Not So Fast
Better Speed Valuation for Transportation Planning

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Planning that favors faster travel tends to increase economic, social and environmental costs, and over the long run leads to “mobility inflation” that increases travel distances. Comprehensive analysis considers all of these factors when evaluating speed impacts.

Summary
Planning decisions often involve trade-offs between travel speed and other goals. It is important to consider all impacts when making speed-related decisions. This report examines why and how to do that. It describes various benefits and costs of faster travel; examines how speed valuation affects planning decisions; how those decisions affect economic, social and environmental outcomes; and provides guidance for comprehensive analysis of these impacts. This analysis indicates that conventional planning tends to exaggerate the benefits and understate the costs of higher travel speeds. This favors faster modes, such as automobiles, over slower but more affordable, healthy, equitable and resource-efficient modes such as walking, bicycling and public transit; favors higher roadway design speeds; and favors sprawl over compact development. Surveys indicates that many people want to drive less, rely more on slower modes, and live in more compact, walkable communities. Serving these demands requires more comprehensive analysis of speed-related trade-offs.
Key Findings

- Transportation planning often involves trade-offs between speed and other goals. It is important to apply comprehensive analysis to these impacts.

- For some trips, such as urgent errands, faster travel can provide large benefits. However, higher speeds are inherently costly. For example, automobile travel costs 10 to 100 times as much as walking, bicycling, e-bikes and public transit, and automobile travel increases infrastructure costs, health and crash risks, and environmental damages by similar amounts. Because wealthier people can afford more speed which increases external costs, planning that favors faster travel tends to be inequitable; it increases the costs that affluent travellers impose on disadvantaged groups.

- Planners often assume that faster travel provides time savings, but people tend to maintain fixed travel time budgets, they devote about the same number of daily minutes to personal travel regardless of speed. As a result, faster travel increases travel distances rather than saving time. This causes mobility inflation, it ratchets up the amount of travel people require to meet their needs, which is costly to communities and unfair to people with limited mobility.

- Current transportation planning practices tend to exaggerate the benefits, underestimate the costs, and ignore the inequities of higher speeds. Current planning generally recognizes trade-offs between speed and safety, but overlooks other impacts such as reduced affordability, health risks, and reduced mobility for non-drivers. These biases result in overinvest in faster modes and higher speed roadway designs, which results in more vehicle travel and sprawl than is optimal.

- Contrary to common assumptions, higher speeds not necessarily support economic development. Faster travel can increase productivity if it increases overall accessibility, but those benefits are generally offset by higher costs and increased sprawl caused by faster traffic.

- The inefficiency and inequity of speed-prioritizing planning are evident if transport performance is evaluated using effective speed, defined as travel distance divided by the time spent travelling and earning money to pay travel expenses. Measured this way, automobile travel is often slower than bicycling and public transit, and is regressive because it benefits affluent motorists who value time more than money, but harms lower-income people who prefer lower-cost modes.

- For efficiency and social equity sake, transportation planning should favor slower, affordable and resource-efficient modes over faster, costly modes, and traffic speeds should be set to protect community livability.

- To their credit, many policy makers and planning practitioners support slower modes and traffic speed reductions more than justified by their economic models; they realize intuitively that walking, bicycling and public transit are important and deserve more investment. However, this occurs despite rather than supported by standard analysis practices. Reforming these practices can justify much more support for slower modes.

- Of course, every traveller has unique needs and preferences. Many choose faster modes, despite their higher costs, for the sake of convenience or status. However, current demographic and economic trends—aging population, increasing urbanization, plus growing affordability, health and environmental concerns—are increasing demand for slower modes and neighborhood livability. Given better options, many people would shift from faster to slower modes, and from automobile-dependent sprawled areas to more compact, multimodal neighborhoods. Everybody benefits if our planning practices respond to these demands.
Preface – A Personal Perspective

The amount that people travel, and therefore the transportation costs they bear and impose on their communities, varies widely depending on geography and personal lifestyle. Households in central city neighborhoods average less than 20 daily vehicle-miles, compared with more than 50 in automobile-dependent suburbs, as illustrated below. Their transportation costs, including their own vehicle expenses, the costs of road and parking facilities required for their travel, plus the congestion, crash and environmental costs they impose on other people, also vary by similar amounts.

Household Vehicle Travel and Expenses by Location (Salon 2014)

Residents of high-accessibility neighborhoods drive significantly less, rely more on slower modes, spend less on transportation, and impose lower external costs than in more automobile-dependent areas.

I can report from personal experience that it is possible, and in many ways better, to rely on slower modes; our family has been car-free for more than a decade. This is possible because we live in a high-accessibility neighborhood located within convenient walking and bicycling distances of numerous services. In fifteen minutes we can walk or bike to more stores, restaurants, parks and jobs than most suburban motorists can reach by car in the same time period, with far lower costs and greater enjoyment. Our transportation cost savings financed our children’s university educations and now leaves us with money to spend on luxuries that would be unaffordable if we lived an automobile-dependent lifestyle. Our daily walking and bicycling maintains our health without requiring special time or expenses for exercise, and nearly every day we have friendly conversations with neighbors.

We are lucky. Most households cannot live this lifestyle because there is a shortage of affordable housing in high-accessibility neighborhoods. During the last century, most were displaced by urban highways and parking lots, or degraded by heavy traffic that makes walking and bicycling dangerous and unpleasant. Why? Although there are many ways to answer this question, a key factor is the common assumption that faster travel is better than slower travel, even in compact urban communities. The shortage of high-accessibility neighborhoods is the result of a self-fulfilling prophecy, as faster traffic squeezes out slower but more affordable and efficient alternatives.

This can change! With more comprehensive analysis of speed impacts, communities can create more affordable, healthy and resource-efficient transportation options that benefit everybody.
“Haste makes waste.”

**Introduction**

Planning decisions often involve trade-offs between travel speeds and other goals. For example, transportation agencies can invest in faster modes, such as driving, or slower more affordable, healthy and resource-efficient modes such as walking, bicycling and public transit. Roads can be designed for higher traffic speeds, with wider lanes, longer blocks and fewer crosswalks, or for slower speeds, with narrower lanes, shorter blocks, and more space devoted to sidewalks, bike- and bus lanes. Development policies can favor automobile-oriented sprawl or compact infill in multimodal neighborhoods.

