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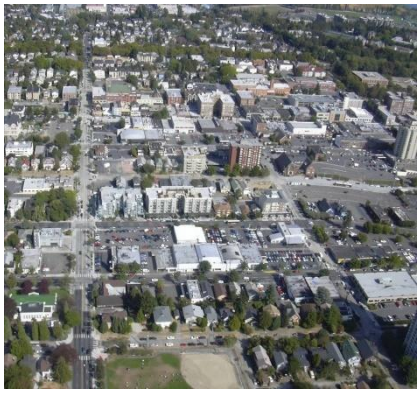
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Understanding Smart Growth Savings

Evaluating the Savings and Benefits of Compact Development

5 November 2026

By
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Abstract

Smart Growth policies create compact, multimodal communities where residents consume less land, drive less and rely more on non-auto modes. This provides various economic, social and environmental benefits including transportation cost savings, more independent mobility and economic opportunity for non-drivers, lower costs of providing public infrastructure and services, traffic safety, improved public fitness and health, more economic productivity, emission reductions and habitat preservation. These benefits are particularly large for people who cannot, should not, or prefer not to drive. Surveys indicate that many households would prefer to live in Smart Growth neighborhoods but cannot due to inadequate supply. This report defines Smart Growth, describes related consumer demands, summarizes research concerning its benefits and costs, and evaluates common criticisms. It indicates that Smart Growth provides larger and more diverse benefits than conventional planning recognizes, so more comprehensive analysis tends to justify more Smart Growth policies. It concludes that to be efficient and equitable, public policies should ensure that anybody, particularly disadvantaged groups, should be able to find suitable housing in Smart Growth neighborhoods. This should be of interest to anybody involved in development policy analysis or who wants more efficient and equitable communities.

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Smart Growth supports compact and efficient building types, such as housing over retail.

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Summary

Smart Growth (also called New Urbanism, urban villages, 15-minute cities, Transit-Oriented Development and other terms) creates more compact and multimodal communities, in contrast to low-density, automobile-dependent sprawl. The following table lists typical Smart Growth strategies. This report investigates and evaluates Smart Growth benefits, costs and consumer demands.

Table ES-1 **Typical 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 and multimodal communities.

Most older communities, including small towns and urban neighborhoods, reflect Smart Growth principles; they had diverse housing types and were designed for walking with sidewalks on most streets, local parks and schools, and neighborhood commercial districts. However, many current policies contradict this type of development, including limits on multifamily housing, restrictions on density and mix, parking minimums, and transportation planning that favors speed over slower but more affordable, inclusive, healthy and resource-efficient travel options. The table below compares differences between Smart Growth and sprawl.

Table ES-2 **Comparing Smart Growth and Sprawl**

	Smart Growth	Sprawl
Description	*Compact, multimodal neighborhoods where most common services are easy to access without driving.*	*Dispersed, automobile-oriented, urban fringe development where most destinations require driving.*
Growth pattern	Mostly infill.	Mostly urban fringe (greenfield) development.
Density and mix	Compact and mixed. More than 20 residents or jobs per acre. Many neighborhood services.	Dispersed and separated. Less than 5 residents or jobs per acre. Few neighborhood services.
Scale	Human scale. Smaller roads and shorter blocks.	Large scale. Wider roads and larger blocks.
Housing types	Mixture of single, missing middle and multifamily.	Mostly single-family on quarter acre or larger lots.
Transportation	Multi-modal. Supports walking, bicycling and public transit.	Auto-oriented. Walking, bicycling and public transit are inefficient, inconvenient and stigmatized.
Transport connectivity	Dense sidewalk, path and road networks, and good connections between modes.	Poor connectivity with numerous dead-ends, few paths, and inadequate intermodal connections.
Roadway design	*Complete streets* accommodate diverse modes and activities.	Roads designed to maximize vehicle traffic volume and speed.
Parking supply	Limited and often priced. Minimal mandates.	Abundant and usually free due to mandates.
Public realm	Emphasis on the public realm (shopping streets, sidewalks and parks).	Emphasis on the private realm (yards, shopping malls, gated communities, private clubs).
Planning process	Planned and coordinated between jurisdictions and stakeholders.	Poorly planned, with little coordination between jurisdictions and stakeholders.

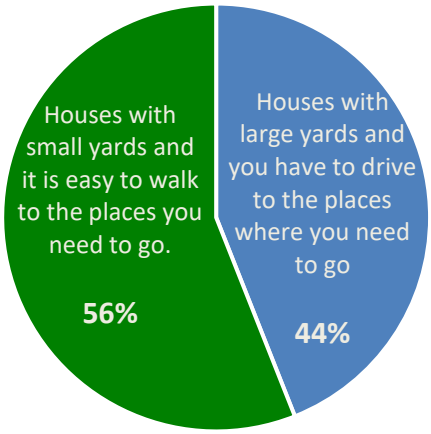
Smart Growth and sprawl differ in many ways including density, mix, housing types and transportation infrastructure.

Surveys indicate that most households prefer Smart Growth neighborhoods over auto-dependent sprawl, as illustrated to the right. Homebuyers place a higher value on sidewalks and places to walk (84%) and being within an easy walk of shops and parks (79%) than other neighborhood attributes including a short commute (72%) and easy access to a highway (74%). The value that people place on living in a walkable neighborhood increased from 45% in 2015 to 53% in 2023.

Most North American neighborhoods are sprawled, creating a shortage of housing that reflects consumer preferences, driving up their prices. Smart Growth policies can increase the supply and reduce the prices of housing in walkable urban neighborhoods, responding to these unmet demands.

By reducing per capita land consumption and improving accessibility, Smart Growth can provide large savings and benefits. It can also increase some costs. The table below categorizes benefits and costs as *internal* (they directly affect the people who choose sprawled locations) and others are *external* (they affect other people).

Figure ES-1 **Community Preferences Survey** (NAR 2023)



National Association of Realtor surveys indicate that most people prefer a compact home in a walkable neighborhood over a house with a larger yard in a sprawled area.

Table ES-3 **Smart Growth Benefits and Costs**

	Internal (To Smart Growth Residents)	External (To Other People)
Benefits	Increased accessibility, which reduces travel time and money costs, and increases affordability. More independent mobility for non-drivers and reduced chauffeuring burdens. More affordable housing and transportation options, and increased economic resilience. Increased traffic safety. Improved fitness and health. Increased community cohesion. Improved aesthetics	Open space preservation (farm and natural lands). Reduced public infrastructure and service costs (roads, utilities, emergency and transit services, etc.). Reduced congestion and crash risk imposed on other people. Reduced healthcare and disability costs. Increased local economic productivity and development. Reduced overall crime rates. Reduced fuel consumption and pollution emissions. Improved aesthetics
Costs	Higher unit land prices (dollars per acre). Less private greenspace (lawns and gardens). Less privacy. More local social problems. More exposure to some pollutants.	Increases in some infrastructure costs such as curbs and sidewalks. More local traffic and parking congestion.

Smart Growth provides various benefits and costs, including some that are internal (borne by the Smart Growth residents) and some that are external (borne by other people). These vary depending on specific conditions.

An extensive body of research has investigated, quantified, and sometimes monetized (measured in monetary units) these impacts. Most focus on certain benefits and costs, such as infrastructure, transportation, public safety and health, or environmental impacts. This study reviews and integrates this research to provide comprehensive analysis of the economic, social and environmental impacts of specific policies, and therefore guidance for optimizing planning decisions.

The table below summarizes the impacts and benefits provided by comprehensive Smart Growth programs that create compact and multimodal communities.

Table ES-4 **Summary of Potential Impacts of Comprehensive Smart Growth Programs**

Benefit Category	Typical Impacts	Optimization Strategies
Land conservation and open space preservation.	Use 40-80% less land per capita for buildings, roads and parking facilities.	Increase density, reduce vehicle use, minimize road and parking facilities.
Public infrastructure and service cost savings.	Reduces costs of providing public infrastructure and services 10% to 30%.	Increase density. Minimize roadway costs.
Reduced vehicle travel and increased non-auto travel.	Residents drive 30-70% less and use non-auto modes 2-10 times more.	Create compact communities. Improve and favor non-auto modes.
Affordability and economic resilience.	Reduces housing costs 10-40% and transport costs 10-60%.	Favor compact, lower-priced homes and improve affordable travel modes.
Accessibility and travel time savings.	Improves accessibility and reduces time spent travelling to work and services 30-60%.	Create compact, mixed communities. Improve resource-efficient modes.
Serve non-auto travel demands.	Can provide non-drivers with accessibility comparable to suburban motorists.	Create compact communities. Improve and favor non-auto modes.
Traffic safety.	Reduces traffic casualty rates 20% to 80%.	Improve and encourage non-auto travel and lower traffic speeds.
Public fitness and health.	Increases physical activity 20-50%, improves health outcomes and increases longevity.	Improve and encourage active travel and support healthy community design.
Energy conservation and emission reductions.	Reduces energy consumption and pollution emissions 10% to 60%.	Create compact communities. Favor resource-efficient modes.
Economic opportunity and prosperity.	Increases economic opportunity and long-term prosperity 10% to 30%.	Support affordable housing in high-opportunity neighborhoods.
Community cohesion and integration.	Significantly increases community cohesion, plus economic and social integration.	Improve walkability and local services. Support affordable infill.
Social problems (poverty, crime, mental illness, homelessness).	Can reduce poverty, crime, mental illness and homelessness.	Improve walkability and local services, and support affordability.
Economic productivity and development.	Increases productivity, employment, innovation, and tax revenues 10% to 30%.	Create compact, mixed communities. Improve resource-efficient modes.
Aesthetics	More potential for beauty, art and creativity.	Good design and affordability.

This table summaries Smart Growth impacts. "Typical Impacts" reflect differences between communities with the 20% highest and 20% lowest ratings for density, housing diversity, Walk Score, transit quality, and TDM incentives.

These are typical values that vary depending on specific conditions and preferences. For example, residents who enjoy driving may choose not to take advantage of improved non-auto travel. Wealthy households may care little about affordable housing and travel options. However, on average Smart Growth policies do provide significant savings and benefits that filter through a community, including benefits to motorists from reduced congestion and chauffeuring burdens, and improved economic development and environmental quality. Smart Growth may increase some costs, although these can be minimized with integrated programs. This indicates that Smart Growth often provides larger and more diverse benefits than conventional planning recognizes, so more comprehensive analysis tends to justify more Smart Growth policies.

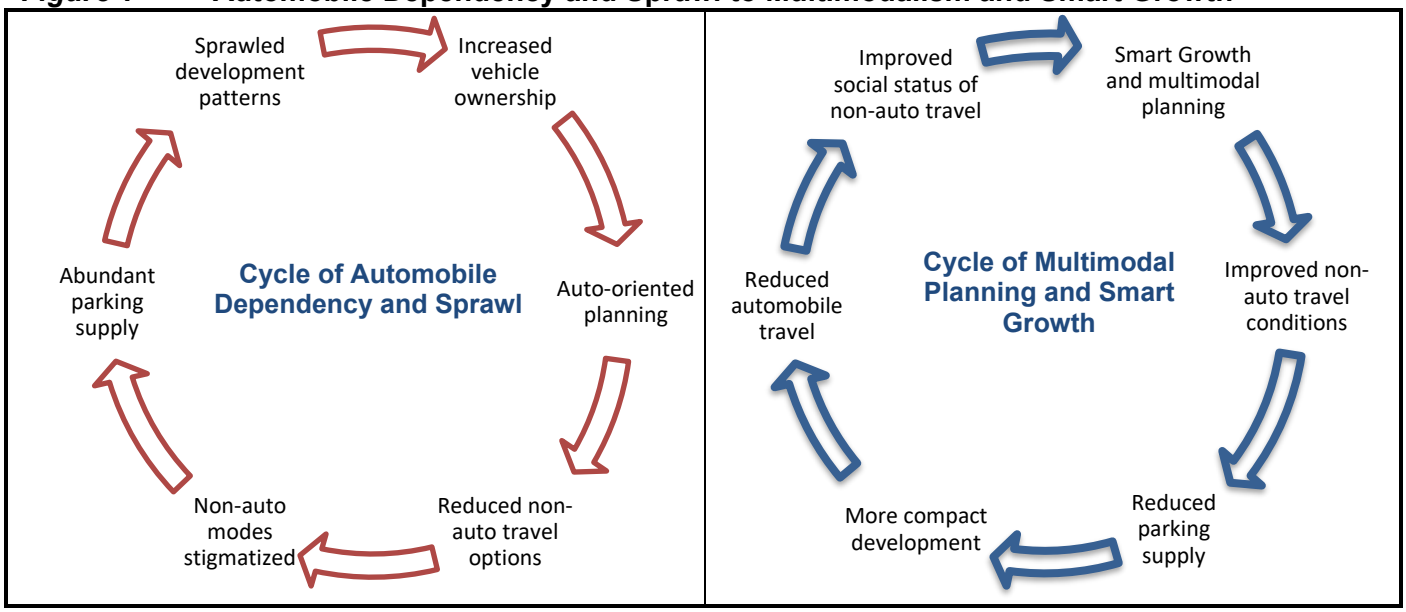
Introduction

Home is where the heart is, and community is where the home is. As a result, there are few issues that affect people more deeply than our community's development pattern, since this touches our hearts.

Both theoretical and empirical research described in this report indicate that more compact and multimodal development – called Smart Growth – can provide large savings and benefits. Such development is more resource efficient: residents consume less land, own fewer vehicles, drive less, require less extensive infrastructure, consume less energy and produce less pollution. By improving affordable and efficient housing and transportation options, Smart Growth is particularly beneficial to physically, economically and socially disadvantaged groups, helping to achieve social equity goals.

This is a timely issue. Many common planning practices contribute to a self-reinforcing cycle of sprawl and automobile dependency (Garceau, et al. 2013). These practices contradict community goals related to affordability, social equity, public health, environmental protection and economic development. Many governments and professional organizations are now implementing reforms to create more compact and multimodal communities (ICMA 2014; ITE 2010; OECD 2018; UN 2014). The figures below illustrate this shift.

Figure 1 **Automobile Dependency and Sprawl to Multimodalism and Smart Growth**



Many current public policies contribute to a self-reinforcing cycle of automobile dependency and sprawl. A new paradigm creates a new cycle of compact development and multimodal transport planning.

To justify and plan these reforms we need to understand their economic, social and environmental impacts. Although many studies investigate these factors individually, fewer studies examine their overall impacts, and fewer provide clear and practical decision-making guidance. This report is designed to fill that gap. It defines Smart Growth and sprawl, describes various Smart Growth benefits and costs, discusses how to optimize Smart Growth policies in a particular situation, examines Smart Growth criticisms, and discusses various implications of this analysis. This information can help identify truly optimal development policies.

Defining Smart Growth and Sprawl

Smart Growth is a general term for a set of policies that create compact, accessible, multimodal communities, in contrast to *sprawl* which refers to dispersed, automobile-dependent development. The table below compares these development patterns.

Table 1 **Comparing Smart Growth and Sprawl** (Litman 2017; OECD 2018; SGN 2011)

	Smart Growth	Sprawl
Growth pattern	*Mostly infill.*	*Mostly urban fringe (greenfield) development.*
Density and mix	Compact and mixed. More than 20 residents or jobs per acre. Many neighborhood services.	Dispersed and separated. Less than 5 residents or jobs per acre. Few neighborhood services.
Scale	Human scale. Smaller roads and shorter blocks.	Large scale. Wider roads and larger blocks.
Housing types	Mixture of single, missing middle, and multifamily.	Mostly single-family on quarter acre or larger lots.
Transportation	Multi-modal. Supports walking, bicycling and public transit.	Auto-oriented. Walking, bicycling and public transit are inefficient, inconvenient and stigmatized.
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Roadway design	*Complete streets* accommodate diverse modes and activities.	Roads designed to maximize vehicle traffic volume and speed.
Parking supply	Limited and often priced. Minimal mandates.	Abundant and usually free due to mandates.
Public realm	Emphasis on the public realm (shopping streets, sidewalks and parks).	Emphasis on the private realm (yards, shopping malls, gated communities, private clubs).
Planning process	Planned and coordinated between jurisdictions and stakeholders.	Poorly planned, with little coordination between jurisdictions and stakeholders.

Smart Growth and sprawl differ in many ways including density, mix, housing types and transportation infrastructure.

The figures below illustrate Smart Growth and sprawl.

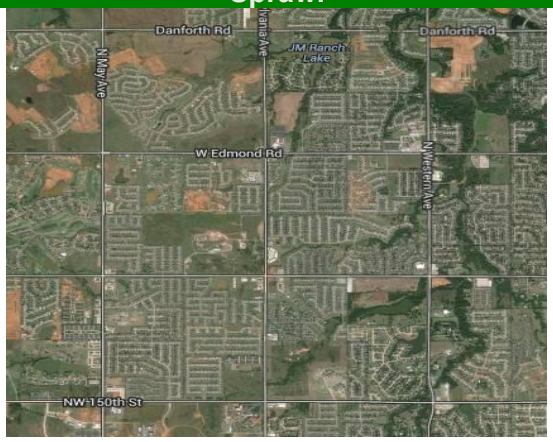
Figure 2 **Sprawl and Smart Growth Illustrated**

Smart Growth



Smart Growth creates compact, walkable neighborhoods, villages and towns.

Sprawl



Sprawl consists of dispersed, disconnected and automobile-oriented development.

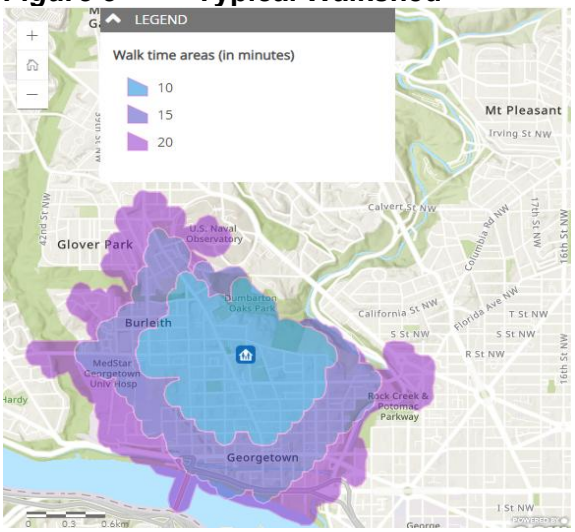
Smart Growth principles can be applied in many ways. Although details vary, they create compact and multimodal communities scaled for walkability, with appropriate public infrastructure. In rural areas these can be villages and small towns with single-family and moderate-density housing organized around a commercial center. In large cities Smart Growth can involve incremental infill in existing residential areas and high-rise buildings around transit stations. In suburbs, "sprawl repair" policies create new complete and walkable neighborhoods. Smart Growth does not require that all residents live in high-rise apartments and forego automobile travel; excepting in large cities with severe geographic constraints, a major portion of households can live in single-family or adjacent (townhouses) with private cars (Litman 2014).

Ideal Smart Growth communities are *urban villages*, which are compact multimodal neighborhoods where commonly-used services are located within a 10 or 15 minute walk or bike trip (Litman 2024). They are also called 15-minute communities, or transit-oriented development (TOD) if organized around a major transit station. To support a full range of services, including a supermarket and elementary school, urban villages typically require at least 10,000 residents and employees, which needs an average of about 10 homes or jobs per acre within a one mile diameter area (about 500 acres).

Below are typical urban village planning requirements:

- 15+ residents or jobs per acre, and at least 0.5 jobs per capita.
- Excellent walkability, with a Walk Score over 70.
- Commonly used services (full-service grocery store, pharmacy, café/restaurant, healthcare, elementary school, childcare, etc.) within a 15-minute walk of most homes and worksites.
- Parks within a 10-minute walk of most homes and worksites.
- At least 20% of homes are affordable and accommodate people with disabilities.
- Sidewalks and crosswalks on virtually all streets, bicycle facilities on most major roadways.
- Complete streets that accommodate diverse modes, with safe traffic speeds.
- Frequent public transit services on major roads.
- Efficiently managed and priced parking.
- Well-designed and maintained public realm (sidewalks, paths, plazas, parks and public buildings).

