VICTORIA Transport Policy INSTITUTE
EFFICIENCY • EQUITY • CLARITY

www.vtpi.org
Info@vtpi.org
250-360-1560

Affordable-Accessible Housing In A Dynamic City

Why and How To Increase Affordable Housing In Accessible Neighborhoods

24 August 2015

Todd Litman
Victoria Transport Policy Institute

This classic 34-unit apartment building located on a half-acre lot near two bus lines and a neighborhood commercial center is a good example of affordable-accessible housing.

Abstract

This report examines ways to evaluate housing affordability, identifies problems caused by inaffordability, and describes *affordable-accessible housing*, which refers to lower priced homes located in areas with convenient access to essential services and activities, which minimizes household cost burdens. Affordable-accessible housing typically consists of lower-priced apartments, townhouses, small-lot single-family and accessory suites located in compact, multimodal neighborhoods. Demand for affordable-accessible housing is growing. Increasing affordable-accessible housing development can help achieve various economic, social and environmental objectives. Many current policies discourage such development, leading to shortages, particularly in growing cities. Policy and planning reforms described in this report can increase affordable-accessible housing development. For illustrated examples of affordable-accessible housing types see the *Affordable-Accessible Housing Photo Essay* (www.vtpi.org/aff_acc_photo.pdf).

Contents

Affordable-accessible housing typically consists of small-lot single-family homes, townhouses, and apartments located in compact, walkable, mixed-use urban neighborhoods with nearby stores and good public transit services.

Executive Summary

Many hard-working families are financially stressed; they are trapped by economic forces that drive up living costs faster than wages. This results, in part, from public policies that favor costly housing and transportation options over over affordable alternatives. Since these are most households' two largest expenses, such policies significantly increase overall cost burdens. Reducing these costs is equivalent to increasing household incomes.

A rational and compassionate society ensures that all households can afford basic housing and transportation. For many households, this best provided by *affordable-accessible housing*, that is, inexpensive housing in accessible, multimodal neighborhoods. Many cities have a shortage of such housing. As a result, many low- and moderate-income households must choose between inferior housing, isolated locations or excessive financial burdens. This study investigates causes and solutions to this problem.

Increasing affordable-accessible housing supply can provide various savings and benefits, including direct benefits to occupants – it is equivalent to increasing the incomes of society's most disadvantaged members – plus various indirect economic, social and environmental benefits from reduced motor vehicle travel and sprawl. This report integrates the following issues related to such development:

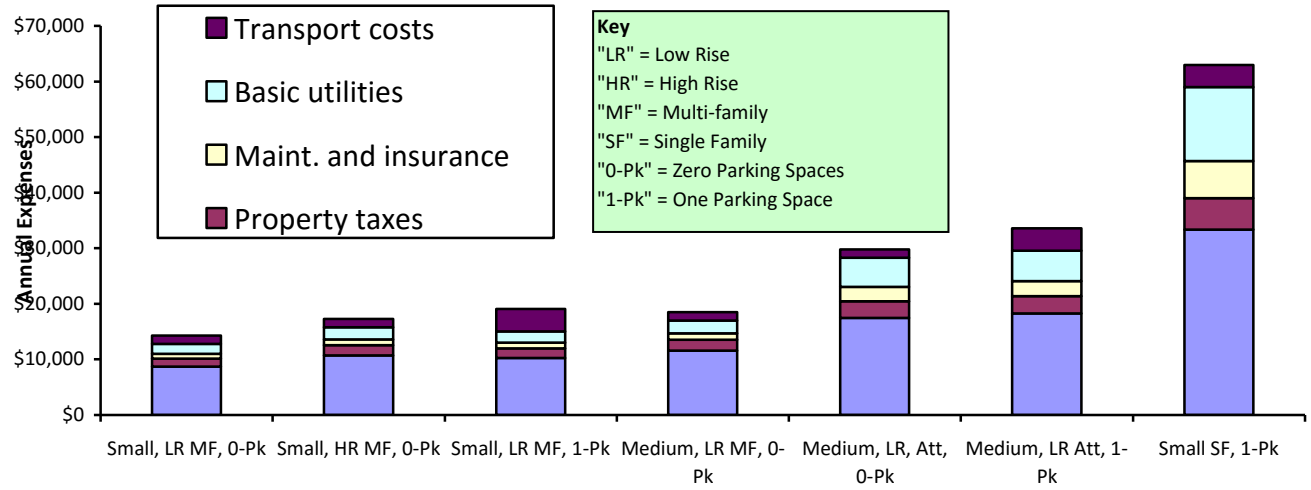
1. *Affordability.* Experts recommend that households spend less than 30% of their budgets on housing (including rents or mortgages, maintenance, property taxes, utilities, etc.), or 45% on housing and transport combined.
2. *Accessible (also called "location efficient") development.* Development in compact, multimodal neighborhoods that provide convenient and affordable access to services and activities. Residents of such neighborhoods tend to own fewer vehicles, drive less, rely more on alternative modes, save on transportation expenses, and impose lower external costs than they would in more sprawled, automobile-dependent areas.
3. *Dynamic (also called "Responsive") planning.* Communities must respond to changing demands and conditions. Current demographic and economic trends are increasing demand for affordable-accessible housing, and increasing the benefits to society of accommodating this increased demand.

Affordability can be evaluated in various ways that lead to very different conclusions as to the nature of the problem and the best solutions. In the past, experts often defined affordability as households spending less than 30% of their budgets on housing, but since households often make trade-offs between housing and transportation costs, many experts now recommend that affordability be evaluated based on lower-income households' ability to spend less than 45% of their budgets on housing and transport combined. This recognizes that a cheap house is not really affordable if it has high operating or transport expenses, and households can afford to spend more for efficient housing located in accessible, multi-modal neighborhoods where transport costs are low. Many commonly-used affordability indicators are incomplete or biased: they reflect average rather than lower-income household budgets, ignore house operation and transport costs, and some only consider single-family housing, ignoring more compact and affordable housing types such as townhouses and apartments. These biases can lead to suboptimal policies.

Various housing types are suitable for affordable-accessible development, including small-lot single family, adjacent (duplexes and townhouses), apartments, and secondary suites. Current demographic and economic trends are increasing demand for such housing. Some households need subsidized housing, but most affordable housing is developed by commercial firms and rented or sold for profit without subsidy.

This study investigates factors that affect overall household costs including land and construction costs, operating expenses (repairs, maintenance, and utilities), location (and therefore transport costs) and age. It developed the *Housing Affordability Analysis Spreadsheet*, which can be used to evaluate how these factors affect overall affordability. A key finding of this research is that house operation and transport costs significantly affect overall affordability. Figure ES-1 illustrates the costs of various housing types. The most affordable housing types, such as low-rise apartments and townhouses, are illegal to build in most urban neighborhoods due to their size, density and minimal number off-street parking spaces.

Figure ES-1 **Costs Of Various Housing Types**



This figure compares typical housing and transport expenses for various new housing types suitable for urban neighborhoods. Low-rise, multi-family housing has the lowest costs, particularly if it has zero parking requirements. However, such housing is often prohibited or difficult to develop due to density restrictions and parking requirements.

Table ES-1 summarizes various benefits of providing sufficient affordable-accessible housing to meet the demand, so any household can find inexpensive housing located in accessible neighborhoods. Affordable-accessible housing is the opposite of gentrification: it creates communities where diverse households live together. Affordable-accessible housing tends to support economic development by increasing developer profits, real estate commissions, property taxes, local business activity, and agglomeration efficiencies.

Table ES-1 **Affordable-Accessible Housing Benefits**

Increased Household Affordability	Reduced Vehicle Travel	Reduced Sprawl
Improved housing options, particularly for disadvantaged households	Reduced regional traffic and parking congestion	Reduced per capita land consumption
Household financial savings	Reduced road and parking infrastructure costs	Reduced costs of providing public infrastructure and services
Reduced homelessness and associated social problems such as crime	Reduced traffic crash costs	Improved accessibility and economic opportunity for disadvantaged residents
Creates more diverse neighborhoods, allowing “aging in place”	Reduced traffic accidents	Energy conservation and pollution emission reductions
Higher property values and tax revenues	Reduced chauffeuring burdens	More local economic development
	More efficient public transit services	

Compared with unaffordable or sprawled housing, affordable-accessible housing provides numerous benefits.

Despite these benefits, affordable infill development faces many obstacles. Current policies discourage affordable infill development; in fact, the most affordable housing types, such as small apartments and townhouses with unbundled parking, are illegal to build in most urban neighborhoods reflecting prejudices against compact housing types and lower-income households. Affordable-accessible housing reflects more diverse household demands and community planning goals.

In most North American cities, a major share of affordable-accessible housing consists of low-rise apartments built before 1975, after which higher construction costs, more burdensome zoning codes requirements, and neighborhood resistance discouraged such development. This study investigated whether it is possible to once again develop such housing, sometimes called the *missing middle* because it is middle size and density. Under favorable conditions (moderate land prices and construction costs, minimal fees and delays, unbundled parking, etc.) it is possible to build such housing that is affordable to second-income quintile households, and over time these become affordable to the lowest income quintile, provided that more is developed in response to demand.

A key insight of this study is that, because their profits tend to increase with housing prices, developers will only produce affordable housing if construction costs are low and demand for higher-priced housing is satisfied. Analysis in this report indicates that with supportive municipal policies developers can earn reasonable profits building small- and medium-size apartments in accessible urban neighborhoods. Even if this housing initially costs more than lower-income households can afford, it tends to become affordable as it ages, or if owned and operated by a non-profit society.

Local residents often oppose affordable-accessible housing development. Some of this opposition reflects concerns about direct impacts such as construction disruptions, loss of privacy and increased traffic, which can be mitigated with thoughtful design and management strategies (Table ES-2), and infill development also benefits existing residents by increasing local services, reducing regional traffic problems, and because current residents may sometime want lower-priced housing options in their neighborhoods. However, much opposition reflects fears that lower-priced housing will attract poor residents who increase neighborhood conflicts and crime, and reduce school performance and property values. There is some truth and much inaccuracy in these fears. Although social problems tend to increase with concentrated poverty, most lower-priced housing occupants are responsible and law abiding low-wage workers, students and pensioners. Affordable-accessible housing can help reduce overall crime rates by increasing passive surveillance, improving economic opportunities for at-risk residents, and reducing motor vehicle crimes.

Table ES-2 **Potential Responses To Neighborhood Concerns** (NMHC 2007; NPH 2003)

Problem	Potential Responses
Fear of lower-income neighbors	Education about the types of households that occupy affordable housing and their neighborhood risks.
Traffic and parking congestion	Affordable-accessible housing residents tend to generate much less traffic and parking than conventional models predict, and any negative impacts can be mitigated.
Increased noise	Improved noise regulation enforcement.
Shading from tall buildings	Consider solar access in building design to minimize shading.
Reduced property values	Research concerning actual property value impacts (property values often increase).
Higher property taxes (if property values increase)	Offer tax deferments, so residents do not pay higher taxes until they sell their property.

Many neighborhood impacts can be addressed with improved design, management and education.

Opposition to affordable infill development tends to be effective due to a political power imbalance: development opponents tend to be well organized and politically powerful while the lower-income households that demand such housing are generally unaware of their interests and politically weak, resulting in less affordable-accessible housing development than is socially optimal considering consumer welfare impacts (including benefits to low-income households that will occupy the new housing) and regional benefits (including reductions in overall traffic and parking congestion, traffic accidents, pollution emissions and crime rates, plus increased business activity compared with more sprawled development).

There are many possible ways to increase housing affordability, as summarized in Table ES-3 (next page). Some strategies are better than others overall because they reduce rather than shift costs, and support other strategic objectives such as reducing traffic and sprawl problems. For example, affordable housing mandates reduce housing costs for some households but increase costs for others, and urban fringe development reduces land costs but increases infrastructure and transport costs. In contrast, allowing higher densities and reducing parking requirements reduces overall development costs and provides other benefits.

Some relatively modest policy reforms can greatly improve affordability and accessibility, and therefore the lives of physically and economically disadvantaged people. These include changes to zoning codes to allow more diverse housing types, reduced parking requirements, improving walking and cycling conditions, and improved public transit service. These reforms help increase the amount of affordable housing built by private developers or the amount of affordable housing produced by a given subsidy. Even if the new housing is initially unaffordable, it can become affordable over time as it ages.

There is considerable debate concerning the causes and solutions to housing inaffordability. Some experts argue that it is caused by urban containment policies and so is best solved with urban expansion, but most objective research indicates that in the attractive, growing, geographically-constrained cities where housing is least affordable, excessive housing prices are caused primarily by impediments to infill development, since such cities cannot expand outward sufficiently to significantly reduce prices, but they can grow upward.

Of course, every household is unique: some prefer driving and being automobile-dependent regardless of where they are located, while others have members that cannot, or prefer not to, drive and value having good transport options. Many households are in between: their housing and transport decisions are influenced by policy and planning decisions such as the type and pricing of housing and travel options available. To maximize benefits, affordable-accessible housing should be diverse to meet diverse housing demands, including various household sizes and types, access to openspace, vehicle parking, and various neighborhood types.

Increasing affordable-accessible housing is a practical way to help disadvantaged people help themselves by reducing their cost burdens; in other words, it helps households be poor but happy. This challenges conventional public policy goals. Conservatives tend to be primarily concerned with improving poor people's employment opportunities, while liberals tend to be primarily concerned with achieving more equitable wealth distribution; both assume that society's goal is to help lower-income households afford larger homes and more automobile travel. Yet, for many households, reducing cost burdens is the best overall ways to improve opportunity and happiness.

Table ES-3 Affordable-Accessible Housing Strategies

Strategies	Impacts
Ineffective and Sometimes Harmful	
Urban blight	Reduces housing costs but harms communities and concentrates poverty
Cheap suburban development	Reduces housing costs but increases transport and sprawl costs
Rent control	Benefits existing residents but reduces lower-priced housing development
Restrict rental-to-owner conversions	Benefits existing residents but reduces lower-priced housing development
Effective But Costly	
Support housing development and purchase	Primarily benefits affluent homebuyers. May do little to increase affordability
Inclusionary zoning (affordability mandates)	Subsidizes housing for some households but increases costs to others
Targeted housing subsidies	Benefits people who receive subsidies, but this may displace others
Subsidize urban fringe transportation	Is costly and exacerbates traffic problems
Sweat equity and volunteer construction	Potential is generally small compared with total affordable housing needs
Most Effective and Beneficial	
Raise allowable densities and heights	Allows more affordable, compact, infill development
Allow and support compact housing types	Allows more affordable, compact, infill development
Minimize & prorate fees for inexpensive housing	Reduces costs of inexpensive, infill housing development
Expedite development approval and permitting	Reduces costs and encourages development of lower-priced housing
Density bonuses and requirements	Encourages developers to build more affordable housing
Lending reforms and incentives	Reduces development financing costs
Identify parcels suitable for infill	Helps developers build infill housing
Provide free or inexpensive land	Helps developers build affordable housing
Targeted tax and fee exemptions	Reduces affordable-accessible housing development costs
Brownfield remediation	Makes contaminated land available for development
Land value tax and undeveloped land surtax	Encourages more compact urban development, reduces land speculation
Reform development and utility fees, and taxes	Encourage more compact and affordable housing development
Affordable housing targets	Encourages communities to accept affordable housing
Address community concerns/improve design	Reduces neighborhood opposition to affordable housing
Allow smaller lots and urban parcel subdivision	Increases the supply of smaller urban lots
Dynamic zoning	Allows communities to respond to increased affordable-accessible housing demand
Improve building design	Reduces neighborhood opposition to affordable infill development
Improve building efficiency	Reduces operating costs, which increases long-term affordability
Address neighborhood concerns	Reduces community opposition to affordable infill development
Smart growth reforms	Encourages more compact development and reduces infill development costs
Traffic and parking management	Reduces traffic and parking problems, and therefore opposition to infill development
Unbundle parking	Reduces development costs and vehicle ownership
Reduced and more accurate parking requirements	Reduces parking costs, particularly for affordable-accessible housing, and may allow parking lots to be converted to housing
Allow development on parking lots	Often provides excellent sites for affordable-accessible housing
Improve affordable transportation options	Improves accessibility, reduces household transport costs, reduces traffic impacts
Discourage or prohibit rental restrictions	May increase the number of rental units available in a community
Affordable housing maintenance programs	Preserves existing affordable housing stock

This table summarizes various ways to support affordable-accessible housing development.