Faster travel has both benefits and costs. It increases the destinations that people can access in a given time period, and therefore their economic and social opportunities, but inevitably increases many costs to users and communities. The value placed on speed significantly affects planning decisions, and therefore various benefits and costs, as illustrated in Figure 1. Conventional planning considers some of these impacts but often overvalues or undervalues others, particularly long-term effects caused by changes in accessibility, total vehicle travel, and development patterns (Adams 1999).

**Figure 1**  
**Travel Speed Valuation Impacts**

<table>
<thead>
<tr>
<th>Speed Priority</th>
<th>Planning Decisions</th>
<th>Travel &amp; Development</th>
<th>Ultimate Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher value placed on speed in planning analysis</td>
<td>Higher roadway design speeds (wider lanes, grade separation, longer blocks, etc.)</td>
<td>Higher traffic speeds</td>
<td>Benefits</td>
</tr>
<tr>
<td>More investments in faster modes (automobile and aviation), less in slower modes (walking, bicycling and transit)</td>
<td>More total vehicle travel (induced travel) and less active and public transport</td>
<td>Higher traffic speeds</td>
<td>Increased productivity</td>
</tr>
<tr>
<td>Automobile-oriented development policies (less density, more parking)</td>
<td>More sprawled development</td>
<td>More total vehicle travel</td>
<td>Costs</td>
</tr>
</tbody>
</table>

*Higher values placed on speed favors faster modes, higher traffic speeds and dispersed development, which reduces non-auto modes, and increases total vehicle travel and sprawl. Planning often overlooks many of these impacts.*

Conventional planning often assumes that higher speeds provide travel time savings, giving people more time to work or spend with their families, but over the long run people tend to maintain fixed travel time budgets (the daily minutes devoted to out-of-home personal travel stays relatively constant) so speed increases usually cause proportionate increases in travel distances. For example, if a roadway improvement increases traffic speeds by 30%, affected motorists will make longer or more trips, so their vehicle-miles increase about 30%. Although the additional vehicle travel (“mobility”) provides user benefits, these tend to be modest because they consist of marginal value vehicle-miles that users are most willing to forego if their travel time costs increase, and the additional vehicle travel increases external costs such as roadway costs, congestion, crash risk, and pollution emissions. A planning process that exaggerates the benefits of increased speed, or overlooks some costs will result in faster traffic, more vehicle travel, and higher total transportation costs than travellers and communities actually want.
Optimal travel speeds vary widely depending on conditions. Compact community design maximizes accessibility which minimizes the travel distances required to access services and activities, so optimal speeds are low. Sprawl reduces accessibility which increases distances and therefore optimal speeds. These approaches often conflict: higher traffic speeds are unsuitable in compact and multimodal neighborhoods, while automobile-oriented communities are dispersed by wide roads and large parking lots, and are unsuitable for walking, bicycling and transit travel. As a result, speed-prioritizing planning forces people to travel faster and farther to meet their daily needs.

Consider these examples.

1. About 15% of U.S. trips are made by slower modes (walking, bicycling and public transit), 20-40% of residents rely on these modes at least sometimes, surveys indicate that many travellers want to rely more on slower modes, and accommodating this latent demand helps achieve many economic, social and environmental goals. Yet, most communities devote much less than 10% of transportation funds and road rights-of-way to slower modes, less than their current and potential mode shares.

2. Most urban streets have design speeds and speed limits over 30 miles per hour (mph), although extensive research indicates that 20 mph speeds significantly increase all road users’ safety and comfort, particularly active modes, and therefore increases their use.

3. During the last century many high-accessibility urban neighborhoods were displaced and degraded by freeways. This increased suburban motorists’ travel speeds, improving their access to city jobs and services, but degraded urban neighborhoods and displaced many of their residents, forcing many households into more automobile-dependent lifestyles.

These examples illustrate how conventional planning often contradicts community goals such as efficiency, equity, health and safety, and environmental quality. There are many ways to explain why such practices are common. They may reflect racist assumptions that considered urban neighborhoods as “blight” to be displaced; consumerist assumptions that automobile travel is better than slower modes and suburbs are better than cities; inadequate analysis that overlooks many impacts; the political influence of vehicle and petroleum industries; and the biased experiences of policy makers and planning professionals who themselves lead automobile-dependent lifestyles. These are all legitimate critiques. However, the mechanism which allows a planning process to favor faster modes over slower modes and sprawl over compact development is the excessive value placed on speed.

This report investigates these issues. It examines how the benefits of speed are valued compared with other goals (Figure 2), and how this can affect planning decisions. It explores various benefits and costs of faster travel, how this valuation affects planning decisions, and the resulting impacts on people and communities. This should be of interest to policy makers, planning professionals, advocates of slower modes, and anybody interested in creating more sustainable communities.
Past Trends
Until recently, transportation progress consisted of faster modes, from walking to horse travel, sailing ships, bicycles, trains, automobiles, airplanes, to supersonic jets, as illustrated in Figure 3.

Figure 3  New Modes’ Initial Availability and Typical Operating Speed (Various Sources)

For most of history, transportation progress consisted of the development of faster modes. Increased travel speeds provided many benefits, but also imposed many costs.

Note that speed is indicated on a logarithmic scale so small increases in height indicate large increases in speed.

In recent decades this significantly increased people’s average speed and distance, as illustrated below. During the Twentieth Century, motorization increased average travel speeds from about 4 to 30 mph, and per capita travel from about 1,000 to 10,000 annual miles or 12,000 annual miles per motor vehicle.

Figure 4  Estimated Annual Passenger-Miles by Mode (Litman 2020, Exhibit 8)

Before 1900 travel consisted primarily of walking, with occasional bike and rail trips. During the Twentieth Century, motor vehicle travel grew. Average speeds increased from about 4 to 30 mph, travel distances increased from about 1,000 to 10,000 annual miles per capita, or 12,000 annual miles per vehicle, while use of other modes declined.
Increased motorized travel significantly increased transportation costs, as illustrated below.

**Figure 5** Estimated Vehicle and Infrastructure Costs (Litman 2020, Exhibit 36)

As vehicle travel increased during the Twentieth Century, transportation costs increased significantly. Per capita inflation-adjusted expenses are estimated to have increased from less than $200 in 1900 to more than $6,000 dollars in 2000.

Expanded roads and parking facilities, increased motor vehicle traffic, and reduced investment in slower modes degraded urban areas and encouraged sprawled development, illustrated in Figure 6.

**Figure 6** How Transportation Affects Urban Development (English 2019)

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

These examples illustrate how faster travel encourages urban dispersion—sprawl—which increases the travel distances required for a given level of accessibility. As a result, speed increases do not usually provide travel time savings; over the long run they generally cause people to travel more.

