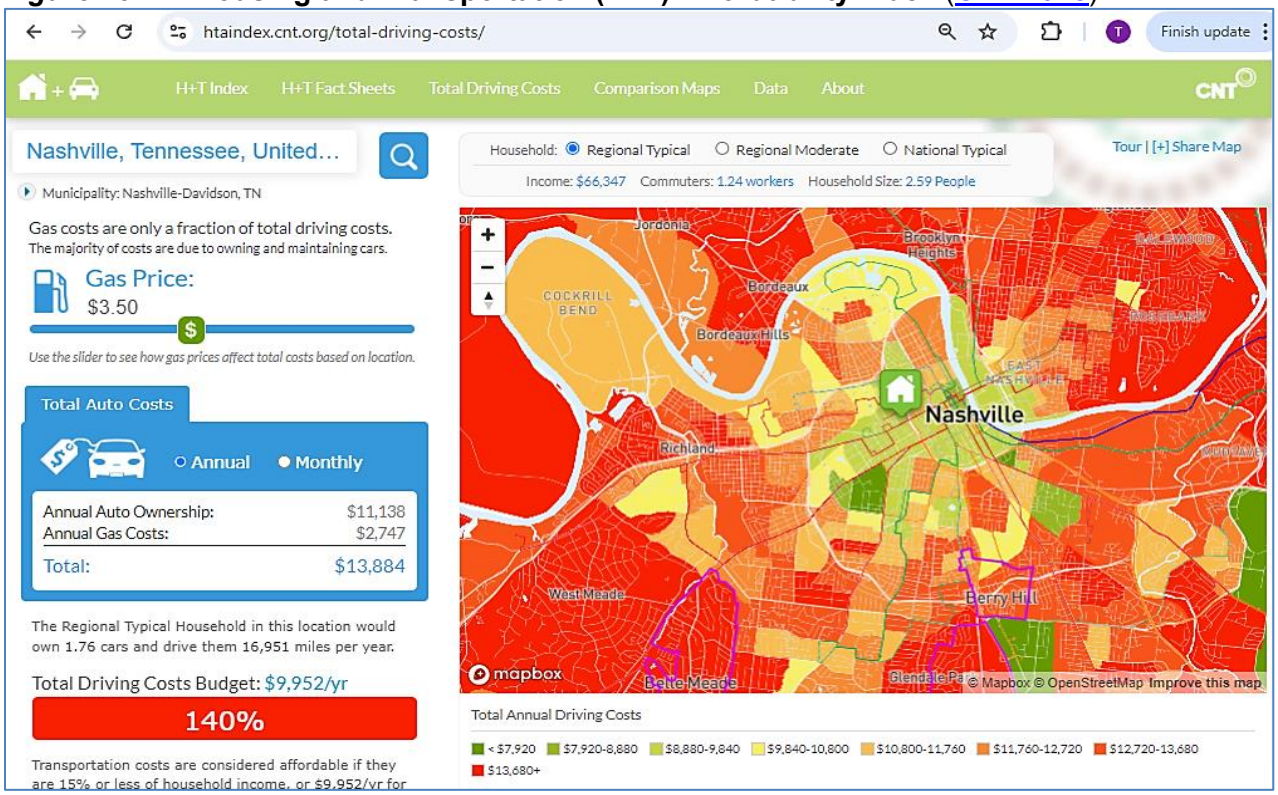
Figure 24 **Portion of Income Spent on Housing and Transportation** (BLS 2023)



Although compact cities such as Philadelphia, Chicago and Seattle, have relatively high housing costs, these are offset by high incomes and low transportation costs, so considering both housing and transport costs they tend to be more affordable overall than sprawled, automobile-dependent cities such as Houston, Los Angeles and Miami.

The *H+T Affordability Index* uses various data to calculate housing and travel costs in specific areas (CNT 2018; Guerra and Kirschen 2016). Results are presented in color-coded maps that show average transportation and housing costs, and other factors, as illustrated below.

Figure 25 **Housing and Transportation (H+T) Affordability Index** (CNT 2018)



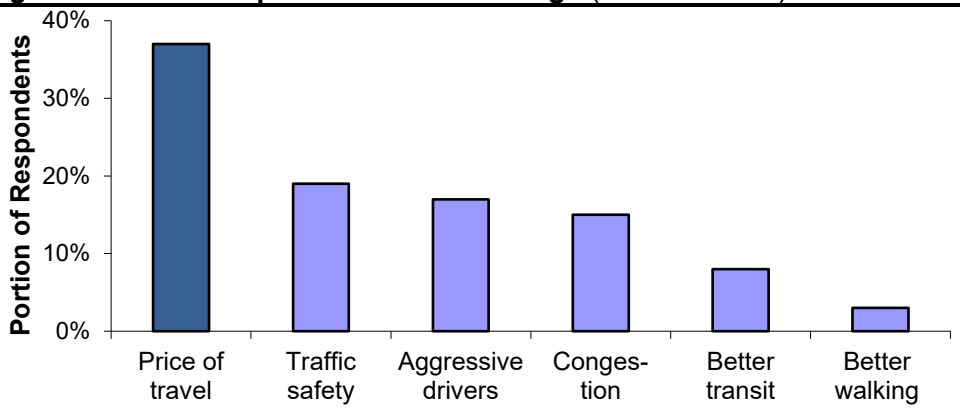
In a typical urban region like Nashville, central, multimodal neighborhoods tend to have much lower transportation costs (green) than outlying areas, increasing overall affordability and financial resilience.

Residents of compact, multimodal neighborhoods usually spend much less on transportation, and often less on housing and transportation costs combined (USDOT 2025). Similar outcomes occur in developing countries (Isalou, Litman and Shahmoradi 2014; Rivas, Serebrisky and Suárez-Alemán 2018). This provides various economic benefits, particularly to lower-income households. Affordable transportation tends to improve household economic resilience; their ability to respond to economic shocks such as vehicle failures, reduced income, disability or fuel price spikes (NRDC 2010; Pivo 2013 and 2014). One study found that unexpected vehicle expenses are one of the more common causes household financial crises leading to eviction risk (Amidan 2025). Since housing tends to appreciate but vehicles depreciate in value, households tend to generate more long-term wealth by shifting spending from vehicles to housing (Litman 2021). For example, a household that spends $15,000 annually on mortgage payments and $5,000 on transportation accrues about $100,000 more equity after a decade than if it spent $10,000 on housing and $10,000 on transport. Living in compact, multi-modal neighborhoods also tends to increase economic mobility – the chance that children born in lower-income families become more economically successful as adults (Ewing, et al. 2016; UI 2021).

Latent Demands for Affordable Travel

There is evidence of significant latent demand for affordable mobility and accessibility options. Although few motorists want to give up driving altogether, there is evidence that many want to drive less, use lower-cost modes more, and live in more accessible neighborhoods, provided those options are convenient, comfortable and affordable. One National Household Travel Survey ranked the "Price of travel," or unaffordability, as transportation system users' most important problem.

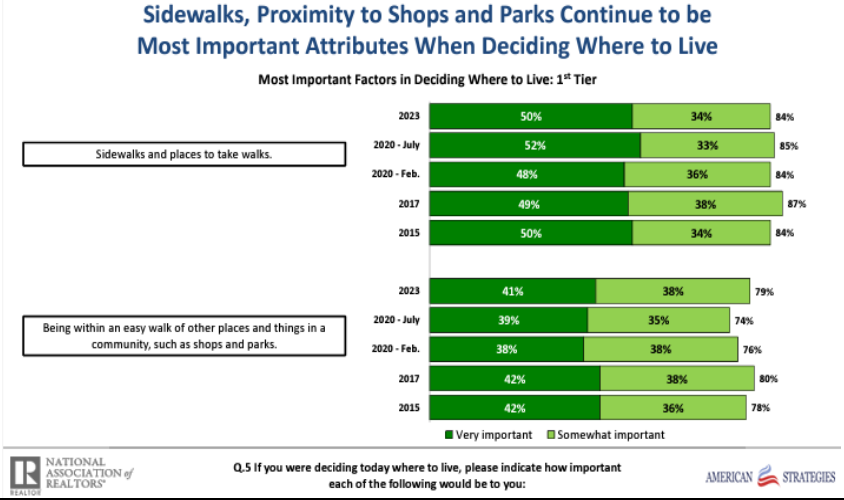
Figure 26 **Transportation Issue Ratings** (Mattson 2012)



National Household Travel Survey respondents ranked "Price of Travel" the most important of six issues, indicating that transportation system users consider unaffordability a major problem.