Introduction

Many responsible families are financially stressed; they are trapped by economic trends that drive up living costs faster than incomes. This results, in part, from public policies that favor costly housing and transportation over more affordable alternatives. Since these are most households' two largest expenses, such policies significantly increase overall cost burdens. Reducing these costs is equivalent to increasing household incomes. Of course, household needs and preferences vary; people don't always choose the cheapest housing or transport options available, but improving affordable options gives lower-income households more freedom to choose the combination that best meets their needs.

These issues are particularly important in attractive, geographically constrained cities where housing inaffordability problems are severe. Market research indicates that a growing number of households want *affordable-accessible housing*: lower-priced, compact housing located in multimodal neighborhoods where residents can rely on affordable travel modes such as walking, cycling and public transit. Such housing is resource efficient: it requires less land, and residents generate less congestion, accidents and pollution than they would in more sprawled areas. As a result, virtually everybody can benefit if any household that wants basic housing in an accessible neighborhood can find suitable options within their budgets. Despite these benefits, affordable-accessible housing development faces many obstacles, making it infeasible in many urban neighborhoods. Affordability requires policy reforms that allow more compact infill development.

This report explores these issues. It describes ways to define and measure affordability, examines factors that affect housing and transportation costs, identifies the benefits and costs of more affordable infill development, evaluates ways to encourage affordable-accessible housing, examines barriers to their implementation, and describes examples of successful programs for increasing affordable-accessible housing. It integrates the following concepts:

1. *Affordability.* Experts often recommend that households spend less than 30% of their budgets on housing (rents or mortgages and operating expenses), and less than 45% on housing and transportation combined.
2. *Accessible (also called "location efficient") development.* Compact, multimodal neighborhoods provide convenient and affordable access to services and activities. Residents of such neighborhoods tend to own fewer vehicles, drive less, rely more on alternative modes, spend less on transport, and impose lower external costs than they would in more sprawled, automobile-dependent areas.
3. *Dynamic (also called "Responsive") planning.* Communities must respond to changing demands and conditions. Current demographic and economic trends are increasing demand for affordable-accessible housing, and increasing the benefits to society of accommodating this increased demand.

Described differently, this study explores practical ways to help people be poor but happy. This is an important but unpopular policy goal. Currently, conservatives tend to be primarily concerned with improving poor people's employment opportunities, while liberals tend to be primarily concerned with more equitable wealth distribution; both assume that society's goal is to help lower-income households afford larger homes and more vehicle travel. There is little enthusiasm for developing basic, inexpensive housing and transport options since both ideologies consider this economically and socially backward, although for many households this is the best way to increase their opportunities and happiness.

This study investigates why and how to increase affordable-accessible housing development. This study should be useful to people involved in housing and transportation affordability, urban development, efficient transport, urban economics, and public health and safety.

Defining and Measuring Affordable-Accessible Housing

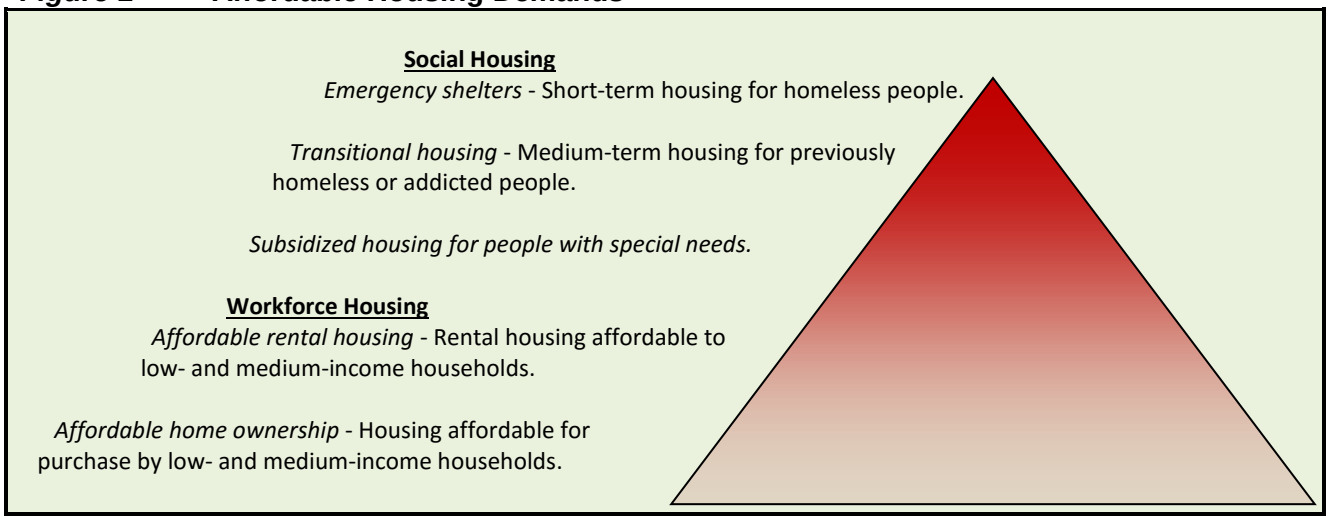
This section discusses ways to define and measure affordability and accessibility, and factors that affect them.

Defining and Measuring Affordability

Affordability refers to people's ability to purchase *basic* (or *essential*) goods and services such as healthcare, food and shelter. *Affordable housing* is traditionally defined as housing costs (including rents, mortgages, property taxes, maintenance and basic utilities) that costs less than 30% of household income or budgets (Hulchanski 1995; Zillow 2015), but some experts recommend that affordability definitions include other household cost burdens (Bieri 2015). Since households often face tradeoffs between housing and transport costs, many experts now define affordability as households being able to spend less than 45% of budgets on housing and transport combined (CNT 2008). This recognizes that an inexpensive house is not truly affordable if it has high transport costs, and households may spend more on a house located in an accessible, multimodal neighborhood with low transport costs.

Figure 1 illustrates various affordable housing demands, which include a relatively small number of households with special needs (disabilities, severe poverty, etc.) that require subsidized *social housing*, and a larger number of lower-wage workers, pensioners, students and artists who want low-priced *workforce* housing to rent or purchase.

Figure 1 **Affordable Housing Demands**



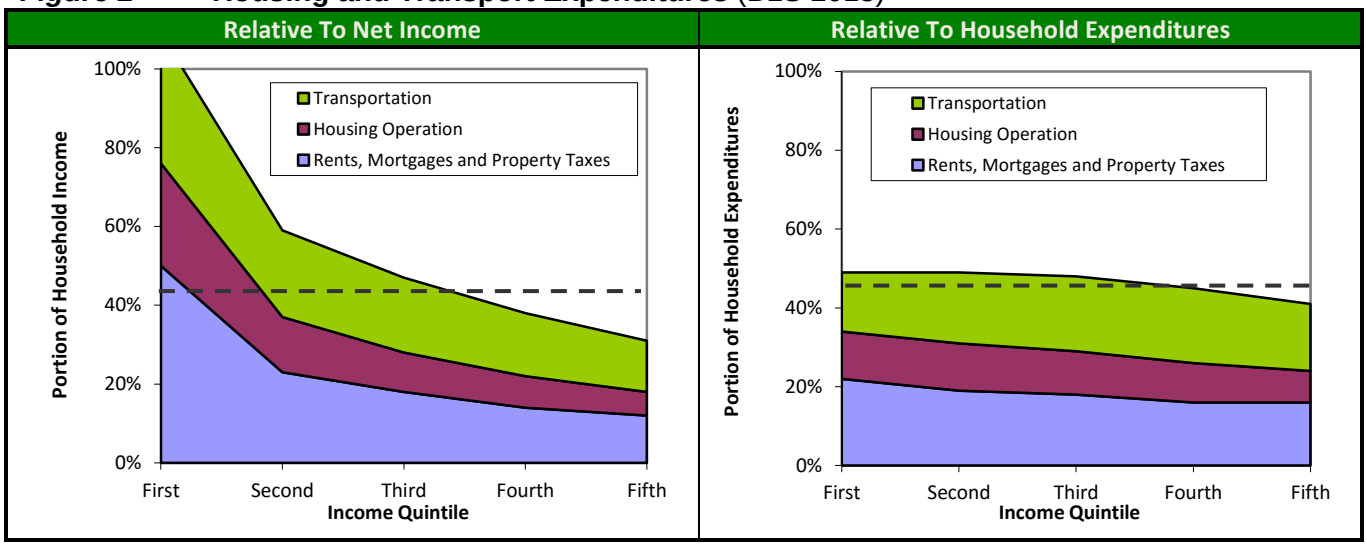
Affordable housing demands range from a small number people who need subsidized social housing to a much larger number of households that need lower-priced workforce housing to rent or purchase. Virtually all of these households can also benefit from living in an accessible location where transportation costs are relatively low.

How incomes are measured affects affordability analysis. Affordability is primarily concerned with cost burdens to lower-income households, for which excessive housing and transport costs can leave insufficient money to purchase other essential goods. Higher-income households may spend a major portion of their income on multiple luxury houses and vehicles without threatening their ability to buy essential goods. As a result, affordability analysis should generally focus on lower-income households' cost burdens, typically measured as the first and second lowest income quintiles (fifth of all households). Affordability analysis sometimes uses *family adjusted incomes* which reflect household size and composition, since larger families must spend more on essential goods such as food and healthcare (Haughton and Khandker 2009; HUD 2014).

This analysis may be based on *gross incomes* (including taxes), *net income* (after taxes), *family-adjusted income equivalents* (which account for household size) or *expenditures*. *Incomes* tend to reflect short-term wealth, while *expenditures* reflect long-term wealth since households sometimes have temporary low incomes, for example, when workers are unemployed or take time off to attend college or travel, and so represent higher- and lower-bounds for affordability.

Figure 2 shows the portion of U.S. household income and expenditures devoted to housing and transport. Most lower-income households spend more on these goods than is considered affordable. During the last century, the portion of household budgets devoted to housing grew modestly, from 27% in 1918 up to 34% in 1987, but the portion devoted to transportation increased substantially, from 3% in 1918 up to 26% in 1987, as automobile ownership and use grew (Johnson, Rogers and Tan 2001).

Figure 2 **Housing and Transport Expenditures** (BLS 2013)



Most households spend more on housing and transport than is considered affordable: 45% of income or expenditures.

This indicates that the concept of affordability is best reflected by indicators which measure lower-income (typically first and second income quintile) households' ability to spend less than 45% of their total budgets on housing and transportation combined. In practice, affordability is measured in various ways (Hulchanski 1995; Njie 2015; Zillow 2015):

- *Median/median* (median house price divided by median household incomes) for a particular area or group.
- Average price per square-foot or -meter for a particular type of house.
- Minimum income needed to rent or purchase a particular type of housing, such as a single-family home.
- Minimum or average price to rent or purchase a type of housing, such as a two-bedroom apartment.
- The quality of housing available for rent or purchase at a given price, such as the number and size of apartments available for rent at less than $1,000 per month, or single-family homes that could be purchased with mortgages less than 30% of lower-income household budgets.
- Total costs to own a particular type of house, including rents or mortgages plus operating expenses.
- Combined housing and transportation costs for a particular area or group.

Table 1 lists some commonly used housing affordability indexes and data sources.

Table 1 **Housing Affordability Indexes**

Indicator
ACCRA Cost of Living Index (www.coli.org), compares costs of living by region for top income quintile households (it is intended to help business professionals negotiate relocation wage adjustments).
Demographia International Housing Affordability Survey (www.demographia.com/dhi.pdf) reports the ratio of median house prices to median incomes for cities around the world.
An HSH index (www.hsh.com/finance/mortgage/salary-home-buying-25-cities.html) calculates the salary needed to purchase a median-priced house
National Home Builder's *Housing Opportunity Index* (www.nahb.org/reference_list.aspx?sectionID=135) indicates the portion of homes sold in an area affordable to median income households.
The National Association of Realtors provides housing price data (www.realtor.org/topics/existing-home-sales/data).
Zillow Home Value Index (www.zillow.com/research/zhvi-methodology-6032) reports sales prices of various house types.
The *Zillow Rent Index* (www.zillow.com/blog/tag/zillow-rent-index) reports home rental prices.
The *Housing + Transportation Index* (http://htaindex.cnt.org) and the *Location Affordability Portal* (www.locationaffordability.info) provide combined housing and transport cost data for various locations.
The U.S. Census *Building Permits Survey* (www.census.gov/construction/bps/msaannual.html) provides data on the number and value of new housing approvals in geographic areas.
The U.S. Bureau of Labor Statistic's *Consumer Expenditure Surveys* (www.bls.gov/cex) and the *American Housing Survey* (www.census.gov/programs-surveys/ahs.html) provide data on housing and transport consumption.

Various indicators and data sets are used to evaluate affordability. They vary in scope. Many only consider home purchase costs, ignoring rental housing, housing operating costs and transportation costs.

Many of these indicators are incomplete or biased:

- The ACCRA Cost of Living Index only considers the highest income quintile, and so is inappropriate for affordability analysis.
- Most indexes measure *average* prices and incomes, and so do not reflect impacts on lower-income households, although they are most burdened by housing inaffordability.
- Most indexes only consider house purchase prices, and so do not reflect *rental* housing affordability, although this is a major housing affordability issue.
- Some indexes, such as the *Demographia International Housing Affordability Survey*, ignore or undercount multi-family housing which tends to exaggerate housing inaffordability in compact cities.
- Most indexes ignore housing operation and transport costs. As a result, they exaggerate the affordability of cheap but inferior quality houses that have high operating costs, and houses in areas with high transport costs.

This is not to suggest that these indicators are totally useless, they are often the only affordability indicators available. However, anybody who works with their results should understand their omissions and biases and take them into account when making conclusions about what house or housing policy is truly optimal overall. For example, a policy that helps lower-income households purchase houses that have high operation or transport costs do not necessarily help improve overall affordability.