However, these trends are unlikely to continue. Traffic speeds and per capita vehicle travel have peaked in most developed countries (OECD 2012). Many urban regions have reached the practical limits of expansion. Surveys indicate that many people want to drive less and rely more on slower modes (NAR 2017). New technologies improve alternatives to driving. Planning increasingly evaluates transport system performance based on accessibility, not just mobility, which places a higher value on slower modes (Litman 2013). Traffic speeds could increase if citizens were willing to bear higher costs but there appears to be little support; few protest, “Raise my taxes to finance urban roadway expansions!”
The Demand for Speed

Travel demand refers to the type and amount of travel that people would choose in a particular situation. A key question in this analysis is the demand for speed and for slower modes, and the degree that conventional planning reflects these preferences.

Of course, people sometimes have situations in which they would willingly pay a high price to travel faster, for example, in an emergency, but travellers usually value speed less than other goals. For example, motorists usually select economy and luxury cars, SUVs, vans and pickup trucks rather than sports cars, indicating that convenience, comfort and safety are generally more important than speed.

Surveys also indicate that, although few motorists want to give up driving altogether, many want to drive less, use slower modes more, and reduce their transportation costs. The National Association of Realtors’ Community Preference Survey (NAR 2017) found that most respondents want to live in a walkable neighborhood rather than an automobile-dependent area even if that requires living in a townhouse or apartment rather than a detached home; 86% prioritize sidewalks and other walking facilities; 62% prioritize public transit access; 54% prioritize bike lane, path and trail access; and 59% said they drive more than optimal because they lack alternatives.

Some highways have tolled express lanes that test motorists’ demand for faster travel. They indicate that, although some motorists are willing to pay cost-recovery tolls (tolls sufficient to finance highway expansions), most would rather save money than time, indicating that they will only choose faster roadways if somebody else pays the additional costs (Parsons Brinckerhoff 2012; Prozzi 2009). For example, on the Katy Freeway, only about 10% of motorists are willing to pay tolls to avoid congestion delays, indicating that 90% of motorists value their time at less than $8 per hour (Burris 2016).

In addition, many communities recognize new planning goals such as affordability (cost burdens on lower-income households), equity (impacts on disadvantaged groups), public health, community livability, and environmental quality, which slower modes and traffic speeds tend to support.

Table 1 Comparing Emission Reduction Strategies

<table>
<thead>
<tr>
<th>Community Goals</th>
<th>Improve Auto Travel</th>
<th>Expand Roadways</th>
<th>Improve Slower Modes</th>
<th>Reduce Road Design Speeds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increased</td>
<td>Increased</td>
<td>Reduced</td>
<td>Reduced</td>
</tr>
<tr>
<td>Increase motorists’ speed and access</td>
<td>✓</td>
<td>✓</td>
<td>✓/✗</td>
<td>×</td>
</tr>
<tr>
<td>Increase non-drivers’ speed and access</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Consumer savings and affordability</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Traffic safety</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Physical fitness and health</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Road and parking cost savings</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Energy conservation reduced pollution</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Community livability and cohesion</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reduce sprawl-related costs</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Improving automobile travel and expanding roadways increases motorists speed and access, but tends to contradict other community goals. Improving slower modes (walking, bicycling and public transit) and reducing traffic speeds improves non-drivers’ accessibility, and by improving affordable and resource-efficient mobility options and reducing total vehicle travel, these actions help achieve a wider range of goals. (✓= supports goal. ×= contradicts goal.)
Speed Benefits and Costs
This section examines various benefits and costs of increased travel speed.

Increased Access
Faster travel expands the area that people can access. In 20-minutes a pedestrian can typically reach an area of about 3 square miles, a bicyclist or transit passenger about 30 square miles, and a motorist averaging 30 mph about 300 square miles as illustrated to the right.

Many jobs, lifestyles and hobbies are only feasible with the higher speeds offered by automobile travel. However, vehicle speeds are just one of many factors that affect accessibility; others include the quality of non-auto travel, network connectivity, development density and mix, and mobility substitutes such as telecommunications (Levinson, Marshall and Axhausen 2018). Development density tends to affect accessibility more than vehicle travel speed (Levine, et al. 2012).

There are often trade-offs between these factors: money and road space invested in faster modes are unavailable investment in slower modes, designing roadways for maximize traffic speeds tends to reduce their connectivity and local accessibility, and highway-oriented sprawl increases the distances between destinations.

New accessibility models can evaluate and compare these factors (Sundquist, McCahill and Brenneis 2021). For example, the Metropolitan Chicago Accessibility Explorer indicates that with a half hour maximum commute, central neighborhood residents can access more than 700,000 jobs by bicycle and 500,000 jobs by transit, which is more than many suburban motorists can reach in the same amount of time. On average, urban residents spend less money and time travelling than suburban residents, as illustrated in Figure 8. This indicates that traffic speed is less important than other accessibility factors, so more compact development with greater proximity and slower modes tends to maximize accessibility overall.
Travel Time Savings
Transportation planners often assume that increased travel speeds saves travel time, and value these savings at 35% to 60% of wages for personal travel, and more for commercial travel (“Travel Time,” Litman 2018; USDOT 2011). This approach tends to overvalue speed gains and undervalue slower modes. In practice, people tend to maintain fixed travel time budgets (Ahmed and Stopher 2014). Studies around the world indicate that most people devote 60-80 daily minutes to out-of-home personal travel, called Marchetti’s Constant (Marchetti 1994). As a result, over the long run, travel speed increases usually result in more mobility rather than saving time. For example, when searching for a home or job, workers usually look for a 30 minute maximum commute, and shoppers generally choose stores they can reach in less than 15 minutes. If traffic speeds increase, commuters and shoppers expand their destinations, increasing vehicle travel. The resulting benefits tend to be modest since the increased mobility consists of marginal-value vehicle-miles that motorists are most willing to forgo if their time costs increase, and the additional vehicle travel increases external costs such as facility, crash and pollution costs. The value of travel time can vary significantly depending on preferences and conditions, particularly for vulnerable modes such as walking, bicycling and public transit. Under favorable conditions, travel can have positive value, while under unpleasant conditions it has high unit costs (Mokhtarian 2005).