The National Association of Realtors' *National Community Preference Survey* found that most families want to live in compact, multimodal neighborhoods where services and activities are easy to access by walking, as illustrated below, but many cannot due to limited supply.

Figure 27 **Community Preference Survey Results** (NAR 2023)



The National Association of Realtors' National Community Preference Survey (NAR 2023) found that most U.S. families want to live in compact and walkable neighborhoods where it is easy to get around without driving (as illustrated below), but many cannot due to limited supply.

After affordable modes are improved their use often increases and driving declines (Litman and Pan 2023). For example, Safe Routes to Schools programs typically increase non-auto school trips 50-100% and reduce driving 10-20%, indicating that many students want to walk and bicycle but need safer facilities (SRTS 2015). Walking, bicycling and transit improvements, commute trip reduction programs and parking policy reforms often have similar effects (Spack and Finkelstein 2014).

Summary of Affordability Factors

This analysis indicates that many factors can affect transportation costs and should be considered in planning analysis. The box to the right lists key factors to consider for comprehensive affordability analysis.

Factors to Consider for Comprehensive Affordability Analysis

- Latent demand (unmet needs) for affordable travel.
- Quality of affordable travel modes.
- Housing and transportation costs, including indirect costs such as parking subsidies and non-market costs such as risks and stress.
- Vehicle ownership and operating costs.
- Non-auto user costs (such as transit and taxi fares).

This analysis finds that some groups (low-income vehicle owners, people with disabilities, and residents of sprawled, automobile dependent areas) tend to bear excessive transportation costs, either because expensive transportation prevents them from access basic services and activities, or they spend more on transportation than is considered affordable, leaving insufficient money to spend on other necessities.

Many planning decisions affect transportation costs and affordability. Transportation costs tend to decline with more multimodal transportation systems and more compact neighborhood development. Even relatively small increases in non-auto mode shares tend to provide large travel cost savings. An important finding is that that total household transportation costs tend to *increase* in communities with lower fuel prices, and probably other types of driving underpricing, such as low parking fees and more highways, apparently because they stimulate automobile-dependency and sprawl. This suggests that policies intended to make driving more affordable are often counterproductive.

The following table summarizes key insights from this analysis.

Table 4 **Summary of Transportation Affordability Analysis Factors**

Factor	Key Insights
Data sources	Affordability analysis should be comprehensive, considering housing, residential parking and transportation costs. Household budgets tend to be more stable than incomes and so provide a more accurate perspective of long-term wealth.
Long-term trends	Transportation costs increased significantly during the last century, and vehicle costs are likely to increase in the future due to their growing size and complexity.
By mode	Walking, bicycling and public transit have much lower costs than automobile travel. Household transportation costs decline as non-auto mode shares increase.
Transportation cost components	Transportation involves many costs, including some, such as residential parking subsidies and emotional stress, that are often overlooked or underestimated in affordability analysis.
Fuel prices	Lower fuel prices increase total transportation costs and reduce affordability overall.
Income class and ability	Most low- and moderate-income households, and people with disabilities, spend more on housing and transportation than is affordable.
By location	Transportation costs increase with vehicle travel and sprawl and decline in more compact, multimodal communities. Residents of compact, multimodal neighborhoods usually less on housing and transportation combined than in sprawled areas.

Many factors can affect transportation affordability analysis. Lower-income households, people with disabilities, and residents of sprawled, automobile-dependent areas.

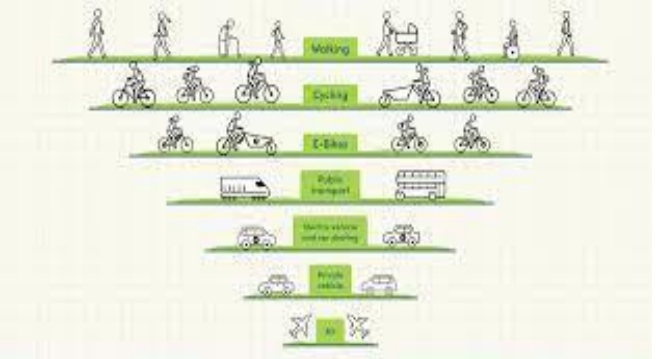
Transportation Affordability Strategies

This section describes policies that can help increase transportation affordability.

Planning Reforms

To increase affordability transportation planning should incorporate affordability goals and correct current biases that favor expensive travel over more affordable options. This applies a sustainable transportation hierarchy which prioritizes affordable and resource-efficient modes and compact and multimodal development over more expensive and resource-intensive alternatives when allocating public resources such as money and roadspace, as illustrated to the right. This tends to significantly improve affordable travel options.

Figure 28 **Sustainable Transport Hierarchy**



A sustainable transportation hierarchy prioritizes affordable and efficient modes in resource allocation.

The table below summarizes current planning biases that undervalue and underinvest in affordable modes, and potential reforms to correct them.

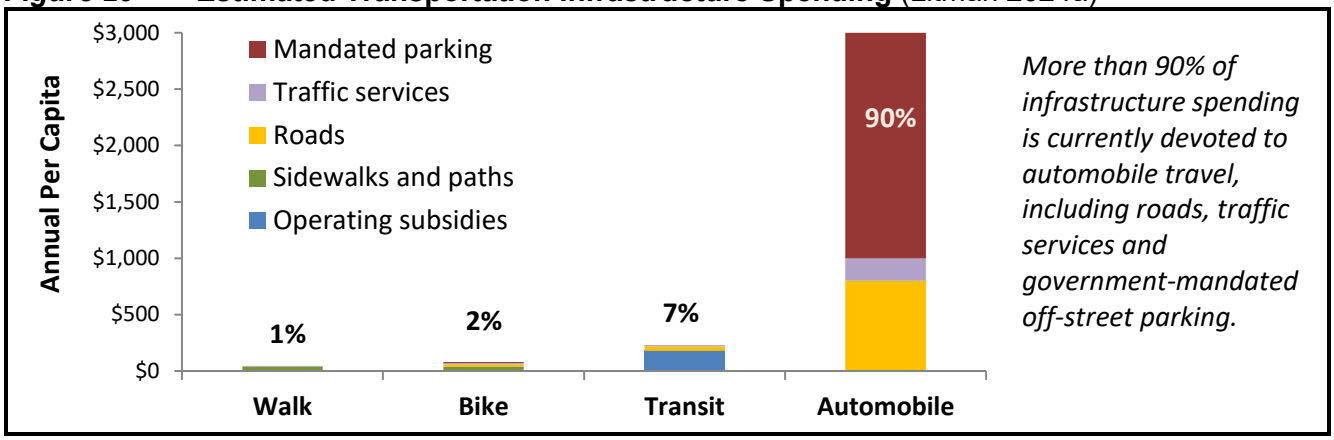
Table 5 **Affordability Policy Biases and Reforms**

Policy Biases	Potential Reforms
Overlooking affordability as planning goal. Current planning favors automobile travel over more affordable travel options.	Recognize affordability as a goal. Evaluate policy and planning decisions' affordability impacts. Favor affordable modes in transportation planning.
Evaluates transportation system performance based on mobility, which favors automobile travel over more affordable options.	Evaluate transportation system performance based on accessibility, which recognizes the value of slower modes and more compact development.
A major portion of infrastructure funding is dedicated to roads and parking facilities, with much less available for affordable modes.	Apply least-cost planning which invests in the options that are most cost-effective overall. Ensure that non-auto modes receive a fair share of investments.
Vehicle parking minimums force property owners to subsidize off-street parking.	Eliminate parking minimums. Manage parking more efficiently. Unbundle and cash out free parking.
Development policies limit density and mix, and limit affordable infill	Allow lower-cost housing types (such as basic multifamily with unbundled parking) in compact, multimodal neighborhoods.
Roadways are designed to maximize automobile traffic volume and speeds.	Apply complete streets policies which ensure that public roads accommodate diverse users and uses.
Planning evaluates transportation system performance based on mobility (travel speeds) using indicators such as roadway level-of-service and congestion delay.	Use accessibility-based performance indicators that measure the time and money required to reach services and activities.
Many travel models only consider time costs, which fails to consider the benefits of more affordable travel.	Use generalized costs, which include both time and monetary costs, when evaluating accessibility.