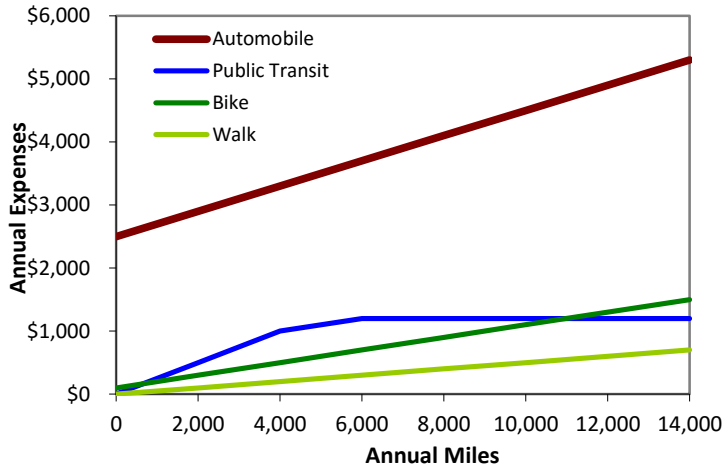
Defining and Measuring Accessibility

Accessibility (or just *access*) refers to the ease of reaching services, activities and destinations, together called *opportunities* (Levinson and El-Geneidy 2006). Various factors affect accessibility (Litman 2013):

- *Mobility* – The ease and speed of motor vehicle travel.
- *Transport options* – The quality of walking, cycling, automobile, public transit and taxi services.
- *Prices* – direct costs of owning and operating automobiles, and public transport fares.
- *Transport network connectivity* – The quality of connections among paths, roads and modes.
- *Land use accessibility* – the geographic distribution of services and activities.
- *User information* – The ease of obtaining information on transport options.

Accessibility is evaluated using various indicators which reflect various perspectives (*Abogo*; Cambridge Systematics 2010; Rodier and Spiller 2012). Conventional planning often evaluates transport system performance based primarily on vehicle traffic conditions using indicators such as roadway level-of-service and average traffic speeds. Newer indicators also consider other modes or measure the number of destinations that can be reached within a given travel time, taking into account both travel speed and trip distances, and therefore land use factors. Few of these indicators consider financial costs and therefore affordability (Litman 2007). If affordability is considered at all, conventional transport planning generally only measures vehicle operating costs, such as fuel prices and road tolls, and sometimes transit fares.

Figure 3 **Typical Costs By Mode** (Litman 2007)



Automobile travel costs much more than walking, cycling and public transit. This typically includes about $2,500-4,000 in fixed expenses plus 20-30¢ per mile in operating expenses. Public transit fares average 25¢ per mile, but frequent users can purchase monthly passes which cost about $1,000 annually. Walking costs about 5¢ and cycling about 7¢ per mile in incremental costs (shoes and bikes).

Affordable modes tend to be slower than driving and so require compact, mixed-use neighborhoods that minimize travel distances and maximize land use accessibility.

Of course, mobility needs and abilities vary. Some people can walk, bicycle and use public transit for most trips, while others require automobiles. Although lower-income motorists can minimize their costs by owning older, low-value vehicles, performing their own maintenance and repairs, and purchasing minimal insurance (sometimes driving uninsured), it is difficult to spend less than $3,200 annually to own and operate an automobile, and their older vehicles often fail, so even vehicle-owning households need alternatives as fallbacks. As a result, transport affordability depends on the quality of affordable modes (walking, cycling and transit), and since these modes are relatively slow, they require compact development to minimize travel distances. Neighborhoods that provide such accessibility are called *walkable*, *multimodal*, *new urbanist*, *smart growth*, *location-efficient*, or *transit-oriented*.

Defining and Measuring Affordable-Accessible Housing

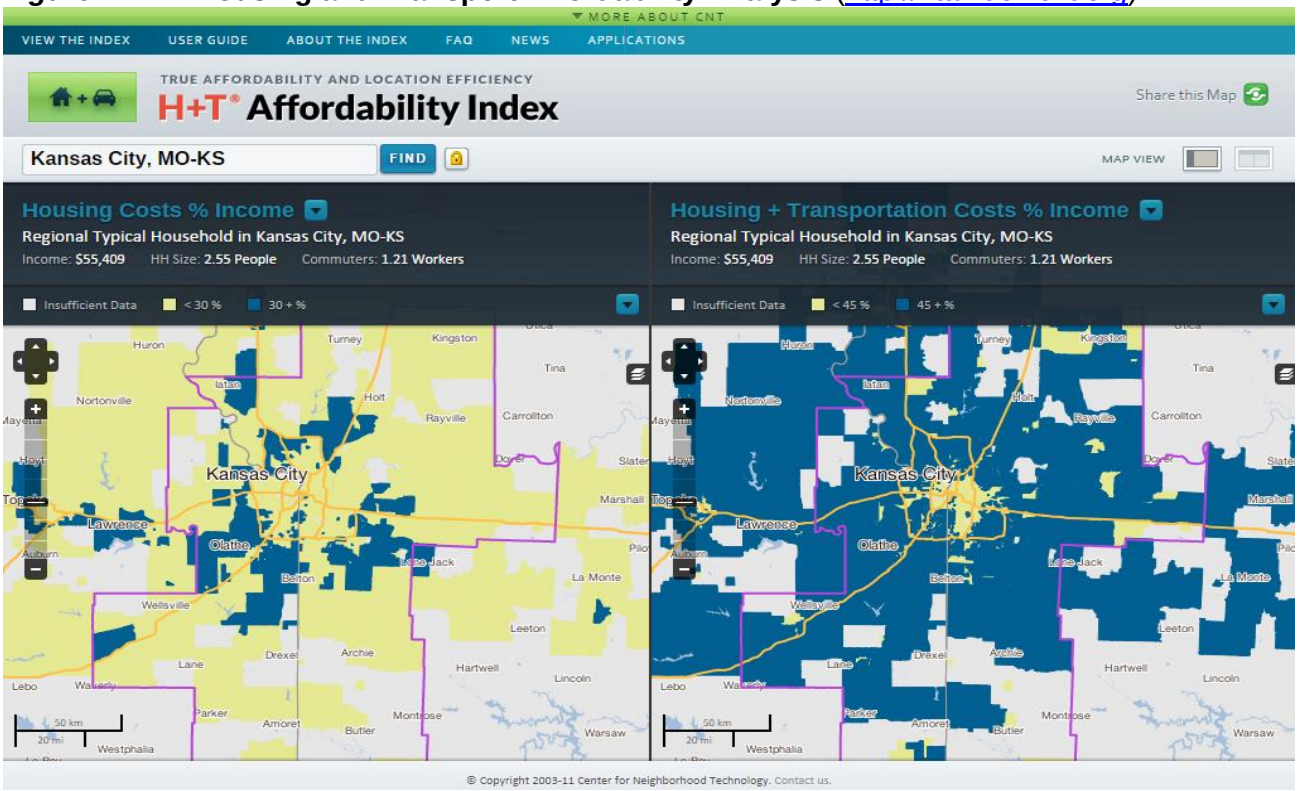
Affordable-accessible (also called *location efficient*) housing refers to lower-priced housing located in accessible, multimodal neighborhoods where residents can minimize their vehicle ownership and use. Affordable-accessible housing is the opposite of gentrification: it creates communities where diverse households live together. It generally needs a combination of the attributes listed in the box below

Affordable-Accessible Housing Attributes

- Diverse, adequate quality, inexpensive housing options.
- Unbundled parking (so households are not forced to pay for parking spaces they do not need).
- Durable and energy efficient buildings (minimal maintenance, repairs and basic utility expenses).
- Accessible (close to services) and multimodal (good walking, cycling, transit and carsharing) locations.
- Some units designed to accommodate people with disabilities.
- Universal design (transportation facilities and services accommodate people with disabilities).
- Housing and neighborhoods are safe and have good public services such as schools.

New tools, such as the *Housing + Transportation Affordability Index* (CNT 2015), the *Location Affordability Portal* (USHUD and USDOT 2015), and the *Location Matters* website (Burda and Singer 2015) measure combined housing and transport affordability for specific areas (Figure 4). This analysis generally indicates that total costs are usually lowest in accessible, multimodal neighborhoods. Housing foreclosure rates, an indicator of unaffordability, also tend to be lower in multimodal areas, indicating reduced financial risk, particularly for lower-income households (Gillen 2012; Pivo 2013; Sipe and Dodson 2013).

Figure 4 **Housing and Transport Affordability Analysis** (http://htaindex.cnt.org)



Considering just housing costs, suburban and rural areas seem most affordable (yellow), but these areas have high transport costs. Considering both housing and transport costs, urban neighborhoods are most affordable overall.

Affordable-Accessible Housing Types

Various housing types are suitable for affordable-accessible development:

- *Small-lot single-family housing.* Stand-alone houses on 2,000 to 4,000 square foot lots.
- *Accessory units* (also called *secondary suites* or *granny flats*). Self-contained living units, with separate entrances, bathrooms and kitchens, created within single-family homes.
- *Laneway houses* (also called *garage conversion*). Small houses built behind or next to a main house, sometimes above or replacing a garage.
- *Townhouses* (also called *rowhouses* or *attached housing*). Connected houses with shared walls but separate, ground-floor entrances.
- *Low-rise apartments*. Rentals or owner-occupied condominiums in 2-6 story, usually wood-frame buildings. These include various designs, such as courtyard and bungalow apartments.
- *Micro-apartments* (apartments less than 500 square feet).
- Additional floors added to existing buildings (such as adding a story to an apartment building).
- *Residential over commercial*. Apartments located above a store or other commercial space on the first and sometimes second floor of an urban building.
- *Industrial or commercial conversions*. Older buildings converted to residential uses, such as loft apartments.
- Housing developed on underused parking lots.

Figure 5 **Typical Affordable-Accessible Housing Types** (Litman 2011; Parolek 2014)


Small-lot single-family housing.


Accessory Units


Laneway houses


Duplex


Townhouses

Residential over retail

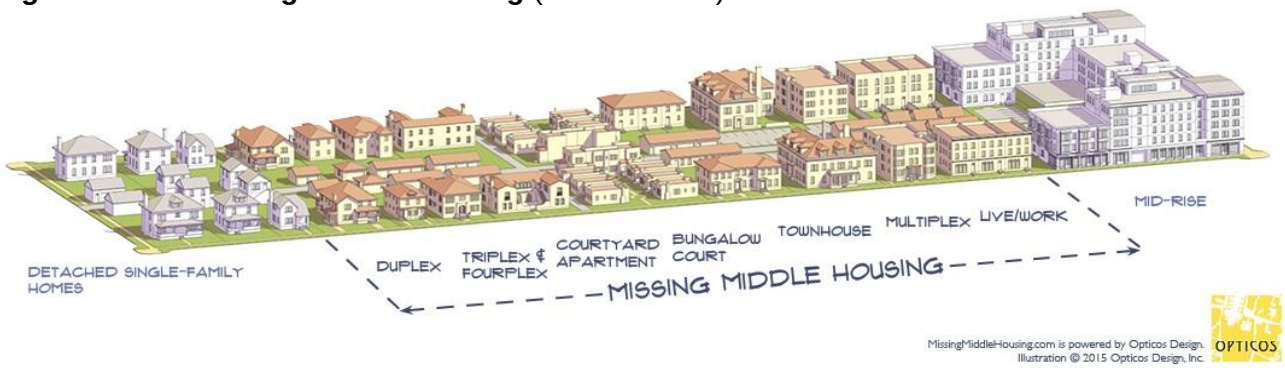

Low-rise Apartment


Loft apartments


High-rise Apartment

In most communities the lowest-priced housing types include townhouses, multi-plexes (two to eight units) and low-rise apartments, called *missing middle* housing since they are denser than single-family housing but less dense than high-rise (Burda and Collins-Williams 2015; Parolek 2014; Portland 2014), and so are suitable for urban neighborhoods, based on *Transect* planning concepts which define specific design practices to apply in various zones that transition from rural to urban cores.

Figure 6 **Missing Middle Housing** (Parolek 2014)



Missing middle housing includes moderate –density, lower-cost housing types suitable for urban neighborhood infill.

In most North American cities a major portion of the existing affordable housing stock consists of these housing types. Most were built prior to 1975, after which rising construction costs, less favorable tax policies, more restrictive zoning codes, higher parking requirements, and neighborhood opposition made such development financially unattractive. The report, *The Low-Rise Speculative Apartment* (Smith 1964), examined the economics of such development. Cecchini (2015) and Let's Go LA (2014) analyze factors that discourage such development, and potential policy reforms to make it more financially attractive. The *Housing Affordability Analysis Spreadsheet* (Litman 2015c) includes a section ("Apt Rent") the minimum rents needed to make such projects financially successful; input values can be adjusted to test how various building types and conditions would affect the business case for building small, new apartment buildings.

Figure 7 **Examples of Basic Apartment Buildings**

Most cities have many examples of small, basic apartments that fit into residential neighborhoods but can no longer be developed due to stricter regulations.

Housing and Transportation Cost Analysis

This section discusses specific factors that affect housing and transport costs. Also see Black (2012), Envision Tomorrow (www.envisiontomorrow.org), Ford (2009), Hogan (2014) and "Lets Go LA" (2014).

Land

Land costs per housing unit depend on land prices (dollars per acre or hectare) times land consumption per unit (the inverse of density). Land prices vary significantly: an acre typically costs a few thousand dollars in exurban areas, tens of thousands of dollars in suburban areas, hundreds of thousands of dollar in urban neighborhoods, and millions of dollars in city centers. High land prices encourage higher density development resulting in relatively constant land costs per housing unit; for example, urban neighborhoods typically have 4-8 times higher land prices and densities as suburban neighborhoods. Table 2 and Figure 8 compare typical land consumption for various housing types.

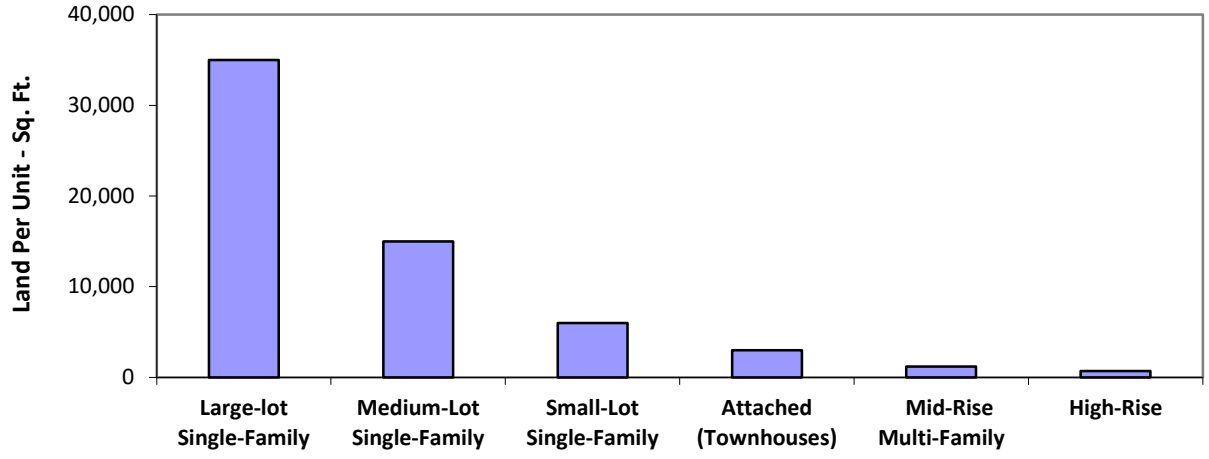
Table 2 **Typical Densities and Land Consumption By Housing Type**

	Large-lot Single-family	Medium-Lot Single-Family	Small-Lot Single-Family	Attached (Townhouses)	Mid-Rise Multi-Family	High-Rise Multi-Family
Stories	1-3	1-3	2-3	2-3	4-8	Over 8
Units/acre	Less than 2	2-5	5-10	15-30	20-60	Over 50
People/acre	Less than 5	4-15	10-30	20-60	40-120	Over 100
Sq. feet per unit	35,000	15,000	6,000	3,000	1,200	700

Building size and per unit land consumption vary significantly depending on housing type.