This has important implications for speed valuation (Metz 2015; Standen 2018). For example, although speed gains sometimes provide large benefits (motorists would pay a lot to save a few minutes), other attributes such as affordability and comfort are often more important (Burris, et al. 2016). Reductions in traffic speed and shifts from faster to slower mode do not necessarily increase travel time costs if they provide a less stressful or more enjoyable travel experience, and increased comfort, for example, by reducing transit crowding, can provide travel time cost savings equivalent to an increase in speed.

Economic Development and Opportunity
Faster travel can sometimes increase economic productivity and opportunity, for example, by allowing commercial vehicles to reach more destinations per shift, expanding the pool of workers available to employers, and increasing the jobs and services available to residents (Ewing, et al. 2016; Smart and Klein 2015). However, slower mode improvements often provide similar productivity gains with lower total costs, for example, if more compact development increases agglomeration efficiencies, or bicycle and transit improvements expand labor pools with lower total costs than roadway expansions. Since faster modes, increased vehicle travel, and sprawl increase many economic costs, it is unsurprising that productivity tends to decline as per capita vehicle travel increases, as shown in Figure 9 (Chatman and Noland 2013; Litman 2014). This suggests that improvements to slower modes and Smart Growth development policies often increase economic development more than automobile-oriented improvements.
Traveller Comfort and Stress
Although some motorists enjoy the thrill of speed, higher traffic speeds generally reduce travel comfort and increase driver stress. Motorists often choose slower roads, such as tree-lined city streets, windy country lanes, and scenic highways, over higher speed arterials and highways. Commuters who drive long distances tend to be less satisfied and more stressed than those who walk, bike, use comfortable public transit, or have shorter car trips (Wei 2015). This suggests that the quality of travel should be valued as much as speed, which justifies more investments in active and public transport, with particular attention to user convenience and comfort, plus lower roadway design speeds and more streetscaping.

Vehicle Expenses
Faster travel tends to increase vehicle costs. A typical pedestrian spends an extra $100 per year on shoes to walk 1,000 miles; a typical bicyclist spends $200 extra per year to ride 2,000 miles; a typical transit user spends $600 on fares to ride 2,000 annual miles; and a typical motorist spends about $5,000 per year to drive 12,000 annual miles. Figure 10 compares these costs measured per mile and year.

Figure 10  Typical User Cost

These costs can be evaluated using effective speed, which measures distance travelled divided by time spent traveling and earning money to pay for travel (Tranter 2010), illustrated in Figure 11. Blue bars show time spent travelling and red bars show time spent earning money to pay travel expenses.

Figure 11  Effective Speed by Income and Mode (Litman 2020)
Since lower-wage workers must spend more time earning their travel expenses and drive fewer average annual miles, effective speeds increase with income, as illustrated in Figure 12. Measured this way, automobile travel is regressive, and improvements to slower modes increase affordability and equity.

**Figure 12** Effective Speed by Income

Effective speed considers time spent traveling and working to pay travel expenses. It therefore increases with income. For lower-wage workers, bicycling and public transit are often faster than driving.

As a result, planning practices that favor automobile travel over more affordable modes are regressive, they favor higher-income over lower-income travellers.

**Infrastructure Costs**

Faster modes, higher travel speeds, and the additional vehicle travel they generate increase infrastructure costs. Higher speeds require more *shy distance* (space between vehicles and other objects), which requires more and wider traffic lanes, and more complicated intersections. For example, at 20 mph a car requires about 45 feet of 10-foot lane, totaling 450 square feet (sf), but at 60+ mph requires about 105 feet of 14-foot lane, totaling 1,470 sf, as illustrated below. Faster modes and higher speeds increase maintenance and safety program costs. Building and maintaining sidewalk and bikeways typically costs $20-50 annual per capita, public transit services typically cost $50-100 annual per capita, while public road cost about $800 and off-street parking facilities $2,000 to $4,000 annual per capita (FHWA 2018, Table HF10; Litman 2018). In compact areas motorists often share parking spaces but sprawl requires more off-street spaces. All these factors increase infrastructure costs.

**Figure 13** Road and Parking Space Required by Travel Modes

Faster modes and higher speeds require more space for travel and parking, plus more complex intersections, more road maintenance, and more traffic safety programs. As a result, higher speeds increase infrastructure costs.
Congestion and Barrier Effect Costs
As previously mentioned, automobiles require far more travel space per passenger-mile than slower modes, and their space requirements increase with speed. As a result, increased speed increases the congestion costs vehicles impose on other road users. Roadway capacity, the maximum number of vehicles a road can carry per hour, tends to peak at 30-45 mph on highways and less on surface streets, as illustrated to the right. Higher speeds increase congestion or require costly roadway expansions.

Wider roads and higher vehicle traffic speeds also increase the delay and risk imposed on pedestrians and bicyclists, called the barrier effect (Litman 2018). This harms active travellers and causes some to shift to motorized modes, which increases traffic problems.

Crash Costs
Crash casualties increase with speed for reasons described in the box to the right. These speed-related factors help explain why per capita traffic fatality rates are five to ten times higher in sprawled, automobile-dependent areas than in compact, multimodal communities (Ewing, Hamidi and Grace 2015).

Total traffic casualty rates tend to decline with reduced vehicle travel, lower traffic speeds, and increased active and public transit travel (Larson 2018; Welle, et al. 2018). Elvik (2005 and 2009) found that crash casualty rates increase exponentially with speed, so a 1% change in speed causes more than 1% change in crashes. Taylor, et al (2000) estimate that each 1 mph traffic speed reduction reduces crashes by 3% to 6% on both urban and rural roads. Using U.S. data, Redelmeier and Bayoumi (2010) find that the travel time savings provided by higher speeds are more than offset by reduced longevity and increased crash delays.

Traffic Risks (NACTO 2020)
Higher speeds increase crash risk in these ways:
1. Reduces drivers’ field of vision, reducing their chance of seeing and avoiding hazards.
2. Increase reaction and braking distances, reducing the chance of avoiding crashes.
3. Increase crash severity. For example, pedestrian crash survival rates decline from 90% at 20 mph to just 10% at 40 mph.
4. Increases total vehicle travel and therefore total risk exposure.
5. Automobile dependency and sprawl reduce traffic safety program effectiveness. For example, anti-impaired driving programs are more effective in multimodal communities where drinkers have alternatives to driving.