Affordable transportation planning requires policy reforms that support lower-cost accessible options.

Currently, non-auto modes receive far less investment than automobile infrastructure, as illustrated below. To be fair and efficient, transportation planning should invest in non-auto modes at least as much as their potential demands, so for example, if walking and bicycling facility improvements could increase active travel mode shares to 20%, communities should be willing to spend up to 20% of their total transportation infrastructure budget on these modes, and more if needed to achieve strategic goals such as improving public fitness and health, and to make up for decades of underinvestment.

Figure 29 **Estimated Transportation Infrastructure Spending** (Litman 2024a)



Multimodal Planning

Multimodal planning creates communities where it is easy to get around using affordable modes.

Economic Evaluation for Affordability

Planning often involves analysis of a policy or projects' benefits and costs. New models can predict how planning decisions affect vehicle ownership and travel (Caltrans 2020); such models can be expanded to evaluate affordability. To support affordability economic analysis should give higher weights to benefits to affordable modes and lower-income travellers.

Improve active modes

Active modes (walking, bicycling, and variants such as wheelchairs, scooters and e-bikes) are the most basic and affordable forms of travel. As previously described, total household transportation costs tend to decline with improved walkability, and active mode improvements support affordability in other ways. For example, most transit trips include active links so improving walking and bicycling conditions can increase transit travel. Similarly, motorists often walk between vehicles and destinations so improving walkability allows motorists to access more affordable parking options.

To achieve their potential, bicycles and e-bikes require bikeways that allow inexperienced riders to make utilitarian trips. Although most communities currently have just 1-3% bike mode shares, those with high-quality bikeways often achieve 3-6%, and because e-bikes can go faster, farther, steeper, with larger loads, they approximately double potential bike mode shares (Litman and Pan 2023). Expanding EV subsidy programs to include e-bikes helps achieve affordability and social equity goals.

Most communities lack adequate funding for sidewalks, crosswalks, bikeways and public pathways, and state departments of transportation, which generally have the largest budgets, generally spend a tiny fraction on active modes, far less than their share of trips (Litman 2024a).

Public transportation improvements

Convenient, attractive and affordable public transit can provide a low-cost alternative to driving. and be a catalyst for transit-oriented developments where residents drive less and rely more on affordable modes. Most North American public transit systems are inadequate and poorly integrated. Interregional transit services are particularly bad; most highways have no transit service, or infrequent and expensive bus services with inconvenient user information and payment systems, and uncomfortable waiting conditions. Many potential users are reluctant to use transit due to security concerns. Programs that address these concerns can help increase transportation affordability.

Some people advocate fare-free transit for affordability's sake, but most experts caution against it. It may be appropriate in rural and suburban areas, but not in cities where transit vehicles are often crowded and fares pay a major portion of costs. To maintain current service levels without fares would require 40-60% more subsidies; most travellers would be better off if that additional funding was instead used to improve transit service, with targetted fare discounts for lower-income travellers.

Carsharing, Taxi/Ridehailing

Although carsharing, taxis and ridehailing (such as Uber and Lyft) have relatively high costs per mile of travel, they provide an important alternative to private automobile travel so they should be improved and supported for occasional use (Paul, et al. 2023). Governments can support them by making public parking spaces available for carsharing and curb space available for passenger loading, and by requiring parking unbundling, so households save on parking costs when they own fewer vehicles.

Transportation Demand Management incentives

Transportation Demand Management (TDM) includes various incentives that improve and encourage travellers to choose affordable modes when possible. Because non-auto modes experience scale economies (their unit costs decline with increased use), incentives to them tend to increase their service quality, and as their use increases so does their social acceptability and political support.

TDM Programs

TDM includes commute trip reduction, school travel and freight management programs, and transportation management associations that encourage efficient travel in particular areas. They can be funded by governments or by property owners to reduce traffic impacts and parking costs.

Parking Policy Reforms

Most current parking policies, such as offstreet parking minimums and unpriced on-street parking, are intended to maximize driver convenience. Although they increase motorists' affordability, they degrade travel by other modes and increase building costs which reduce housing affordability. Reforms include *unbundling* (parking is rented separately from building space, rather than automatically included), *cash out* (non-auto commuters receive the cash equivalent of parking subsidies provided to commuters who drive), *efficient pricing* (motorists pay directly for using parking facilities, with prices that vary to reduce congestion), and reduced or eliminated parking minimums (so non-drivers are no longer forced to pay for off-street parking they don't need).

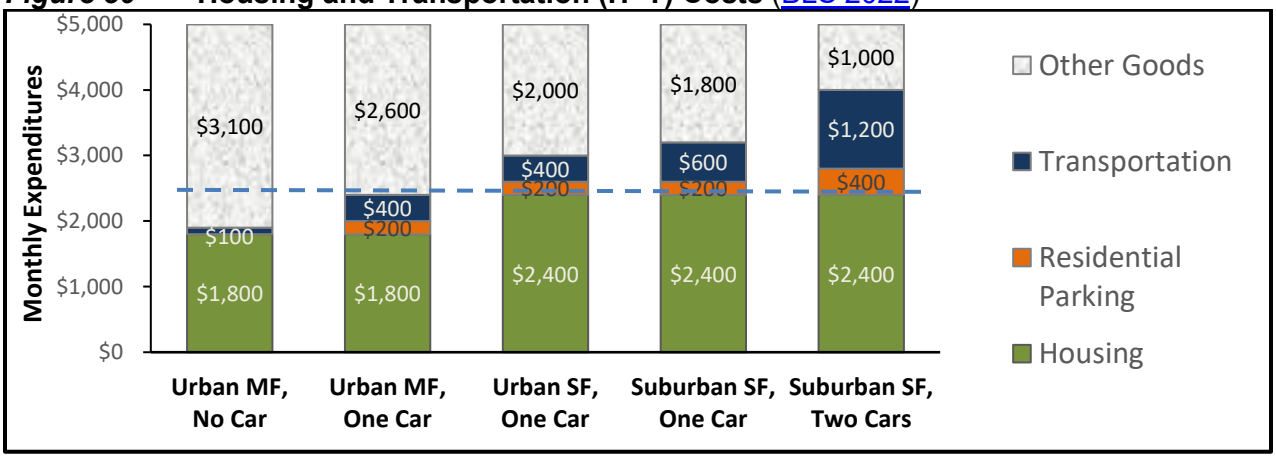
Pay-As-You-Drive (Distance-based) Pricing

Pay-As-You-Drive (also called *distance-based*) pricing converts fixed vehicle insurance premiums and fees into variable costs, giving motorists savings when they reduce their mileage. This can provide hundreds of dollars in annual savings to motorists who minimize their annual vehicle-miles.

Affordable-Accessible Housing

Transportation tends to be most affordable in compact, multimodal neighborhoods where it is easy to get around without driving, called *urban villages* or *transit-oriented development* (TCRP 2022). The figure below compares housing, parking and transportation costs for various locations. The most affordable option is usually multifamily (MF) housing with unbundled parking located in a multimodal neighborhood where residents can minimize vehicle ownership and use. Single family (SF) suburban housing tends to have higher housing costs and requires an automobile for every adult. Actual costs vary depending on specific needs and conditions but the basic relationships are consistent: compact housing located in multimodal neighborhoods is generally most affordable overall.