Land prices also tend to increase with accessibility, representing the capitalized value of transportation cost savings. Urban land price increases can be minimized with policies described later in this report, including land value taxes, affordable housing inclusionary zoning, windfall gains taxes, and broadly distributed upzoning so higher densities are allowed in many locations rather than just a few parcels.

Figure 8 **Typical Densities of Various Housing Types**



Land consumption per housing unit, and therefore land costs, vary significantly depending on housing type. Larger-lot housing requires 10-100 times as much land per unit as compact multi-family housing.

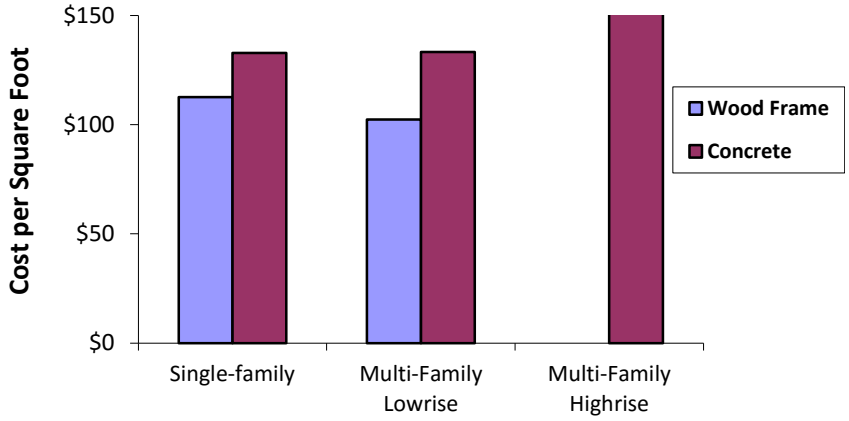
Site Preparation

Site preparation includes *soft costs* (planning, permits, fees, etc.) and *hard costs* (ground preparation, retaining walls, driveways, utility connections, etc.). Under favorable conditions these can be as low as 10% of construction costs, but are often higher due to planning requirements and fees. Large-scale development can minimize soft costs due to economies of scale, although urban-fringe development may have high costs for infrastructure such as driveways, utility lines, water and sewage. Some jurisdictions impose development fees to cover off-site public costs, such as road and utility network expansions. Unit costs are often high for small scale infill projects due to high planning and design requirements, and sometimes demolition and brownfield cleanup expenses.

Construction

Construction costs vary by location, time (costs increase during booms), design, materials, and amenities (ICC 2015). Figure 9 compares construction costs for three common housing types. Wood frame construction tends to have the lowest cost ($100-150 per square foot) and can be up to 5 stories high. Concrete construction costs more ($150-200 per square foot) but can be taller, which reduces land costs per unit, and so become cost-effective with high land prices (millions of dollars per acre).

Figure 9 **Typical Building Construction Costs** (ICC 2015)



Wood frame buildings tend to have the lowest construction costs. Wood frame multi-family tends to have lower construction costs ($102/sf) than single-family ($113/sf). Concrete construction costs more ($152/sf), but can be taller, which reduces land costs and so becomes cost-effective where land prices are high.

These factors can increase construction costs:

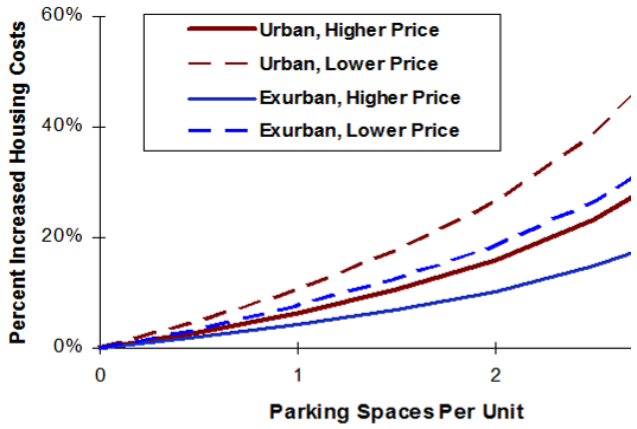
- More efficient design, such as increased insulation, better doors and windows, and more efficient mechanical systems (heating, air conditioning, water heaters, lighting, etc.). These costs are often repaid over time through lower operating costs.
- Improved safety features such as fire resistant materials, fire escapes, smoke and carbon monoxide alarms and seismic security (earthquake resistance).
- Universal design (ability to accommodate people with diverse needs, including wheelchair users), which may require elevators, wider doors and hallways, and ramps.
- Improved aesthetics (better design, materials and landscaping).

These features can provide long-term savings and benefits, so many house buyers will demand them and willingly pay the higher price, but regulations that require such features tend to increase construction costs and may reduce housing affordability.

Parking Facility Costs

Parking lots, driveways and garages add land and construction costs. Construction costs typically range from $5,000 per space for surface parking up to $60,000 for structured or underground spaces, plus operating costs. Parking lots and driveways often consume more land than is devoted to buildings. Parking costs are relatively modest for higher-priced housing, but can significantly increase total costs of lower-priced housing in high land price areas, illustrated in Figure 10, so minimum parking requirements are a major deterrent for affordable-accessible housing (Hurd 2014; Portland 2012). Lower-income households in accessible locations have low vehicle ownership rates and so need relatively few parking spaces. Since each driveway eliminates one on-street parking space, off-street parking requirements often result in little or no increase in total parking supply. Various management strategies can help reduce the number of parking spaces needed, such as sharing parking facilities among various users, efficient pricing, unbundling (renting parking spaces separately from housing, so instead of renting an apartment with two "free" parking spaces, occupants pay $800 for the apartment and $100 for each parking space), improved regulation, and carsharing can help reduce the number of parking spaces needed to serve a residential development.

Figure 10 **Increased Per Unit Housing Price Due to Parking Costs** (Litman 2012)



This figure shows parking costs as a percentage of development costs for various housing types. The percentage is greatest for lower price urban housing. As a result, high parking requirements in zoning codes are often a major deterrent to affordable-accessible housing development.

Financing

Land acquisition, planning, site preparation and construction, occur months or years before a project is completed and so require construction financing, which tends to have relatively high rates due to its relatively high risk. Financing costs are affected by interest rates and development project duration (less delay reduces financing costs). Even modest additional costs or delays early in the development process can significantly increase final housing prices; a $10,000 additional expense or six month delay early in the development process can add $20,000 to final housing prices. Affordable-accessible housing tends to be particularly sensitive to financing costs because developers are often smaller firms, and buyers often have weaker credit ratings, resulting in higher interest rates.

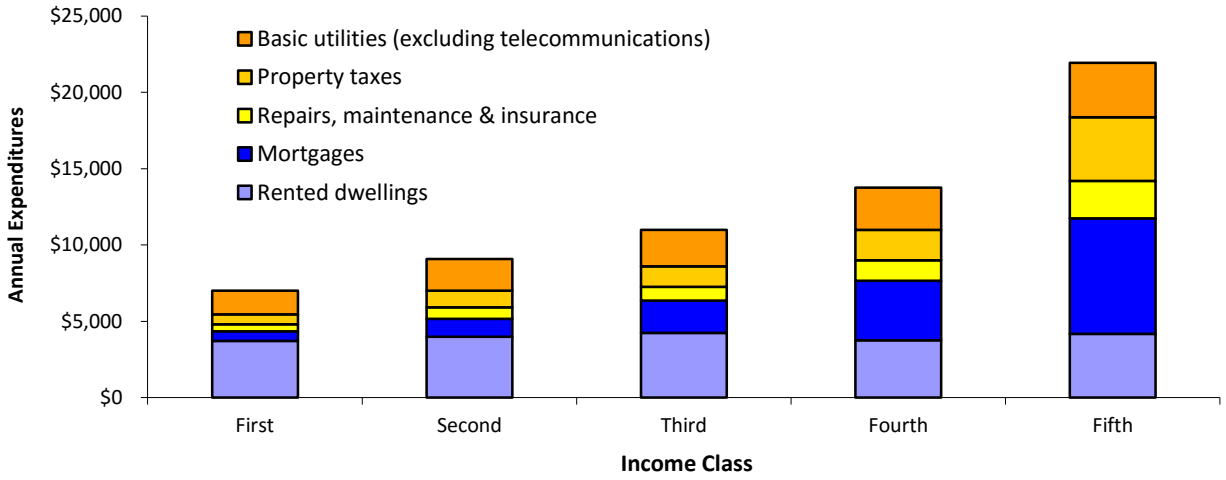
Used Housing Prices

Buildings typically have 50-year operating lives and so tend to depreciate (decline in value) 1-2% due to wear and style changes, although this is often invisible due to inflation, and in desirable areas declining building values may be offset by rising land values. Other market factors can affect used housing values: prices tend to increase if more people want to live in an area, and decline if more housing is developed. Even if the new housing is relatively expensive it can attract some households from used housing, freeing up supply and reducing prices.

Housing Operating Expenses (Taxes, Insurance, Maintenance, Repairs and Basic Utilities)

Housing operating expenses include property taxes and insurance, maintenance and repairs, condominium and homeowner association fees, and basic utilities (water and power). Figure 11 shows U.S. household expenditures on rents, mortgages and various operating expenses. Rent or mortgages typically represent 55-65% and operating expenses 35-45% of total housing costs. For every dollar that first and second income quintile households spent on mortgages they spent 17 cents on property taxes; 12 cents on repairs, maintenance and insurance; and 37 cents on basic utilities.

Figure 11 **Housing Expenditures by Income Class** (BLS 2012)



More than a third of housing expenditures are devoted to operating costs including maintenance, repairs, insurance, property taxes and basic utilities. These costs tend to be high for older and larger houses.

Most housing operating costs (often excluding electricity and gas) are included in rents and condominium association fees. Condominium fees typically range from 20-50¢ per square foot, and average of $236 per month overall (Table C-10-00, U.S. Census 2015). Rental property managers typically charge about 10% of rents to cover administration responsibilities.

Repair, maintenance and utility costs tend to increase with building size and age, and so are often high for inexpensive older houses. Although lower-income homeowners often perform some of their own home maintenance and repairs, they generally require professional help for major projects. Older houses typically require $2,000 to $5,000 annually for maintenance and repairs, and $2,000 to $4,000 annually for basic utilities, depending on size, fuel and climate. Property insurance tends to be lower in urban than rural areas due to faster emergency response times and professional fire departments.

As a result, older, low-priced single-family houses tend to have $4,000-8,000 higher operating costs than newer, well insulated and maintained houses or condominium. Energy efficient houses tend to have significantly lower foreclosure rates indicating that house operating costs affect affordability and economic security (Kaza, Quercia and Tian 2014).

Household Transportation Costs

On average, lower-income (first and second income quintile) households spend $4,200-5,000 annually on transportation (BLS 2012; "Table S-O4C-AO" US Census 2013), or about 16% of total household expenditures, but this varies significantly depending on how and how much residents travel. Households that rely primarily on walking and cycling can spend less than $1,000 annually on local transport (a quality bicycle can be purchased for less than $1,000 and will last ten years with about $100 annual maintenance), or $1,500 if they rely on public transit and so purchase monthly transit passes. Although lower-income motorists use various strategies to minimize their vehicle costs, such as purchasing older vehicles and performing their own maintenance when possible, they typically must spend at least $3,000 annually to own and legally operate a low-annual-mileage vehicle, and $5,000 if they drive high annual miles. As a result, transport affordability depends on households' ability to minimize vehicle ownership, for example, sharing a vehicle among multiple drivers or being car-free.

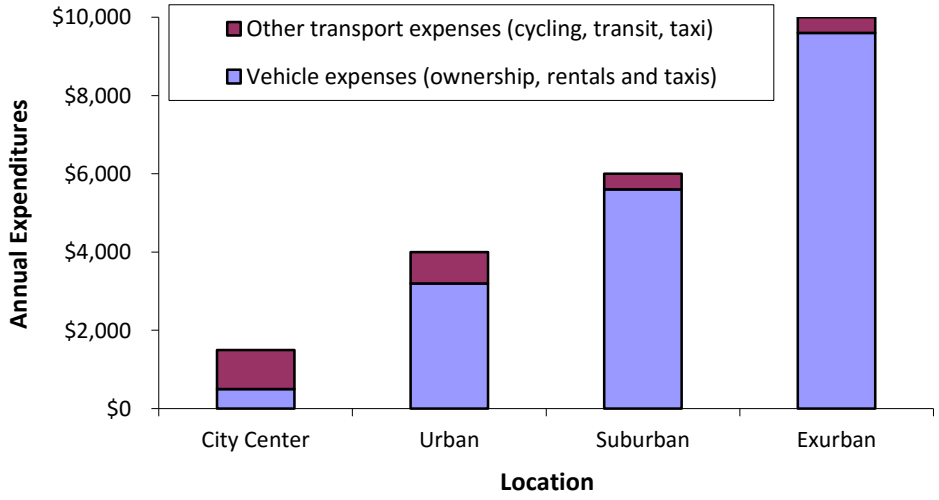
Table 3 **Two-Adult, Low-income Household Transportation Costs Example**

	City Center	Urban	Suburban	Exurban
Motor vehicles	0	1	1-2	2
Vehicle expenses (ownership, rentals and taxis)	$500	$3,200	$5,600	$9,600
Other transport expenses (walking, cycling, transit)	$1,000	$800	$400	$400
Total transport expenses	*$1,500*	*$4,000*	*$6,000*	*$10,000*
Transport portion of $20,000 total income	7.5%	20%	30%	50%

Because automobiles are costly, households can save by locating in compact, multimodal neighborhoods where vehicle ownership can be minimized.

Table 3 and Figure 12 illustrate how location affects the transport expenditures of a typical low-income, two-adult household. Households located in compact, multimodal neighborhoods tend to own fewer vehicles, drive less and spend much less on transportation than they would in sprawled, automobile-dependent areas (Ewing and Hamidi 2014; USHUD and USDOT 2015). Not all households minimize their transportation costs: many own more vehicles and drive more than necessary, but lower-income households are likely to take advantage of cost savings opportunities when available.

Table 12 **Two-Adult, Low-income Household Transport Expenses Example**



Household transportation expenditures vary depending on how and how much residents travel. Because automobiles are costly, households can save on transportation costs if located in compact, multimodal neighborhoods.

Housing and Transportation Costs Summary

Table 4 summarizes factors that affect housing and transportation cost.