Figure 3 **Typical Walkshed**



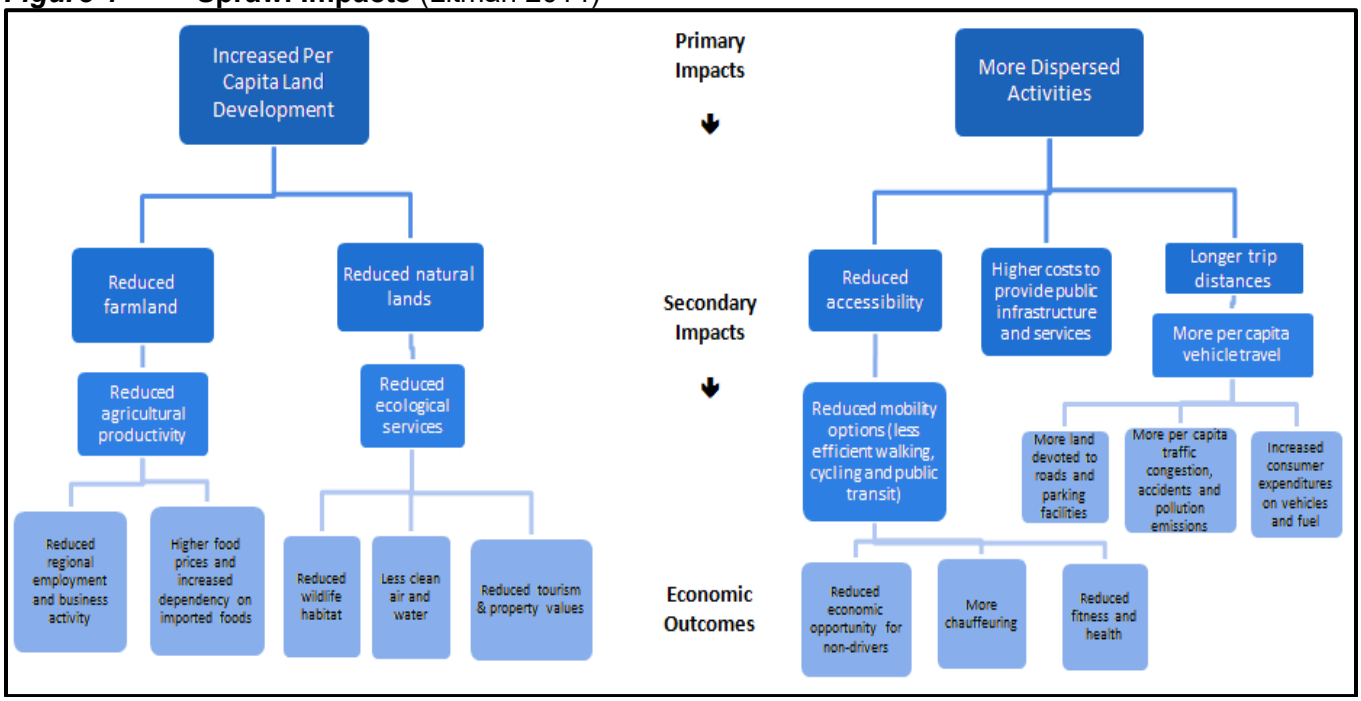
This map shows the area that that can be reached within a typical 10-, 15- and 20-minute walk from a central location, taking into account travel distances, street design and geographic constraints.

This type of neighborhood provides a high level of non-auto access which increases non-drivers' economic opportunities (education, employment, affordable shopping and other public services), and reduces disparities between drivers and non-drivers. To be efficient and equitable, communities should ensure that anybody who wants can find suitable housing in a compact and walkable urban village.

Overview of Sprawl Costs and Smart Growth Benefits

To evaluate Smart Growth benefits it is useful to understand the costs of sprawl. Sprawl has two primary impacts: it increases per capita land consumption, and it disperses development which increases the distances between common destinations, and therefore the costs of providing public infrastructure and services, and the travel costs required to access services and activities. These, in turn, impose various economic costs including reduced agricultural production and ecological services; increased infrastructure and transport costs borne by governments, businesses and households; reduced economic productivity, reduced economic opportunities for disadvantaged people; more traffic congestion and accidents, higher per capita energy consumption and pollution emissions, plus reduced public fitness and health, as illustrated below. The magnitude of these costs often depends on how they are measured: for example, sprawl tends to reduce local congestion and pollution impacts, measured in a particular area, but many of these costs shift elsewhere, so total impacts, measured per capita, often increase.

Figure 4 **Sprawl Impacts** (Litman 2014)



Sprawl has two primary resource impacts: it increases per capita land development and it increases the distances between common destinations. These, in turn, impose various economic costs.

Various studies have quantified these impacts (Aderneck 2023; Ahlfeldt and Pietrostefani 2019; Borys 2017; Burchell and Mukherji 2003; Duranton and Puga 2020; Ewing and Hamidi 2017; FBCI and SGA 2021; Hamidi, et al. 2026; Landis 2026; Litman 2014; NCE 2018; RMI 2023). They vary in scope and methods. Some only consider infrastructure (road, utility, school, etc.) costs, others consider other public service costs (emergency response, waste collection, school busing, etc.). Some include transport costs (vehicle costs, risk and pollution, etc.). Some include other economic, social and environmental impacts. These studies also vary in geographic scale (neighborhood, city, region and country) and how sprawl is measured. Most studies have been performed in North America, since that is where debates about sprawl are most intense and suitable data most available, but many of these economic impacts occur to some degree in most cities, so these research results are transferable to other countries, provided they are scaled to reflect regional demographic and geographic conditions.

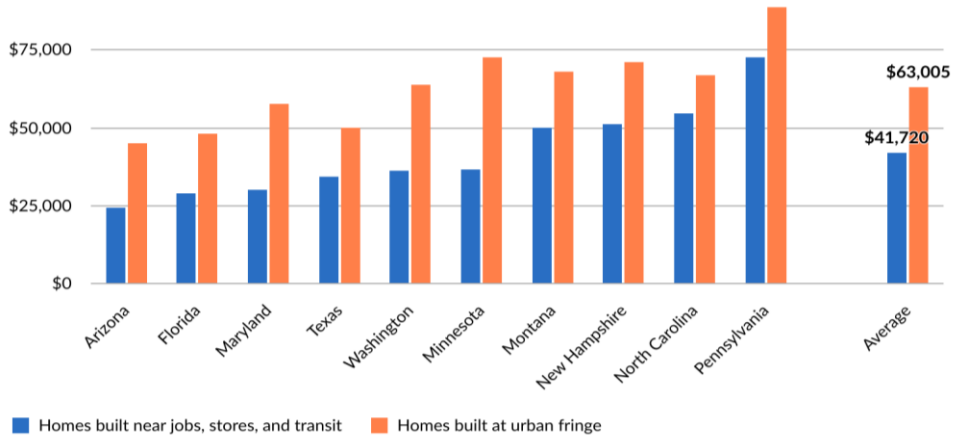
Major sprawl cost studies are summarized below:

- The study, *Who Sprawls the Most* (Hamidi, et al 2026) analyzed transportation and land use patterns for U.S. metropolitan areas, urban counties, and census tracts. It found that compact and connected communities:
    - Have higher housing but lower transportation and energy expenses, making them more affordable overall.
    - Provide more transportation options such as walking and quality public transit.
    - Have lower rates of hospitalizations from health conditions such as COPD and heart attack due to more physical activity (particularly walking), better access to healthy food options, and better access to preventive care.
    - Lower rates of death from car accidents due to less total driving.
    - Lower rates of disconnected youth due to better accessibility.
    - Higher levels of social connectivity and civic engagement (social capital).

- The study, "Building Homes Near Jobs, Stores, and Transit Saves Public Dollars" (Rodnyansky, et al. 2026) shows that building homes near existing jobs, stores, and transit saves both up-front and ongoing public costs, and produces more property tax revenue per acre than urban fringe development. This research used economic modeling to estimate the fiscal impact of new housing in 10 U.S. states: Arizona, Florida, Maryland, Minnesota, Montana, New Hampshire, North Carolina, Pennsylvania, Texas, and Washington. For each state, researchers modeled the number of new homes needed to relieve housing shortages over the next decade and how public costs and revenues would vary according to the type, location, and density of housing. Key findings include:
    - Up-front cost to government and taxpayers of building roads, water and sewer lines, and other public utilities to serve new homes near existing jobs, stores, and transit is approximately $21,000 lower per home than the infrastructure costs associated with building homes at the outer edge of cities and towns.
    - Ongoing costs to government and taxpayers of maintaining roads and utilities that serve new homes are 50% lower, on average, when those homes are built near existing jobs, stores, and transit.
    - Property taxes generated per acre are 13% higher when new homes are built near jobs, stores, and transit.
    - On average, the payback period for infrastructure associated with new homes is 50% longer when those homes are built in outlying areas than when they are built near existing jobs, stores, and transit.
    - Local government can keep property tax rates down while maintaining healthy balance sheets when more housing is built in established areas.

The following graphs illustrate their results.

Figure 5 **Up-Front Infrastructure Costs** (Rodnyansky, et al. 2026)



This and other studies indicate that public infrastructure costs (roads and utility lines) are significantly higher for urban-fringe development.

(© 2006 Pew Charitable Trusts. ECOnorthwest modeling)

Figure 6 **Infrastructure Maintenance Costs** (Rodnyansky, et al. 2026)

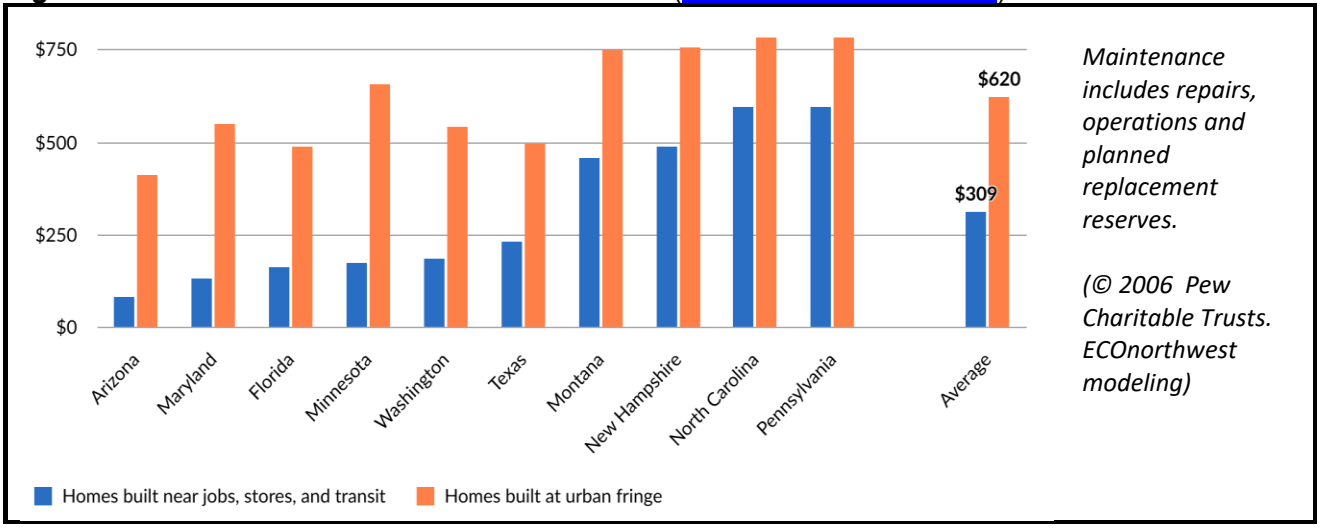
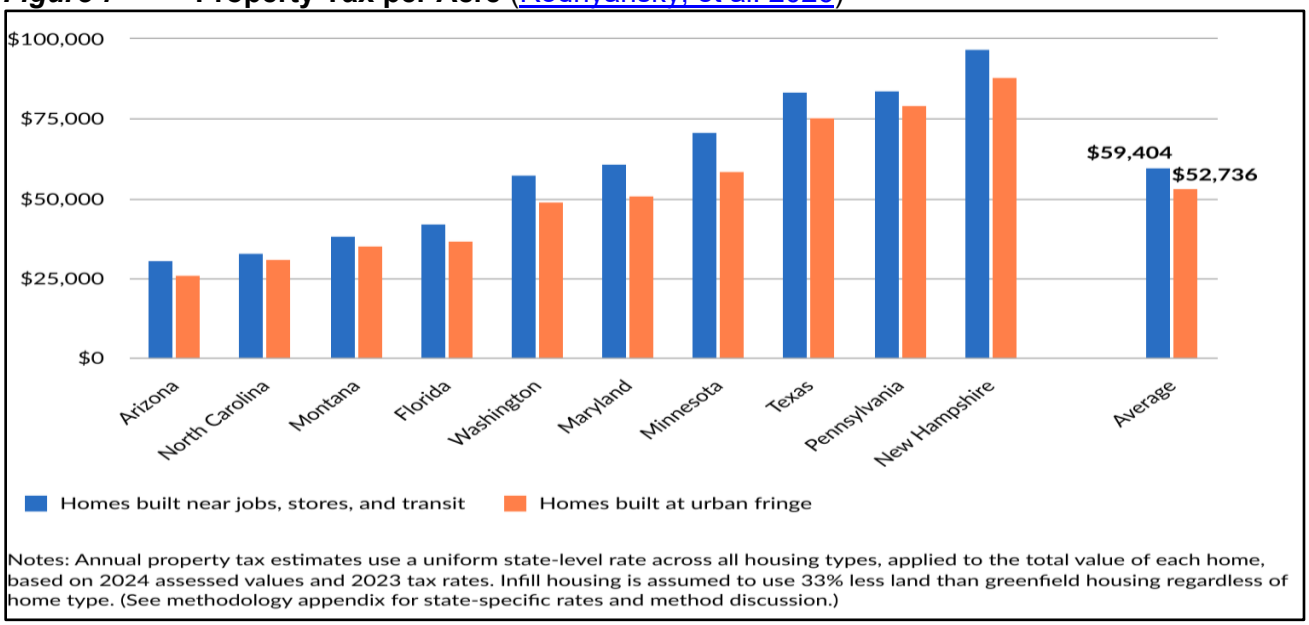


Figure 7 **Property Tax per Acre** (Rodnyansky, et al. 2026)



- The report, *Moving the Needle? Understanding the Uneven Performance of State and Local Land, Transportation, Energy, and Water Conservation Efforts* (Landis 2026), found that local and state policies significantly affect per capita land consumption and habitat displacement, park supply, automobile and public transit travel, renewable energy production, water consumption and associated costs.
- The report, *Rationale for Smart Growth Fiscal Impact Analysis and Model Fiscal Impact Assessment Ordinance* (Nelson, Nicholas and Juergensmeyer 2022), provides detailed guidance for calculating the incremental costs of sprawled development, and for incorporating this information into public policies.
- *El Costo de la Expansión Urbana en México* (*The Cost of Urban Expansion in Mexico*) calculated the additional housing, infrastructure and transportation costs of auto-dependent, urban fringe development (Zubicaray, et al.

2021). If found that sprawl costs exceed 1% of Mexico's annual GDP and are unfair to lower-income workers who experience less access to jobs and service, and higher transport costs. The researchers conclude that the current development model is not financially sustainable, and recommend reforms to achieve economic and social goals.

- *Measuring Sprawl*, calculated a compactness index score for 221 U.S. metropolitan areas and 994 counties reflecting four factors: *density*, *mix*, *connectivity* (density of road network connections) and *centricity* (the portion of jobs in major centers). The table below summarizes their key results.

Table 2 **Summary of Smart Growth Outcomes** (Ewing and Hamidi 2017)

Outcome	10% Compactness Score Increase Effects
Average household vehicle ownership	0.6% decline
Vehicle miles traveled	7.8% to 9.5% decline
Walking commute mode share	3.9% increase
Public transit commute mode share	11.5% increase
Average journey-to-work drive time	0.5% decline
Traffic crashes and injuries per 100,000 population	0.4% to 0.6% increase
Fatal crash rate per 100,000 population	13.8% decline
Body mass index	0.4% decline
Obesity	3.6% decline
Any physical activity	0.2% increase
Diagnosed high blood pressure	1.7% decline
Diagnosed heart disease	3.2% decline
Diagnosed diabetes	1.7% decline
Average life expectancy	0.4% increase
Upward mobility*	4.1% increase
Transportation affordability	3.5% lower transport costs relative to income
Housing affordability	1.1% higher housing costs relative to income.

This table summarizes various economic, health and environmental impacts from more compact development.

** Upward mobility refers to the probability that a child born in the lowest income quintile reaches the top quintile by age 30.*

- The report, *Urban Land Use Reform: The Missing Key to Climate Action* (RMI 2023) analyzed the impacts of Smart Growth policies (upzoning, reduced parking mandates, faster project approvals, etc.) on three typical North American cities. The table below summarizes the results.

Table 3 **Smart Growth Policy Impacts** (RMI 2023)

	Austin	Charlotte	Denver	Average
Vehicle travel reductions	12%	8%	13%	11%
Building energy savings	16%	4%	7%	9%
Reduced per capita water consumption	17%	12%	10%	13%
Reduced per capita land consumption	53%	69%	82%	68%
Greenhouse gas emission reductions	14%	5%	8%	9%
Carbon sequestration (1,000 annual tonnes)	200	33	48	94

Smart Growth development policies can provide significant reductions in vehicle travel, building energy, water and land consumption, greenhouse emissions, and more greenhouse gas sequestration due to greenspace preservation.

- Ahlfeldt and Pietrostefani's (2017 and 2019) analysis of 300 academic papers found that 69% identify positive effects associated with compact urban form: over 70% attribute positive effects of economic density (the number of people living or working in an area) and 58% attribute positive effects to land use mix. They also identify congestion, health, and well-being costs that can result from higher urban densities, and so recommend mitigation policies that maximize benefits and minimize costs.
- The British Columbia *Community Lifecycle Infrastructure Costing Tool* (https://tinyurl.com/2c8efrvt) estimates the lifecycle costs of different development patterns considering density, location, design, and other factors.

- The report, *Suburban Sprawl: Exposing Hidden Costs, Identifying Innovations* (SP 2013), compared public costs that tend to increase with sprawl (construction and maintenance of roads, sewers, water, community centers, fire protection, policing, and school busing) with tax revenues. It concluded that incremental revenues rarely cover the full incremental costs. It also discussed various economic and social benefits of more compact development.
- *Analysis of Public Policies that Unintentionally Encourage and Subsidize Sprawl* (Litman 2014), for the London School of Economic's Cities Program, quantified various economic impacts of sprawl. It divided U.S. cities into density quintiles (fifths) and estimated the additional land consumption, public service, transport, and health costs of sprawled development. It estimates that sprawl's incremental costs average approximately $4,556 annual per capita, of which $2,568 is internal (borne directly by sprawl location residents) and $1,988 is external (borne by other people). The study identified various market distortions that increase sprawl.
- A detailed study for Halifax, Nova Scotia (Stantec 2013) found that a compact development scenario that increased the portion of new housing located in existing urban centers from 25% to 50% reduced infrastructure and transportation costs approximately 10%, improved public health and reduced pollution emissions.
- *The Costs of Sprawl – 2000* (Burchell, et al. 2002; Burchell and Mukherji 2003), for the Transportation Research Board (a division of the U.S. National Academy of Sciences) evaluated the following sprawl impacts:
  - Urban development of farm and wild lands.
  - Water and sewage infrastructure.
  - Local road and public services costs
  - Increased vehicle travel and associated costs.
  - Residents' quality of life.
  - Real estate development costs.

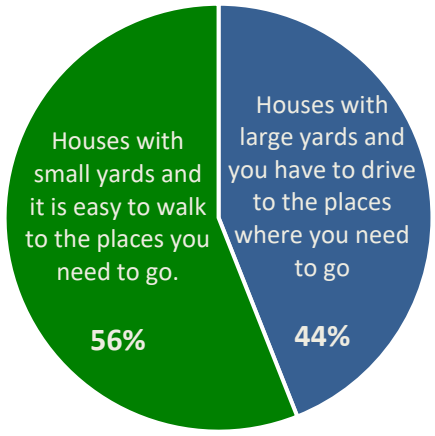
These and other studies indicate that by increasing land consumption and travel distances, sprawl tends to increase a number of costs. Conversely, Smart Growth can provide various savings and benefits. Many studies only consider a subset of these effects and so overlook some impacts.

Criticisms. Critics argued that some studies exaggerate sprawl costs, and any costs are offset by sprawl benefits (Cox and Utt 2004). However, as discussed in more detail below, these critics use crude and often inappropriate evidence in their attempts to refute the costs of sprawl research, none respond to the most recent and detailed studies, and none are peer reviewed.

Smart Growth Demands

Surveys indicate that many households want to live in Smart Growth communities but cannot due to limited supply. For example, the National Association of Realtor's *Community Preferences Surveys* indicate that, although most households prefer single-family over multi-family homes, given realistic trade-offs between, most would choose a compact house located in a walkable neighborhood over a large-lot house in an automobile-dependent, sprawled area with higher transportation costs, as illustrated to the right.

Figure 8 **Community Preferences Survey** (NAR 2023)



National Association of Realtor surveys indicate that most people prefer a compact home in a walkable neighborhood over a house with a larger yard in a sprawled area.

That survey found that people rate having sidewalks and places to take walks (84%) and being within an easy walk of shops and parks (79%) higher than other neighborhood attributes including being within a short commute to work (72%), and easy access to the highway (74%). The preference for walkable neighborhoods grew from 45% in 2015 to 53% in 2023 (NAR 2023). Other surveys find similar results (Burda 2014).