Figure 30 **Housing and Transportation (H+T) Costs** (BLS 2022)



Compact housing with unbundled parking and affordable non-auto travel gives households more money to spend on other goods. (MF = multifamily; SF = single family; dashed line shows affordable 45% of budgets.)

Surveys indicate that many families, particularly those with low incomes, want to live in such housing but cannot due to limited supply (NAR 2023). Most North American municipalities prohibit multifamily housing in most residential areas, mandate offstreet parking which forces car-free families to pay for costly spaces they do not need, and invest relatively little in affordable travel modes. The following policies help create more compact, multimodal and affordable communities.

Table 6 **Smart Growth Policies**

Compact Development	Multimodal Transportation
• Increasing allowable densities, height and mix. • Compact housing types (townhouses, apartments, etc.). • Reduced and more flexible parking minimums. • Limiting urban expansion. • Lower fees and charges for compact development.	• Improved sidewalks, crosswalks and bikeways. • Improved public transit services. • Less urban roadway expansions. • Complete streets and connected roadway design. • Reduced parking supply and efficient parking pricing.

Smart Growth includes various policies that create more compact, multimodal communities.

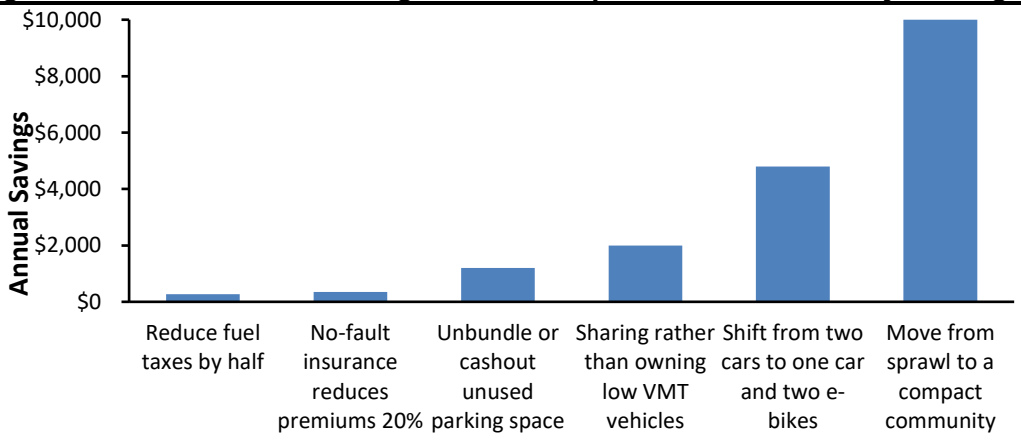
Affordable Automobile Travel

Because driving is the dominant travel mode and vehicle expenses are most household's largest travel expense, people often assume that the best transportation affordability strategies reduce vehicle costs with lower fuel taxes, road tolls and parking fees, or vehicle purchase subsidies. Advocates argue that these strategies improve disadvantaged households' economic opportunities, although the impacts are actually mixed (Klein 2020). One study found that owning a car increases low-income households' incomes, but much less than incremental vehicle costs, leaving them poorer overall (Smart and Klein 2015). Although 90% of low-income motorists consider car ownership worthwhile, about half report significant financial hardships (Klein, Basu and Smart 2023).

Many vehicle savings strategies shift costs to other sectors. For example, low fuel taxes and road tolls increase general taxes (for roadway costs not paid by user fees), and "free" parking increase housing costs (for residential parking) and retail prices (for customer parking). Reducing insurance premiums reduces crash victim compensation. Since vehicle travel tends to increase with income, cross-subsidies from lower to higher VMT households tend to be regressive. For example, funding roadway expansions through general taxes is more regressive than tolls (Schweitzer and Taylor 2008). Policies that make driving cheaper tend to increase automobile dependency and sprawl, which reduce affordable travel options and increase the risk and pollution that motorists impose on non-drivers.

Most vehicle cost reduction strategies provide modest savings. For example, since U.S. state and federal fuel taxes current average 53¢ and motorist consume an average of 650 gallons of fuel annually, cutting fuel taxes in half would save a typical motorist less than $200 per year. Vehicle insurance premiums currently average about $1,000 per vehicle-year, so if no-fault coverage reduces these by 20%, motorists save about $200 annually. Unbundling and cashing out unused parking spaces, and sharing rather than owning a lower-mileage car, can save many hundreds of dollars per year, and shifting from owning two cars, to one car and two e-bikes, or moving from a sprawled area that requires two high-mileage vehicles to a compact community that requires just one car can provide thousands of dollars in annual savings, as shown below.

Figure 31 **Estimated Savings from Transportation Affordability Strategies**



Many vehicle cost reduction strategies provide modest annual savings. Strategies that reduce vehicle ownership and unnecessary parking costs can provide much larger savings.

To be fair and efficient, any travel subsidies should target lower-income travellers and accommodate any modes, not just driving. For example, rather than exempting lower-income motorists from road tolls it is better to provide *mobility wallets* that can pay tolls, transit and taxi fares, or car- and bike-sharing, so lower-income travellers can choose the best travel option for each trip.

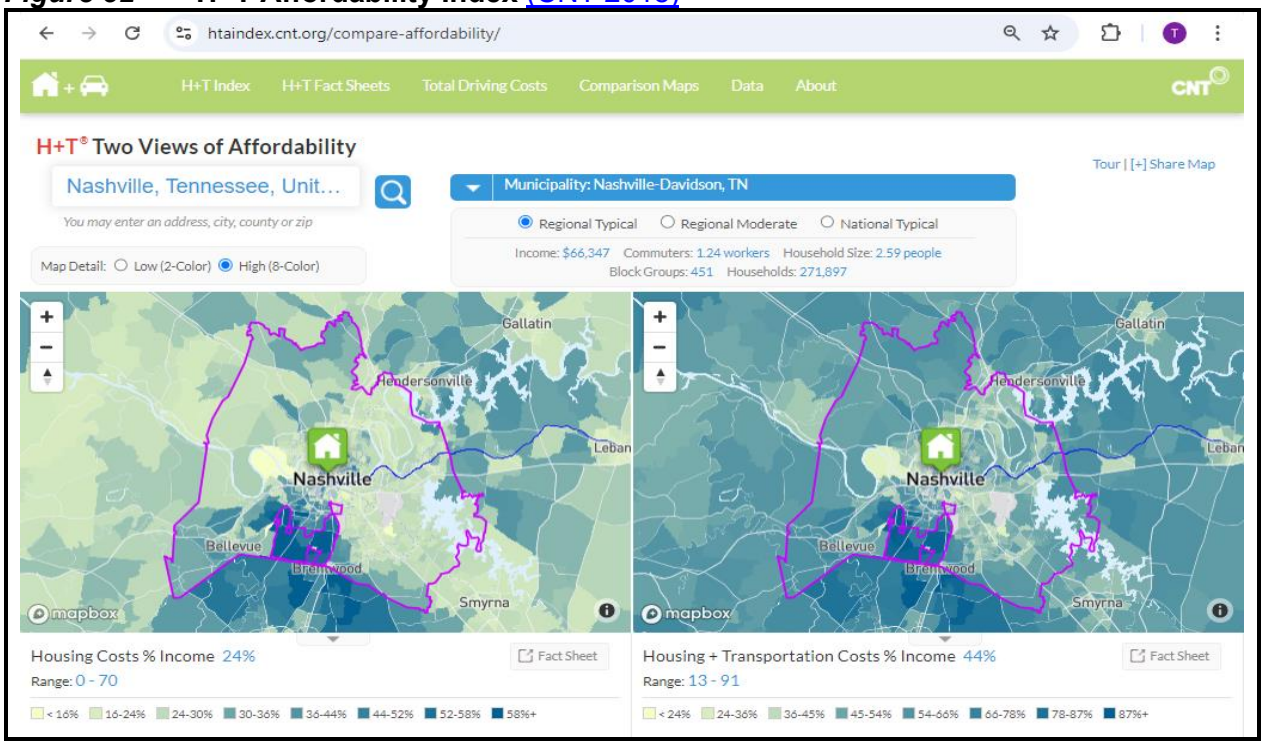
Transportation Affordability Analysis Examples

Examples of affordable transport policies and projects are described below.