Table 4 **Housing and Transport Cost Factors**

Category	Description	Typical Values
Land	Raw land costs.	Costs per acre range from a few thousand dollars in rural areas up to millions of dollars in city centers. Costs per housing unit decline with density.
Site preparation	Planning and site preparation costs include design, permits, fees, retaining walls, sidewalks, driveways, and utility connections.	Typically 10-30% of construction costs
Construction	Costs of constructing houses.	Wood frame $100-150 per sf; concrete $150-200 sf., with higher costs for higher quality design and materials
Parking	Costs of building driveways and garages.	From $5,000 per space for surface parking up to $60,000 for underground, plus land and operating costs
Finance	Costs of financing development and ownership.	Construction finance 6%, ownership finance 5%
Age	Buildings depreciate in value over time.	Prices decline 1-2% annually, depending on markets
Operating expenses	Property taxes and insurance, repairs, maintenance, condo fees, and basic utilities.	20-60% of mortgages. These costs tend to increase with building value, size and age.
Rental mgmt.	Rental property management costs.	10% of rents.
Transport	Incremental vehicle ownership and operation, public transit and taxi fares.	From less than $1,000 in accessible, multimodal up to $10,000 in sprawled, automobile-dependent areas.

This table summarizes the various housing and transport costs.

Cost Analysis

Various tools can be used to evaluate the total costs of various housing options, including the *Housing and Transportation Affordability Index* (http://htaindex.cnt.org), which accounts for both housing and transport costs, the *L-Cycle* (www.housingpolicy.org/lcycle) rental housing lifecycle costing tool, and the *Envision Tomorrow Prototype Model* (www.envisiontomorrow.org/enhanced-roi). The *Affordable-Accessible Housing Analysis Spreadsheet* (www.vtpi.org/Aff_acc_hou.xls), developed for this study, indicates how factors such as land prices, density, building size, operating expenses, and transport expenses affect total costs and affordability. Table 5 and Figure 13 illustrate typical costs of various new urban housing types.

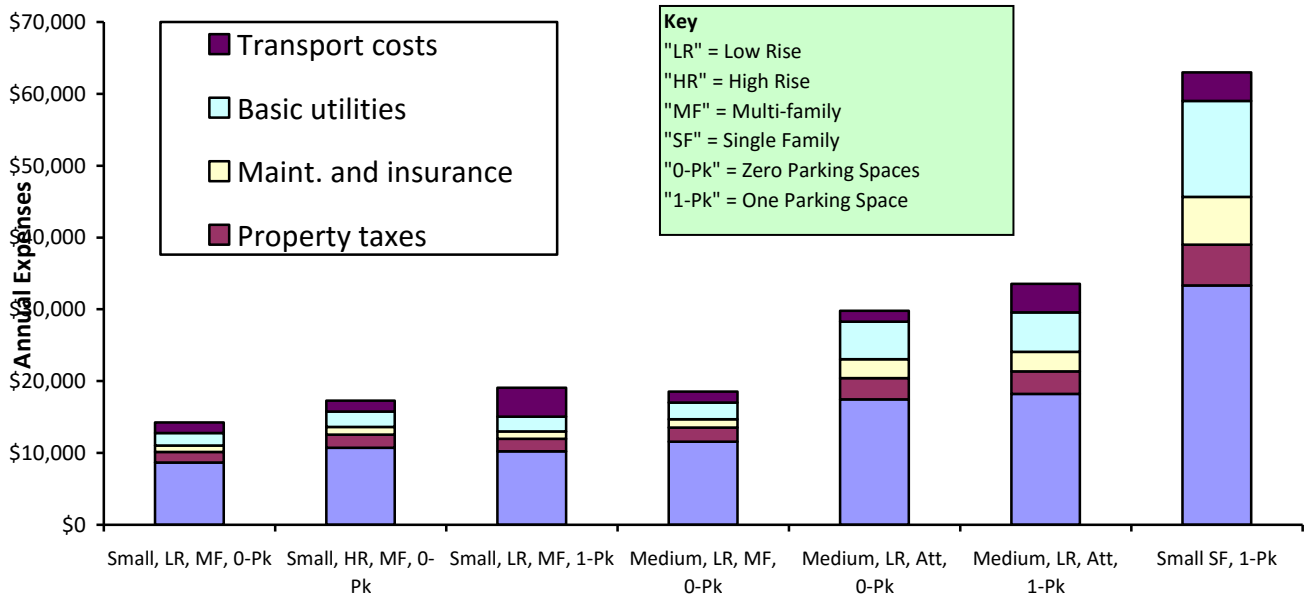
Table 5 **Annual Housing and Transport Expenses for New Urban Housing** (Litman 2015c)

	Small, LR MF, 0-Pk	Small, HR MF, 0-Pk	Small, LR MF, 1-Pk	Med., LR MF, 0-Pk	Med., LR Att., 0-Pk	Med., LR, Att., 1-Pk	Small SF, 1-Pk
Mortgage	$8,684	$10,727	$10,246	$11,579	$17,466	$18,247	$33,332
Property taxes	$1,476	$1,824	$1,742	$1,968	$2,969	$3,102	$5,667
Maint. and insurance	$868	$1,073	$1,025	$1,158	$2,620	$2,737	$6,666
Basic utilities	$1,737	$2,145	$2,049	$2,316	$5,240	$5,474	$13,333
Transport Costs	$1,500	$1,500	$4,000	$1,500	$1,500	$4,000	$4,000
Total	*$14,266*	*$17,269*	*$19,061*	*$18,521*	*$29,795*	*$33,560*	*$62,998*
Minimum Income	***$31,702***	***$38,375***	***$42,358***	***$41,159***	***$66,212***	***$74,578***	***$139,996***

This table summarizes total housing and transportation expenses for various types of new urban housing types, and minimum monthly incomes needed for this to be affordable (45% of income). Key: see Figure 11 (next page).

This analysis indicates that the lowest-priced new urban housing usually consists of low-rise multi-family apartments, either rented or owned (cooperatives or condominiums). For example, this indicates that it is possible to spend $14,266 annually on housing and transport for a new 600 square-foot apartment, and $21,820 annually for a 1,000 square-foot apartment, provided they are located in an accessible, multimodal area where residents need not own a car. However, such housing is illegal to develop in most neighborhoods: it is too dense and lacks required parking spaces.

Figure 13 **Urban Housing and Transport Costs**



This graph compares housing and transport costs for various new housing types. Low-rise, multi-family housing has the lowest costs, particularly if it has zero parking. Such housing is often prohibited or burdened with various development costs, which makes new housing unaffordable to most lower-income households.

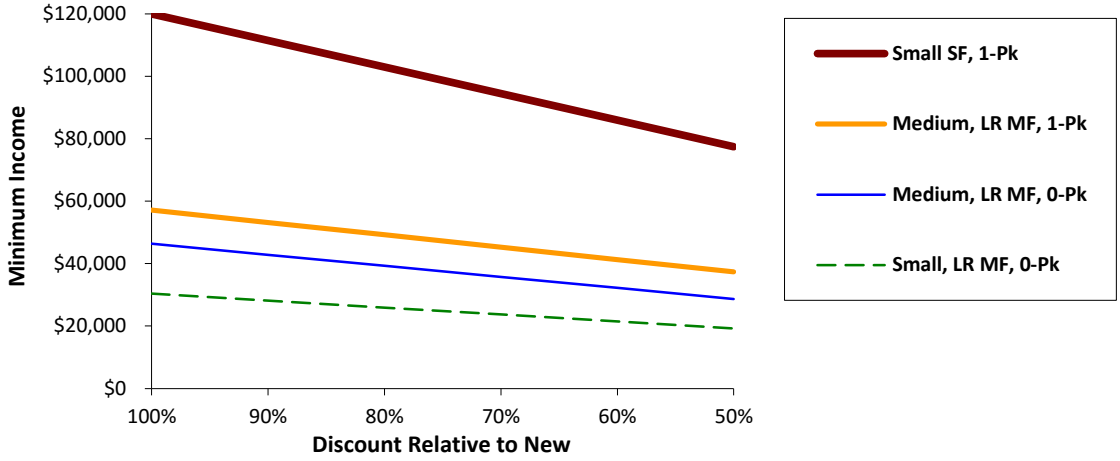
Additional development expenses and delays add relatively more to the ultimate price (what residents pay to purchase or rent) of inexpensive infill housing than to more expensive housing built in large-scale developments, as described in the box below. Affordable-accessible housing development therefore requires minimal and predictable development costs, fees and delays.

Following a Nickel Through The Development Process
Many development costs are multiplicative: financing, most taxes, sales commissions and developer profit targets (the profit developers must earn, on average, to justify their effort to build) are all proportionate to project costs. As a result, each additional dollar of development cost adds more than a dollar to the ultimate prices that consumers pay for housing, and each day of project delay further increases housing prices and reduces affordability.

For example, a $50,000 planning study for a ten unit project directly costs $5,000 per unit, but because it occurs early in the development process it incurs 3-6% annual construction financing costs, 10% real estate transaction taxes and fees plus 10-20% developer profits and sales commissions, adding $10,000 in total costs, which raises the minimal possible retail price from $150,000 to $160,000. Similarly, a planning regulation that delays a project by a year can add thousands of dollars per unit in additional financing and development costs.

House values typically decline 1-2% annually. In normal markets, most affordable housing consists of older housing with prices driven down by continual development of moderate-priced housing as illustrated in Figure 14. A failure to build new moderate-priced housing results in future housing unaffordability.

Figure 14 **Minimum Income Required For Older Houses**

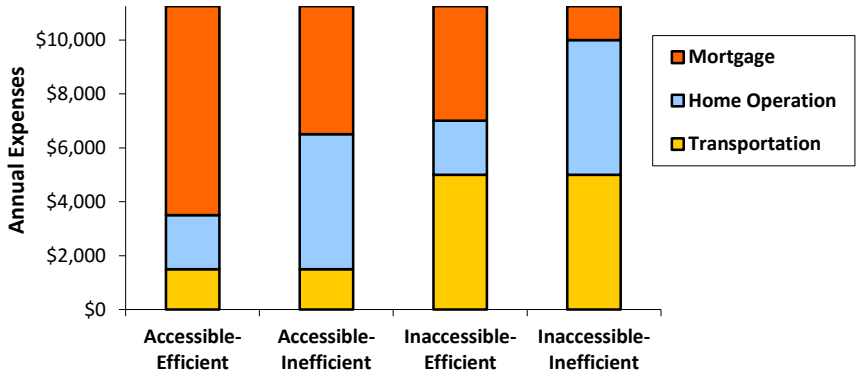


In a normal market, housing prices decline 1-2% annually, so 20-40 year old housing provides inexpensive housing.

Some households have special needs that require subsidized housing, but most factors discussed previously also affect social housing development costs. For example, charities can usually build more housing units within a given budget if allowed higher densities and fewer parking spaces than zoning codes currently allow, and occupants save on transport if their housing is located in accessible, multimodal neighborhoods.

A key finding of this research is that housing operation and transportation costs vary widely. For example, annual operating expenses range from about $2,000 for an efficient (well insulated and maintained) apartment or townhouse to more than $5,000 for an inefficient single-family house, and annual transport costs range from $1,500 in an accessible location to more than $5,000 in a sprawled, automobile-dependent location. A household with $25,000 annual income can afford to spend $11,250 on housing and transport; an inefficient house in an automobile-dependent location leaves just $1,250 for mortgages, as illustrated below.

Figure 15 **Affordability By Housing Condition and Location**



A household with a $25,000 income should spend up to $11,250 annually on housing and transport. This is only possible with efficient housing that minimizes operating expenses located in an accessible neighborhood that minimizes transport costs. Affordability indicators that ignore these factors encourage households to purchase less efficient and accessible housing than is optimal overall.

Table 6 summarizes an affordability analysis example for a 12-unit apartment built on a 6,000 sq-ft. lot. This indicates that under favorable conditions (moderate land prices, low construction costs and minimal parking requirements), new 750 square foot apartments could rent for less than $1,400 per month, and 10-20% less if developed by a charitable organization, which eliminates real estate transaction and profit costs, making them affordable to many lower-income household if located in a neighborhood with low transport costs.

Table 6 **12-Unit Apartment Building Financial Analysis** (Litman 2015c)

	Total	Per Unit
Parcel size (square feet)	6,000	
Stories	3	
Units	12	
Parking spaces	4	
Parking space construction costs	$5,000	
Total building size (interior square feet)	10,000	
Construction costs (per square foot)	$120	
Land development costs (relative to construction)	15%	
Construction finance (interest rate)	6%	
Developer's profit target	10%	
Real estate marketing, fees and commission	10%	
Long-term finance (interest rate)	5%	
Long term loan duration (years)	30	
Building Construction Costs		
Building space (square feet)	*10,000*	*750*
Building lot coverage	*56%*	
Floor Area Ratio (FAR)	*1.67*	
Land costs	$300,000	$25,000
Demolition	$30,000	$2,500
Land development costs	$180,000	$15,000
Construction	$1,200,000	$100,000
Parking costs	$20,000	$1,667
Carrying Costs	$103,800	$8,650
Developer profit	$183,380	$15,282
Total Development Costs	*$2,017,180*	*$168,098*
Real estate marketing, fees and commission	$201,718	$16,810
Total retail price	**$2,218,898**	**$184,908**
Rental Costs		
Monthly mortgage payment (100% financed)	$12,029	$1,002
Operating costs (percentage of mortgage)	30%	
Occupancy rate	95%	
Owner annual profit target	10%	
Minimum rent	**$16,460**	**$1,372**
Transportation Costs		
Vehicles owned		0
Fixed costs (per vehicle year)		$3,500
Annual vehicle travel (vehicle-miles)		3,000
Variable costs (per vehicle-mile)		$0.25
Public transit and taxi fares (annual)		$1,000
Other transportation expenses		$100
Total transportation expenses		**$1,850**
Affordability		
Minimum income for less than 30% on rent		**$4,572**
Min. income for less than 45% on rent & transport		**$3,391**

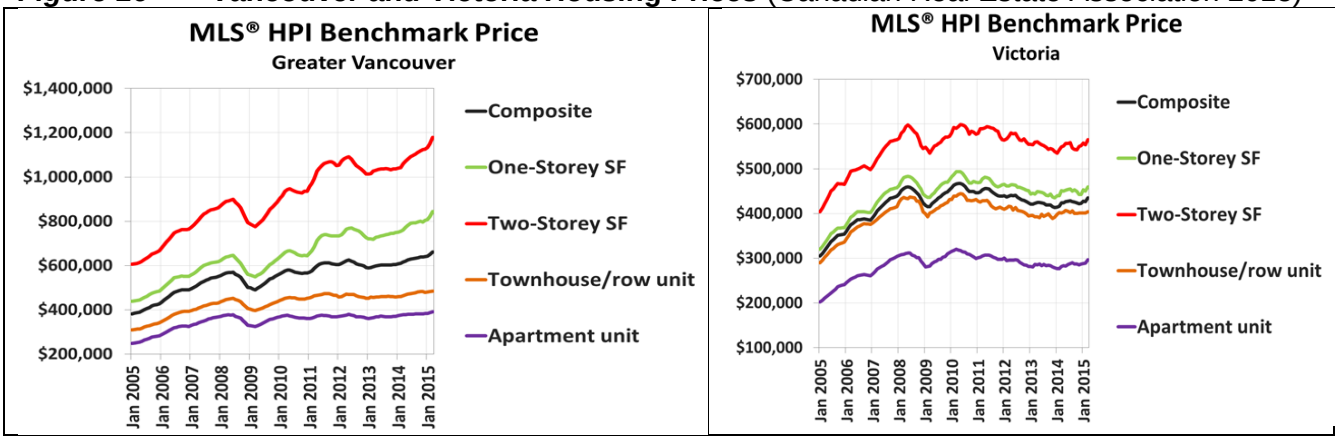
*This table illustrates the development costs, rents and affordability of a three-story, 12-unit, apartment building on a 6,000 square foot lot, using the "Apt Rent" tab of the "*Housing Affordability Analysis Spreadsheet.*" Developers and building owners could cover all costs and earn 10% annual profits, making this a worthwhile investment.*

When new, these units would be affordable to moderate-income households if located in accessible areas with minimal transport expenses, and can become affordable to lower-income households if enough are built to help reduce rents in older buildings.