As walking, bicycling and public transit travel increase in a community, total traffic casualty rates, including all modes, tend to decline, an effect called “safety in numbers.”
Energy Consumption and Pollution Emissions

Under typical highway conditions, motor vehicle fuel economy peaks at 50 to 80 kilometers per hour (kph, about 30 to 50 mph), and less under stop-and-go conditions (Figure 16). One study estimates that reducing highway speeds from 120 to 110 km/h could reduce fuel consumption and related emissions by diesel cars by 12% and gasoline cars by 18% (EEA 2020). Motor vehicle noise also increases with speed (Figure 17). Although electric cars produce less noise than internal combustion engines at low speeds, the differences decline at speeds over 20 kph, as tire and wind noises increase.

Community Livability and Cohesion

Higher traffic speeds tend to reduce community livability (local environmental qualities such as safety, quiet, air quality, and attractiveness), and community cohesion, the quality of interactions among residents in a neighborhood, as illustrated to the right. Higher travel speeds offer fewer opportunities for social interaction, such as unplanned conversations that occur among residents, businesses, pedestrians and transit passengers.

Cortright (2017) found a negative correlation between travel speeds and transportation system satisfaction: residents in lower speed regions tend to be more satisfied than those in higher-speed regions.

As traffic speed and volumes increase, community livability features, such as neighborhood social interactions, tend to decline.
Automobile Dependency and Sprawl
Speed-prioritized planning tends to increase automobile dependency and sprawl in the following ways (Ewing and Hamidi 2017; Handy, Weston and Mokhtarian 2005; Shill 2020):

- Roadway expansions and resulting increases in traffic speeds create barriers to active travel (called the barrier effect), and degrade urban environments, making slower modes less efficient relative to automobile travel and urban locations less attractive relative to sprawled locations.
- Minimum parking requirements increase the costs of infill in areas with high land values, which favors development at the urban fringe where land is cheaper.
- Many urban highways displaced high-accessibility urban neighborhoods (Brinkman and Lin 2019).
- Public expenditures on faster modes leave less money to invest in slower modes.

These factors contribute to a self-reinforcing cycle of automobile dependency and sprawl, as illustrated to the right. Together they reduce non-auto travel options and create more dispersed communities where people must travel farther to reach services and activities, reducing accessibility, particularly for non-drivers. This tends to be costly (Handy 2020). People who live or work in automobile-dependent, sprawled areas must drive more, spend more money on transportation, require more costly infrastructure, and spend more time travelling than residents of compact, multimodal neighborhoods. These additional costs can be considered indirect, long-term impacts of speed-prioritizing transport planning.

Social Equity Impacts
Social equity refers to the distribution of impacts (benefits and costs) and the degree that those are considered fair and appropriate. Horizontal equity (also called fairness) assumes that similar people should be treated similarly. Vertical equity (also called justice or progressivity) assumes that physically, economically and socially disadvantaged people should be favored over people with more advantage. Speed can have the following equity impacts:

- Speed-prioritizing planning favors faster modes, particularly automobiles, over slower but affordable and inclusive modes. The result is often unfair (motorists receive an excessive share of funds and road space), and since vehicle travel often increases with income, it tends to be regressive.
- Higher speeds increase delay, risk, noise and pollution that vehicle traffic imposes on active modes.
- Urban highways often displace lower-income neighborhoods, which is unfair and regressive.
- Automobile-dependency and sprawl reduce affordable and inclusive transport options, which harms people who cannot drive or have low incomes. This reduces their economic opportunities, their ability to access schools, jobs and affordable services.
Summary of Impacts
Table 2 summarizes these impacts. Many of these effects are exponential, so modest increases in speed can cause large increases in costs. For example, increasing urban traffic speed from 20 to 30 mph tends to significant increase congestion, crash risk and noise.

Table 2  Speed Impacts

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Effects of Higher Speeds</th>
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<tbody>
<tr>
<td>Accessibility</td>
<td>Increases the area that motorists can reach in a given time period.</td>
</tr>
<tr>
<td>Travel time costs</td>
<td>Allows travellers to save time, although, instead they usually travel farther.</td>
</tr>
<tr>
<td>Economic development and opportunity</td>
<td>Increase productivity and opportunity in some ways but reduces it in others.</td>
</tr>
<tr>
<td></td>
<td>Automobile dependency and sprawl tend to reduce productivity overall.</td>
</tr>
<tr>
<td>Traveler comfort and driver stress</td>
<td>Generally reduces comfort and increase stress.</td>
</tr>
<tr>
<td>Vehicle costs</td>
<td>Faster modes and speeds usually increase vehicle costs.</td>
</tr>
<tr>
<td>Infrastructure costs</td>
<td>Faster modes require much more costly roads and parking facilities.</td>
</tr>
<tr>
<td>Congestion and barrier effect</td>
<td>Requires more road space, which increases congestion delays.</td>
</tr>
<tr>
<td>Crash costs</td>
<td>Significantly increases crash frequency, severity and exposure.</td>
</tr>
<tr>
<td>Energy consumption and pollution</td>
<td>Beyond optimal speeds (30 to 50 mph on highways and less on surface streets) increased</td>
</tr>
<tr>
<td>emissions</td>
<td>speed increases energy consumption, noise and pollution emissions.</td>
</tr>
<tr>
<td>Community livability and cohesion</td>
<td>Faster traffic tends to reduce community livability factors including safety, quiet,</td>
</tr>
<tr>
<td></td>
<td>and community cohesion (positive interactions among people).</td>
</tr>
<tr>
<td>Automobile dependency and sprawl</td>
<td>Contributes to a cycle of automobile dependency and sprawl, which increases driving,</td>
</tr>
<tr>
<td></td>
<td>reduces non-auto modes, and disperses destinations.</td>
</tr>
<tr>
<td>Social equity</td>
<td>Speed-prioritizing planning that increases traffic speeds, automobile dependency and</td>
</tr>
<tr>
<td></td>
<td>sprawl tend to be unfair and regressive.</td>
</tr>
</tbody>
</table>

*Increasing travel speeds has various impacts on travellers and communities.*

How Speed is Considered in Transportation Planning
This section examines how conventional planning evaluates various speed-related impacts.