Most North American neighborhoods are relatively sprawled, creating a shortage of housing that reflects consumer preferences, which drives up their prices. One recent survey found that homes in walkable neighborhoods sell for 24% more on average than comparable houses in car dependent areas (Katz 2020). Zhou, Reid and Carroll (2024) found that home values increased on average 3% and up to 20% for being in proximity to a brewpub/taproom, indicating consumer demands for neighborhood social activities. Smart Growth policies can increase the supply and reduce the prices of housing in such neighborhoods, responding to latent consumer demands. The NAR's survey found that 20% of households that currently live in a detached house would actually prefer a more compact home in a walkable neighborhood. A survey of suburban Kitchener, Canada residents found that 37% of respondents would prefer living in a more transit oriented area (Huang, Parker and Minaker 2021).

Consumer preferences for sprawl partly reflect social features such as perceived safety, school quality, social status and financial stability. Smart Growth policies that provide these features in more compact walkable neighborhoods respond to consumer demands. Even people who aspire to own a single-family house may prefer more compact housing at other times in their lives, for example, when they are young, old, experiencing a disability or financial stress, or during transition periods. Current demographic and economic trends are increasing demand for Smart Growth homes (NAR 2023):

- Seniors and younger generations, both growing demographic segments, tend to prefer more compact and multimodal neighborhoods, while the number of families with young children, the segment that most prefers single-family housing, is not growing.
- Increasing health and environmental concerns are increasing demand for walkable communities.
- Increasing financial stress and uncertainty are increasing demand for affordable housing and transport options.
- Improving travel options (better walking, cycling, transit, ridesharing and telecommunications) are improving demand for non-auto modes and reducing automobile travel demands.

Specific Smart Growth Savings and Benefits

This section describes various Smart Growth savings and benefits. Quantified impacts are intended to reflect differences between the 20% Smartest Growth communities (20% densest, most diverse, highest Walk Score, transit service quality, typically a central urban neighborhood with frequent transit service) with the 20% most sprawled and auto-dependent areas (typically an exurban area with few sidewalks or local services, and minimal transit).

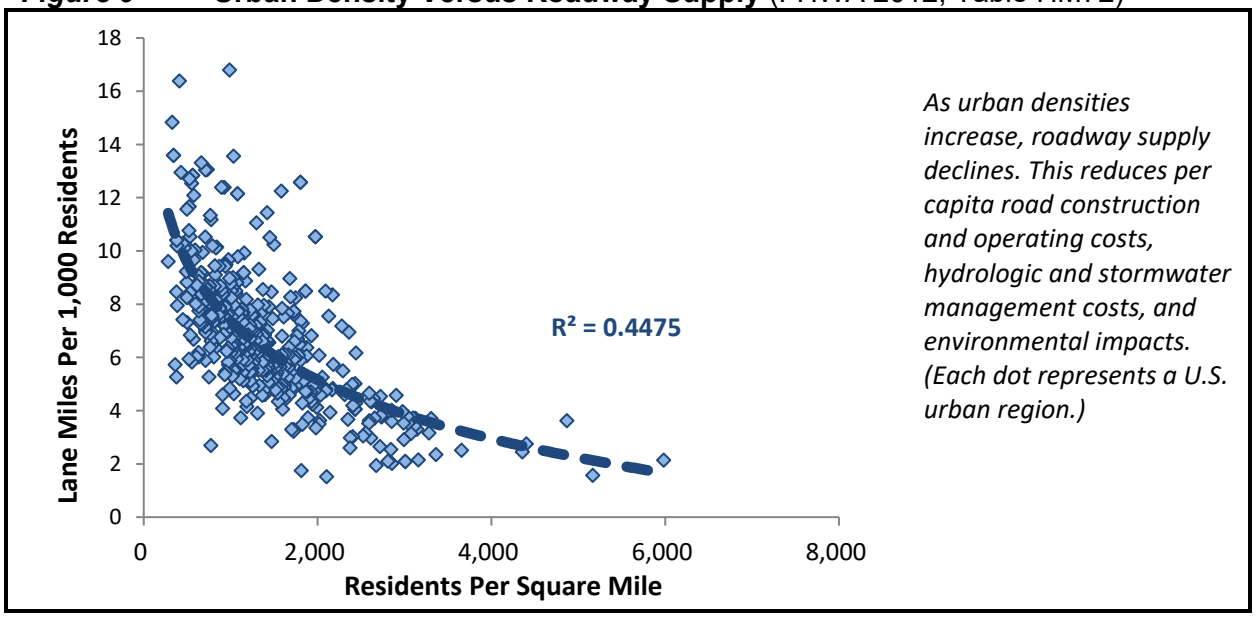
Reduced Land Consumption and Open Space Preservation

Land is a scarce and valuable resource. Development often displaces and disturbs open space such as wetlands, farmlands, parks, forests, and culturally significant sites, reducing their economic, social and environmental services including agricultural production, groundwater recharge, habitat, plus recreation and aesthetic values that support economic activities such as tourism (Harnik and Welle 2009; Hawkes 2016; Weller 2018). In addition to direct impacts, sprawl has *urban shadow* impacts that disrupt beneficial activities, for example, by increasing land prices and introducing activities that frighten wildlife. Such impacts can be significant even if only a minority of farmland or habitat is developed.

Smart Growth can significantly reduce per capita impervious surface area (land covered by buildings and pavement) which can provide various benefits including reduced stormwater management costs, improved groundwater percolation, reduced heat island effects (increased ambient temperatures and excessive heat in urban areas due to dark surfaces), and displacement of farms, natural habitat and other environmentally valuable resources (Ahlfeldt, Baum-Snow and Jedwab 2026; Arnold and Gibbons 1996). The amount of land required for a given amount of interior space declines with building height, and land required for roads and parking tends to decline with density due to reduced vehicle travel and fewer lane-miles of roadway.

The figure below shows how per capita lane-miles decline with urban density. U.S. cities with less than 1,000 residents per square mile have about 670 square feet of road space per capita, nearly three times as much as the 235 square feet in denser cities with more than 4,000 residents per square mile. Similarly, central neighborhoods require less road space per capita than at the urban fringe.

Figure 9 **Urban Density Versus Roadway Supply** (FHWA 2012, Table HM72)



As urban densities increase, roadway supply declines. This reduces per capita road construction and operating costs, hydrologic and stormwater management costs, and environmental impacts. (Each dot represents a U.S. urban region.)

Motor vehicles also require parking at each destination. A typical parking space is 8-10 feet (2.4-3.0 meters) wide and 18-20 feet (5.5-6.0 meter) long, totaling 144-200 square feet (14-20 sq. meters), and off-street parking requires driveways and access lanes so typically requires 250-350 square feet (25-35 square meters) per space. There are typically between two and eight off-street parking spaces per vehicle, with lower values in Smart Growth communities and more in sprawled areas (Litman 2019; McCahill and Garrick 2012).

Some studies quantify openspace values (McConnel and Walls 2005; Tagliafierro, et al. 2013). Impervious surfaces such as buildings, parking lots and roadways generally provide the least environmental benefits, and they increase stormwater management costs and heat island effects (higher ambient temperatures from sunlight). Preserving natural hydrologic flows provides many savings and benefits including reduced stormwater management and water supply costs, increased recreation and tourism, and improved ecological health. Jacob and Lopez (2009) found that per capita stormwater runoff volumes and pollution loadings decline with development density. They estimate that increasing from 4 to 8 dwelling units per acre is one of the most effective ways to reduce water pollution. Sorensen, et al. (2018) found that, between 1992 and 2012, 62% of all U.S. urban development occurring on farmland, and urban expansion accounted for 59% of U.S. farmland losses. Bigelow, Lewis and Mihiar (2022) found that urban fringe development rates declined after 2000 due to rising fuel prices and policy changes, indicating how public policies can affect openspace displacement. The box below ranks the external benefits of various land uses.

External Values Ranked (McConnel and Walls 2005) 1. Shorelands and wetlands such as lake and marshes. 2. Unique natural and cultural lands such as forest, meadows and heritage sites 3. Farmlands 4. Parks and gardens 5. Lawns 6. Impervious surfaces (buildings, parking lots and roads)	*Some land use types, such as shorelines, unique natural and cultural lands, and high value farmlands, provide significant external benefits that justify their preservation.*

The table below summarizes estimated economic, social and environmental values of openspace in the Puget Sound region. Many are indirect and so tend to be undervalued. For example, area residents may be unaware that openspace reduces disaster risks, maintains water quality and supports local industries.

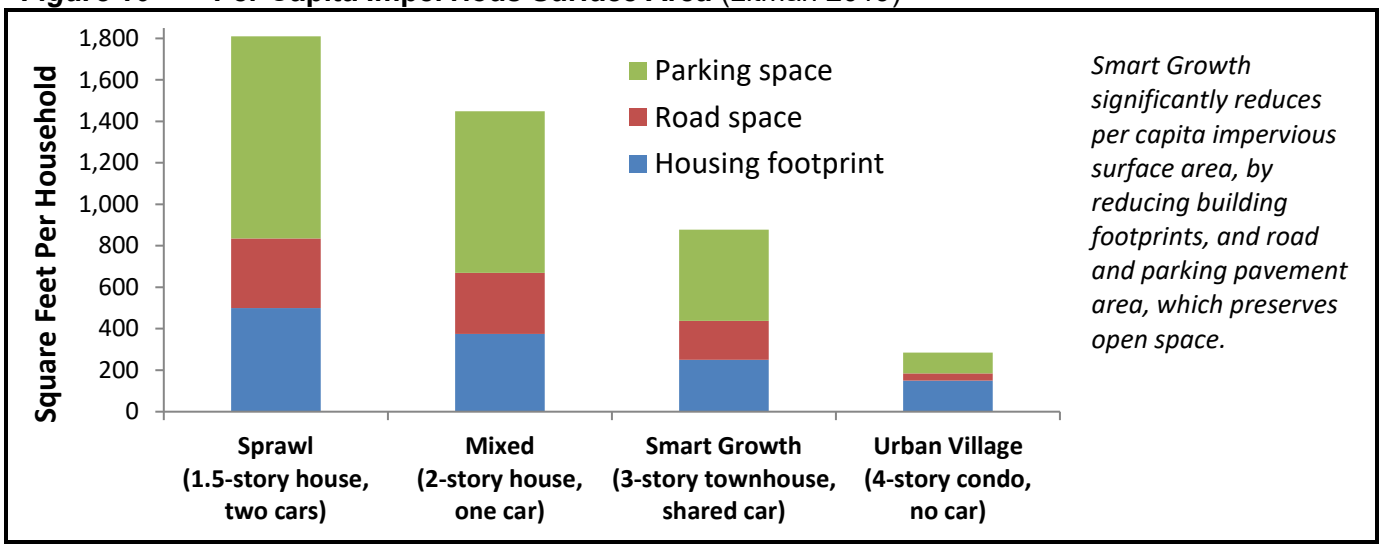
Table 4 **Puget Sound Openspace Values** (Chadsey, Christin and Fletcher 2015)

	Low Range		High Range	
	Total (m)	**Per Acre**	**Total (m)**	**Per Acre**
Aesthetic (perceived beauty and higher property values)	$2,294	$655	$9,510	$2,717
Air quality protection	$422	$121	$529	$151
Food production (farm and aquaculture)	$13	$4	$86	$25
Shelter (wildlife habitat)	$74	$21	$111	$32
Water quality and percolation	$63	$18	$1,925	$550
Health (exercise and mental health)	$41	$12	$50	$14
Play (outdoor recreation and related industries)	$2,633	$752	$4,133	$1,181
Disaster mitigation (e.g., flood protection)	$1,860	$532	$4,194	$1,199
Raw materials (lumber, stone, etc.)	$23	$7	$155	$44
Waste and pollution transformation	$4,034	$1,153	$4,569	$1,306
Totals	*$11,458*	*$3,274*	*$25,264*	*$7,219*

This study indicates that openspace provides diverse economic, social and environmental benefits.

The figure below show that Smart Growth typically requires 60-90% less impervious surface area and so reduces stormwater management costs and displaces less openspace than in sprawled areas. Since a healthy forest contains 40-100 significant trees per acre, a suburban house typically displaces 5-12 more trees than a Smart Growth home.

Figure 10 **Per Capita Impervious Surface Area** (Litman 2019)



Smart Growth significantly reduces per capita impervious surface area, by reducing building footprints, and road and parking pavement area, which preserves open space.

Summary: Smart Growth residents typically consume 40-80% less land for buildings, roads and parking facilities, which reduces stormwater management and heat island effects, and preserves habitat.

Criticisms. Critics claim that open space preservation policies are unjustified, citing statistics indicating that only a small portion of total land area is urbanized and there is no overall shortage of farmland (Hartland Institute 2013). However, this fails to account for many open space benefits. Cities are often located in areas with high value farmlands and natural lands such as river deltas, shorelines and forests, were openspace provides particularly large and unique benefits.

Public Infrastructure and Service Cost Savings

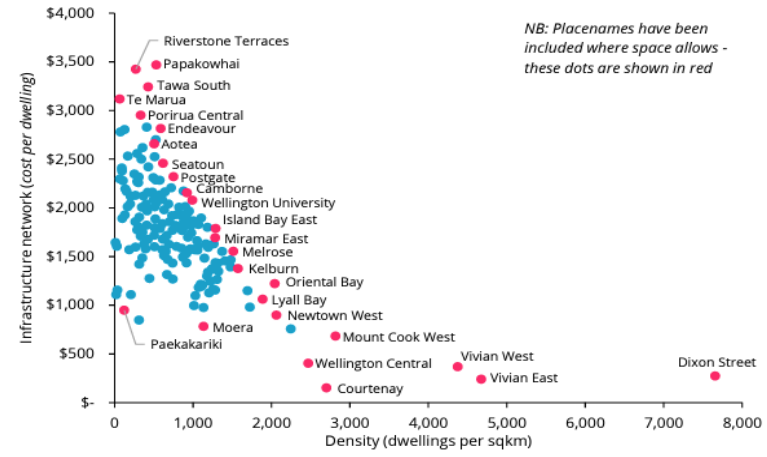
Smart Growth reduces the costs of providing many types of public infrastructure and services by reducing the length of roads and utility lines, and travel distances needed to provide public services such as garbage collection, policing, emergency response, and school transport, and so reduces per capita costs of providing these services. However, some of these impacts are complex and require detailed analysis.

Some studies find that per capita expenditures on public services increase with density (Holcombe and Williams 2008; Ladd 1992), but these studies often ignore costs to households and differences in service quality. For example, exurban and rural households often provide their own utilities (water wells, septic systems, garbage disposal, etc.), which is often more expensive than municipal utilities. Exurban and rural residents traditionally accept lower quality public services such as unpaved roads, volunteer fire departments, and no municipal water, sewage or garbage collection, which increase household costs including vehicle repairs, fire insurance premiums, water and waste management, but sprawl often attracts residents to urban fringe areas who demand urban quality services, which increases public costs.

Infill development can increase some infrastructure costs by raising design standards, planning requirements and brownfield remediation, but not proportionate to density; taller buildings usually have similar mitigation and remediation costs as a smaller building, so unit costs tend to decline with density. Various studies, summarized below, have quantified these costs. These studies reflect lower-bound impacts since most only consider a subset of total public costs and relatively modest Smart Growth policies, such as more compact single-family development without substantial shifts to multi-family housing.

- A New South Wales Productivity Commission study, *Building More Homes Where Infrastructure Costs Less* (NSW 2023) calculated that Sydney, Australia public infrastructure (roads, public transport, utilities, schools, health care and emergency services) costs increase with sprawl, ranging from less than $40,000 per home in central neighborhoods to more than $100,000 in outer suburbs.
- The study, *Infrastructure Costs and Urban Form* (Sense Partners 2024) found that the costs of providing roads and pipe networks declines significantly with housing density and proximity to city centers, as illustrated below.

Figure 11 **Road and Pipe Costs by Density** (Sense Partners 2024)



Source: Sense Partners

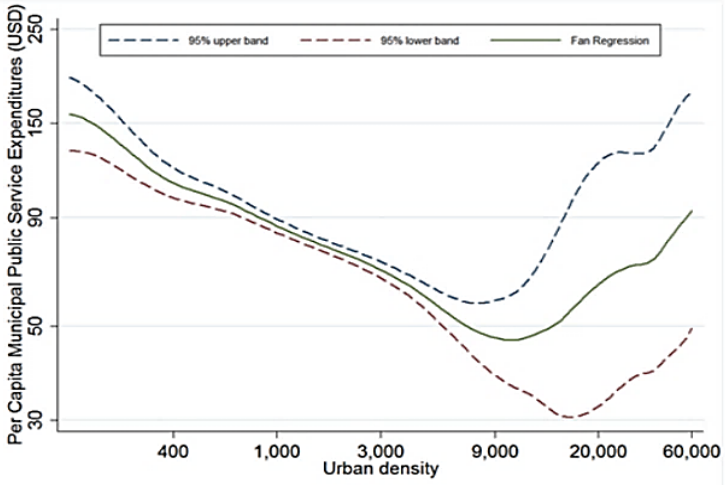
This study of the Wellington, New Zealand region found that local government costs to provide roads and utility networks declines significantly with housing density and with proximity to city centers. It found that walking (and probably bicycling, but that was not explicitly measured) has much lower infrastructure costs than motorized travel so public costs decline with higher active mode shares.

- Aderneck (2023) found that public infrastructure costs per dwelling unit usually decline with increased densities due to reduced linear infrastructure (i.e., roads, water pipes, sewer lines), although other factors such as infrastructure condition (age, capacity), geography and topography. Onsite infrastructure capital and operating costs are typically

five to nine times more expensive per unit ($40,000 vs. $5,000) for single-family compared with multifamily housing because infrastructure serves more units.

- Mattson (2021) found that construction and operating costs of municipal roadways, emergency services, parks and recreation, water, sewage and solid waste management tend to decline with density.
- Goodman (2019) found that increased density slightly increases some public costs but this effect is small compared with the costs of sprawl, which increases per capita costs for schools, emergency services and sewage. Increasing a city's density from the 25th to the 50th percentile ranking increases annual per capita expenditures by $5 but reducing its sprawl ranking from the 50th to the 25th percentile reduces per capita annual expenditures by $61.
- *Building Better Budgets: A National Examination of the Fiscal Benefits of Smart Growth* (SGA 2013) found that compact development typically reduces public infrastructure construction costs by a third and ongoing public services costs by 10%.
- A Charlotte, North Carolina study found that neighborhoods with low densities and disconnected streets require four times the number of fire stations at four times the cost compared with more compact and connected neighborhoods (CDOT 2012).
- Fernández-Aracil and Ortuño-Padilla (2016) found that each 1% increase in compact population is associated with a 0.217% per capita decrease in public service costs in Spanish urban areas.
- Analyzing municipal budgets in 8,600 municipalities of Brazil, Chile, Ecuador and Mexico, de Duren and Compeán (2015) found that low-density development approximately triples per capita expenditures on public service, with the greatest efficiencies at approximately 90 residents per hectare (figure below). This justifies policies that encourage densification, particularly in medium-sized cities.

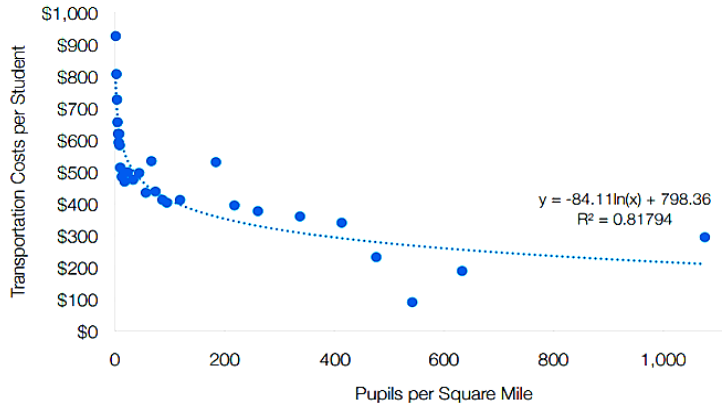
Figure 12 **Municipal Service Costs By Urban Density** (de Duren and Compeán 2015)



All else being equal, the annual costs of providing public water, sewage, garbage collection by municipal governments in Brazil, Chile, Ecuador, and Mexico range from more than $150 in very low density areas to about $50 per capita.

- A study for the City of Madison, Wisconsin investigated how these impacts vary by development pattern (SGA and RCLCO 2015a). If found that annual net fiscal impacts (incremental tax revenues minus incremental local government and school district costs) are $6.8 million net revenue ($203 per capita and $4,534 per acre), compared with $4.4 million ($185 per capita and $1,286 per acre) for the low density scenario. A similar study for West Des Moines, Iowa predicts that to accommodate 9,275 new housing units a compact development scenario designed to maximize neighborhood walkability would have $11.2 million net costs ($417 per capita and $17,820 per acre), about 50% more than the $7.5 million ($243 per capita and $2,700 per acre) by the lowest density scenario (SGA and RCLCO 2015b). The following figure illustrates how school transportation costs decline with density due to reductions in the need to provide school bus services.