H+T Affordability Index

The *H+T Affordability Index* (https://htaindex.cnt.org) calculates housing and transportation costs for U.S. neighborhoods. The results are presented in color-coded maps, as illustrated below. This can be used by households, planners, developers and researchers to evaluate costs and affordability.

Figure 32 **H+T Affordability Index** (CNT 2018)



The H+T Affordability Index measures affordability in many ways. Many areas rated affordable (light green) considering just housing (left map) are unaffordable when travel costs are also considered (right map).

Location Affordability Index

The U.S. Department of Housing and Urban Development's *Location Affordability Index* uses American Community Survey data to calculate neighborhood housing and transportation costs for eight typical household profiles (HUD 2019). It produces heatmaps showing housing and transport affordability, and where adding more lower-cost housing can provide the greatest affordability gains (Lavery 2019).

Transportation Insecurity Index

University of Michigan researchers surveyed lower-income residents to evaluate transportation insecurity based on six symptoms: lateness; skipped trips; excessive travel time burdens; social isolation; feeling unsafe; and worrying (Murphy, Griffin and Gould-Werth 2022; Ricks 2022). They estimate that one in four and more than half of all people in poverty are transportation insecure, which is 2.5 times more than food insecurity. They found that unreliable transportation is a major risk to low-wage workers, reducing their economic opportunities and welfare.

Transit Equity Dashboard

The *Transit Equity Dashboard* (https://dashboard.transitcenter.org) measures how well transit networks connect disadvantaged populations (racial minorities, people with low incomes, single mothers, etc.) to jobs, services, and amenities. It measure disparities and progress toward equity.

Latin American Transportation Affordability

This Inter-American Development Bank study analyzed household transportation expenditures by income class (Rivas, Serebrisky, and Suárez-Alemán 2018). It found that wealthier households spent a larger percentage of their budgets on transportation (17%) than poorer households (7.7%). However, to achieve a high level of accessibility lower-income households would often need to spend 25% of their income, indicating unaffordability.

Automobile Ownership and Economic Opportunity

A study by Smart and Klein (2015) analyzed how automobile and transit access influences low-income people's access to basic activities including healthcare, shops, jobs and schools, and how these change over time. They found that being carless is often temporary: although 13% of households are carless during any given year only 5% are carless every year. It found that poor families, immigrants, and people of color are less likely to have a vehicle and more likely to transition into and out of car ownership than non-poor, US-born white families. Formerly carless households that obtain a vehicle typically work more hours and earn approximately $2,300 more per year but must spend more than $4,100 annually on their vehicles and so are financially worse off overall.

Racial Analysis of Transportation Cost Burdens

The study, "Black Households Are More Burdened by Vehicle Ownership than White Households," analyzed racial disparities in transportation affordability (Molloy, Garrick and Atkinson-Palombo 2024). Black households are three times as likely as White households not to have access to a car and, thus, spend comparatively little on transportation. Of Black households with vehicles, 76% are burdened by transport costs compared with 60% of White households. Black households with vehicles allocate more of their total average annual spending to transport regardless of income, and disparities in transportation burden are present even in high-earning households. Black households that are in poverty spend on average $1,115 more per car than their White peers. Insurance, gasoline, vehicle loans, and leasing costs tend to be higher for Black than for White households.

Locating Affordable Housing in Accessible Neighborhoods

The *National Study on Transportation Affordability of HUD Housing Assistance Programs* used a model tailored for low-income households to evaluate the transportation costs for 76,000 housing units in U.S. federal affordable housing programs (Jahan and Hamidi 2020). It found that over 44% of these homes are located in neighborhoods with unaffordable transportation and concluded that subsidized housing should be located in accessible neighborhoods to reduce household travel costs.

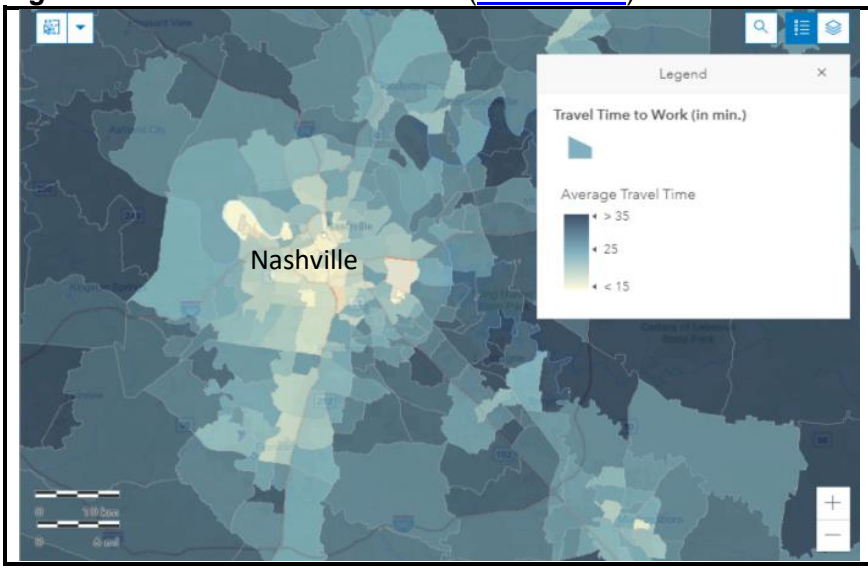
Economic Transfers Verses Resource Costs

Some affordability strategies are economic transfers: money or other resources shifted from one group to another. Others result from net resource savings. Planning analysis should account for economic transfers and generally favor policies that provide net savings. For example, low fuel taxes, road tolls and parking fees reduce the cost of driving but increase general taxes and housing costs to pay for road and parking facilities not paid by user fees. Similarly, low transit fares require tax subsidies. However, shifts from driving to walking, bicycling and public transit tends to reduce total costs because these modes require less space and energy, and therefore less costly infrastructure, and impose less congestion, risk and pollution, which reduces total resource costs.

Time Versus Money Costs

The main justification for favoring automobile travel over affordable modes is the assumption that driving is faster, which saves time and increases economic productivity. There are good reasons to question those assumptions (Litman 2023). Although driving is often faster for individual trips, automobile travel tends to encourage sprawl which increases travel distances and congestion delays. As a result, although individual travellers may consider automobiles faster than other modes, residents of central, multimodal neighborhoods spend much less time travelling than motorists in automobile-dependent areas (Ewing and Hamidi 2014). The figure below illustrates this.

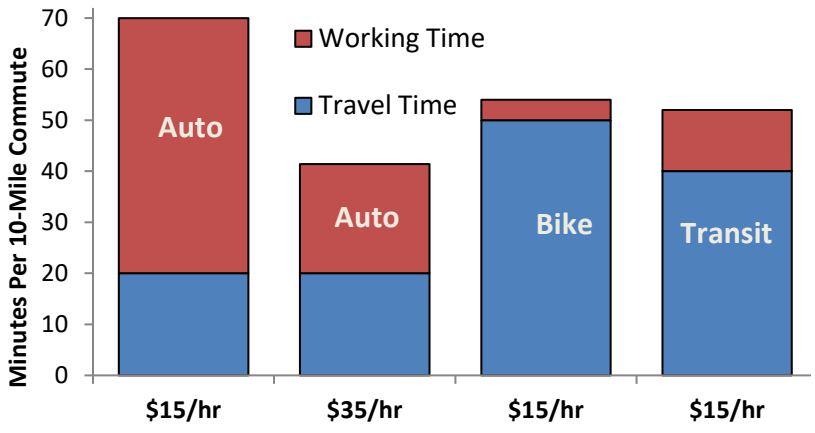
Figure 33 **Commute Duration** (SJSU 2021)



This map shows that Nashville region commute durations tend to be lower in central areas than outer suburbs. Although central area residents rely more on slower modes and experience more congestion, their lower speeds are offset by shorter trip distances, reducing the total time and money they spend travelling. This is similar to the travel cost patterns found by the H+T Affordability Index maps. Most other regions have similar patterns.