Travel Time Savings
Conventional planning often assumes that faster travel provides time savings, ignoring travellers’ tendency to maintain fixed travel time budgets, so increased speed actually increases travel distances rather than saving time. Planning often assumes that higher speeds increase productivity and leisure time, sometimes described as “commuters can spend more time with their family,” when their actual benefit is increased access to more dispersed housing and shopping options, which increases external costs caused by vehicle traffic and sprawl. Planning also tends to exaggerate the value that travellers place on travel time. It often values personal time at 30-60% of traveller wages, which is often much more than they are actually willing to pay, for example, when choosing between a faster but expensive mode or route, and a slower but lower costs alternative (Burris 2017). This exaggerates the benefits and understates the costs of faster traffic.
Accessibility Trade-Offs
Conventional planning often overlooks and undervalues trade-offs between traffic speed and other accessibility factors, and therefore delays to other travel modes. For example:

- Wider roads and faster traffic increase walking and bicycling delay and risk (called the barrier effect), which shifts some active travel to chauffeured car trips, imposing time costs on drivers.
- Hierarchical road networks (smaller streets that connect to larger arterials but not each other) and one-way streets reduce connectivity, which increases the travel distances between destinations.
- High parking minimums encourage sprawled development, and urban highways displace high-accessibility urban neighborhoods, which increase travel distances and reduce non-auto access.
- Resources devoted to increasing traffic speeds are unavailable for other accessibility improvements such as active mode facilities, and public transit service improvements, or affordable infill housing.

Cost Trade-Offs
Conventional planning often overlooks and undervalues many speed-related costs. For example:

- Reduced active travel comfort and safety, and increased driver stress.
- Increase user costs and reduced affordability (costs imposed on lower-income households).
- Increased road and parking infrastructure costs.
- Increased congestion and barrier effects.
- Increased crash costs. Planning generally considers how speed affects crash rates on a particular facility, but generally ignores the additional crashes caused by induced vehicle travel (TRB 2021).
- Increased energy consumption and pollution emissions.
- Reduced community livability and cohesion.
- More automobile dependency and sprawl reduce overall accessibility and travel options, and therefore increase the amount of vehicle travel required to access services and activities. These changes impose various economic, social and environmental costs.

Consumer Preferences
Conventional planning assumes that most travellers prioritize speed over other goals, and gives little consideration to preferences for slower but more affordable, healthy and low-stress mobility options. Standard performance indicators measure travel speed and delay, but overlook other impacts.

Social Equity Impacts
Conventional planning considers horizontal equity, such as whether each area receives their fair share of roadway funding, but gives less consideration to the fairness by which money and road space is allocated between faster and slower modes, or how those impacts affect disadvantaged groups (such as how slower traffic speeds affect people with disabilities or low incomes). Transportation agencies produce little data for evaluating such impacts.
Table 3 summarizes these factors.

<table>
<thead>
<tr>
<th>Speed Impacts Considered in Conventional Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts of Higher Speeds</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>Increased motorist access</td>
</tr>
<tr>
<td>Travel time savings</td>
</tr>
<tr>
<td>Economic development and opportunity</td>
</tr>
<tr>
<td>Reduced traveler comfort and increased driver stress</td>
</tr>
<tr>
<td>Increased vehicle costs</td>
</tr>
<tr>
<td>Increased infrastructure costs</td>
</tr>
<tr>
<td>Congestion and barrier effect</td>
</tr>
<tr>
<td>Crash costs</td>
</tr>
<tr>
<td>Energy consumption and pollution emissions</td>
</tr>
<tr>
<td>Community livability and cohesion</td>
</tr>
<tr>
<td>Automobile dependency and sprawl</td>
</tr>
<tr>
<td>Social equity</td>
</tr>
</tbody>
</table>

Conventional transportation evaluation tends to describe and quantify the direct user benefits of increased traffic speeds, but tends to overlook or undervalue many of the costs, particularly induced vehicle travel costs.

Most traffic speed optimization studies and tools by transportation professional organizations consider the trade-offs between travel time savings and local crash risk (Frith 2012; TRB 2021), but there is little consideration of how slower modes, slower traffic speeds and reducing total motor vehicle travel can help achieve other community goals such as affordability, social equity and health (AARP and CNU 2021; OECD 2020; Standen 2018).

Many transport data sources, such as census, surveys and traffic statistics, tend to overlook or undercount non-commute travel, children’s travel, recreational travel, short trips (within a traffic analysis zone), and walking or bicycling links of public transit and automobile trips. This makes these modes less visible and less important.
Impacts on Planning Decisions
The previous section indicates that common planning practices tend to exaggerate the benefits and underestimate the costs of increased travel speeds. This favors faster over slower modes, higher roadway design speeds, and sprawl over compact development. Although these decisions may individually seem reasonable and justified by the old planning paradigm, their cumulative effects can be large, resulting in much more automobile dependency and sprawl than would be justified by more comprehensive and multimodal analysis.

Although automobiles are expensive to own, with thousands of dollars in annual fixed costs, they seem cheap to use, costing just a few cents per vehicle-mile. This price structure encourages motorists to maximize their driving in order to “get their money’s worth” from their large expenditures. The demand for mobility is virtually unlimited: if travel time and money costs decline, people tend to travel more, although the benefits of each additional vehicle-mile decline, since rational travellers choose higher-value before lower-value travel, reflecting the principle of declining marginal benefits. Figure 20 illustrates a travel demand curve, which shows the relationship between marginal user costs and annual vehicle-miles. Because automobile travel imposes large external costs, much of this travel may be economically inefficient: its incremental user benefits are smaller than its total costs, including infrastructure, congestion, crash, and pollution external costs.

This indicates that speed-prioritizing planning practices have these results:
- Less affordable, healthy and resource-efficient travel. Communities are less walk- and bikeable.
- Faster and more vehicle travel than is optimal. A major portion of this additional vehicle travel is economically-inefficient; its incremental user benefits are less than its external costs.
- Communities are more automobile-dependent and sprawled. More vehicle travel is required to access services and activities. Total transportation costs increase, including external costs.
- The transportation system becomes less equitable due to reduced affordability, fewer mobility options for non-drivers, and increased external costs, including many that affluent motorists impose on disadvantaged people who walk, bike, ride transit, and live in urban neighborhoods.
Comprehensive Speed Evaluation
The following factors should be considered when evaluating travel speed changes.

1. **Impacts on overall accessibility**, including accessibility by automobile and other modes. It should consider ways that wider roads and increased traffic may reduce access by non-auto modes.

2. **Impacts on traveller comfort and driver stress**. Improved travel comfort and reduced stress can be considered to reduce travel time unit costs.

3. **Impacts on user costs and affordability** (savings to lower-income households). Faster modes tend to be costly; lower-speed modes are more affordable.

4. **External costs that increase with speed** including road and parking infrastructure costs, congestion, crash risk and pollution emissions. These should be recognized, and where possible quantified.