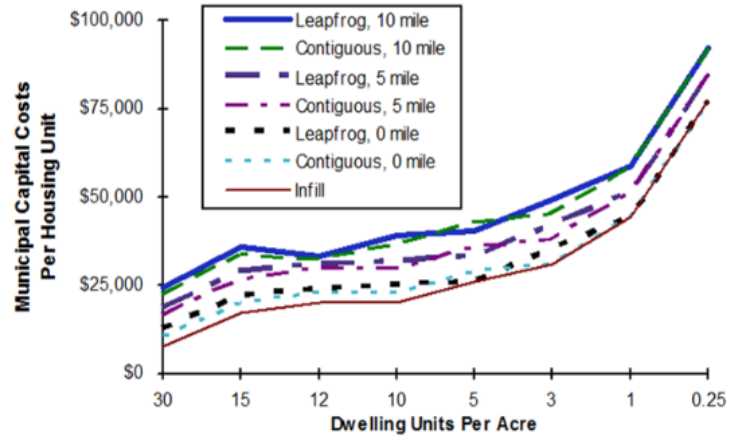
Figure 13 **Transportation Costs Per Student** (SGA 2015, p. 11)



Wisconsin Department of Public Instruction data show that school transport costs decline with density and are very low for more than 100l pupils per square mile.

- Detailed analysis of 2,500 Spanish municipal budgets found that lower-density development increases per capita costs of providing local services (Rico and Solé-Ollé 2013). The study found that in lower density urban areas with less than 25 residents per acre, each 1% increase in urban land area per capita increases municipal costs by 0.11%. Of this, 21% is due to increased basic infrastructure costs, 17% to increased culture and sports program costs, 13% to increased housing and community development costs, 12% to increased community facilities costs, 12% to increased general administration costs, and 6% due to increased local policing costs.
- The City of Calgary (2016) developed cost-based development fees using detailed and transparent accounting of infrastructure costs, such as new water and sewage lines, roadway improvements and other public services. The resulting fees are significantly higher in sprawled locations to reflect the higher costs of providing public infrastructure and services there. Fees range from $2,593 per multi-unit unit, $6,267 for a single-family home, and $422,073 to $464,777 per hectare in suburban areas.
- *Smart Growth & Conventional Suburban Development: Which Costs More?* (Ford 2010) found that compact residential development reduces infrastructure costs 30-50% compared with conventional suburban development.
- Burchell and Mukherji (2003) found that sprawl increases local road lane-miles 10%, annual public service costs 10%, and housing development costs about 8%, adding about $13,000 per dwelling unit or $550 per year.
- The figure below illustrates the results of a study showing that municipal infrastructure costs tend to decline with density and are lowest for infill development.

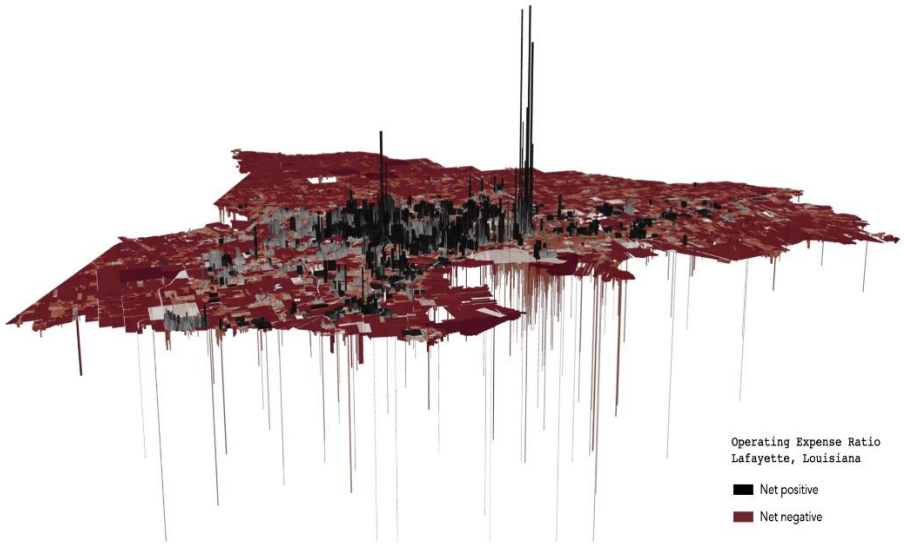
Figure 14 **Residential Service Costs** (Frank 1989)



The costs of providing public infrastructure, including roads, utilities and schools, tends to be much lower for compact, infill development, providing hundreds of dollars in annual savings per capita compared with sprawl.

Fiscal impact analysis evaluates how the incremental public service of development compare with their incremental tax revenues (Fodor 2011; Minicozzi 2012). The report, *Rationale for Smart Growth Fiscal Impact Analysis and Model Fiscal Impact Assessment Ordinance* (Nelson, Nicholas and Juergensmeyer 2022) provides guidance for calculating fiscal impacts of a particular development, accounting for Smart Growth related geographic and design factors that affect public costs. The figure below illustrates this analysis.

Figure 15 **Development Costs Versus Revenues** (Urban Three)



Development fiscal impact mapping indicates revenues (above ground) and costs (below ground).

This analysis indicates that compact development tends to provide the greatest revenues, and compact, mixed development provides the greatest efficiency by minimizing the costs of providing public infrastructure and services. Transportation planning that supports compact development tends to increase this efficiency.

Summary: Smart Growth typically reduces per capita public infrastructure and service costs 10% to 30%.

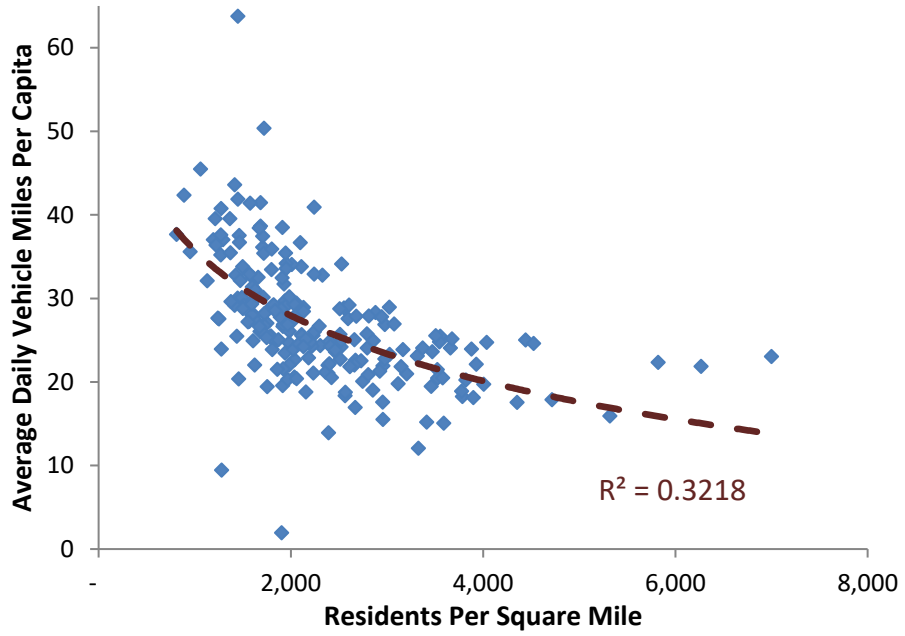
Criticisms. Critics claim that Smart Growth increases rather than reduces public infrastructure and service costs or that cost savings are insignificant (Cox and Utt 2004). They cite research by Ladd (1992) which indicated that per capita public expenditures increase in higher-density counties, although that author specifically cautioned against such a conclusion due to many confounding factors that influence the relationships between county-level density and infrastructure costs:

- Larger and denser cities tend to have more business activity, which generates revenues and imposes costs, and so increases per capita government expenditures.
- Sprawled area households tend to provide more of their own services, such as water, sewage and garbage disposal, which often cost more in total than what urban residents pay, and their public services are often lower quality, such as unpaved roads and volunteer fire departments. The lower local government expenditures partly reflect cost shifts rather than true savings.
- Smart Growth affects density and design at a finer geographic scale than these studies analyze. Neighborhood- and site-level analyses are needed to accurately evaluate Smart Growth savings.
- Higher government expenditures in denser, more urbanized areas partly reflect higher wages in urban areas, so urban-rural differences are smaller when measured as a portion of income.
- Larger, denser cities tend to contain a disproportionate share of residents with special needs, such as poverty and mental illness, who require additional public services.

Reduced Vehicle Travel and Increased Non-Auto Travel

Smart Growth reduces motor vehicle travel and associated costs, and increases non-auto travel (Cervero and Arrington 2008; Galdes and Schor 2022; Schneider, Handy and Shafizadeh 2014; Spack and Finkelstein 2014; Tomer, Kane and Vey 2020). It does this by increasing proximity between destinations, improving non-auto modes, reducing traffic speeds, and reducing parking supply. The figures below illustrate these effects.

Figure 16 **Per Capita Vehicle-Miles Versus Population Density** (FHWA 2018, Table HM72)

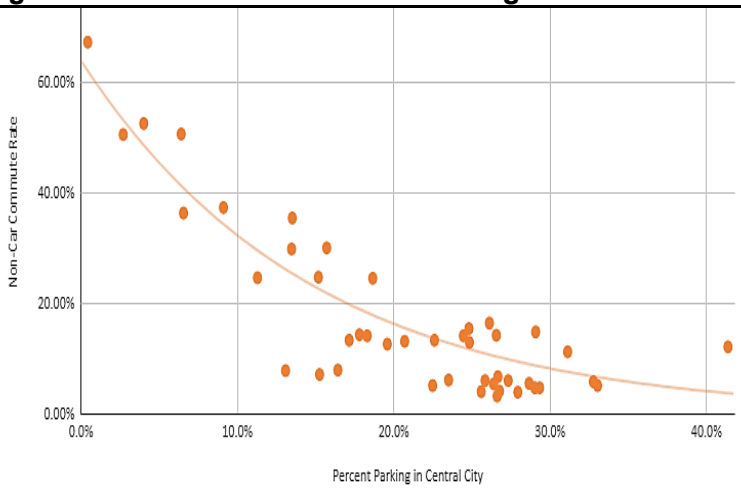


Per capita vehicle travel tends to decline with urban population density. The largest declines result from increases from low (less than 2,000 residents per square mile, or about 3 per acre) to moderate densities (more than 4,000 residents per square mile or more than 6 per acre).

This actually reflects more than just density. Higher densities are also associated with more mixed development and more multimodal transportation systems.

Other Smart Growth strategies, such as reduced parking supply and efficient parking pricing, can significantly reduce automobile travel and increase use of other modes, as illustrated below.

Figure 17 **Land Devoted to Parking Versus Non-Auto** (PRN 2023)



As the portion of urban land devoted to parking declines non-auto mode shares increase. This occurs because increased parking supply encourages driving, degrades walking conditions and disperses development, resulting in automobile dependency and sprawl.

The table below summarizes how various Smart Growth factors affect travel activity.

Table 5 **Smart Growth Impacts on Travel Summary** (Litman 2023)

Factor	Definition	Travel Impacts
Regional accessibility	Location of development relative to regional centers.	Reduces per capita vehicle mileage. Central area residents typically drive 10-30% less than at the urban fringe.
Density	People or jobs per unit of land area (acre or hectare).	Reduces vehicle ownership and travel, and increases use of non-auto modes. A 10% increase typically reduces VMT 0.5-1% as an isolated factor and 1-4% including associated factors (regional accessibility, mix, etc.).
Mix	Proximity between different land uses (housing, commercial, institutional),	Reduces vehicle travel and increases non-auto travel, particularly walking. Mixed-use areas typically have 5-15% less vehicle travel.
Centeredness (centricity)	Portion of jobs in commercial centers (e.g., central business districts and town centers).	Increases non-auto travel. Typically, 30-60% of commuters to major commercial centers use non-auto modes compared with 5-15% at dispersed locations.
Network Connectivity	Degree that walkways and roads are connected.	Reduces total vehicle travel. Improved walkway connectivity increases non-motorized travel.
Complete Streets	Scale, design and management of streets.	Multimodal streets increase use of non-auto modes. Traffic calming reduces VMT and increases active travel
Active transport (walking and bicycling)	Quantity and quality of sidewalks, crosswalks, paths, and bike lanes. Walk Score rating over 70.	Improving active travel conditions increases use of these modes and reduces automobile travel. Residents of walkable communities typically walk 2-4 times more and drive 5-15% less than in auto-dependent areas.
Transit quality and accessibility	Quality of transit service and whether neighborhoods are considered transit-oriented development (TOD).	Increases ridership and reduces automobile trips. Residents of transit oriented developments typically to own 20-60% fewer vehicles, drive 20-40% fewer miles, and use non-auto modes 2-10 times more than in automobile-oriented areas.
Efficient parking management	Number of parking spaces per building unit or acre, and how parking is managed and priced.	Reduces vehicle ownership and use and increases non-auto travel. Cost-recovery pricing (users finance parking facilities) typically reduces affected vehicle trips 10-30%.
Site design	Whether oriented for auto or multi-modal accessibility.	Can reduce automobile trips, particularly if implemented with improvements to non-auto modes.
TDM	Incentives to choose more efficient transport options.	Reduces vehicle ownership and use and increases non-auto travel. Often reduces affected trips 30-60%
Integrated Smart Growth programs	Integrated programs that result in more compact development, multimodal transport systems and various TDM incentives.	Reduces vehicle ownership and use and increases non-auto travel. Residents of compact, multimodal communities typically own 20-60% fewer vehicles, drive 20-80% less, and use non-auto modes 2-10 times more than in auto-dependent areas.

This table summarizes typical impacts of various land use factors on travel activity.

Although most strategies only affect a portion of total vehicle travel, such as commute trips, local errands or urban trips, their impacts tend to be cumulative and synergistic (total impacts are greater than the sum of individual impacts). Integrated Smart Growth programs often leverage large vehicle travel reductions, as described in the following box.

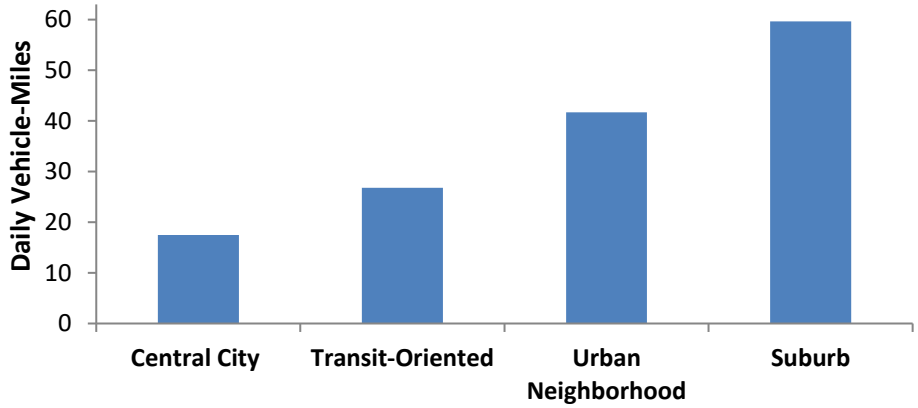
Smart Growth Vehicle Travel Leverage Effects (Litman 2023; Tian 2022)
With integrated Smart Growth programs, each additional non-auto travel-mile often reduces several motor vehicle-miles for the following reasons:

- *Shorter trips.* A shorter non-auto trip often substitutes for longer motorized trips, such as walking or biking to local shops rather than driving to a regional shopping center.
- *Reduced chauffeuring*. In auto-dependent areas, 5-15% of travel is to chauffeur non-drivers. These trips often have empty backhauls (empty travel to pick up or drop off passengers). As a result, a mile of independent mobility by non-drivers often substitutes for two motor vehicle miles.
- *Synergistic effects.* Non-auto journeys often involve multiple modes, so they become more effective if improved together. For example, public transit becomes more efficient and attractive if implemented with walking and bicycling improvements, more compact development and parking policy reforms.
- *Vehicle ownership reductions*. Smart Growth policies allow some households to reduce their vehicle ownership which tends to leverage large reductions in their vehicle travel.
- *Lower traffic speeds.* Smart Growth policies, such as compact development and complete streets policies, tend to reduce vehicle traffic speeds, which reduces automobile travel and makes non-auto modes more competitive.
- *Social norms.* Smart Growth policies support a virtuous cycle of improved, increased, and more social acceptance of non-auto modes.

Conventional planning often ignores these indirect impacts and so underestimates the potential impacts and benefits of integrated Smart Growth program.

Summary: Smart Growth residents typically drive 30-70% less and use non-auto modes 2-10 times more than in sprawled, auto-dependent areas, as illustrated below.

Figure 18 **California Household Vehicle Travel by Location** (Salon 2014)



Households in compact, walkable and transit-oriented areas drive 30-70% less and use non-auto modes 2-10 times more than in sprawled, auto-dependent areas due to the combination of increased proximity, improved non-auto travel, slower traffic speeds and less convenient parking.

Criticisms. Critics claim that individual factors such as density and public transit improvements do little to reduce vehicle travel (NAHB 2010) but their claims are inaccurate (Litman 2011).

Affordability and Economic Resilience

Affordability refers to households' ability to purchase basic goods such as food, housing, transportation and healthcare. It is a potential; households don't always take advantage of savings opportunities, but benefit from having options available if needed. Economic resilience refers to households' ability to respond to unexpected financial stresses; increased affordability tends to increase economic resilience. Smart Growth increases affordability and resilience in several ways and reduces them in a few others, as summarized below.

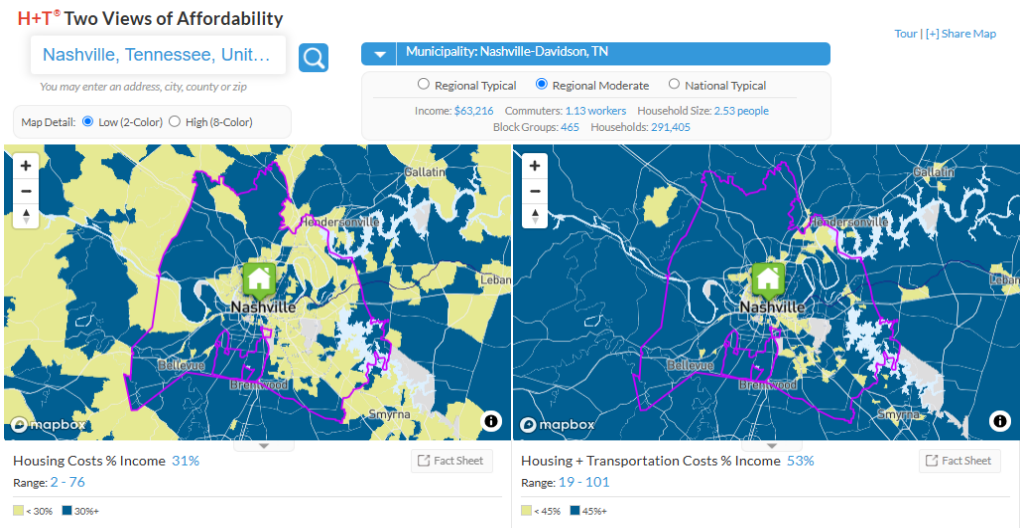
Table 6 **Smart Growth Household Affordability Impacts**

Increases Affordability	Reduces Affordability
Allows more affordable housing types (smaller lots, townhouses, apartment, accessary dwelling units, etc.).	
Reduced parking and setback requirements which reduces land requirements per housing unit.	
May reduce various fees for compact development, reflecting lower public service costs.	Urban growth boundaries can reduce developable land supply, and therefore increase larger-lot housing prices.
Reduced transport costs, particularly if it allows households to reduce their vehicle ownership.	Increased design requirements (curbs, sidewalks, sound barriers, etc.) may increase development costs.
Improves access to affordable consumer goods.	

Smart Growth tends to reduce many household costs, although it can increase others.

Allowing more compact, moderate-priced infill with unbundled parking increases housing affordability and reduces transport costs (Myers and Park 2020). As previously described, households in compact, multimodal neighborhoods typically own 20-60% fewer vehicles and drive 30-70% fewer annual miles than in auto-dependent areas (Cervero and Arrington 2008; Daisa, et al. 2013). Ewing and Hamidi (2014) found that each 10% increase in their compactness index is associated with a 3.5% decrease in the portion of household budgets spent on transport. The Housing + Transportation Index, illustrated below, indicates that central neighborhoods provide thousands of dollars in annual transportation savings.

Figure 19 **Housing and Transportation Affordability Index Analysis** (CNT 2024)



In these maps, yellow indicates affordability. In Nashville and most other urban regions, sprawled areas tend to have more affordable housing (left map) but central areas tend to be most affordable overall considering total housing and transportation costs. Smart Growth policies tend to increase overall affordability.