When evaluated using *effective speed*, which measures distance travelled divided by time spent traveling *and* earning money to pay travel expenses, driving is slower than bicycling or public transit for low- and moderate-income travellers, as illustrated below.

Figure 34 **Effective Speed by Income and Mode** (Litman 2020)



Measured by effective speed (distance divided by time spent travelling and earning money to pay travel expenses), bicycling and transit are usually faster than driving for lower-wage workers. As a result, policies that favor driving over affordable modes are regressive; they force lower-income travellers to spend more than optimal time working to pay travel expenses.

Transportation Affordability Planning Examples

This section describes examples of transportation planning to support affordability goals.

Planning Priorities

Transportation agencies currently evaluate transportation system performance based primarily on indicators of mobility, such as roadway level of service and hours of congestion delay, which favors faster travel over slower but more affordable and inclusive options (Litman 2023). More emphasis on affordability and social equity goals justifies more investment in affordable modes and Smart Growth policies that create compact, multimodal neighborhoods as illustrated below.

Table 7 **Comparing Transportation Goals, Indicators and Preferred Investments**

	Mobility	Affordability and Equity
Goals	Maximize travel speed and distance	Ensure that everybody, including disadvantaged groups, can access basic services and activities.
Performance indicators	Roadway level-of-service, traffic speeds, and congestion and parking delays.	Time and money costs for basic access, and per capita transport expenditures by disadvantaged groups.
Preferred investments	Increasing road and parking supply where congested.	Improving affordable modes (walking, bicycling and public transit), TDM programs and Smart Growth.

Mobility-based planning favors faster modes over slower but affordable modes, and sprawl over compact development. Prioritizing affordability and equity supports more compact and multimodal development.

Affordable-Accessible Housing

Smart Growth, Transit-Oriented Development, 15-minute communities and urban village are all terms for creating compact, multimodal neighborhoods where it is easy to access common services and activities (diverse and affordable stores, parks, schools, restaurants, interregional public transit, healthcare jobs, etc.) by affordable modes. Various guides identify policies and planning practices for creating such communities (ODOT 2022; TCRP 2022)

Multimodal Congestion Relief

Governments invest significant resources to reduce traffic congestion, mostly for roadway expansions. Considering affordability and social equity goals justifies more multimodal planning plus TDM incentives for peak-period travellers to choose affordable and resource-efficient modes.

Table 8 **Comparing Congestion Reduction Strategies**

Planning Goals	Highway Expansion	F&A Transit With TDM
Congestion reduction	✓	✓
Roadway cost savings		✓
Parking cost savings		✓
Consumer savings and affordability		✓
Traffic safety		✓
Improved mobility for non-drivers		✓
Fossil fuel conservation		✓
Pollution reduction		✓
Physical fitness and health		✓
Strategic objectives (reduced sprawl)		✓

Highway expansions may reduce congestion (although this is generally offset by induced vehicle traffic over time), frequent and affordable (F&A) transit services provide more benefits and tend to be more cost-effective.

Emission Reduction Planning

Most emission reduction plans devote most of their budgets to electric vehicle (EV) subsidies and little to e-bikes. Although EVs have lower fuel costs than fossil fuel vehicles, this is offset by their higher purchase costs so they do not increase affordability, and other than reducing petroleum consumption and pollution emission they provide few other benefits. In contrast, bicycles, including e-bikes, are more affordable and resource-efficient than automobiles and so help achieve many planning goals, as illustrated in the table. E-bike subsidy programs can provide large benefits; recipients typically bicycle more frequently (3 to 4 days, riding 30 to 70 km per week) and reduced their auto use by about 50 km per week, with large benefits to lower-income users (Bigazzi, Hassanpour and Bardutz 2024). This suggests that emission reduction plans should prioritize e-bike over electric car subsidies.

Table 9 **Comparing Electric Car and E-bike Impacts**

Planning Goals	Electric Cars	Bikes/E-Bikes
Congestion reduction		✓
Roadway cost savings		✓
Parking cost savings		✓
Consumer savings and affordability	**Higher purchase, lower operating**	✓
Traffic safety		✓
Improved mobility for non-drivers		✓
Fossil fuel conservation	✓	✓
Pollution reduction	✓	✓
Physical fitness and health		✓
Strategic development objectives (reduced sprawl)		✓

Shifting to electric cars reduces fossil fuel consumption and pollution emissions, but provides few other benefits. Shifting from cars to bicycles, including e-bikes, helps achieve many planning goals including affordability.

Heavy Loads and Longer-Distance Trips

It can be difficult to carry heavy loads or travel longer distances by non-auto modes, causing some households to own seldom-needed vehicles, but once they own a vehicle they use it frequently due to its low variable costs. As a result, carsharing (neighborhood vehicle rentals that substitute for private vehicle ownership) and interregional transit (longer-distance bus and rail services) can allow households to own fewer vehicles, which leverages savings and benefits. These effects should be considered when evaluating carsharing or interregional transit improvements. For example, carshare members typically reduce their vehicle ownership 25-50% (Lovejoy, Handy and Boarnet 2014).

Complete Streets Roadway Design

Currently, most road space is devoted to general traffic lanes and on-street parking. Many streets lack sidewalks and crosswalks, few have bus- or bike lanes, and many are designed for traffic speeds that are too high for safety. Complete streets policies ensure that public roads safely accommodate all possible users, including affordable modes. As a result, analysis of complete streets projects should consider the degree that by improving affordable travel options they provide financial savings and benefits, particularly to people with disabilities and lower-income households.

Comprehensive Policy Analysis

Affordability analysis should be comprehensive; it should consider impacts on the quality of affordable modes, changes in vehicle ownership and use, economic transfers, plus impacts on auto-dependency and sprawl. The table below compares these impacts for various affordability strategies.

Table 10 **Transportation Affordability Strategy Evaluation**

Strategies	Affordable Travel Options	Vehicle Ownership	Vehicle Use	Economic Transfers	Auto-Dep. & Sprawl
Driving Cost Reductions					
Low fuel taxes and road tolls (below cost recovery)	Reduced	Increased	Increased	Increases general taxes	Increased
Parking minimums & subsidies	Reduced	Increased	Increased	Higher housing costs	Increased
Roadway expansions	Reduced	Increased	Increased	Tax funding	Increased
Electric vehicle subsidies	Reduced	Increased	Increased	Tax funding	Increased
Transportation Demand Management					
Active mode improvements	Improved	Reduced	Reduced	Tax funding	Reduced
Transit improvements	Improved	Reduced	Reduced	Tax funding	Reduced
Reduced parking mandates	Improved	Reduced	Reduced	Tax funding	Reduced
Efficient parking pricing, unbundling & cash out	Improved	Reduced	Reduced	Money to non-drivers	Reduced
Carsharing	Improved	Reduced		Savings to low-mileage drivers	Reduced
Pay-as-you-drive pricing		Reduced	Reduced	Savings to low-mileage drivers	
Smart Growth development	Improved	Reduced	Reduced	Various savings	Reduced
E-bike subsidies	Improved	Reduced	Reduced	Tax funding	
TDM programs	Improved	Reduced	Reduced	Tax funding	Reduced
Transit fare subsidies	Improved	Reduced	Reduced	Tax funding	
Multimodal wallets	Improved	Reduced	Reduced	Tax funding	

Comprehensive analysis should consider direct and indirect impacts, including impacts on vehicle ownership and travel, subsidy costs or rewards, and sprawl-related costs.