Testing This Analysis in Vancouver and Victoria

This cost analysis can be tested based on actual market prices. For example, Vancouver and Victoria, British Columbia are attractive, economically successful and geographically constrained. Their average housing prices increased significantly during the last decade. As a result, they rate among the least affordable housing markets, based on conventional indicators such as median/median ratios (Cox and Pavletich 2015). However, these high prices primarily involve land-intensive housing types, such as larger single-family homes, reflecting land scarcity. More compact, land-efficient housing types, such as townhouses and apartments, have experienced much smaller price increases and are relatively affordable (Metro Vancouver 2015), as illustrated in Figure 16. As a result, geographically constrained cities may seem unaffordable if measured based on single-family houses, but not if more compact housing types are considered.

Figure 16 **Vancouver and Victoria Housing Prices** (Canadian Real Estate Association 2015)



Single-family housing prices increased significantly during the last decade, but townhouses and apartment prices increased little, making these housing options relatively affordable.

A recent search of Victoria area (Esquimalt, Oak Bay, Saanich and Victoria) housing options found more than a dozen new condominiums priced below $230,000 for one-bedroom and $300,000 for two bedrooms, and more than a dozen used condominiums starting at $150,000 for one-bedroom and $175,000 for two, indicating that housing prices typically decline 30-50% as they age. Similarly, there are more than 100 one-bedroom apartments that rent for less than $700 per month, and more than 100 two-bedroom apartments that rent for less than $1,000 per month, mostly in commercially-managed buildings. Table 7 indicates the minimum incomes needed for households to spend less than 45% on housing and transport for car-free and car-owning households.

Table 7 **Minimum Affordable Income for Victoria Housing Options**

	Monthly Housing Expenses	Minimum Monthly Income	
		Carfree ($1,500)	One car ($5,000)
New , one-bdrm condo, $230,000, $200 mo. fees	$1,197	$2,939	$3,587
New, two-bdrm condo, $300,000 $300 mo. fees	$1,601	$3,836	$4,484
Used, one-bdrm condo, $150,000, $150 mo. fees	$801	$2,057	$2,705
Used, one-bdrm condo, $175,000, $200 mo. fees	$959	$2,409	$3,057
Used -bdrm apartment, $700 rent, $50 utilities	$750	$1,944	$2,593
Used -bdrm apartment, $1,000 rent, $100 utilities	$1,100	$2,722	$3,370

This table calculates the income needed for housing and transport to total less than 45% of total income for car-free and car-owning households. (Condominium payments assume 20% down payment, 5% interest rate, 30-year mortgages.)

This is not to understate the challenges lower-income households face finding affordable housing in expensive cities; the lower-priced housing options often have undesirable features such as small sizes, undesirable locations and unattractive views. However, these examples demonstrate that basic market principles do apply to urban housing: in desirable, geographically constrained cities, the prices of land-intensive housing types, such as larger, single-family homes, increase significantly, while the prices of more space-efficient housing types increase much less. As houses ages their prices usually decline 30-50%, providing a stock of relatively affordable housing, as long as the supply of such housing continues to expand in response to demand.

This analysis illustrates the importance of policies that support affordable-accessible housing development in attractive, geographically-constrained cities with rising land prices, such as Vancouver and Victoria, BC. It is unrealistic to increase their affordability by expanding outwards; even using optimistic projections, the amount of land that could be added to their residential land supply is too small to drive down prices, and such housing is burdened with the additional costs of providing public infrastructure and services to lower-density urban-fringe locations, and with much higher household transportation costs. More infill development increases housing supply, which reduces housing prices, without increasing additional costs, and so is more economically efficient overall.

Affordable-Accessible Housing Benefits and Cost

This section describes various benefits and costs of affordable-accessible housing compared with higher housing costs or lower-priced sprawled housing.

Perhaps the best way to identify affordable-accessible housing benefits is to consider the problems that result from unaffordable housing and transport, and sprawled development.

Problems Associated with Unaffordable Housing and Transportation (Taylor 2015)

- Residents live with chronic financial stress and are vulnerable to financial crises, for example, if they have a vehicle failure, accident, illness or lose a job.
- Households spend a greater portion of their budgets on housing and transport, leaving many lower-income households with insufficient money to purchase other essential goods such as healthy food and healthcare.
- Fewer households can shift from renting to owning their homes, and therefore building wealth.
- Houses are more crowded, causing stress, and in some cases, reduced academic achievement.
- Households have fewer neighborhood location options which results in longer commutes.
- Businesses may have difficultly recruiting and retaining employees, and must pay higher wages.
- Reduced population and business growth reduces overall economic productivity and tax revenue.

Problems Associated with Sprawl (Ewing and Hamidi 2014; Litman 2015b)

- Increased costs of providing public infrastructure and services (roads, parking facilities, utility lines, emergency services, school transportation, etc.).
- Slower emergency response times.
- Increased per capita land consumption which reduces the amount of land available for farming and wildlife habitat.
- Reduced accessibility, particularly for non-drivers, forcing households to spend more money and time on transport.
- Increased per capita traffic congestion, traffic accidents and pollution emissions.
- Reduced walking and cycling for transportation, resulting in reduced public fitness and health.
- Communities are more homogenous, resulting in less integration of economically and socially excluded groups, and poverty concentration.

Affordable-accessible housing helps reduce virtually all of these problems (Newmark and Haas 2015). Of course, more compact development can also impose costs. The following pages discuss these impacts. Not every affordable-accessible housing policy or project has all of these benefits and costs, but most have several, and all of these potential impacts should be considered when they are evaluated.

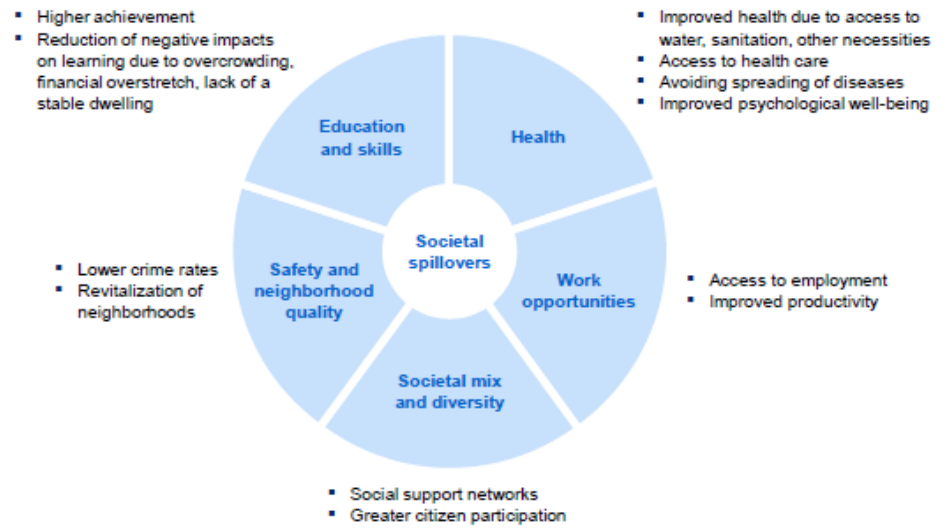
Potential Benefits

- *Household savings and affordability.* Low housing and transport costs leave households with more money to spend on other goods, which is particularly important for lower-income households.
- *Improved accessibility, particularly for non-drivers, and reduced chauffeuring burdens.* Improved accessibility directly benefits non-drivers, and drivers benefit from reduced need to chauffeur non-drivers.
- *Reduced homelessness and associated problems*. Increasing the supply of affordable-accessible housing can help reduce homeless and associated problems such as illnesses, crime and public drunkenness.
- *Allows aging-in-place.* Affordable-accessible housing suitable for seniors and people with disabilities allows residents to remain in their communities through lifecycle changes.
- *Congestion reduction and infrastructure savings.* Residents of more accessible, multimodal locations drive less and so cause less traffic and parking congestion, and reduce road and parking facility costs.
- *Traffic safety.* More accessible, multimodal neighborhoods usually have significantly lower per capita traffic fatality rates compared with sprawled, automobile-dependent areas.
- *Energy conservation and emission reductions.* Residents of compact, multimodal neighborhoods tend to consume less energy for housing and transport, and emit less pollution.
- *Reduced crime, increased security.* Crime rates tend to decline in more walkable, compact, mixed urban neighborhoods, and with more economic opportunity for at-risk populations (see box on the following page).
- *Smart growth benefits.* More compact development helps preserve openspace and reduce public service costs.
- *Increased economic opportunity*, particularly for physically and economically disadvantaged people. Improved access to education and employment tends to increase employment rates and wages.
- *Economic development benefits.* More compact, accessible development increases property values, economic productivity, and tax revenues.
- *More local services.* More residents increase the number of stores, restaurants and other services in an area.
- *Increased transit efficiency*. More transit users increase load factors and operating cost efficiency.

Potential Costs

- *Increased local congestion.* Compact development may increase local traffic and parking problems.
- *Less private greenspace.* Denser development reduces the size of lawns and gardens.
- *Less privacy and quiet.* Compact neighborhoods tend to have less privacy and more noise exposure.
- *Reduced views and sunlight.* Taller buildings can block views and solar access.
- *Loss of character homes.* Infill development often involves replacing smaller, older, and sometimes historically unique houses with larger, often multi-family housing.
- *Increases in some development costs.* More compact development can increase the local disruptions (vehicle traffic, noise and dust) caused by construction, and sidewalk and stormwater management costs.
- *Increases some public service costs.* More lower-income households may increase demand for some public services including schooling, welfare, and public transportation.

Figure 17 **Affordable Housing Benefits** (Woetzel, et al. 2014)



Improving access to affordable housing can provide a variety of economic, social and environmental benefits. Even people who will never occupy such housing benefits from having an adequate supply in their communities

Affordable-Accessible Housing and Crime

A common objection to affordable housing development is the assumption that, by attracting low-income residents and increasing urban densities, it increases crime. There is some truth and lots of inaccuracy in this assumption.

There is evidence that concentrated poverty increases total crime activity by creating communities where criminal behavior is normalized and residents have limited economic opportunities (Fraser, Oakley and Levy 2013). Conversely affordable-accessible housing development can reduce crime rates by allowing lower-income households to move into more mixed-income neighborhoods, and improving accessibility and economic opportunity for at-risk populations, such as poor teenagers' ability to access jobs.

Simplistic analysis may lead to false conclusions concerning these impacts. For example, crime mapping generally shows that more crimes occur in denser, mixed urban centers, but this does not really means that higher urban densities increase crime rates or risks to individuals. Academic studies indicate that, all else being equal, per capita crime rates are negatively associated with development density and mix, and pedestrian activity. For example, Hillier and Sahbaz (2006) analyzed residential burglary and robbery rates in an economically and socially diverse London neighborhood. They found that, all else being equal, crime rates declined with residential density. The researchers conclude that crime risk tends to decline on streets that have more through traffic, and crime are lower if commercial and residential buildings are located close together. Similarly, Li and Rainwater (2000) found that crime rates in Irving, Texas are primarily explained by socioeconomic factors such as income, and land use factors that affect crime opportunity. For example, assault and robbery rates are highest in areas with concentrated poverty, residential burglary rates are higher in higher income neighborhoods where many residents spend their days away from home, and automobile thefts are highest in large malls where numerous vehicles in large parking lots provide opportunities.

Although per capita crime rates tend to increase as communities increase from towns (under 100,000 residents) to medium-size cities (up to one million residents), large cities have significantly lower crime rates, as illustrated in the following graph. The lower crime rates in large cities probably reflects a combination of less concentrated poverty, as more middle- and higher-income residents move into inner neighborhoods, increase accessibility and economic opportunity for low-income residents, more walking activity in urban neighborhoods, and reductions in vehicle ownership and automobile-related crimes.

Economic Benefits

By reducing resource costs and improving accessibility, affordable-accessible housing can increase economic productivity and development. This section discusses specific ways this occurs.

Economic Opportunity

Affordable-accessible housing is particularly beneficial to economically and socially disadvantaged households. Affordable-accessible housing is the opposite of *gentrification* (the displacement of lower-income households by wealthier households), it allows diverse households to live together in attractive neighborhoods, and so helps economically disadvantaged children to attend better schools, have more diverse neighbors, and better access to jobs and services. Children raised in concentrated poverty face severe academic and economic barriers; living in more mixed income neighborhoods tends to improve their peer support, positive role models and social connections, reducing multi-generational poverty (Basolo 2013; DHUD 2012). Ewing and Hamidi (2014) found that lower-income children have a greater chance of economic success if they grow up in compact, multimodal communities.

Household Wealth Generation

Households significantly increase their long-term wealth by choosing more expensive houses with lower transportation costs over cheaper houses with higher transport costs (Gillen 2012; USEPA 2014). Motor vehicles tend to depreciate rapidly while housing tends to appreciate, particularly if located in areas desirable due to their accessibility. This can have large impacts on long-term wealth. For example, in the short-term, spending $20,000 annually on a mortgage and $5,000 on transport has the same total cost as a $15,000 annual mortgage and $10,000 on transport, but after a decade the additional $5,000 mortgage payments accrues about $100,000 in additional equity (wealth) compared with the additional $5,000 spent on vehicles and fuel.

Local Businesses and Municipal Benefits

Higher-housing-lower-automobile also tends to benefit local businesses, including developers and the contractors they employ, and real estate professionals. It also tends to increase local property tax revenues, increasing funding for local governments. In most regions, automobile expenditures tend to generate relatively little employment and business activity because vehicle and fuel industries support few local jobs, so shifting household expenditures from transportation to housing supports local economic development. More compact development also tends to reduce the costs of providing public infrastructure and services.

Regional Productivity Benefits

Affordable-accessible housing can increase economic productivity by expanding the pool of workers available to businesses and by providing *agglomeration efficiencies* (Melo, Graham and Noland 2009); in contrast, policies that limit development density in economically successful cities reduce productivity. A U.S. Federal Reserve Bank study estimate that restrictions on infill development imposed a “regulatory tax” of about 20% in Washington DC, and Boston, and 50% in San Francisco and Manhattan (Glaeser, Gyourko and Saks 2005). Similar restrictions limit urban growth in developing country cities such as Mumbai (Jog 2015).

Hsieh and Moretti (2014), estimate that eliminating development density restrictions in large cities would increase employment and productivity five times, increasing national productivity as much as 13.5%. Empirical evidence indicates that regional productivity tends to increase with density and transit ridership and decline with per capita VMT (Litman 2014).