Households in Smart Growth areas tend to have lower mortgage foreclosure rates, indicating more resilience; they are better able to respond to unexpected economic stresses such as reduced incomes or additional financial burdens (Amidan 2025; Chakraborty and McMillan 2018; Gilderbloom, Riggs and Meareshttp://www.sciencedirect.com/science/article/pii/S0264275114001474 - af015 2015; NRDC 2010; Pivo 2013; Wang and Immergluck 2019; Welch, Gehrke and Farber 2018; Won, Lee and Li 2017).

Summary: Residents of compact, multimodal neighborhoods typically own 20-60% fewer vehicles and drive 30-70% fewer annual miles which reduces their transportation costs 10-60%. Compact housing types (accessory units, townhouses and mid-rise multifamily with unbundled parking) typically cost 10-40% less than comparable-quality single-family homes, with larger savings in urban areas with high land values. As a result, Smart Growth policies that increase the supply of basic compact housing in accessible, multimodal neighborhood significantly increase overall affordability. Smart Growth significantly increases economic resilience by providing affordable travel options that households can use when they experience a vehicle failure, fuel or insurance price increases, or other financial shocks.

Criticisms. Critics argue that Smart Growth increases housing prices which reduces affordability. However, much of their research is incomplete and biased. Their arguments often reflect the assumption that Smart Growth consists primarily of urban containment policies, which increase land prices and housing costs (Cox and Pavletich 2015; Cheshire and Vermeulen 2009). In fact, such policies are only one of many Smart Growth strategies, most of which reduce costs. Smart Growth significantly reduces transportation costs, allows more compact housing types, reduces minimum parking requirements, reduces some development fees. Affordability analysis should consider all of these strategies and impacts. Critics often focus on single-family housing prices and ignore the ways that Smart Growth reduces prices for other housing types (Litman 2018) and ignore non-housing affordability such as transportation costs.

Ewing and Hamidi (2014) found that compact development reduces housing affordability but increases overall affordability by reducing transportation costs: each 10% increase in their compact development index is associated with a 1.1% increase in housing costs but a 3.5% decrease in transport costs relative to income, so households save more than three dollars on transportation for each additional dollar spent on housing. The *Housing + Transportation Index* analysis indicates that Smart Growth neighborhoods provide substantial net savings considering total housing and transportation costs (CNT 2024).

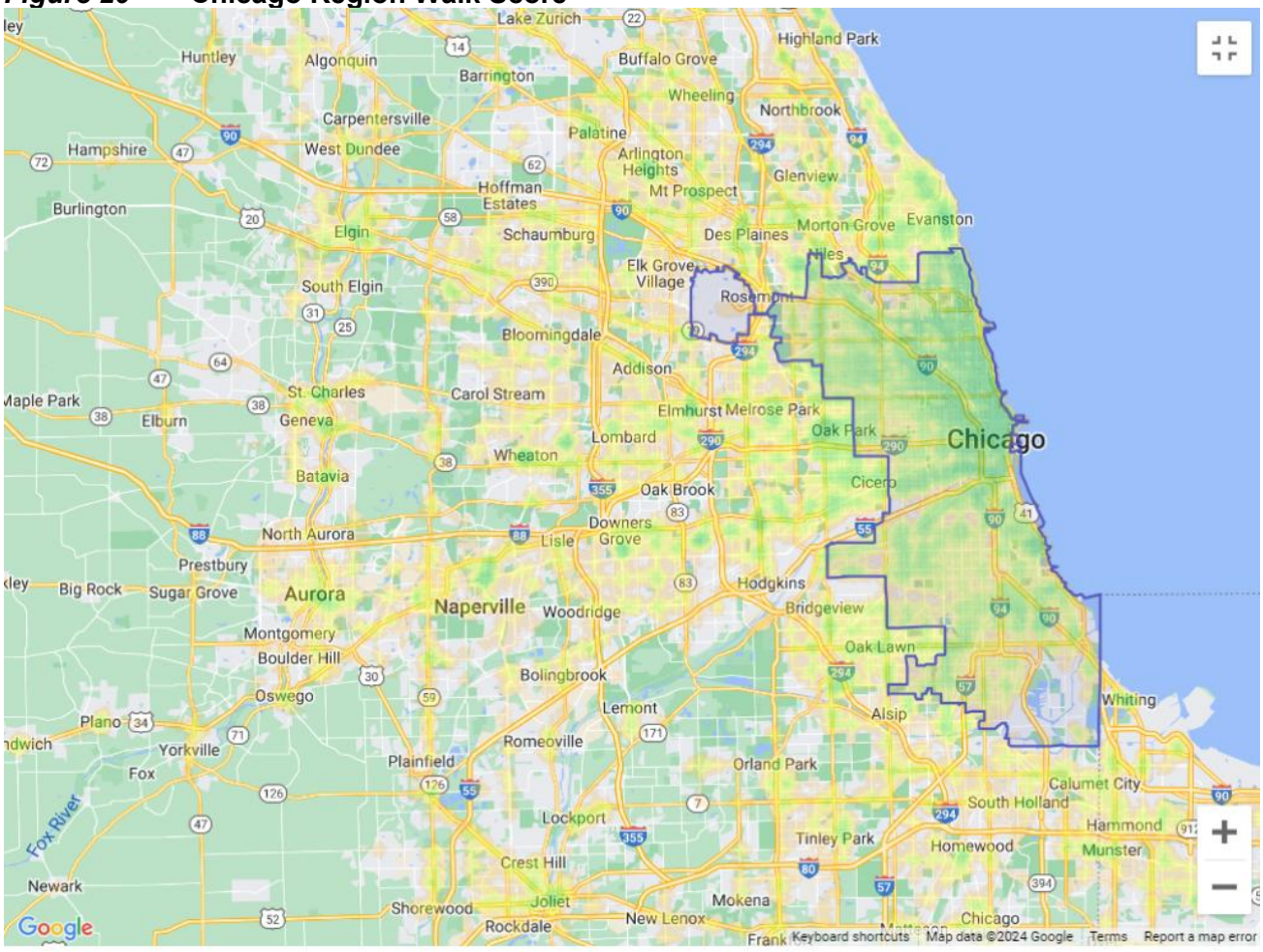
Critics are correct that by themselves some Smart Growth policies can increase land prices (dollars per acre), but if implemented with upzoning and parking policy reforms which increase density and reduce development costs, resulting in lower costs overall (Been, Ellen and O'Regan 2023; Maltman 2023; Myers and Park 2020). Smart Growth policies that support more affordable housing types and transportation options tend to increase affordability overall.

Accessibility and Travel Time Savings

Smart Growth significantly improves overall accessibility, that is, people's ability to reach services and activities, which reduces their travel costs and improves their economic opportunities, particularly for non-drivers. New analysis tools, such as the *Housing and Transportation Affordability Index*, the *Smart Location Mapping*, and *Street Smart* can evaluate multimodal accessibility (Sundquist, McCahill and Brenneis 2021).

Walk Score is a useful indicator of local accessibility. It measures proximity to common destinations such as shops, restaurants and parks, and therefore people's accessibility to these services and activities. The heatmap below shows Chicago region Walk Scores. Green indicates a score over 70 which means a high degree of accessibility. Most central area neighborhoods and portions of some suburbs have this rating, although not all of these have all of the attributes required to achieve Smart Growth goals. For example, some urban neighborhoods lack family-oriented amenities such as local parks and schools, many suburban towns lack high quality public transit services required for commuting, and many very accessible neighborhoods are unaffordable and so fail to provide accessibility and travel time savings to disadvantaged groups who need them most, including people with disabilities and low incomes.

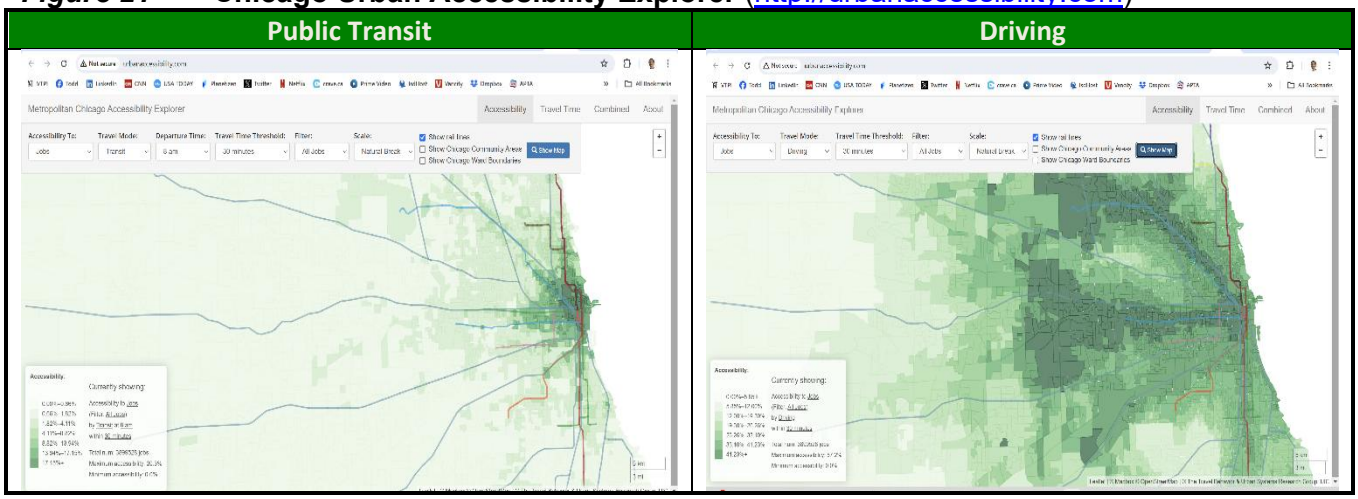
Figure 20 **Chicago Region Walk Score**



Walk Score indicates proximity to commonly used services such as shops, restaurants and parks. Green indicates a Walk Score over 70 which means that many services are located within walking distances so it is possible to live car-free.

Non-drivers living in compact, multimodal neighborhoods usually have equal or better access to jobs and services than suburban motorists, as illustrated below, at a fraction of the costs.

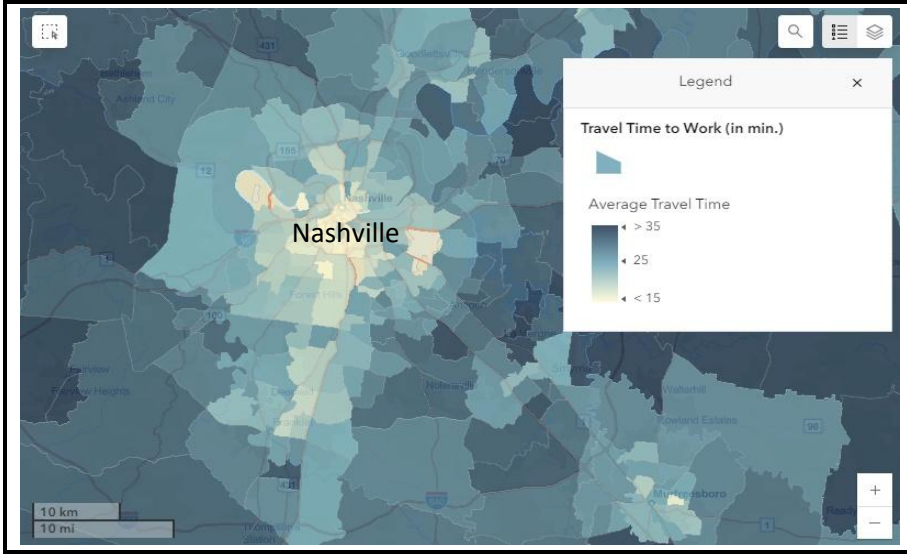
Figure 21 **Chicago Urban Accessibility Explorer** (http://urbanaccessibility.com)



These maps compare the number of jobs accessible within 40 minutes from various Chicago neighborhoods. Central area transit commuters can access far more jobs (dark green) than most suburban motorists (light green) with far lower costs.

Smart Growth also saves travel time. Commute durations are usually much lower in central urban neighborhoods (often less than 15 minutes), than in sprawled, urban-fringe areas (often over 30 minutes), as illustrated below. Central neighborhood residents also tend to spend less time and money travelling to other destinations such as schools, shops and parks (CNT 2024).

Figure 22 **Commute Duration** (Mineta Institute Commute Duration Dashboard)



Average commute duration (minutes per commute) is generally much shorter in central, multimodal neighborhoods than in automobile-dependent urban fringe areas. This figure illustrates this effect in Nashville, Tennessee, using US Census Data. Similar patterns are seen in most urban regions.

A detailed study of travel activity in Halifax, Canada found that average time spent travelling increased from 92 daily minutes in city neighborhoods, 94 daily minutes in suburban areas, and 107 daily minutes in exurban areas (Millward and Spinney 2011). Mean one-way commute durations increased from 12.7 minutes in city neighborhoods, 15.7 minutes in suburbs, 18.1 minutes for closer exurbs and 21.9 minutes for the most

distant areas. Urbanites spend less time in cars and more using non-auto modes: inner-city respondents average only 56 minutes per day in a car (45 as driver, 11 as passenger), compared with 72 minutes in suburbs and 85 to 91 minutes in exurban areas, while daily minutes devoted to active travel (walking and bicycling) declined from 27.8 in urban areas, 16.5 in suburbs, 13.7 for closer exurbs and 13.2 in outer exurbs.

The study, "Mobilities of care and cognitive labour: Can urban proximity reduce the organisational burden of everyday mobility?" (Mombelli, et al. 2026), using survey data of 823 caregivers in the Barcelona, Spain region, found that greater walking-distance proximity to common destinations is associated with reduced cognitive burden, more seamless trip integration, and fewer conflicts, indicating less mental effort required to coordinate daily life. It concluded that dense, mixed-use development around care destinations such as schools and health services may reduce burdens and support more equitable everyday mobility.

Denser development tends to increase congestion *intensity* (reductions in peak-period traffic speeds), but by increasing proximity and improving non-auto travel options Smart Growth tends to reduce per capita congestion costs (Ewing, Tian, and Lyons 2017; Levine, et al. 2012). A major Arizona Department of Transportation study found that households in compact, mixed neighborhoods drive significantly less during peak periods and so experienced substantially lower congestion costs than in more sprawled, automobile-dependent areas (Kuzmyak 2012). Residents of higher-density neighborhoods averaged 36% shorter commute trips and 25% shorter shopping trips than in sprawled areas. Many Smart Growth features can reduce congestion costs, so if congestion is a concern these should be implemented more.

Table 7 **Smart Growth Congestion Reduction Strategies**

Smart Growth Feature	Congestion Impacts
Increased development density and mix	Increases local vehicle trips but reduces per capita trip generation and distances and improves non-auto modes. This reduces regional traffic congestion
More connected road network	Disperses traffic. Reduces trip distances. Supports space-efficient modes.
Improved transport options	Reduces total vehicle trips.
Transport demand management	Reduces total vehicle trips, particularly under congested conditions.
Parking management	Can reduce vehicle trips and support more compact development

Smart Growth includes many features that can reduce traffic congestion.

Summary: Smart Growth policies greatly improve overall accessibility, particularly for non-drivers. In automobile-dependent suburbs motorists can access an order of magnitude more destinations than non-drivers, but in compact, multimodal areas non-drivers have comparable access as suburban drivers with much lower financial costs. Residents of compact, mixed central neighborhoods spend about half as much time travelling to work and errands than in sprawled automobile-dependent areas. Although compact neighborhood residents tend to rely more on slower modes, have lower traffic speeds and more intense congestion, these factors are more than offset by greater proximity.

Criticisms: Critics argue that by increasing development density, Smart Growth increases traffic congestion. However, they only measure congestion intensity rather than total congestion delays, ignore impacts on overall accessibility (total time and money required to reach destinations), and disregard the congestion reduction impacts of Smart Growth strategies such as increased roadway connectivity, efficient road and parking pricing, improvements to alternative modes, and incentives to shift mode during peak periods.

Independent Mobility for Non-Drivers

In a typical community, 20-40% of travellers cannot, should not, or prefer not to drive, as summarized below, and will use non-auto modes if they are convenient, comfortable and affordable. By creating compact, multimodal communities Smart Growth gives non-drivers independent mobility; in central multimodal neighborhoods non-drivers have comparable access as motorists in sprawled areas.

Table 8 **Types of Non-Auto Travel Demands** (Litman 2022)

Type	Prevalence	Costs if not Served
Seniors who do not or should not drive.	5-10% of population.	Non-drivers lack mobility, require chauffeuring (special vehicle travel to transport a non-driver), must use higher-cost options (such as taxis and ridehailing) or move to another community with better transport options.
People with mobility impairments.	5-10% of population.	
Adolescents (12-20 years).	10-20% of population.	
Drivers who share vehicles.	5-15% of motorists.	
Drivers who temporarily lack vehicles.	Varies.	
Lower-income households.	20-40% of households.	Lack mobility or bear excessive transport costs.
Tourists and visitors.	Varies.	Lack mobility or visit other areas.
People who do not drive for religious or cultural reasons.	0-3% of households.	Lack mobility during religious days or move to more walkable areas.
Impaired or distracted travelers.	Varies.	Impaired and distracted driving increases crashes.
People who walk and bike for health and enjoyment.	40-60% of residents.	Must spend time and money exercising at a gym or have insufficient exercise.
Families with pets to walk.	20% of households.	Pets lack exercise or owners drive to walking areas.
Motorists who benefit from better travel options for others.	Most motorists.	Motorists bear more congestion, risk and chauffeuring burdens.

In a typical community, 20-40% of travellers cannot, should not, or prefer not to drive and will use non-auto modes if they are convenient, comfortable and affordable.

In North America about 15% of total trips are by non-auto modes and their mode shares increase significantly when communities improve their conditions, indicating latent demands. Failing to serve these demands is unfair and inefficient; it deprives non-drivers of independent mobility, forces motorists to devote time and money to chauffeuring non-drivers; forces travellers to drive when they would prefer to use more affordable, healthy and enjoyable alternatives, and increases motor vehicle travel and associated costs. In automobile-dependent areas, 5% to 15% of vehicle trips are for chauffeuring, which is inefficient because they often involve empty backhauls – empty vehicle-travel required to drop-off and pick-up passengers – so transporting a non-driver five miles generates ten vehicle-miles of travel (Litman 2015). Improving non-auto modes tends to benefit everybody including motorists who enjoy reduced traffic and parking congestion, crash risk and chauffeuring burdens.

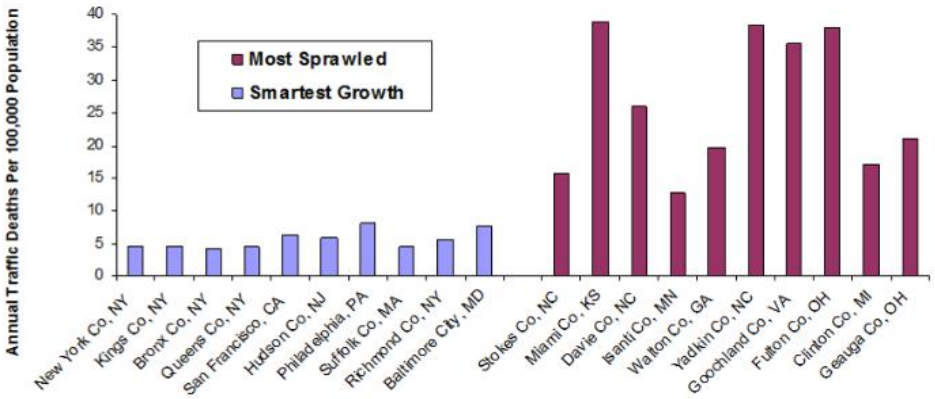
Summary: Smart Growth greatly improves non-drivers accessibility, virtually eliminating the disparity of access between drivers and non-drivers, and typically increases non-auto trips by two to ten times.

Criticisms: Critics sometime argue that most people prefer automobile travel, citing statistics that 90% of households own private vehicles and more than 92% of commute trips are by automobile, but this undercounts and undervalues non-auto travel demands and the benefits of serving those demands. In North

Traffic Safety

Numerous studies indicate that Smart Growth reduces traffic deaths and injuries (Ahangari, Atkinson-Palombo and Garrick 2017; Ewing, Hamidi and Grace 2016). Figure 15 illustrates one study's results.

Figure 23 **Annual Traffic Death Rate** (Ewing, Schieber and Zegeer 2003)



Of 280 U.S. counties analyzed, the ten with the lowest sprawl rating have about a quarter the traffic fatality rates as the most sprawled counties.

Ewing and Hamidi (2014) found that a 10% increase in their Smart Growth index reduces per capita crash fatality rates 13.8%. Dumbaugh and Rae (2009) analyzed crashes in San Antonio, Texas neighborhoods. Accounting for demographic and geographic factors they found that:

- Increased vehicle travel tends to increase crash rates, with approximately 0.75% more crashes for every additional million miles of vehicle travel in a neighborhood.
- Population density is significantly associated with fewer crashes, with each additional person per net residential acre decreasing crash incidence 0.05%.
- Each additional freeway-mile in a neighborhood is associated with a 5% increase in fatal crashes, and each additional arterial mile is associated with a 20% increase in fatal crashes.
- Each additional arterial-oriented commercial parcel increased crashes 1.3%, and each additional big box store increased crashes 6.6%, while pedestrian-scaled commercial uses were associated with 2.2% fewer crashes.
- The number of both young and older drivers were associated with increased total crashes.