This indicates that most driving cost reduction strategies reduce affordable travel options by increasing automobile ownership and use, which increases automobile dependency and sprawl. Many TDM strategies improve affordable modes directly, and indirectly by increasing their demand. For example, efficient parking pricing increases demand for walking, bicycling and public transit, which justifies better facilities and services. Many TDM strategies also encourage compact development which reduces sprawl. Some strategies, such as efficient parking pricing, carsharing and PAYD pricing, provide financial benefits to lower-mileage drivers (typically those that drive a vehicle less than 6,000 annual miles). Although some TDM strategies require funding, this is often offset by infrastructure savings. For example, walking, bicycling and transit improvements are generally cheaper than the costs of expanding roads and parking facilities to accommodate more automobile travel.

Modelling Affordability Impacts

Transportation models are often used to evaluate policies and projects. To analyze affordability impacts they should measure 1) latent demands by lower-income travellers; 2) the quality of affordable travel options; 3) disparities between automobile and non-auto accessibility; 4) housing affordability in accessible areas; 5) transportation and housing cost burdens. No current models measure all these factors.

Some traffic models measure some expenses, such as vehicle operating costs and transit fares, but generally ignore vehicle ownership and residential parking costs. Multimodal accessibility models can measure the jobs and services reachable by various modes, but do not usually measure monetary costs. The *H+T Affordability Index* (CNT 2018) and *Location Affordability Index* (HUD 2019) predict how location decisions affect housing and travel costs, but not qualitative factors such as walkability or transit travel comfort. New models can analyze how transportation and land use decisions affect vehicle ownership, travel and emissions (Caltrans 2020; Litman, Shebeeb and Milam 2024).

To evaluate affordability these models should be modified to measure how policies and planning decisions affect accessibility, service quality and financial costs disaggregated by mode, ability and income. For example, a model can predict how potential roadway designs, pricing or parking regulations will affect access, convenience and safety of various modes; and how it will affect cost burdens for various demographic groups and income classes, including indirect impacts such as residential parking costs. As previously discussed, many policies that reduce driving costs, such as low fuel taxes, "free" parking and unpriced roads, can reduce overall affordability by shifting costs to other sectors and increasing automobile dependency and sprawl. Policies that allow households to reduce their vehicle ownership, such as carsharing and high-quality public transit, can increase affordability by reducing vehicle ownership and residential parking costs, and allowing more lower-cost infill housing.

The table below categorizes policies according to whether they tend to reduce or increase affordability. Many policies have synergistic effects; an integrated package that improves affordable modes, encourages their use and creates more compact and mixed communities can provide larger total benefits than the sum of their individual impacts.

Table 11 **Typical Affordability Impacts of Policies**

Reduce Affordability	Increase Affordability
• Parking mandates (increase housing costs) • Underpriced parking (encourages driving) • Low fuel taxes (increase auto-dependency) • Urban highway expansions (increase sprawl) • Auto-oriented planning (favors driving over affordable modes) • Wider roads and higher traffic speeds (degrades active travel) • Sprawled development (increases travel costs, reduces access by affordable modes)	• Reducing or eliminating parking mandates, and unbundle and cash out free parking. • Multimodal planning and complete streets policies. • Expanding sidewalks, crosswalks and bikeways. • E-bike subsidies • Smart Growth development policies. • Affordable infill housing with unbundled parking • Vehicle sharing services and incentives. • TDM programs (e.g., school transport management). • Pay-as-you-drive vehicle pricing. • Public transit fare reductions

This table indicates how various policies tend to affect affordability.

Answers to Research Questions

How should transportation affordability be defined and evaluated?

Affordability refers to costs relative to incomes. Transportation affordability means that households can purchase travel to access basic services and activities and still afford other necessities. A common target is for households to spend less than 15% of their budgets on transportation or 45% on housing and transport combined. Its analysis should consider unmet transport needs, latent demands for lower-cost travel options, and excessive cost burdens, particularly by disadvantaged households. This requires comprehensive travel demand and household expenditure data.

How affordable is transportation?

Most North American households spend more on transportation than is considered affordable, and far more than peer countries. Excepting the highest income quintile, most households spend more than 15% of their budgets on transportation and more than 45% on housing and transport combined. Low-income vehicle-owning households and sprawled area residents have particularly high burdens.

How does unaffordable transportation affect households?

Excessive travel costs deprive lower-income residents of access to basic services and therefore economic and social opportunities (Ward and Walsh 2023); forces travellers to use inconvenient, uncomfortable and sometimes dangerous travel options; and leave lower-income families with insufficient money to purchase necessities. One survey found that U.S. motorists spend an average of 20% of their income on vehicles, over a quarter consider their vehicle unaffordable, 46% find it difficult to save because of car-related expenses, and 18% report that car costs reduce their well-being (Lewis 2024). Because automobiles sometimes impose large and unpredictable expenses they impose economic risks, indicated by high housing foreclosure rates in auto-dependent areas (Amidan 2025: Gilderbloom, Riggs and Meares 2015; NRDC 2010; Pivo 2013). Of six middle-class households interviewed about their excessive credit card debt (an indicator of financial stress and risk), four mentioned vehicle expenses as contributing factors: the need to replace a failing vehicle, pay for unexpected repairs, and purchase a car and pay insurance for a teenage child (de Visé, et al. 2024).

Is there significant latent demand for more affordable transportation?

There is evidence that many travellers want more affordable options. More than half of all North Americans use non-auto modes at least three times a week (Buehler and Hamre 2015). Surveys indicate that many households are burdened by high transportation costs, and many families want to live in more accessible and multimodal communities but cannot due to limited supply (NAR 2023). After affordable modes are improved, such as better sidewalks, bikeways, public transit and vehicle sharing services, their use often increases and automobile travel declines (Litman and Pan 2023).

How well do transportation agencies respond to demands for more affordable travel?

Few transportation agencies have clearly defined affordability goals or evaluation methods. If considered at all, agencies measure individual expenses such as fuel prices, tolls, parking fees or fares; they seldom analyze total household transport costs or affordability strategies. Planning decisions involve trade-offs between affordability and travel speed; when travellers' willingness to pay for time savings is tested with optional tolls, many travellers choose to save money rather than time (Burris 2016; Litman 2023). However, conventional planning evaluates transport system performance based primarily on speed, using indicators such as roadway level of service, which favors faster modes over slower but cheaper options. Better demand analysis tends to increase support for affordable modes.

Conclusions

Affordability refers to the costs of goods relative to incomes. Unaffordable transportation forces lower-income families to forego desired activities and opportunities, use inconvenient and uncomfortable travel options, or spend more than they can afford on mobility. Affordable transportation ensures that everybody can enjoy opportunity, freedom and happiness.

For affordability, experts recommend that households spend no more than 45% of their budgets on housing and transportation combined, which recognizes the trade-offs families often face between housing and travel expenses. A typical family that spends 30% of its budget on housing can afford to spend up to 15% on travel. Of course, every household has unique needs and abilities; some can afford to spend more than these limits but others less, and even people who can afford higher-cost modes can benefit from having affordable options available if needed. Although housing expenditures are larger, transportation costs are more variable and unpredictable, including occasional large financial shocks due to vehicle failures, crashes and traffic citations.

Transportation cost reductions can significantly increase families' discretionary spending ability (residual funds after paying for necessities), and therefore their economic freedom and resilience. For example, owning one less vehicle typically saves $5,000 in vehicle costs plus 15% in housing costs if parking is unbundled, which approximately doubles low-income families' discretionary spending from about $15,000 to $22,000, and by a third for moderate-income families from $23,200 to $30,900.