5. **Automobile dependency and sprawl**. As much as possible, planning should describe, and if possible model, ways that increased traffic speeds will help create communities where it is difficult to get around without a car, and development is dispersed.

6. **Social equity impacts** including underinvestment in slower modes, harms that faster modes impose on slower modes, and impacts on disadvantaged groups. The table below indicates groups that benefit or are harmed by speed-prioritizing planning.

<table>
<thead>
<tr>
<th>Table 4: Speed-Prioritizing Equity Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who Benefits</td>
</tr>
<tr>
<td>• Wealthier suburban motorists</td>
</tr>
<tr>
<td>• Automobile industries and suburban</td>
</tr>
<tr>
<td>developers</td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
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</tbody>
</table>

*Speed-prioritizing planning tends to benefit some people, but harms others.*

Because slower modes are so constrained, small increases in their speed or access can provide relatively large benefits. For example, a 1,000 foot shortcut saves pedestrians about the same amount of travel time as a motorist gains from two-mile shortcut. The value that people place on travel time varies. Under uncomfortable conditions, time spent travelling can have high unit costs, so improving travel comfort is comparable to increasing speeds, particularly for walking, bicycling and public transit travel.

It can be useful to compare the allocation of resources between faster and slower modes. Policies that favor faster modes often result in an unfair portion of funding and road space being devoted to automobile facilities to the detriment of walking, bicycling and public transit. Similarly, crash risk and casualty rates can be compared between faster and slower modes (Culver 2018).

New tools can help evaluate speed impacts. For example, multimodal level-of-service ratings can quantify the disamenity that higher traffic speeds cause to walking and bicycling (Dowling 2010). Integrated transportation-land use models that consider how transportation system changes, such as wider roads and public transit service improvements, affect accessibility, travel activity and development patterns, and how decisions related to the location and type of development that occurs in a community, will affect future accessibility and travel patterns (Levinson and King 2020).
Criticisms and Reforms

The tendency of planning to overvalue speed and undervalue slower modes has been criticized by urbanists such as Jane Jacobs and Louis Mumford, and by transportation experts such as John Adams (1999) and Paul Tranter (2010). Others criticize the automobile dependency and sprawl (Handy 2020; Shill 2020), including the harms imposed on disadvantaged groups (Culver 2018).

Several current, overlapping policy trends and planning movements support lower-speed travel:

- **Shifts from mobility-oriented to accessibility-oriented transportation planning.** This recognizes that vehicle travel speed is just one of many factors that affect accessibility, and so acknowledges the importance of slower modes and compact development in improving accessibility.

- **Vehicle travel reduction targets.** Some jurisdictions have targets to reduce motor vehicle travel and increase use of slower modes (ACEEE 2019). This recognizes that current levels of mobility are economically-excessive. Establishing such a target can help coordinate policies between various agencies, jurisdictions and levels of government to favor compact, multimodal development. For example, vehicle travel reduction targets justify shifting road and parking facility investment to support slower modes; more compact development and less sprawl; plus parking policy reforms.

- **Healthy, equitable, sustainable planning.** Many communities and organizations have plans or goals to create healthy, equitable and sustainable communities. Since faster modes tend to be less healthy, equitable and sustainable than slower modes, these tend to support slower speed planning.

- **Smart Growth, New Urbanism and Transit Oriented Development.** These are planning movements that include various policies and programs to create more compact communities and multimodal transportation systems where residents can choose the most efficient option for each trip, including walking and bicycling for local errands, public transit when travelling on busy urban corridors, and automobiles when they are truly optimal, considering all impacts.

- **15-minute or 20-minute neighborhoods.** This refers to compact, mixed, multimodal neighborhoods where it is easy to access commonly-used services and activities within a short walk or bike ride. This emphasizes the importance of slower modes in an efficient and equitable community.

- **Complete streets policies** ensure that public roads are designed to accommodate diverse users and uses, including slower modes, sidewalk activities, and nearby businesses and residences. It includes specific road design practices including *streetscaping* (redesigning streets to include more modes, activities and aesthetic features), traffic calming (designing streets to reduce traffic speeds), and *placemaking* (designing streets to better integrate with local activities such as shopping, recreation, and community events, in recognition that streets are places, not just travel corridors).

- **Car-free and car-lite planning** are urban planning movements to create more communities with minimal automobile travel.

All of these movements favor slower over faster modes, and reducing urban vehicle traffic speeds to what is safe and comfortable for mixed traffic (Boarnet 2013; Brenneis 2021).
Principles for Optimal Speeds

This section describes four principles to consider for optimizing travel speeds:

1. **Consumer sovereignty** requires that planning responds to consumer demands. For example, if more people want to use slower, affordable, healthy modes increases, the planning process should investing more resources in these modes create more compact, multimodal neighborhoods.

2. **Efficient pricing** requires that, as much as possible, consumers should pay the marginal costs of the goods and services they use. For example, motorists should pay directly for using roads and parking facilities, with fees that are higher for larger vehicles and during congested periods.

3. **Social equity** requires that planning favors physically economically or socially disadvantaged groups over more able, affluent and advantaged groups. This means, for example, giving priority to modes commonly used by disadvantaged groups, such as walking, bicycling and public transit.

4. **Strategic planning** means that individual, short-term decisions should support strategic, long-term goals. For example, if a community wants to increase affordability, public health, social equity and environmental quality, individual planning decisions should support those goals.

These principles have important implications for speed optimization. They suggest that for consumer sovereignty and efficiency sake, travellers should be able to choose between lower-speed-lower-price and higher-speed-higher-price travel options, which provide incentives to choose the most appropriate modes for each trips, and for social equity and strategic goals sake, priority should be given to slower but resource-efficient modes over faster but costly modes. This is called a sustainable transportation hierarchy, as illustrated to the right. Comprehensive analysis also justifies Smart Growth development policies to create compact, multimodal neighborhoods that minimize the amount of travel, and therefore the travel speeds, needed for accessibility.

Conventional planning tends to set traffic speeds based on safety goals, but more comprehensive analysis considers speed reduction benefits such as affordability, resource-efficiency and community livability, which justifies more priority for slower modes and traffic. For example, comprehensive analysis can justify more bus-lanes because they not only increase bus passenger travel speeds, they also favor a resource-efficient mode (Litman 2015). The table below illustrates typical maximum traffic speeds for various roads. These are lower than what is commonly used, reflecting the additional benefits of traffic speed reductions, besides safety.