Garrick and Marshall (2011) found that in California, more compact, connected and multi-modal urban areas have about a third of the traffic fatality rates as in sprawled, automobile dependent areas. Several factors help explain why Smart Growth provides large safety benefits: it reduces total vehicle travel and traffic speeds, improves emergency response, and by improving travel options helps reduce driving by higher risk groups such as youths, seniors and drinkers. As a result, Smart Growth complements traffic safety strategies such as graduated driver's licenses and anti-drunk-driving campaigns.

Summary: Residents of compact, multimodal neighborhoods typically have 20-80% lower per capita traffic fatality rates as the same demographic groups living in automobile-dependent, sprawled areas.

Criticisms: Conventional traffic safety analysis generally ignores the increased traffic crashes caused by sprawl and Smart Growth safety benefits. Smart Growth critics also ignore this issue.

Public Fitness and Health

Smart Growth improves physical fitness and health by increasing active travel (walking and bicycling) and reducing driving risks (Ewing and Hamidi 2017; Iravani and Rao 2019; Rachele, et al. 2018). Health experts recommend that adults engage in moderate physical activity at least 150 minutes per week (about 22 daily minutes), and more for youths (CDC 2021). Although there are many ways to exercise, most require special time, expense and effort, which discourages their use, particularly by currently sedentary and overweight people. For many, the most practical way to achieve exercise targets is to walk and bike for utilitarian trips and recreation. Since most public transit trips include active mode links, it also increases exercise.

A major study of residents in 14 international cities found that controlling for other factors, net residential density, intersection density, public transport density and number of parks were significantly, positively related to physical activity (Sallis, et al. 2016). The physical activity differences between residents of the most and least activity-friendly neighbourhoods ranged from 68 to 89 min/week, which represents 45–59% of the 150 min/week recommended by guidelines. Using U.S. national travel survey data and accounting for demographic factors, Dong (2020) found higher rates of utilitarian walking and bicycling in central neighborhoods, suburbs and rural areas than in outer suburbs. Inner-city residents walk and bicycle about three times more, and rural residents about 50% more than in suburbs. A detailed review of neighborhood cardiovascular health impacts found that many Smart Growth features – including walkability, residential density, safety from traffic, recreation facilities, street connectivity, and local stores – tend to increase physical activity and reduce body mass index, diabetes and cardiovascular disease (Malambo, et al. 2016).

Frederick, Riggs and Gilderbloom (2017), found statistically strong relationships between modal diversity (the portion of trips made by non-auto modes) and positive public health outcomes including healthier behaviors, more leisure quality, less sedentary living, fewer Years of Potential Life Lost (an indicator of longevity and overall health), and higher birth weights (an indicator of infant health). These relationships are stronger than many other sociological, geographical, and economic indicators including density, latitude, race, education and income, suggesting that living in a multimodal community provides significant health benefits. The study, *Linking Neighborhood Walkability to the Independence and Quality of Life of Older Adults* (Redelmeier, et al. 2023) found that neighborhood walkability is a key element in enabling older adults to maintain independence and happiness. Althoff, et al. (2025) found that people who move from less walkable to more walkable cities took 1,100 more daily steps, adding 11 minutes of exercise.

Aldred, Goodman and Woodcock (2024) found that residents in walkable, low-traffic London suburbs walked significantly more, own fewer vehicles and drive less than in otherwise comparable areas. They estimate that low traffic neighbourhoods provide £4,800 average physical-activity benefits per capita compared to £28–£112 costs. A ten-year study in Perth, Australia found that residents' overall health improved if they moved from sprawled to more compact, walkable neighborhoods (Giles-Corti, et al. 2013). It found that an additional local shop increased residents' walking 5-6 weekly minutes and an additional recreational facility (park, beach, etc.) increased residents' physical activity 21 weekly minutes. Using sophisticated statistical analysis that accounts for various demographic and economic factors, Ewing, et al. (2014) found that Smart Growth is associated with reduced obesity and associated health problems and greater longevity; doubling their Sprawl Index increased life expectancy approximately 4%, which translates into an average three-year difference in life expectancy between people in less compact versus more compact counties. Hamidi, et al. (2018) found significantly higher life expectancy in compact than in sprawling counties. Sprawl increases mortality both directly, and indirectly, by reducing physical activity, increasing total travel, traffic speeds and emergency response times, and reducing access to health care services and healthy foods.

The study, "Where Matters Health & Economic Impacts of Where We Live," found positive relationships between neighborhood walkability and park access and health outcomes, as summarized below.

Table 9 **Health Impacts of Walkability and Park Access** (Frank, et al. 2019)

	Walkable Compared with Auto-Dependent Areas	Areas with Many Parks Compared with No Parks
Physical Activity	45% more likely to walk for transportation and 17% more likely to meet physical activity targets.	20% more likely to walk for leisure or recreation and 33% more likely to meet the physical activity targets.
Obesity	42% less likely to be obese.	43% less likely to be obese.
Diabetes	39% less likely to have diabetes.	37% less likely to have diabetes.
Heart Disease	14% less likely to have heart disease.	39% less likely to have heart disease.
Stress	23% less likely, to have stressful days.	19% less likely to have stressful days.
Sense of Community	47% more likely to have a strong sense of community and belonging.	23% more likely to have a strong sense of community and belonging.

This detailed study found significant positive relationships between walkability, park accessibility and health.

Increased urban densities can increase some health risks such as pedestrian and bicycle traffic risks, and exposure to noise and local air pollutants. To maximize public safety and health, Smart Growth should emphasize strategies that maximize active mode safety, minimize noise and air pollution, and reduce other risks that increase with density.

The *Health Economic Assessment Tool* (HEAT) (WHO 2024) and the *Dynamic Modeling for Health Impact Assessment* (DYNAMO-HIA) (Mansfield and Gibson 2015) calculate monetized values of policies and projects that improve and increase walking and bicycling, including savings from avoided driving, improved public fitness and health, reduced congestion and pollution, changes in traffic crash risks and consumer welfare. The DYNAMO-HIA methodology accounts for changing population health characteristics over time, which results in significantly lower benefit estimates than the HEAT Tool, so they can be used to reflect lower- and higher-bound values.

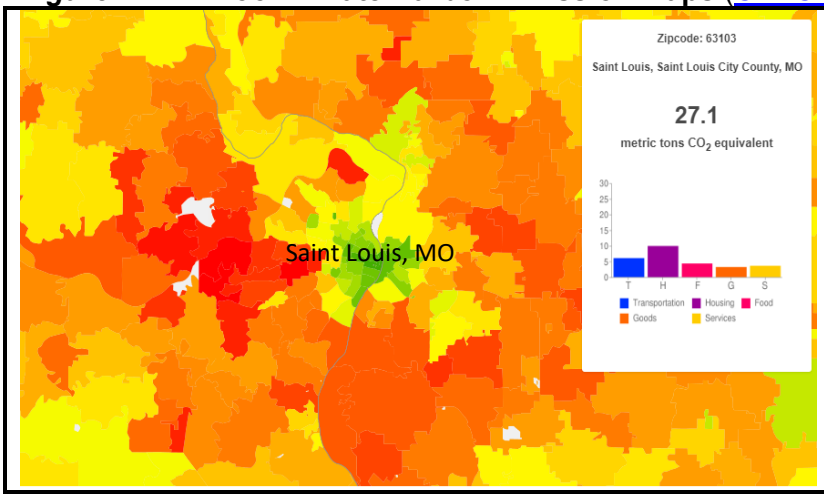
Summary: Residents of compact, multimodal neighborhoods are much more physically active and more likely to achieve physical activity targets, are less likely to be overweight, have lower crash risks, have better health outcomes, and live two to four years longer than in automobile-dependent areas.

Criticisms: Critics argue that Smart Growth provides small health benefits and cite statistics showing that suburban residents are healthier than urban residents, ignoring confounding factors such as income and age. Using a survey that tracked 6,111 people between 1978 and 1994, Eid, et al. (2008) found no significant weight impacts from those that move to more or less sprawled neighborhoods, and concluded that the positive relationship between sprawl and obesity found in other studies reflects the tendency of overweight people to move to sprawled neighborhoods.

Energy Conservation and Emission Reductions

Smart Growth reduces per capita energy consumption and pollution emissions by reducing infrastructure needs, building energy use and vehicle travel (Decker, et al. 2017; Dingil, et al. 2019; Güneralp, et al. 2017; Jones and Kammen 2014; Lee and Lee 2014; LSE 2014; Subin, et al. 2024; Wilson and Melton 2018; Wu, et al. 2020). The **CoolClimate Calculator**, illustrated below, shows that total household emissions from transportation, housing, food, and goods are much lower in compact neighborhoods.

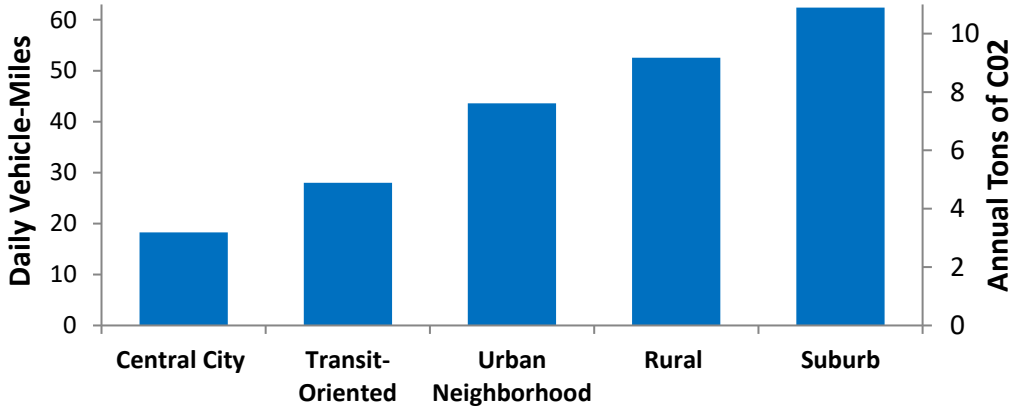
Figure 24 **CoolClimate Carbon Emission Maps** (CoolClimate Maps)



CoolClimate Maps show per-household carbon emissions including transportation, housing, food, goods and services consumed, at a zipcode scale. This example of Saint Louis, Missouri indicates that emissions range from less than 30 metric tons in central areas (dark green) to more than 60 (dark red) in outlying suburbs. Similar patterns exist in most urban regions.

The study, *US Urban Land-Use Reform: A Strategy for Energy Sufficiency* (Subin, et al. 2024) identified neighborhood factors that affect per household VMT; it concluded that building all new homes in each state's lowest VMT neighborhood would provide significant emission reductions and other benefits. Salon (2014) used detailed travel survey data to analyze how demographic and geographic factors affect travel activity (how and how much people travel), and developed models for predicting how various land use development changes will affect travel. She found that transit access, and pedestrian and bicycle-friendliness reduce vehicle travel. The number of jobs within five miles is associated with lower VMT, while the number of jobs beyond five miles is associated with higher VMT. Decker, et al. (2017) used Salon's model to estimate that policies that encourage urban infill could reduce a region's average household travel by about a third, from 57 down to 39 average daily vehicle-miles.

Figure 25 **Household Vehicle Travel by Location** (Salon 2014)



Motor vehicle travel and emissions are much lower (20-60%) in compact, transit-oriented than in sprawled, auto-dependent areas.

Jones and Kammen (2014) found that household energy consumption and emissions tend to decline when densities exceed about 3,000 residents per square mile due more efficient buildings and reduced driving. Using Montreal, Canada travel data, Winkelman, DeWeese and El-Geneidy (2019) found that compact neighborhoods reduce driving 20-50%. Drew, Nova and Fanning (2015) found that mid-rise (3-4 story) is generally most resource-efficient housing type. Popovich, Rojanasakul and Plumer (2022) found that central neighborhoods generally have the lowest emissions, although some dense areas have high emission rates due to affluence and some rural areas have low emissions due to poverty, but affluent city residents would have even higher emissions if they located in automobile-dependent areas.

Lee and Lee (2014) examined how urban form influences household carbon emissions in the 125 largest U.S. urban regions. They found that doubling population density is associated with a 48% reduction in transport emissions and 35% reduction in residential energy consumption. They also find that doubling per capita transit subsidies reduces vehicle travel 46% and transportation emissions 18%. Ewing and Hamidi (2014) found that each 10% increase in their compactness index reduced vehicle travel 7.8% to 9.5%. Detailed analysis by Schneider, Handy and Shafizadeh (2014) found that Smart Growth reduces residential and commercial vehicle trips by 10% to 60%.

Summary: Smart Growth typically reduces energy consumption and pollution emissions by 10% to 60%, particularly if integrated with complementary policies such as district heating and vehicle electrification.

Criticisms: Critics argue that Smart Growth energy savings and emission reductions are small and not cost effective (Pisarski 2009). National Association of Home Builders sponsored studies (NAHB 2010) claimed that there is no clear link between residential land use and emissions, but a review of their research reports actually indicates significant support for Smart Growth, as summarized in the table below.

Table 10 **Critique of NAHB Claims** (Litman 2011)

NAHB Claims	Critique
"Higher density development will not necessarily deliver the benefits that many in the policy community ascribe to it."	This statement ignores other land use factors besides density. Researchers estimate that an integrated Smart Growth program can reduce future transport emissions 7-10%.
"The existing body of research demonstrates no clear link between residential land use and GHG emissions"	Untrue. Existing research clearly demonstrates links. All NAHB researchers except Fruits acknowledge that compact development significantly reduces emissions.
"The assumption of a causal connection between density and GHG emissions is based on prevailing beliefs within the planning community and not on verifiable scientific research or analysis."	Untrue and confuses the issue by referring only to density. Abundant evidence demonstrates causal connections between land use factors and GHG emissions. All NAHB researchers except Fruits recognize these connections.
"The weight of the evidence suggests that the effect of density on travel behavior is modest. In fact, doubling density results in about a 5% decrease in vehicle trips and VMT."	Untrue and confuses the issue by referring only to density. Current research indicates that doubling density by itself reduces affected vehicle travel 5-19%, and doubling all compact development factors reduces vehicle travel 20-40%.
"The density and layout of communities have only a modest impact on peoples' transportation choices and travel behavior."	Untrue. Many studies indicate that increasing development density, mix, connectivity and mobility options can reduce vehicle travel 20-40%, which is more than *modest*.

The National Association of Home Builders (NAHB) claims that their research demonstrates that Smart Growth policies do little to reduce household energy consumption and emissions, but it actually indicates the opposite.

Economic Opportunity and Long-Term Prosperity

Smart Growth areas tend to have higher average wages and salaries, and better economic opportunities and long-term outcomes (Ewing, et al. 2016; Jaffe 2016; Otero, Volker and Rozer 2021; Sisson 2018), particularly for lower-income families (Agnello 2020) and adult non-drivers (Kneebone and Holmes 2015).

The Equality of Opportunity Project investigated geographic factors affect *upward mobility*, the chance that a child born in poverty becomes more economically successful as an adult (Chetty, et al. 2014; Cortright 2018). Carlston and Wei (2024) used fine-scale (tract and city-level) data to analyze the relationships between sprawl and intergenerational mobility. The authors found that sprawl negatively affects upward intergenerational mobility at multiple scales: a 1 standard deviation (SD) increase in sprawl at the tract level is associated with a 0.07 SD decrease in upward mobility, while a 1.0 SD increase in city-level sprawl is associated with a 0.08 SD decrease. This negative relationship only applies to lower-income children.

Using this data and accounting for other factors, Ewing and Hamidi (2014) found that each 10% Smart Growth index increase is associated with a 4.1% increase in residents' upward mobility. The study, "Does Urban Sprawl Hold Down Upward Mobility?" finds that as compactness doubles, the likelihood of upward mobility increases about 41% (Ewing, et al. 2016). Chetty, et al. (2022) found that *economic connectedness*, a child's share of high socioeconomic status (SES) friends is among the strongest predictors of upward mobility, indicating the value of mixed-income communities.

Recent analysis of the HOPE VI program that redeveloped public housing with high poverty rates into mixed-income communities found that this significantly improved children's economic mobility (Chetty, et al. 2026). Study lead, Harvard economist Raj Chetty explains, "Just giving people cash, just giving people education, doesn't do as much as if you pair it with connections that then help them."

The study found that the HOPE VI revitalization program:

- *Did not increase impoverished adults' incomes.* Neighborhood poverty rates declined about 10% due to more higher income residents rather than public housing residents earning more.
- *Children who grow up in revitalized neighborhoods earn more as adults.* Each year of childhood exposure to a revitalized public housing unit raised children's earnings in adulthood by 2.8%. Those living there from birth earned 50% more over their lifetimes.
- *Earnings gains exceed costs of revitalization.* Revitalizing a single public housing unit increases the future earnings of children who grow up there by $500K (adjusting for inflation and interest rates), far exceeding the cost of $170K borne by taxpayers.
- *Gains for children were driven by stronger social connections with higher-Income neighbors.* Children in revitalized public housing interacted more with higher-income neighbors and benefited most when surrounded by more affluent peers.
- *Economic mobility can be increased by better connecting lower- and higher-opportunity areas.* Many low-income neighborhoods remain disconnected from nearby high-opportunity areas. Connecting such neighborhoods could increase economic mobility at scale.

Chyn (2018) found that children who left concentrated poverty neighborhoods are 9% more likely to be employed as adults and have 16% higher average annual earnings than non-displaced peers. Talen and Koschinsky (2013) found that children's chance of future economic success increases with neighborhood walkability. Similarly, Oishi, Koo and Buttrick (2018) found that walkable cities have smaller employment and income disparities between drivers and non-drivers. Frederick and Gilderbloom (2018) found that increased

commute mode diversity (smaller automobile mode shares) is associated with less income inequality between races and genders, and higher earnings for white women and African-American men. As a result, mixed-income neighborhoods with good schools and convenient access to services and jobs are considered high-opportunity areas.

Ganong and Shoag (2017) find that U.S. regional income convergence (income equalization between poor and rich) declined partly due to high housing prices: historically, both high- and low-skilled workers migrated from low- to high-wage states which reduced wage imbalances, but this declined after 1980s partly due to high housing costs in high-opportunity regions. Ding and Hwang (2016) found that economically disadvantaged residents (those with low credit scores or without mortgages) who remain in gentrifying neighborhoods experienced credit score improvements, while those who move to lower-income neighborhoods experienced significant credit score declines. This suggests that mixed-income infill can improve disadvantaged households' economic opportunities if it includes affordable housing.

Smart Growth allows households to spend less on transportation, allowing them to invest more in their homes, allowing them to build more wealth. In a typical situation, a household that chooses an urban home that has a $100,000 higher purchase price but $5,000 lower annual transportation costs will accrue a half-million dollars more equity after 25 years of mortgage payments (Litman 2014).

Summary: Smart Growth areas typically provide 10-30% higher wages and salaries and increase disadvantaged residents' economic opportunity and long-term prosperity 10-30%.

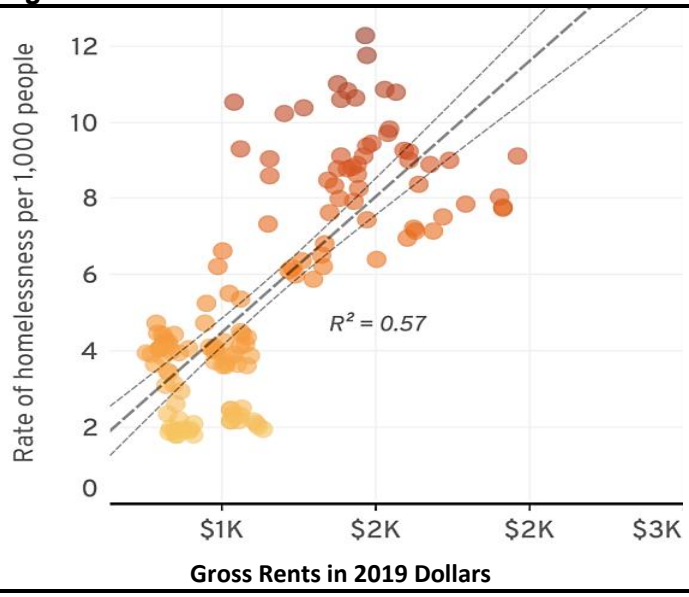
Criticisms: Critics argue that Smart Growth leads to gentrification which displaces poor households and reduces minority home ownership rates (Heartland Institute 2013; Lewyn 2019), but true Smart Growth that increases affordable housing supply in compact, multimodal neighborhoods reduces these problems.