This study finds that transportation cost burdens increase with motor vehicle ownership and use, and therefore with automobile dependency and sprawl. Because most North American communities are auto-dependent, most families consider car ownership a necessity, but it is also a curse. Most low- and moderate-income households spend more on transportation than is considered affordable and are harmed as a result. Lower-income motorists tend to pay high vehicle loan and insurance rates, and the older vehicles they drive are vulnerable to mechanical failures and crashes. People with disabilities and low-income households, and rural residents are particularly likely to bear excessive travel costs.

This analysis indicates that automobile ownership is unaffordable to most low-income and many moderate-income households. Automobiles are resource-intensive; they require more materials, energy, space, and more expensive infrastructure, and so they are more costly overall than other modes. Efforts to make driving cheaper by minimizing fuel taxes, parking fees and road user charges are often counterproductive because they impose indirect costs and encourage automobile-dependency which reduces affordability. For example, "free" parking increases housing costs, and *lower* fuel prices are associated with *higher* total transportation costs, as illustrated below.

There are several ways to frame this issue. One perspective assumes that unaffordability reflects income disparities, so transportation planning can do little to improve affordability. Another assumes that affordability requires minimizing vehicle costs so low-income travellers can afford to drive, but that tends to be inefficient and unfair. Automobile travel imposes many costs so reducing individual expenses only modestly increases overall affordability. Even a free vehicle is unaffordable for many low-income households due to insurance, fuel, maintenance and repairs, crashes and traffic citations. Underpricing driving shifts costs to other sectors, reducing overall affordability; for example, low fuel taxes and road tolls increase general taxes (to pay roadway costs not funded by user fees), "free" parking increases housing costs (for residential parking) and the price of goods (for customer parking), and no-fault insurance reduces crash victim compensation. By making driving cheaper, underpricing increases traffic problems, and by reducing non-auto demand reduces affordable travel options.

A better way to increase transportation affordability is to improve lower-cost modes – walking, bicycling, e-bikes, public transit, Mobility as a Service (MaaS), and telework – and create more compact and multimodal communities where it is easy to access common services and activities without driving. To be affordable, equitable and efficient a transportation system must be diverse so travellers can choose the best option for each trip: walking and bicycling to local destinations, high quality public transit when travelling on busy corridors, and automobiles when they are truly most efficient, considering all impacts. Relatively small increases in non-auto mode shares are associated with large user savings. Because non-auto modes experience economies of scale (unit costs decline as more people use them), policies that favor automobile travel tend to reduce affordable mode efficiency and quality, and transportation demand management incentives that discourage driving tend to improve transportation system diversity, efficiency and equity.

The box to the right lists multimodal affordable transportation strategies which reduce total costs by improving lower-cost travel options. These tend to have synergistic effects; they become more effective and beneficial as more are integrated, for example, if active and public transit improvements, carsharing services, increased density and mix, parking policy reforms, and TDM incentives are implemented together so travellers have travel options *and* incentives to use them. In addition to affordability, these strategies help achieve other community goals including better access for non-drivers, improved public fitness and health, plus reduced congestion, infrastructure costs, traffic risks and environmental harms. In contrast, strategies intended to make driving more affordable by reducing fuel taxes, road tolls and parking fees tend to contradict other goals, and over the long run tend to reduce affordability by increasing automobile dependency and sprawl.

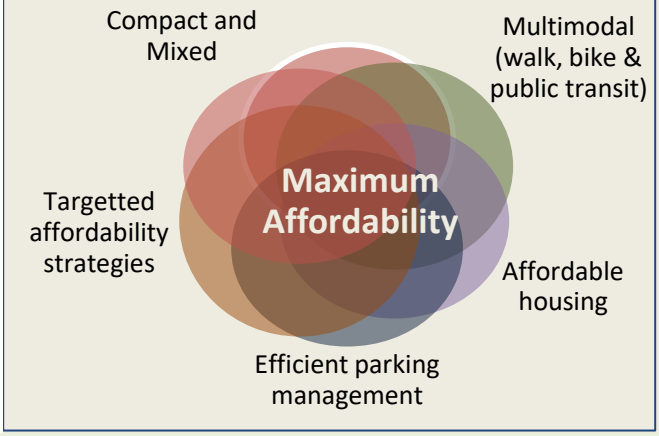
Box 3 Multimodal affordable transportation strategies

- Apply a sustainable transportation hierarchy in planning and funding. Align individual planning decisions to support strategic goals.
- Improve and encourage affordable modes including walking, bicycling, e-bikes, public transit, car-sharing and telework.
- Spend at least the portion of infrastructure budgets on affordable modes as their potential mode shares. For example, if walking and bicycling improvements would result in 20% active mode shares, they should receive up to that portion of funding for fairness sake, or more to achieve strategic goals and make up for past underinvestments.
- In economic evaluations give extra weight to improvements to affordable modes and benefits to lower-income travellers.
- Support vehicle sharing (carsharing and MaaS) and encourage households to right-size their vehicle fleets.
- Implement Smart Growth policies that create compact, multimodal neighborhoods where it is easy to use affordable modes.
- Increase affordable housing in multimodal neighborhoods.
- Apply complete streets planning so all streets accommodate affordable modes.
- Reform parking policies to increase efficiency. Unbundle and cash out free parking so non-drivers are no longer forced to subsidize parking facilities they do not need.
- Implement TDM incentives that encourage travellers to use affordable and resource-efficient modes when possible.

There is evidence of significant latent demands for affordable travel options. Although few motorists want to give up driving altogether surveys indicate that many want to live in more compact, multimodal communities, spend less time and money driving, and rely more on non-auto modes, provided they are convenient, comfortable and affordable. Physically and economically disadvantaged people especially benefit from living in compact, multimodal neighborhoods. Current planning does a poor job of responding to those demands. It gives little attention to affordable transportation goals and is biased in ways that undervalue and underinvest in affordable modes. To better respond to travellers' demands, transportation agencies must apply more comprehensive analysis.

Current transportation price structures are an obstacle to affordability. Most vehicle costs are external or fixed, so people bear many costs regardless of how much they drive, and motorists save little from marginal reductions in vehicle travel. For example, parking mandates force all households to subsidize parking, and motor vehicle travel imposes travel delay, risk, and pollution on communities. Vehicle payments, financing, taxes, registration fees, insurance and scheduled maintenance are not significantly affected by the amount a vehicle is driven during a year. This price structure makes driving cheaper than public transit for most trips, and encourages motorists to maximize their mileage to get their money's worth from their large fixed expenses. To correct this, policies should encourage households to right-size their fleets by supporting carsharing and Mobility as a Service, and unbundling parking so households can save more money when they own fewer vehicles. Governments can convert fixed costs into variable costs by applying pay-as-you-drive pricing to insurance premiums, vehicle taxes and registration fees. The figure to the right shows the components of a truly affordable transportation system.

Figure 35 **Requirements for True Affordability**



True affordability requires a combination multimodal transportation (good walking, bicycling and public transit), of compact and mixed development (typically a Walk Score over 70), affordable housing, efficient parking management, and targetted programs that provide discounts and subsidies to households that need them.

Any good story requires a villain. In this case, a primary cause of unaffordability is the tendency of planning to prioritize speed over other goals, which favors faster modes over slower but more affordable modes, higher roadway design speeds over complete streets that accommodate all modes, and sprawl over compact development. A century of such planning has made most North American communities automobile dependent, and therefore travel unaffordable. To be efficient and equitable, transport planning must give affordability as much consideration as speed and safety. This is not to suggest that other goals should be ignored, but planning should prioritize the speed, convenience and safety of affordable modes, for example, by improving sidewalks, crosswalks and pedestrian short-cuts, providing bike and bus lanes, and creating compact and multimodal neighborhoods communities that provide affordable accessibility.

Conventional economics often assumes that happiness requires more income. This study offers a different perspective; it describes why and how to increase transportation affordability. Not everybody chooses the cheapest modes, but many people want more affordable, efficient and equitable travel options than currently exist, and many policies that increase affordable transportation provide many co-benefits. Transportation planning should apply these concepts to increase overall opportunity, independence, freedom and happiness.

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