Table 8 summarizes affordable-accessible housing benefits and costs. Not all of these impacts apply everywhere, but they apply to some degree in most situations. It is important that these all be considered when evaluating housing policies.

Table 8 **Affordable-Accessible Housing Benefits and Costs**

	Benefits	Costs
Internal (impacts occupants)	Financial savings (particularly lower transport costs) Improved accessibility for non-drivers More local services Higher property values Increased physical fitness and health Increased economic opportunity Allows aging in place Reduced traffic accident risk Reduced chauffeuring burdens	Higher housing costs Less private greenspace Less privacy More exposure to noise and local air pollution More exposure to poverty and associated social problems Increases in some development costs
External (impacts other people)	Reduced homelessness and associated problems Reduced traffic and parking congestion Reduced road and parking infrastructure costs Reduced traffic accidents Energy conservation and emission reductions Reduced crime rates Local economic development Higher property values and tax revenues More efficient transit services	More local traffic and parking congestion Reduced views and sunlight Lost character homes More local poverty and associated social problems Increases in some development costs Increases in some public services costs

Affordable-accessible housing has various benefits and costs compared with less affordable or more sprawled housing.

Affordable-Accessible Housing Demand

An important question in this analysis is the demand for affordable-accessible housing, that is, the amount of lower-priced, compact housing located in accessible neighborhoods that would be rented or purchased.

Although only a minor portion of current North American housing is affordable-accessible, real estate market studies indicate that an increasing portion of households want to live in more accessible, multimodal neighborhoods, provided they are attractive, safe and affordable (NAR 2013). For example, one recent community preference survey found that approximately half of respondents prefer a more compact, walkable neighborhood over sprawled, automobile dependent neighborhood (PEW 2014). Levine and Frank (2007) found that many automobile-dependent community residents would prefer more walkable, mixed-use neighborhoods provided that they have appropriate amenities and design features.

Current demographic and economic trends are increasing affordable-accessible housing demand (Litman 2009; Missing Middle - Demand 2015; ULI 2011):

- Aging population is increasing the number of retirees, many with limited incomes, and the number of people who cannot or should not drive.
- Lagging incomes are increasing demand for lower price housing and transport options.
- Increased urbanization and congestion is increasing demand for walking, cycling and grade-separated transit.
- Improving travel options (better walking and cycling conditions, transit services, etc.) and more attractive urban conditions (lower crime rates, more parks, streetscaping, etc.) are increasing urban housing demand.
- Health and environmental concerns increase demand for walking, cycling and public transit.
- Changing preferences, particularly by younger households, increase demand for urban living.

As a result of these trends, if, in a particular communities households demanded 10,000 affordable-accessible housing units in 1990, demand is likely to be 20,000 today and more than 30,000 in 2030. Many urban areas are thousands of units short of market demand for such housing. Affordable-accessible housing development is particularly appropriate in cities with the following attributes:

- Rapid population and economic growth.
- Geographic constraints limit urban expansion.
- Existing stock of lower-priced housing is limited.
- Aspires to support economic development, help disadvantaged households, and protect the environment.

Of course, every household has unique needs and preferences that affect their housing demands. For example, larger households need houses with sufficient bedrooms; some households enjoy gardening or have pets that require yards (demands that can sometimes be satisfied with rooftop and allotment gardens, shared yards and public parks); and some households have hobbies or businesses that require studios, workshops or garages in their building or available for rent nearby. Some households will only choose urban neighborhoods that have well-rated schools or other services. Some households will only choose housing that lacks parking spaces if vehicle rental services are located in or near the building. To be attractive to consumers, affordable-accessible housing must responds to these needs and preferences.

Dynamic City Planning

A dynamic city responds to growing demand for affordable-accessible housing by removing unnecessary impediments and increasing support, for example, by allowing more affordable housing types, improving affordable travel modes, and allowing more compact, infill development. Many jurisdictions are slow to do this, in fact, they sometimes respond to increased demand by adding more restrictions on growth and affordability. For example, a California Legislative Analyst Office study, *California's High Housing Costs: Causes and Consequences* (Taylor 2015), concludes that the state's high housing prices (house prices are about two-and-a-half times, and monthly rents about 50% higher than the national average) result primarily from local restrictions on compact infill housing, and that annual housing development must increase from the current 100,000-140,000 up to 170,000-250,000 units to meet demand and reduce excessive prices. Other attractive urban regions face similar shortages due to similar restrictions on infill development.

Table 9 lists examples of common public policies that discourage affordable-accessible housing development. Some of these are clearly intended to exclude lower-priced housing. Others reflect older planning practices, such as the assumption that "transportation" means automobile travel and affordable modes are unimportant. Some are subtle, technical practices that unintentionally favor higher priced housing and transport, and lower density development.

Table 9 **Examples of Policies That Discourage Affordable-Accessible Housing**

Affordable Housing	Affordable Transportation	Compact Development
• Minimum parcel size and restrictions on subdivision • Restrictions on building density, floor area ratios (FARs), height and lower-priced housing types • Restrictions on mixed-use development (such as apartments over commercial) • Minimum parking and setback requirements • Fees and design requirements that increase housing development costs	• Streets that lack sidewalks • Wider roads designed for high traffic speeds, which create barriers to walking and cycling. • Urban freeways that divide communities • Abundant, subsidized parking supply • Underinvestment in public transport • Lack of cycling facilities • Low fuel prices	• Restrictions on development density and compact housing types • Urban fringe infrastructure investments (roads, water and sewers lines, etc.) not charged directly to users • Minimum parking requirements • Public facilities (schools, post offices, etc.) that are difficult to access without a car

Many current policies favor more expensive housing and transport over more affordable options.

Of course, virtually all of these policies benefit somebody and so seem reasonable and justified from some perspectives. Restrictions on density and multi-family housing are intended to preserve neighborhood homogeneity and exclude poverty, and minimum parking requirements are intended to improve motorists' convenience. However, their impacts are cumulative and synergistic (implemented together, their total impacts tend to be larger than their individual impacts). For example, restrictions on density and multi-modal housing force lower-priced housing to be developed at the urban fringe where transportation costs are high, so lower-income households face the double burden of high housing and transportation costs.

Local government's reluctance to support affordable-accessible housing largely results from opposition by neighbors (Hilber and Robert-Nicoud 2013). Some of their objections reflect concerns about direct impacts such as construction disruption and traffic problems, which can often be addressed with design and

management strategies, but opposition often reflects fears that lower-priced housing will attract poor households that cause social problems and reduce property values. This is understandable since residents can suffer if their neighborhood becomes economically distressed (i.e., a "slum"), but such concerns are often exaggerated: most affordable housing residents are responsible and law abiding, a few lower-priced housing units seldom degrades a neighborhood, and better housing for lower-income households can help reduce total social problems. At best, excluding poor residents from a neighborhood simply displaces them elsewhere. As previously discusses, affordable-accessible housing can help reduce total regional social and traffic problems by increasing at-risk residents' economic opportunities, and by reducing total vehicle ownership and use. Infill development provides direct benefits to local residents that can help offset the costs they bear, including more neighborhood services (more shops and restaurants), more affordable housing options that may allow current residents to remain in their community after selling their single-family homes or to allow family members to live nearby, and higher development allowances increase real estate values which benefits home owners in the long-run. Table 10 lists potential responses to potential community concerns.

Table 10 **Addressing Neighborhood Affordable Housing Concerns**

Concern	Response
Construction disruption	This can be addressed through good project management
Reduced privacy	This can be addressed through good design and landscaping
Increases traffic and parking problems	Lower-income households located in accessible neighborhoods tend to own relatively few vehicles and drive less than conventional traffic models predict, and much less than if they lived in sprawled locations
Lower-income households are dangerous and demanding	Existing residents may want affordable-accessible housing in the future in order to *age in place* (continue living in their community as they grow old) or to allow family members and friends to live nearby (AARP 2005)
Increased crime	Most affordable-accessible housing residents are responsible and law abiding, they are lower-wage workers, students and pensioners. Affordable-accessible, mixed income development tends to reduce total crime.
Reduced property values	Allowing increased density tends to increase property values
Increased tax rates, if property values increase	The additional taxes will be recouped when the property is sold. Municipal governments can offer tax deferral policies, so taxes are paid upon sale.
Changes "neighborhood character"	Changes can be good as well as bad, including more local services. Existing residents may someday want to live in affordable housing in their neighborhood.

Many objections to affordable-accessible housing are exaggerated and can be addressed through good planning.

Residents' ability to block affordable infill development reflects a political power imbalance. Affordable-accessible housing opponents tend to be vocal and well organized, while the ultimate beneficiaries, lower-income households that would be future residents, are generally unaware of their interests and not politically influential. Their interests are represented by developers, who are often criticized as "only motivated by profits," and therefore morally suspect. These political forces result in less affordable infill housing development than is optimal from social welfare (considering benefits to future residents) or regional (considering community benefits such as reduced traffic problems) perspectives.

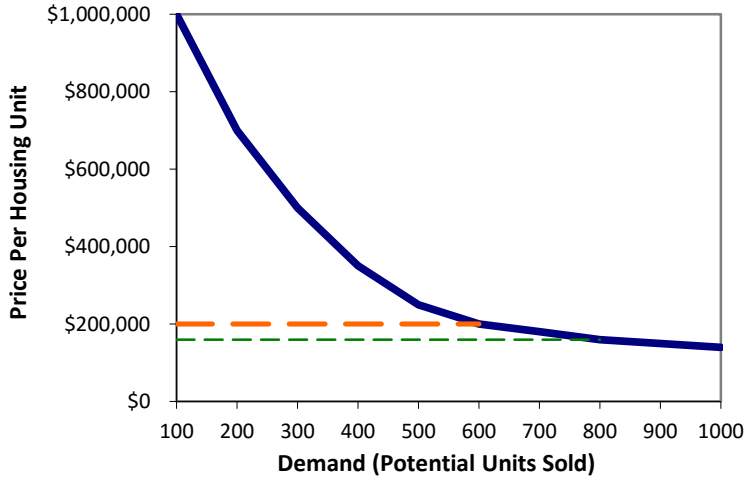
Factors Affecting Affordable Housing Development

This section describes factors that affect the amount of affordable-accessible housing that will be developed in an area.

Developer and real estate profits tend to be proportionate to sales prices; for example, a $400,000 unit provides twice the potential profit as a $200,000 unit. For this reason, developers will generally build as many higher-priced units as the market can bear before moving down the demand curve to lower-priced units. As a result, relatively modest density restrictions or cost increases can significantly reduce the number of affordable housing units built.

For example, a developer with a one-acre urban parcel suitable for 50 units might build 10 high-priced units, 20 medium-priced units and 20 lower-priced units, reflecting the demand curve, but if density restrictions limit the parcel to 30 units, the developer is most likely to eliminate the lower-priced units since they are least profitable. Similarly, if additional expenses, such as minimum parking requirements or added fees increase minimal development costs from $160,000 to $200,000 per unit, the minimal feasible sales price (development costs plus 10% profit) increases from $176,000 to $220,000. Figure 18 illustrates a typical housing demand curve, which shows the number of new housing units sold at various prices in a neighborhood. With this demand curve, the increase from $176,000 to $200,000 per unit reduces potential sales from 800 to 600 units, which means that 200 households would like to live in that neighborhood in a modest house without a parking space, provided it is priced under $200,000, but cannot due to density restrictions or increased development costs.

Figure 18 **Housing Sales Demand Curve**



This demand curve shows the number of housing units that could be sold at various prices. If the number of buildable units is constrained, developers will generally produce higher-priced units since they are most profitable. Only after the higher-priced market is saturated will they build lower-priced housing, even if the potential market is large.

As a result, the minimum feasible price (the cheapest housing that developers could justify building) increases as development costs and construction delays increase.

There are many real examples which show how development restrictions and costs reduce the production of lower-priced housing. For example, in 2003 a developer proposed the Bohemia and Castana buildings, a pair of three- and four-story mixed-use buildings with ground-floor commercial and 71 residential units, a third of which were to be moderate-price rentals, in the Cook Street Village, an accessible neighborhood in Victoria, BC. The proposal was rejected due to local residents' objections to what they considered the project's excessive size. In 2006 the developer proposed a smaller three-story design with only 51 units, no rentals, which was approved. In a city with nearly 50,000 houses, 20 fewer units is too small to notice, but if this is typical, it indicates that community resistance reduces the production of affordable infill housing by 40%.

Affordable-Accessible Housing Development Strategies

Various strategies can facilitate affordable-accessible housing development, but some are better than others overall, considering all of their impacts.

Ineffective and Sometimes Harmful

Urban Blight

In mature, low-growth cities, affordable housing often consists primarily of old, inefficient housing in undesirable neighborhoods. Although such housing is cheap to rent or purchase, it is often uncomfortable and costly to operate, with high maintenance and utility costs, and to the degree that low-priced housing is concentrated in "slum" neighborhoods, it tends to exacerbate social problems such as crime and multi-generational poverty.

Cheap Suburban Development

Urban fringe housing can be easy to develop due to low land costs, minimal neighborhood opposition and avoidance of some infrastructure costs (such as sidewalks and stormwater connections), but such savings are often offset by increased transportation costs, including vehicle expenses, travel time and traffic accidents, plus other costs of sprawl, including higher costs of providing public infrastructure and services.

Rent Controls

Rent controls (also called *rent stabilization*) regulate landlords' ability to raise rents. They generally allow modest annual rent increases to current tenants and larger increases for new tenants. Rent controls increase affordability for current occupants but by reducing rental housing profitability they may reduce housing quality (landlords have less incentive to maintain their properties, and may have incentives to make the units so unpleasant that current renters leave), and may reduce the profitability, and therefore reduce the development of new lower-priced housing, resulting in less total supply and higher prices for other (non-occupant) households (Jenkins 2009; Powell and Stringham 2004; Tatian 2013; for an alternative perspective see Collins 2009). Because occupants only maintain below-market rents if they stay in their current homes, they are discouraged from moving, for example, to be closer to work or family.

Restrict Rental-To-Owner Conversions

Jurisdictions sometimes prohibit owners from converting rental units to condominiums in order to protect the supply of affordable rental housing. However, this reduces the supply of affordable condominiums and reduces the incentive for developers to build more rental units.

Inefficient and Costly

General Policies That Support Housing Development and Purchases

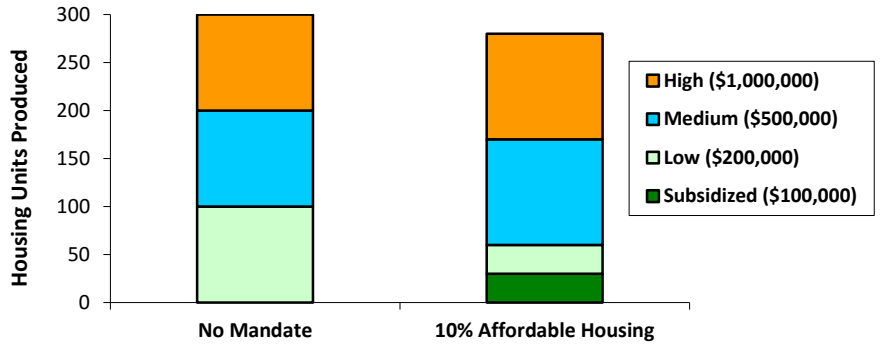
Policies such as low interest rates, mortgage interest tax deductions, and infrastructure investments (e.g., urban fringe roadway expansion) support housing development and purchases. They primarily help middle- and higher-income households purchase more expensive homes, and much of the value may be capitalized into land values (e.g., if interest rates decline 10% all house buyers can all pay 10% more). Lower-income households often benefit little.