Community Cohesion and Integration

Community cohesion refers to positive interactions among neighbors. This is an important value and helps achieve other goals including crime prevention, public safety, equity, public health, and happiness (Litman 2025; Steuteville 2024). Smart Growth tends to increase community cohesion by enhancing the public realm (places where people informally and spontaneously interact) by improving sidewalks, local parks and public transport, and by creating more mixed neighborhoods where residents use local services. Smart Growth also tends to increase income, social and racial integration by improving affordable housing options in attractive areas (Demsas 2021; Furth 2022; Lens and Monkkonen 2016).

Smart Growth policies that increase moderate-priced housing supply also help integrate people who are currently homeless. In the book, *Homelessness is a Housing Problem* (Aldern and Colburn 2022) researchers Clayton Page Aldern and Gregg Colburn found that market housing availability and affordability are the most important factors affecting homelessness rates, as illustrated below. Describing their research, Colburn explained, "Pretty soon it became very clear that rental costs and vacancy rates were by far the biggest predictor of rates of homelessness in a community. It's not the only factor. There are all sorts of complicated phenomenon, but it's a far more convincing phenomenon than anything else."

Figure 26 **Rents Versus Homelessness Rates for U.S. Cities** (Aldern and Colburn 2022)



Although people who are poor, addicted or mentally ill are more likely to experience homelessness, higher rates of people with those conditions do not necessarily cause higher rates of homelessness.

The most important factor affecting homelessness rates is housing prices: higher market rents lead to more homelessness.

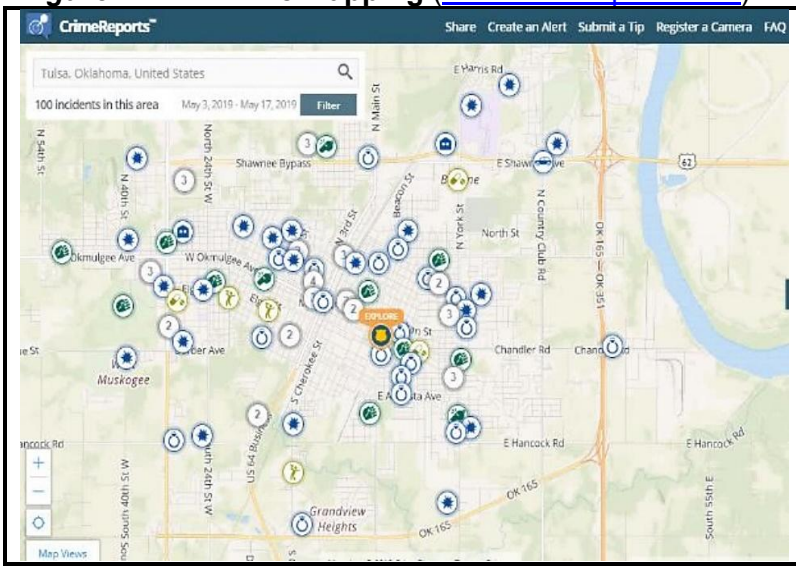
Summary: Smart Growth policies that improve the public realm (sidewalks, local parks and public transit facilities) and neighborhood services tend to increase community cohesion. Policies that increase diverse housing types in walkable neighborhoods tend to encourage economic and social integration, including people who are currently homeless due to mental illness and addiction.

Criticisms: Critics sometimes argue that upzoning leads to *gentrification* (more affluent people living in lower-income neighborhoods) and *displacement* (lower-income residents forced out of their neighborhoods), increasing segregation. However, increasing moderate-priced housing supply tends to reduce low-income household displacement, particularly if it also includes social housing (McMillan 2021).

Reduced Social Problems (Poverty, Crime, Mental Illness and Homelessness)

Poor households tend to locate in central urban neighborhoods for maximum access to services and economic opportunities (Glaeser, Kahn and Rappaport 2008). As a result, some urban neighborhoods have concentrated poverty and associated social problems such as crime, addiction, mental illness and homelessness. In addition, some crime types are associated with certain commercial activities such as stores and banks (robberies) and bars (fights). New crime-reporting apps and mapping systems that show police-reported crimes and residents' reports of suspicious activity exaggerate crime risk: they indicate *crime density* (crimes per area) which many people misinterpret as *crime rates* (crimes per capita), causing people to overestimate actual urban crime risks (Molla 2019).

Figure 27 **Crime Mapping** (www.crimereports.com)



Crime reporting and mapping apps like Nextdoor, Citizen, Neighbors and Crimereports.com indicate that crime density (crimes per square-mile or -kilometer) increases with development density and mix, but fail to account for population density or the special risks associated with commercial activities such as banks and bars, and so does not really indicate that per capita crime rates or typical individuals' crime victim risks increase with density and mix. Research that accounts for these factors indicates that per capita crime risk tends to decline with more compact and mixed development that increases natural surveillance.

As a result, people sometimes conclude that denser development increases social problems but this confuses cause and effect; suburban policies such as restrictions on multifamily housing and auto-oriented planning exclude poor people, which shifts these problems to urban areas. There is actually no evidence that denser development increases total poverty, crime or mental illness (Bhugra, et al. 2019; Meyer 2013), on the contrary, as previously described, credible research indicates that by improving the public realm, increasing community cohesion and improving disadvantaged people's economic opportunities, Smart Growth helps reduce social problems (Talen and Koschinsky 2014).

High quality studies indicate that, all else being equal, crime rates tend to decline with urban density and walkability due to more *passive surveillance* (also called *eyes on the street*) as more residents and by-passers can see and report possible threats (Gilderbloom, Riggs and Meares 2015; Pina-Sánchez and Davies 2026; Tang 2015). For example, using high-resolution data to evaluate how land use factors affect street crime (robbery and assault) in Chicago, Twinam (2018) found that crime rates decline with population density, and although they increase near commercial land uses, particularly liquor stores and late-hour bars, dense mixed-use areas are safer than typical residential areas. Chang and Jacobson (2017) found that, all else being equal, Los Angeles neighborhood crime rates decline with walkability; temporary closures of medical marijuana dispensaries, due to state laws changes, and to restaurants due to health code violations, caused street crime rates to increase, and then decline again after they reopened. The authors conclude that this probably reflects "eyes upon the street" crime deterrent effects. Similarly, Anderson, et al (2013) found that mixed

commercial- and residential-zoned areas in Los Angeles are associated with lower crime than are commercial-only zoned areas, and that neighborhoods where zoning changes increased residential development in previously commercial-only blocks experienced significant crime declines, suggesting that mixing residential and commercial development tends to reduce crime rates. Also using high-resolution land use and crime data, Humphrey, et al. (2019) found that although crime rates increase in commercial districts, they decline near businesses such as cafes and convenience stores that are open more weekly hours. Using a large database of British urban street crime, Pina-Sánchez and Davies (2026) found that neighbourhood crime perception tends to increase with motor traffic.

After adjusting for socioeconomic factors such as age, employment status and income, Browning, et al. (2010) found that per capita violent crime rates decline with density in Columbus, Ohio neighborhoods, particularly in the most disadvantaged areas. Christens and Speer (2005) also found that per capita violent crime rates decline with density in the Nashville, Tennessee region. Foster, et al. (2019) found a large and statistically significant negative relationship between New Urbanist design (compact, walkable nieghborhoods) and self-reported crime rates: accounting for neighborhood demographic factors, each 10% increase in their New Urban index, the odds of being a crime victim declined 40%, with particularly large reductions (51%) associated with improved neighborhood walkability. Using international data, Ahlfeldt and Pietrostefani (2017) found that crime rates increase with density in the US cities, but decline with density in other OECD countries, perhaps reflecting the location of concentrated poverty. Vidal-Domper, et al. (2024) found that in Quito, Ecuador, robbery rates decline with the presence of people, commercial activities, squares and pocket parks and public transport stations, validating Jane Jacob's argument that "eyes on the street" increase safety.

Bhugra, et al., (2019) investigate how urban living affects residents' mental health and happiness. They found various mental health impacts: urban residency can *increase* psychosis and mood disorder risks, addiction to some drugs, and some people's unhappiness, but *reduces* dementia, some types of substance abuse and suicide rates, and increases many people's happiness, particularly those who are poor or alienated. Urban living also tends to *improve* mental health by increasing economic and social opportunities, fitness and health, and access to mental health services, and higher mental illness rates reported in cities may partly reflect better reporting. A recent study of U.S. maternal-infant interactions and parenting stress, found that, accounting for socioeconomic factors such as income and education, urban mothers demonstrated significantly more responsiveness and reciprocity than their rural counterparts, and rural mothers rated their infants significantly higher in negative affectivity and distress (Neumann, et al. 2020). Using U.S. subjective wellbeing (SWB) survey results correlated with travel data, the study "Does Car Dependence Make People Unsatisfied with Life?" found that driving for more than half of out-of-home activities is associated with a decrease in life satisfaction (Saadaoui, et al. 2024).

Summary: Although some urban neighborhoods have concentrated poverty, crime, mental illness and homelessness, this primarily reflects social drift, the tendency of people with social problems to choose accessible locations. Smart Growth policies that improve community cohesion, affordability and economic opportunities can reduce these problems overall.

Criticisms: Critics use simple correlations between density and social problems as evidence that Smart Growth causes such problems (Burnett and Villarreal 2004; O'Toole 2008), ignoring confounding factors and evidence that Smart Growth policies reduces poverty and crime rates.

Economic Development and Productivity

Smart Growth tends to support economic development goals including productivity, employment, wages, innovation, development, property values and tax revenues (Ahlfeldt, Baum-Snow and Jedwab 2026; Angel and Blei 2015; Boarnet, et al. 2017; Decker, et al. 2017; FBCI and SGA 2021; GCEC 2014; Litman 2014; Minicozzi 2012; Rodriguez and Leinberger 2023). The table below describes these impacts.

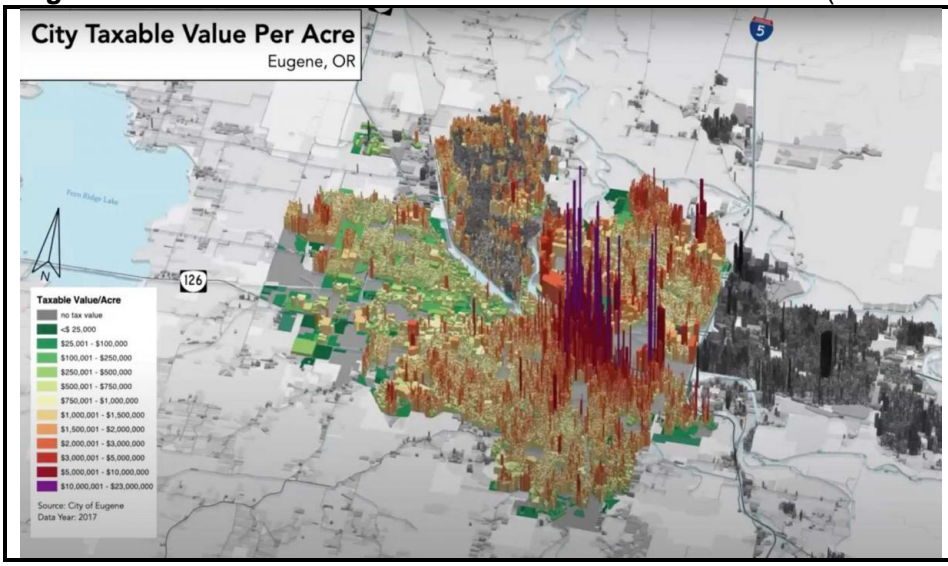
Table 11 **How Smart Growth Supports Economic Development**

Smart Growth Policy	Economic Development Impacts
Reduced per capita land consumption	Increased agricultural productivity. Open space preservation supports recreation and tourism industries.
Public infrastructure and service efficiencies	Government and utility cost savings
Reduced transportation costs	Shifts expenditures from vehicles and fuel to more locally produced goods, increasing regional employment and productivity
More livable communities	Attracts residents, jobs and visitors, increasing business activity
Improved mobility for non-drivers	Improves economic opportunity for disadvantaged residents, and increases their productivity
Reduced crashes and improved public health	Reduced crash damages, and reduced medical and disability costs

Smart Growth tends to increase economic productivity in several ways.

New analysis tools can be used to measure the economic development impacts of different land uses and development patterns. For example, Ray, et al. (2024) found that auto-oriented planning significantly reduces economic activity and tax revenues: in Bridgeport, CT urban highway and parking facility development displaced buildings which reduced local property tax revenue by approximately three quarters, from $19 million (potential) to $5 million (actual), and reduced economic diversity and resilience. Compact, mixed use development tends to generate more employment and business activity, property value and tax revenue than lower-density development, as illustrated below.

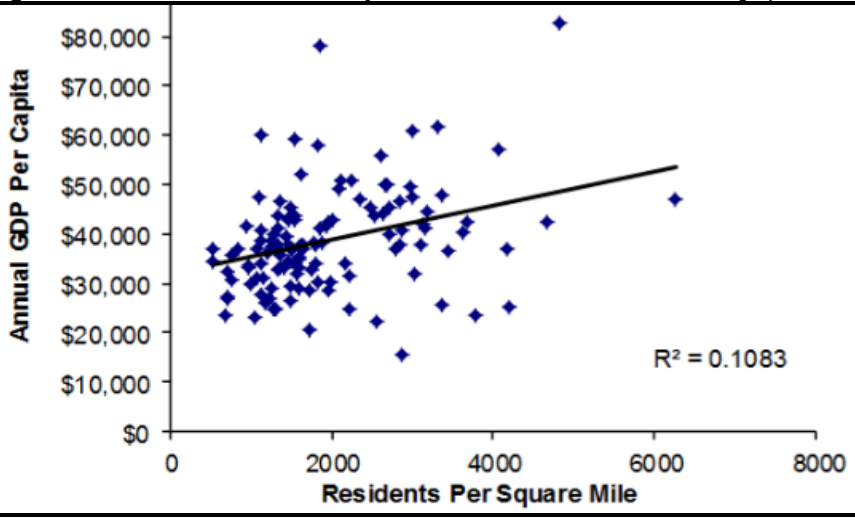
Figure 28 **Visualization of Land Value Per Acre** (Steuteville 2022)



Compact development tends to generate more employment, productivity, value and tax revenue per acre than sprawl.

Agglomeration efficiencies refers to economic productivity gains provided by more compact development which facilitates economic interactions (Donovan and Munro 2013; Melo, Graham, and Noland 2009; Hardesty 2013). The figure below shows the positive relationship between GDP and density. Ahlfeldt and Pietrostefani (2019) found that economic productivity, wages and property values increase with density. On average, doubling urban density increases productivity by 2–6% (Abel, Dey and Gabe 2012). This correlation is particularly strong for knowledge-based industries (Boarnet, et al. 2017). Xiao, Wu and Kim (2021) find that inventor productivity declines with commuting distance: every 10 km increase in distance is associated with a 5% decrease in annual patents per inventor and a 7% decrease in patent quality. Hamidi, Zandiatashbar and Bonakdar (2019) found that the number of patents, firm innovations, and innovative small firms are positively associated with a U.S. region's Metropolitan Compactness Index (MCI). They find that compact development facilitates innovation and productivity by encouraging more social interactions and enhance social capital, while minimizing poverty and segregation.

Figure 29 **Per Capita GDP and Urban Density** (BTS 2006 and BEA 2006)

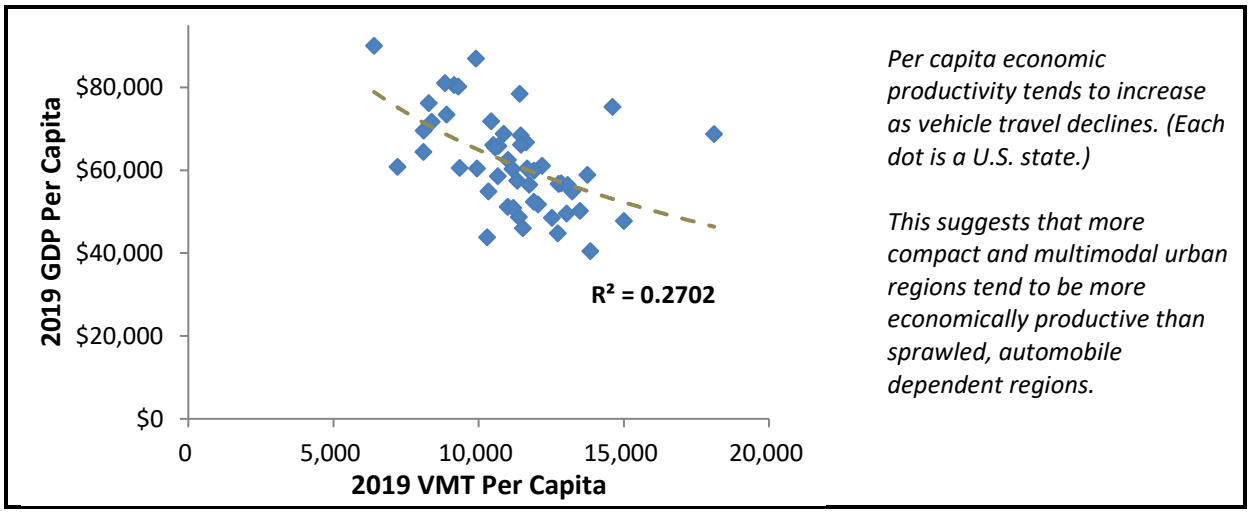


Per capita gross domestic product (GDP) productivity tends to increase with population density. (Each dot is a U.S. urban region.)

This and other research demonstrate efficiencies of agglomeration.

Per capita GDP tends to decline with vehicle traveled, as illustrated below.

Figure 30 **Per Capita GDP Versus VMT for U.S. States (FHWA 2019)**

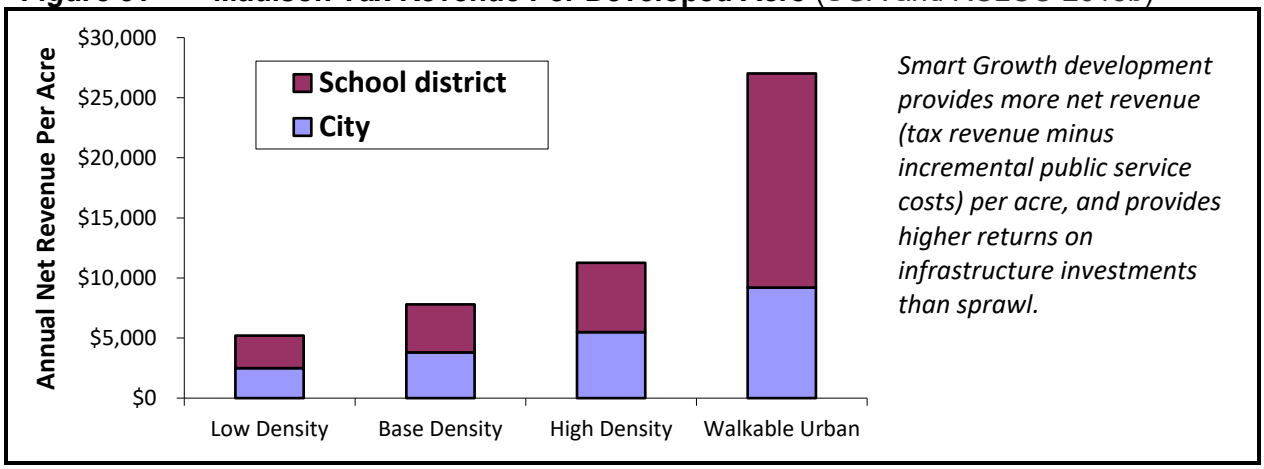


Per capita economic productivity tends to increase as vehicle travel declines. (Each dot is a U.S. state.)

This suggests that more compact and multimodal urban regions tend to be more economically productive than sprawled, automobile dependent regions.

Compact development tends to increase tax revenue per acre (CMAP 2014; RTR 2022). As a result, Smart Growth policies tend to increase municipal and school tax revenues.

Figure 31 **Madison Tax Revenue Per Developed Acre** (SGA and RCLCO 2015b)



Smart Growth development provides more net revenue (tax revenue minus incremental public service costs) per acre, and provides higher returns on infrastructure investments than sprawl.

Summary: Smart Growth policies that increase density and accessibility, reduce development costs, reduce automobile dependency and transportation costs tend to increase economic productivity, employment, innovation, property development and values, and tax revenues 10-30%. As a result of these efficiencies, Smart Growth locations typically provide 10-30% higher wages and salaries.

Criticisms: Critics cite data showing positive relationships between vehicle ownership and incomes, and examples of economically successful sprawled areas (Cox 2014), but their analysis is incomplete and ignores abundant evidence showing that Smart Growth supports economic development and can reduce the cost of living (particularly transportation costs) leaving households with more wealth.

Aesthetic Benefits

Auto-dependent, sprawled development is criticized for creating ugly landscapes with too much pavement, excessive scaled building and signage, limited building diversity, unattractive public realms that discourage

unscheduled social interactions, and high costs that exclude students, artists and other creatives, and poor fashion. As fashionista Derek Guy explains, “The motivation of putting on a nice outfit is lower when you transport yourself in one box to go to your office and you go back to your car and go back home. I like being able to wear a nice outfit, go for a walk and get a little exercise in.” (Short 2024).