<table>
<thead>
<tr>
<th>Table 5</th>
<th>Maximum Traffic Speeds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Facility</strong></td>
<td><strong>Maximum Vehicle Traffic Speeds</strong></td>
</tr>
<tr>
<td>Suburban arterial</td>
<td>40 mph (64 kph)</td>
</tr>
<tr>
<td>Urban arterial</td>
<td>30 mph (50 kph)</td>
</tr>
<tr>
<td>Residential street</td>
<td>20 mph (30 kph)</td>
</tr>
<tr>
<td>Mixed traffic street</td>
<td>10 mph (15 kph)</td>
</tr>
</tbody>
</table>

*Comprehensive analysis that considers all impacts, including the comfort and safety of all mode users, livability, and overall accessibility, tends to justify lower traffic speeds than commonly used.*
Conclusions
There are two very different visions of paradise. One envisions paradise as a distant place, such as an isolated suburban home or holiday resort far from congestion, noise and pollution. The other envisions paradise as existing communities enhanced to become more livable. These two visions conflict in their transportation goals. If paradise is a distant place, it requires abundant higher-speed mobility so people can travel quickly between dispersed homes, jobs, services and resorts. If paradise results from improving existing communities, it requires limiting traffic speeds to protect livability. These conflicting visions have important implications for speed evaluation.

A key conclusion of this study is that faster modes and higher traffic speeds impose costs on users and communities that inevitably reduce livability. Many current planning practices overlook these impacts. They assume that faster travel and increased vehicle travel are desirable, even in areas that are highly vulnerable to traffic impacts. This is reflected in funding and design practices that favor faster modes and higher roadway design speeds. There are good reasons to change these priorities to favor slower modes and reduce traffic speeds. Higher speeds incur large costs that offset much of their benefits, and are unfair to slower mode users.

During the last century, motorization significantly increased people's travel speeds and distance, but also significantly increased user and community costs. In 1900, people travelled mainly by walking about three miles per day, and spent negligible money on travel. Now, a typical motorist drives about 30 daily miles, but to do so must devote about 20% of their income, and therefore about 20% of their workday, to paying vehicle expenses. Their community also bears significant economic, social and environmental costs. The table below summarizes these benefits and costs. Current planning practices tend to exaggerate the benefits and undervalue many of these costs. This favors faster modes, higher roadway design speeds, and more urban expansion than is optimal.

**Table 6** Typical Benefits and Cost of Faster Travel

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>• People sometimes enjoy the experience of speed.</td>
<td>• Reduced accessibility for non-drivers.</td>
</tr>
<tr>
<td>• Short-term travel time savings.</td>
<td>• Reduced traveller comfort and increased driver stress.</td>
</tr>
<tr>
<td>• Long-term increases in travel distance, expanding the destinations</td>
<td>• Increased user costs and reduced affordability.</td>
</tr>
<tr>
<td>motorists can reach.</td>
<td>• Increased road and parking infrastructure cost.</td>
</tr>
<tr>
<td></td>
<td>• Increased traffic congestion and barrier effects.</td>
</tr>
<tr>
<td></td>
<td>• Increased crash costs.</td>
</tr>
<tr>
<td></td>
<td>• Increased energy consumption and pollution emissions.</td>
</tr>
<tr>
<td></td>
<td>• Reduced community livability and cohesion</td>
</tr>
<tr>
<td></td>
<td>• More automobile dependency and sprawl.</td>
</tr>
<tr>
<td></td>
<td>• Inequity imposed on disadvantaged groups.</td>
</tr>
</tbody>
</table>

Higher speeds provide user benefits and increase various user and community costs.

Planners often assume that faster travel provides time savings, but people tend to maintain a fixed travel time budget, so faster travel increases mobility rather than save time. Higher travel speeds contribute to a self-reinforcing cycle of increased vehicle travel, reduced travel options, automobile-dependency and sprawl. This ratchets up the amount of travel people require to meet their needs – it causes mobility inflation – which is costly to communities and unfair to people with limited mobility.
The inefficiency and inequity of speed-prioritizing planning are evident if transport performance is evaluated using effective speed, defined as travel distance divided by the time spent travelling and earning money to pay travel expenses. Measured this way, automobile travel is often slower overall than active and transit modes, and is regressive because it benefits affluent motorists who value time more than money, but harms people who have other priorities. Conventional planning assumes that travellers prioritize speed, but in practice they often choose slower options for affordability, health, enjoyment and livability sake. Surveys indicate that many people want to drive less, rely more on slower modes, live in more compact communities, and reduce their transportation costs. To be efficient and equitable, planning must respond to these demands.

These practices require more comprehensive analysis of speed impacts. Transportation engineers generally recognize the trade-offs between traffic speed and safety, but overlook or undervalue other impacts. For example, commonly-used transportation data sets undercount travel by slower modes; transport models are scaled to evaluate regional travel and overlook conditions within neighborhoods; economic analysis measures traffic speeds but not the convenience and comfort of slower modes; and many external impacts that increase with speed, such as the barrier effect, noise, plus induced travel and sprawl costs, are generally overlooked.

To their credit, many policy makers and planning practitioners support slower modes and traffic speed reductions more than justified by their economic models; they realize intuitively that walking, bicycling and public transit are important and deserve more investment. However, this occurs despite rather than supported by standard analysis practices. Reforming these practices can justify much more support for slower modes.

Consider the three examples described in the Introduction.

1. Currently, most transportation funding and road space is devoted to automobile travel. More comprehensive planning justifies more investments in walking, bicycling and public transit to achieve planning goals and ensure that non-drivers receive a fair share of public resources.

2. Currently, most urban streets are designed for speeds over 30 mph. More comprehensive analysis justifies reducing traffic speeds to increase safety and comfort, particularly for active modes, and to create more livable neighborhoods.

3. During the last century many high-accessibility urban neighborhoods were displaced by freeways. More comprehensive analysis justifies rebuilding and enhancing those neighborhoods, and building more housing options there, so that any household, including those with lower incomes, can find suitable homes in an attractive, walkable urban neighborhood.

Of course, every traveller has unique needs and preferences. Many will choose faster modes, despite their higher costs, for the sake of convenience or status. However, current demographic and economic trends — aging population, increasing urbanization, plus growing concerns about affordability, public health and environmental quality — are increasing demand for slower modes and neighborhood livability. Given better options, many people would shift from driving to slower modes, and from automobile-dependent sprawled areas to more compact, multimodal neighborhoods. Everybody benefits if our planning practices respond to these demands.
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