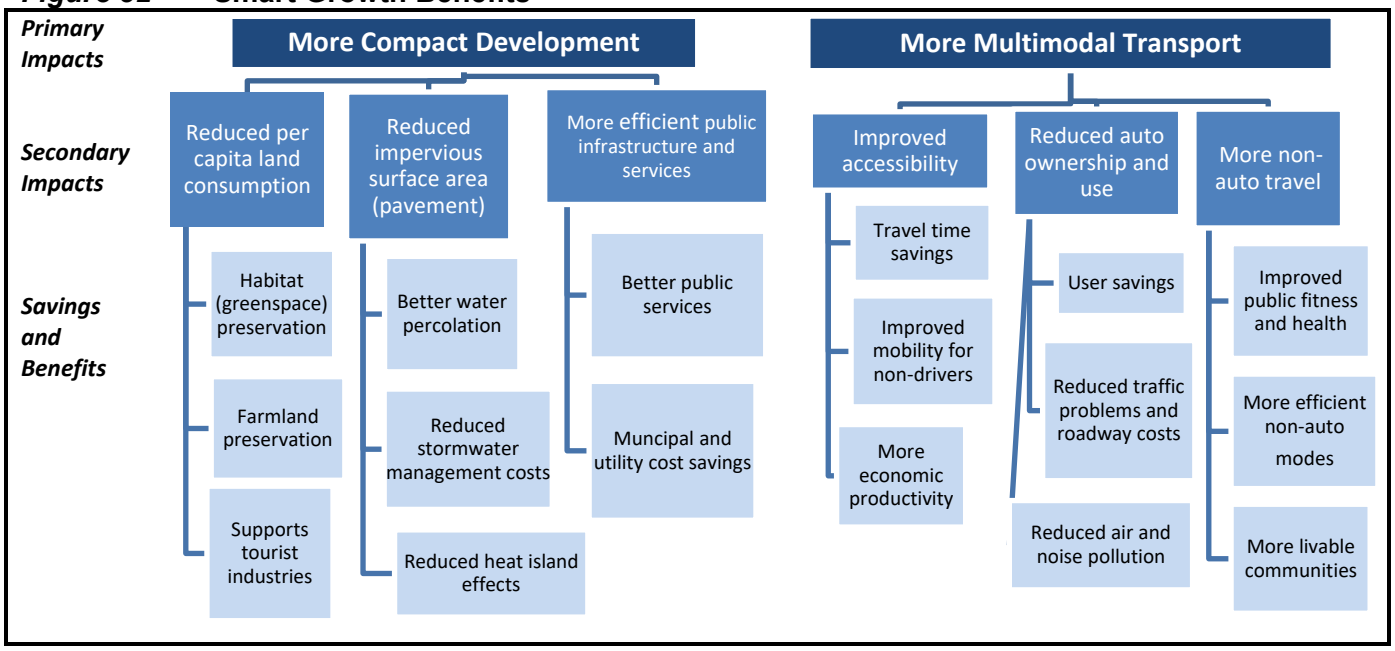
Summary: Smart Growth can create more human scale, walkable, diverse and affordable communities that support beauty, art and creativity.

Criticisms: Critics can argue that beauty, art and creativity are entirely subjective, and unsuitable public policy goals.

Benefits Summary

The following figure illustrates Smart Growth impacts and benefits.

Figure 32 **Smart Growth Benefits**



Smart Growth has two primary impacts: it creates more compact and multimodal communities. These reduce land consumption, infrastructure costs and vehicle travel, and increase accessibility and non-auto travel, which provide many savings and benefits.

The table below categorizes these benefits.

Table 12 **Smart Growth Benefits by Category**

Economic	Social	Environmental
• Reduced costs of providing public infrastructure and services. • Improved accessibility reduces transportation costs to households, businesses and governments. • Agglomeration efficiencies, which increase economic productivity. • Reduced vehicle and fuel spending reduces export exchange burdens. • Openspace preservation increases agricultural and recreation industry productivity.	• Increased accessibility increases economic opportunities for disadvantaged people. • Reduced traffic casualties (injuries and deaths). • Improved public fitness and health. • Increased community cohesion. • Reduced chauffeuring burdens. • More opportunities for beauty, art and creativity.	• Openspace preservation maintains wildlife habitat and other ecological functions. • Reduces surface and groundwater disruptions, maintains water quality, and reduces stormwater management costs. • Reduces per capita energy consumption and pollution emissions. • Reduces heat island effects.

Smart Growth can provide a variety of economic, social and environmental benefits.

The table below summarizes the impacts and benefits of comprehensive Smart Growth programs that create compact and mixed communities and more multimodal transportation systems.

Table 13 **Summary of Potential Impacts of Comprehensive Smart Growth Programs**

Benefit Category	Typical Impacts	Optimization Strategies
Land conservation and open space preservation.	Use 40-80% less land per capita for buildings, roads and parking facilities.	Increase density, reduce vehicle use, minimize road and parking facilities.
Public infrastructure and service cost savings.	Reduces costs of providing public infrastructure and services 10% to 30%.	Increase density. Minimize roadway costs.
Reduced vehicle travel and increased non-auto travel.	Residents drive 30-70% less and use non-auto modes 2-10 times more.	Create compact communities. Improve and favor non-auto modes.
Affordability and economic prosperity.	Reduces housing costs 10-40% and transport costs 10-60%.	Favor compact, affordable housing and travel options.
Accessibility and travel time savings.	Improves accessibility and reduces time spent travelling to work and services 30-60%.	Create compact, mixed communities. Improve resource-efficient modes.
Serve non-auto travel demands.	Can provide non-drivers with accessibility comparable to suburban motorists.	Create compact communities. Improve and favor non-auto modes.
Traffic safety.	Reduces traffic casualty rates 20% to 80%.	Improve and encourage non-auto travel and reduce traffic speeds.
Public fitness and health.	Increases physical activity 20-50%, improves health outcomes and increases longevity.	Improve and encourage active travel and support healthy community design.
Energy conservation and emission reductions.	Reduces energy consumption and pollution emissions 10% to 60%.	Create compact communities. Favor resource-efficient modes.
Economic opportunity and long-term prosperity.	Increases economic opportunity and long-term prosperity 10% to 30%.	Support affordable housing in high-opportunity neighborhoods.
Community cohesion and integration.	Significantly increases community cohesion, plus economic and social integration.	Improve walkability and local services. Support affordable infill.
Reduce social problems.	Can reduce poverty, crime, mental illness and homelessness.	Improve walkability and local services, and support affordability.
Economic productivity and development.	10% to 30% more productivity, employment, property values, innovation and tax revenue.	Create compact, mixed communities. Improve resource-efficient modes.
Aesthetics	More potential for beauty, art and creativity.	Good design and affordability.

"Typical Impacts" reflect differences between communities with the 20% highest and 20% lowest ratings for density, housing diversity, Walk Score, transit quality, and TDM incentives (e.g., reduced parking supply and efficient parking pricing).

Many Smart Growth strategies only affect a portion of total households or travel, such as lower-income households or local trips, but their impacts tend to be synergistic so integrated Smart Growth programs can have large total impacts. These benefits are potentials that depend on specific conditions and preferences. For example, Smart Growth can significantly improve accessibility, which allows residents to save travel time and money, but people who enjoy driving may choose not to do so. Some residents may invest local transportation cost savings into long-distance travel that adds emissions. Similarly, not every resident is able to take advantage of the improved economic opportunities provided by Smart Growth locations. However, on average Smart Growth does provide large, measurable benefits.

Smart Growth can increase some local costs, although these can be mitigated to maximize net benefits. It tends to increase land prices per acre, but by allowing higher densities it reduces land costs per home. Compact development leaves less land for private lawns and gardens, and increased density can increase people's exposure to noise and air pollution. Denser development may increase local congestion, but by reducing per capita vehicle trips reduces total regional traffic problems. Some social problems including poverty, crime, mental illness and addiction can increase with density but that generally reflects "social drift," the tendency of people with those problems to move to areas with more services; there is little evidence that density increases total social problems, and by increasing community cohesion and disadvantaged people's economic opportunities it can reduce social problems overall.

One of the largest external costs of Smart Growth concern the disruption that infill development can impose on existing neighborhoods including construction noise, increased traffic and parking congestion, reduced privacy, and the introduction of new and sometimes culturally different neighbors. However, comprehensive Smart Growth policies can minimize and offset these impacts. For example, Smart Growth tends to reduce vehicle ownership and use, and targetted travel and parking management strategies can further reduce these problems. Even if local impacts increase, by reducing per capita vehicle travel Smart Growth tends to reduce regional traffic problems compared with more sprawled development.

Critics sometimes claim that sprawl provides benefits that offset costs, but most benefits they cite are direct user benefits and economic transfers, such as larger yards, increased privacy and reduced crime; there is little evidence that increased sprawl provides significant external benefits (more sprawled development benefits people in other areas). This is expected since rational people and businesses externalize costs and internalize benefits; if sprawl really did provide external benefits, developers or occupants would find ways to capture those benefits, for example, by demanding subsidies.

The table below categorizes benefits and costs as *internal* (they directly affect the people who choose sprawled locations) and others are *external* (they affect other people).

Table 14 **Smart Growth Benefits and Costs**

	Internal (To Smart Growth Residents)	External (To Other People)
Benefits	Increased accessibility, which reduces travel time and money costs, and increases affordability. More independent mobility for non-drivers and reduced chauffeuring burdens. More affordable housing and transportation options, which increased economic resilience. Increased traffic safety. Improved fitness and health. Increased community cohesion. Better aesthetics.	Open space preservation (farm and natural lands). Reduced public infrastructure and service costs (roads, utilities, emergency and transit services, etc.). Reduced congestion and crash risk imposed on other people. Reduced healthcare and disability costs. Increased local economic productivity and development. Reduced overall crime rates. Reduced fuel consumption and pollution emissions. Better aesthetics.
Costs	Higher unit land prices (dollars per acre). Less private greenspace (lawns and gardens). Less privacy. More local social problems. More exposure to some pollutants.	Increases in some infrastructure costs such as curbs and sidewalks. More local traffic and parking congestion.

Smart Growth provides various benefits and costs, including some that are internal (borne by the Smart Growth residents) and some that are external (borne by other people). These vary depending on specific conditions.

Critiquing Criticisms

Various critics, often supported by industries that benefit from automobile travel and spawl, argue that Smart Growth policies are unpopular, costly and ineffective (Hartland Institute 2013). Much of their evidence is incomplete and inaccurate, and seldom reflects academic standards (Litman 2011 and 2020).

Critics argue that since most North Americans live in single-family homes and drive automobiles they are harmed by policies that create compact, multimodal communities. However, Smart Growth does not eliminate single-family housing or automobile travel, but it does significantly improve alternatives. As previously discussed, surveys indicate that many households would prefer living in more compact and multimodal neighborhoods than they currently do, but cannot due to limited supply. Smart Growth responds to these demands. Households that want larger-lot homes because they enjoy gardening or have large pets also benefit from Smart Growth that reduces demand and prices for urban fringe properties.

Critics often misrepresent Smart Growth. They assume that it consists mainly of new regulations such as urban growth boundaries (Hartland Institute 2013), but Smart Growth actually removes regulations such as restrictions on housing types and densities, and parking minimums. Lewyn and Jackson (2014) found that regulations forcing Smart Growth are actually rare. In a review of 2,622 Connecticut zoning districts Bronin (2021) found that only 2.5% allow three-or-more-family homes. Critics argue that non-auto modes are too slow to serve the needs of busy, modern families, but as previously described, central neighborhood residents spend far less time travelling, and drivers in multimodal communities spend less time chauffeuring than in sprawled auto-dependent areas.

Critics often provide incomplete and biased evidence. For example, Cox and Utt (2004) found that a 1,000 increase in residents per square mile is associated with $53 annual per capita municipal and water utility spending, which they call “miniscule,” but they ignore the costs of providing private water and sewage in sprawled areas and ignore other public costs. Numerous studies described in this report show that Smart Growth can provide large infrastructure. Similarly, critics claim that crime rates increase with density but fail to account for confounding factors such as poverty; considering these factors, compact, walkable areas have lower per capita crime rates (Hillier and Sahbaz 2006; Litman 2014).

Critics argue that Smart Growth policies increase housing prices (Budds 2020), citing Yonah Freemark’s 2019 study, “Upzoning Chicago: Impacts of a Zoning Reform on Property Values and Housing Construction,” which found that three years after transit station area upzoning, area land prices increased and few new units were built. However, the analysis was limited in scope and duration. Freemark states, “In no way is it suggesting that increases in the number of housing units won’t eventually lead to lower prices overall.” In fact, numerous independent studies indicate that Smart Growth policies that increase infill do increase affordability through filtering, as some occupants of lower-priced units the new homes, and over time as the new houses depreciate (Been, Ellen and O’Regan 2023; Maltman 2023).

Critics argue that because it relies on land use changes, Smart Growth is too slow to provide significant benefits, but in fact many of its strategies, including active and public transit service improvements, efficient parking management and TDM incentives can be implemented quickly.

Critics sometimes misrepresent research. For example, Fruits (2011) use outdated studies to conclude that “compact development is not a useful tool for reducing greenhouse gas emissions.” He claimed that “some studies have found that more compact development is associated with greater vehicle-miles traveled,” citing a 1996 paper which simply speculated that increased roadway connectivity could sometimes increase vehicle travel; subsequent empirical research disproved this idea (Litman 2011).

The following table critiques various Smart Growth criticisms.

Table 15 **Critiquing Smart Growth Criticism** (Hartland Institute 2013; Litman 2011)

Criticism	Critique
Urbanization does not threaten agricultural land. Since 1950, urban areas of more than 1,000,000 population have consumed an amount of new land equal to barely 1/10th the area taken out of agricultural production. The culprit is improved agricultural productivity, not development.	Many cities are surrounded by unique, high value farmlands, which sprawl threatens in various ways. Sprawl can disturb far more farmland than just what is classified as "urban."
There is no practical way for low-density urban areas to be redesigned to significantly increase transit and walking. Whether in America or Europe, most urban destinations are reasonably accessible only by automobile. Transit can be an effective alternative to the automobile only to dense core areas, such as the nation's largest downtowns.	In both urban and suburban areas, Smart Growth can create more compact, multimodal neighborhoods where residents drive less and rely more on alternative modes (FHWA 2014). Housing preference surveys indicate that many people prefer living in such neighborhoods
Large expanses of land are already protected as open space. All of the nation's urban development, in small towns and major metropolitan areas, accounts for approximately 4 percent of land (excluding Alaska).	Many cities are surrounded by unique and valuable open space, including wildlife habitat and watersheds. Sprawl can disturb far more openspace than just what is classified as "urban."
Smart Growth increases traffic congestion and air pollution by concentrating vehicle traffic. International and U.S. data shows that higher population densities are associated with greater traffic congestion and the slower, more stop-and-go traffic caused by higher densities increase air pollution.	Academic studies actually show that comprehensive Smart Growth policies that increase density, mix and transport options tend to reduce traffic congestion, energy consumption and pollution emissions (Decker, et al. 2017; Kuzmyak 2012; Litman 2011).
Overall home ownership rates, and black home ownership rates in particular, tend to be higher where there is more sprawl. While transportation costs are greater in more sprawling urban areas, lower housing costs more than make up the difference, making the overall cost of living lower where sprawl is greater.	Smart Growth allows more lower-priced housing types and increases overall affordability; higher housing costs are more than offset by transport savings (CNT 2024; NRDC 2010), and Smart Growth is associated with increased economic mobility (Ewing et al. 2016).

Many Smart Growth criticisms are inaccurate. They generally cannot withstand scrutiny.

Some criticisms are legitimate but justify *more* rather than *less* Smart Growth policy implementation. For example, infill development may increase local traffic and parking problems unless implemented with strategies to reduce vehicle ownership and use such as improvements to non-auto modes, more efficient parking management and TDM incentives. To ensure that redevelopment of urban neighborhoods does not displace lower-income residents it is important to build diverse housing, including affordable housing, and provide family-oriented such as local parks and schools, and full-service grocery stores.

Recommendations

The following Smart Growth strategies help achieve various planning goals:

- Reduce restrictions on urban infill. Allow and encourage more compact and mixed development.
- Favor compact and affordable housing types such as townhouses and mid-rise multifamily.
- Minimize road and parking pavement. Improve roadway connectivity and design.
- Improve active modes with more sidewalks, crosswalks and paths, lower traffic speeds.
- Improve public transit with more service, nicer vehicles and stops, and more affordable fares.
- Implement TDM incentives such as efficient road and parking pricing, and commute trip reduction programs.
- Reform parking minimums and manage parking more efficiently.

These strategies tend to have synergistic effects: their impacts are larger when they are implemented together. For example, by itself compact and mixed development may reduce driving 15%, and by itself multimodal planning reduces driving 10%, and by itself a TDM program may reduce driving 5%, but together they reduce it by 50% by providing a combination of improved proximity and incentives to use non-auto modes. The table below indicates the strategies that are most effective at achieving various benefits.

Table 16 **Strategies for Achieving Various Benefits**

Benefit Category	Increase Allowable Densities	Favor Affordable Housing	Minimize pavement	Improve Active Travel	Improve Transit	TDM Incentives	Parking Reforms
Land conservation and open space preservation	✓		✓	✓	✓	✓	✓
Public infrastructure and service cost savings	✓		✓	✓	✓	✓	✓
Reduced driving and increased non-auto travel	✓		✓	✓	✓	✓	✓
Affordability and economic resilience	✓	✓		✓	✓	✓	✓
Accessibility and travel time savings	✓			✓	✓	✓	
Serve non-auto travel demands	✓			✓	✓	✓	✓
Traffic safety	✓			✓	✓	✓	✓
Public fitness and health	✓			✓	✓	✓	✓
Energy conservation and emission reductions	✓		✓	✓	✓	✓	✓
Economic opportunity and long-term prosperity	✓	✓		✓	✓	✓	✓
Community cohesion	✓	✓		✓	✓		✓
Reduce social problems	✓	✓		✓	✓		✓
Economic development	✓	✓		✓	✓	✓	✓
Improved aesthetics	✓	✓	✓	✓	✓	✓	✓

Smart Growth applies various strategies that can provide a variety of benefits.

Conclusions

Smart Growth policies create compact, multimodal communities. That is a significant change from current policies that limit densities and favor automobile travel over other modes. Consumer surveys indicate that many households would prefer to live in more compact, walkable communities than they currently do, due to limited supply. Smart Growth policies respond to these unmet demands.

Considerable research quantifies and sometimes monetizes (measures in monetary units) Smart Growth impacts. This study reviews and integrates this research to provide comprehensive information on Smart Growth benefits and costs, and guidance for optimizing planning decisions. This indicates that compared with the 20% most sprawled communities, residents in the 20% Smartest Growth communities typically:

- Use 40-80% less land for buildings, roads and parking facilities.
- Have 10% to 30% lower costs of providing public infrastructure and services.
- Drive 30-70% less and use non-auto modes 2-10 times more.
- Can save 10-40% on housing costs and 10-60% on transport costs.
- Have excellent access to services and activities, and spend 30-60% less time travelling.
- Have non-auto accessibility comparable to suburban motorists.
- Have 20% to 80% lower traffic casualty rates.
- Are significantly more physically active, have better health outcomes, and live two to four years longer.
- Reduce energy consumption and pollution emissions by 10% to 60%.
- Enjoy significantly greater economic opportunity and long-term prosperity.
- Have greater community cohesion and social integration.
- Can experience less poverty, crime, mental illness and homelessness.
- Are more economically productive, with greater average employment, incomes and innovation.
- Can be more beautiful, artistic and creative.

Some of these benefits are potentials that depend on individual needs and preferences. For example, residents who enjoy driving may choose not to take advantage of non-auto modes. Some residents may invest their vehicle cost savings into more long-distance travel that increases emissions. Wealthy households may care little about affordable housing and travel options. However, on average Smart Growth policies do provide large, measurable benefits that filter through a community, including direct benefits to the people who choose more compact homes and rely more on non-auto travel, and indirect benefits to suburban motorists who enjoy less congestion and risk, and greater regional productivity.

Smart Growth may increase some costs, although these can be minimized. For example, compact development increases unit land prices (dollars per acre) but that can be offset by allowing higher densities that reduce unit land costs. Similarly, infill can increase local traffic problems but by reducing trip generation tends to reduce regional traffic problems, particularly if implemented with TDM incentives.

This analysis indicates that Smart Growth often provides larger and more diverse benefits than conventional planning recognizes. More comprehensive analysis can justify more Smart Growth policy implementation. This suggests that to be efficient and equitable communities should ensure that anybody, particularly physically, economically and socially disadvantaged groups, should be able to find suitable housing in compact, walkable Smart Growth neighborhoods where it is easy to get around without driving.

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