Affordable Housing Mandates (Inclusionary Zoning)

Affordable housing mandates (also called *Inclusionary zoning*) require that a portion of new housing units (typically 10-20%) be sold or rented below market prices, or developers contribute to an affordable housing fund. This helps create affordable housing as communities grow, and if required of all developers these cost are partly capitalized into land values, minimizing the burden on individual developers or governments. However, this approach usually satisfies only a small portion of affordable housing demand, resulting in a large subsidy to a small number of households, and by adding a cost to new housing development tends to reduce total housing production and therefore future affordability.

For example, if the cheapest housing units costs $200,000 to develop and regulations require 10% be priced at $100,000, each of the nine non-qualifying units bears an additional $11,111 ($100,000/9) cost, which adds about $20,000 to their final price, including overhead and financing costs. This is a small increase for high-priced housing (2% for a million dollar house) but a large increase for lower-priced housing (10% for a $200,000 condominium). Since lower-priced housing development tends to be price sensitive, this can significantly reduce the number produced. In this way, inclusionary zoning can reduce housing affordability, particularly over the long run, by reducing production of the moderately-priced houses that will be the future affordable housing stock. Figure 19 illustrates an example of this effect. Actual responses will vary depending on market conditions; in some situations, subsidy costs may reduce land values or developer profits, but in the least affordable markets these costs are likely to be incorporated into prices. A study by Means and Stringham (2012) found robust empirical evidence that below-market housing mandates reduce housing construction and increase prices.

Figure 19 **Impacts of Affordable Housing Mandates on Housing Production**



If developers are required to sell 10% of units below production costs, they must recover the subsidy costs by building more, larger and higher-priced units, and fewer smaller, low- and medium-priced units. This reduction in lower-priced housing production may reduce future housing affordability.

To avoid these negative effects, moderate-priced housing that is likely to become affordable within a decade or two can be exempt from affordable housing mandates and funding requirements. For example, if housing is considered affordable if priced under $200,000 per unit, affordable housing mandates would only apply to housing priced over $400,000, since $200,000 to $400,000 units help increase affordable housing.

Targeted Subsidies

Another common strategy that may have undesirable unintended consequences is to subsidize a particular group's rents. Unless this increases the total supply of lower-priced housing, such subsidies may drive up rents and displace other deserving households. For example, a rent subsidy provided to lower-income seniors may cause recipients to displace other lower-income households such as service workers, students and people with disabilities, forcing them to accept less desirable housing options. Only if the subsidies increase total affordable housing supply in desirable areas will it provide overall benefits.

Subsidize Urban Fringe Transportation

Affordable housing is sometimes located at the urban fringe where land prices are lower but transportation is costly, particularly for non-drivers. In response, governments and charities may subsidize automobile ownership and expand public transit service. However, this is costly and exacerbates other problems including congestion, road and parking facility costs, accidents and pollution emissions.

Sweat Equity and Volunteer Construction

Housing can be built by owners or volunteers. This is common in developing countries and rural areas where simple homes are often built with traditional methods, but is less appropriate for modern urban buildings which require specialized materials and skills. Many households that most need affordable housing are unsuitable builders due to inexperience, disabilities and heavy work schedules, and amateur-built housing often has imperfections that cause future problems and reduce resale values.

Most Cost Effective and Beneficial

Raise Allowable Densities and Heights

Many jurisdictions limit parcel size, development density, building heights, floor area ratios (FARs), multi-family housing, and conversions of commercial or industrial buildings to residential uses, and require minimum parking and setbacks (Cutler 2014; Glaeser and Ward 2008; Yglesias 2012). Eliminating or reducing such policies allows more compact, affordable infill development.

Identify and Reduce Barriers to Affordable-Accessible Housing Types

Identify and reduce existing policies and planning practices that add unnecessary costs, delay and uncertainty to the development of inexpensive, compact housing types most suitable for affordable infill (Cecchini 2015; Curran and Wake 2008):

- *Small-lot single-family housing.* Stand-alone houses on 2,000 to 4,000 square foot lots.
- *Accessory units*. Self-contained units with separate entrances, kitchens and bathrooms.
- *Laneway houses* and *garage conversion*. Small houses built behind or next to a main house, sometimes above or replacing a garage.
- *Townhouses* (also called *rowhouses* or *attached housing*). Connected houses with shared walls but separate entrances.
- *Low-rise (2-6 story) apartments*, used for either rentals or owner-occupied condominiums.
- *Micro-apartments* (apartments less than 500 square feet).
- Additional floors added to existing buildings.
- *Residential over commercial*. Apartments located above a commercial space in an urban building.
- *Industrial or commercial building conversions* to residential uses, such as loft apartments.
- Housing developed on underused parking lots.

Minimize and Prorate Fees for Lower-Priced Housing

Fixed costs and fees represent a larger share of total costs for smaller projects and lower-priced housing. For example, a planning requirement such as a traffic study, a design requirement such as an elevator, or a development fee of $10,000 per unit, may significantly increase the retail price of small and inexpensive housing projects, and therefore significantly reduce total affordable infill housing development, but have little impact on the final price of expensive housing built in large projects. Governments can minimize such costs and provide discounts and exemptions for lower-priced infill housing, for example, exempting them from traffic studies, elevator requirements and development fees.

Expedite Development Approval and Permitting

Expedite the development approval and permitting process for lower-priced housing in order to reduce their costs and make such projects more attractive to developers. This can include, for example, eliminating traffic and parking impact studies (justified because affordable-accessible development tends to generate far less traffic and parking than standard models predict), and shorter planning review and permitting periods for developments that meet affordable-accessible housing guidelines.

Lending Reforms and Incentives

Provide loan guarantees, tax incentives and public-private partnerships that help minimize development borrowing costs (Black 2012).

Density Bonus and Requirements

Allow higher densities and greater heights than normal in exchange for more affordable housing units. This supports compact, affordable, infill development while preventing land value increases that would result if increased density were allowed for higher priced housing units. It some cases municipal governments can require minimum building density and height in accessible locations, for example, at least four stories along major arterials, and three stories along minor arterials, with flexibility to allow design variations.

Identify Parcels Suitable For Affordable-Accessible Development

Governments or private organizations can maintain a database of lots suitable for affordable infill housing.

Provide Free or Inexpensive Land for Affordable Housing

Governments often control various land parcels, including outdated public facilities and land acquired though unpaid taxes. They can donate or sell at a discount appropriate parcels to affordable housing development, particularly for social housing to accommodate people with special needs.

Brownfield Remediation

Brownfields are sites whose development potential is constrained by perceived or real environmental contamination, including many in urban areas suitable for affordable housing. Cleaning up these sites by enforcing legal requirements on past owners or through subsidies can make them suitable for development.

Targeted Tax and Fee Discounts and Exemptions

Provide discounts or exemptions to lower-priced infill development (Black 2012).

Land Value Tax and Undeveloped Land Surtax

Land value taxes that shift property tax burdens from buildings to land value tends to encourage more compact, accessible development, and reduces land speculation (Rybeck and Rybeck 2012). This makes buildings cheaper to construct, improve and maintain, and discourages land price increases and speculation, resulting in more affordable, infill development on high-value sites.

Reform Taxes, Development Fees and Utility Rates to Support Compact Development

Development fees, taxes and utility rates can be structured to encourage compact development by providing discounts or exemptions for smaller and cheaper units, for housing with lower vehicle trip and parking generation rates, and for compact, infill development, reflecting the lower costs of providing public infrastructure and services to such housing (HUD 2008). Special discounts can be offered for affordable housing, similar to lower tax rates for heritage buildings and seniors. Federal and state tax policies can also be reformed to support accessible-affordable housing (AIA 2010).

Dynamic Zoning

Incorporate automatic adjustments to zoning codes to achieve strategic objectives. For example, automatically increase the allowable heights of single-family parcels adjacent to a commercial development by one story, and allow automatic conversion to multi-family on these parcels after ten years. Similarly, allowable densities, building heights, floor area ratios (FARs), suites, and uses could automatically increase in certain areas or for certain land use categories, based on a time schedule (e.g., a 5% annual increase) or specified criteria (such as when the supply of affordable housing declines to a certain point).

Address Neighborhood Concerns

Neighborhood opposition to affordable infill development often results from concerns that can be addressed with better information or responsive policies, as described in the table below.

Table 11 **Potential Responses To Neighborhood Concerns** (NMHC 2007; NPH 2003)

Problem	Potential Responses
Fear of lower-income neighbors	Education about the types of households that occupy affordable housing and their neighborhood risks.
Traffic congestion	Analysis about the relatively low trip generation rates of affordable-accessible housing residents (typically half or quarter of average units).
Parking congestion	Analysis of affordable-accessible housing parking demand (typically less than half of average units), and improved parking management and enforcement.
Increased noise	Improved noise regulation enforcement.
Shading from tall buildings	Consider solar access in building design to minimize shading.
Reduced property values	Research concerning actual property value impacts (in many situations property values actually increase if higher density development is allowed).
Higher property taxes (if property values increase)	Offer tax deferments, so residents do not pay higher taxes until they sell their property.

Many neighborhood impacts can be addressed with improved design, management and education.

Improve Building Design

Opposition to infill development often reflects unhappiness with design rather than density. Municipal governments can support design contests, planning workshops and community involvement to help develop more acceptable design. Websites such as the *Affordable Housing Design Advisor* (www.designadvisor.org), the *Congress for New Urbanism* (www.cnu.org), the *Missing Middle* (www.missingmiddlehousing.com) and Portland's Infill Design (www.portlandoregon.gov/bps/34024) provide resources for improving lower-priced housing design and responding to requirements of specific situations. Design improvements, such as more attractive buildings and community amenities, can be required in exchange for higher allowable densities.

Resource Efficiency Design

Encourage developers to incorporate resource efficiency practices when building affordable housing, and use lifecycle cost analysis to optimize decisions that involve trade-offs between construction and operating costs (EEFA 2015). This can be implemented by requiring developers to meet standards such as LEED Ratings.

Smart Growth Reforms

Various policies, such as those described in Table 12, can encourage more compact, mixed, accessible development. Such measures can reduce development costs by allowing higher densities that reduce parking requirements, increase transportation affordability, and help achieve other economic, social and environmental objectives. Smart growth policies can be implemented in both existing urban areas and in newer suburban communities (Larco 2010).

Table 12 **Examples of Smart Growth Reforms** (Litman 2005)

Strategy	Description
Comprehensive community planning	Community has a planning process which identifies strategic transport and land use goals, objectives and targets
Intergovernmental coordination	Effective coordination among various levels of government
Location-based fees	Structure development fees based on the costs of providing public services
Smart tax policies	Correct tax policies that encourage sprawl
Smart growth public facilities	Locate and design schools, parks and other public facilities for multimodal accessibility
Reform zoning codes	Reduce restrictions on density and mix, and excessive parking requirements
Encourage urban redevelopment	Encourage urban redevelopment with infrastructure investments
Growth controls	Limit urban expansion into farmlands and valuable habitat
Transport planning reforms	Improve alternative modes and encourage more efficient transport
More neutral transport funding	Reduce dedicated roadway and parking funds. Apply least-cost planning
Mobility management	Implement mobility management as an alternative to roadway expansion
Parking management	Implement parking management as an alternative to parking facility expansion
Educate decision-makers	Educate decision-makers about smart growth policies and benefits.
Land use impact evaluation tools	Develop better tools for evaluating land use impacts.

This table describes smart growth reforms that support urban development and increase accessibility.

Compact development can provide various direct and indirect benefits, some of which are often overlooked (Ewing and Hamidi 2014; Litman 2015b). These include transportation cost savings, travel time savings, improved accessibility for non-drivers, improved public fitness and health, plus increased household wealth generation and economic opportunity. Providing information on these benefits to households making location decisions (where to rent or buy a house), real estate professionals, and public officials concerning where and how to support residential development supports smart growth development.

Implement Traffic and Parking Management

Opposition to infill development often reflects residents' concerns about increased traffic and parking congestion. Such concerns are often exaggerated since lower-income, accessible neighborhood residents tend to own far fewer vehicles and generate fewer trips than regional averages (Millard-Ball 2015; Schneider, Handy and Shafizadeh 2014), and the following strategies can further reduce these problems.

Table 13 **Traffic and Parking Management Strategies** (Litman 2006)

Strategy	Description
Traffic calming	Change roadway designs to limit traffic speed.
Mobility management	Use policies and programs to encourage use of more efficient transport options, such as shifting from peak to off-peak, and from automobile to more resource-efficient modes.
Improve travel options	Improve walking, cycling and public transit to reduce automobile ownership and use.
Carsharing	Develop carsharing services (short-term vehicle rentals) in residential buildings and neighborhoods to reduce households' need to own automobiles.
Shared parking	Parking spaces serve multiple users and destinations.
More accurate requirements	Adjust parking standards to more accurately reflect demand in a particular situation.
Remote parking	Provide off-site or urban fringe parking facilities.
Efficient parking pricing	Charge motorists directly and efficiently for using parking facilities.
Unbundle parking	Rent or sell parking facilities separately from building space.
Bicycle facilities	Provide bicycle storage and changing facilities.
Improve user information	Provide convenient and accurate information on parking availability and price, using maps, signs, brochures and electronic communication.
Overflow parking plans	Establish plans to manage occasional peak parking demands.
Address spillover impacts	Monitor and address spillover problems, such as residents using forbidden parking spaces.
Improve enforcement	Insure that parking regulation enforcement is efficient, considerate and fair.

Management strategies can reduce traffic and parking problems, and therefore opposition to infill development.

Unbundle Parking

Parking unbundling means that parking spaces are rented separately from building spaces, so for example, rather than paying $1,000 a month for an apartment with two "free" parking spaces, residents pay $800 per month for an apartment plus $100 for each parking space they want to use, so renters are not forced to pay for parking they do not need. This is particularly appropriate for affordable-accessible housing since lower-income occupants tend to own fewer than average vehicles. This reduces development costs and encourages households to reduce their vehicle ownership, which can help reduce traffic problems.

Reduced and More Accurate Parking Requirements

Reduce minimum parking requirements and adjust them in response to demographic, geographic and management factors, such as those described in Table 14. This can significantly reduce the costs of infill housing development, and many of these strategies encourage households to reduce their vehicle ownership and use, which reduces traffic problems (Manville 2010).

Table 14 **Parking Requirement Adjustment Factors** (Litman 2006)

Factor	Description	Typical Adjustments
Density	Number of residents or housing units per acre/hectare	Reduce requirements 1% for each resident per acre (e.g. 15% at 15 residents per acre and 30% at 30 res. per acre)
Land use mix	Range of land uses located within convenient walking distance	Reduce requirements 5-10% in mixed-use developments. Additional reductions possible with shared parking
Transit accessibility	Nearby transit service frequency and quality	Reduce requirements 10% within ¼ mile of frequent bus service, and 20% within ¼ mile of a rail transit station
Carsharing	Whether a carsharing service is available nearby	Reduce residential requirements 10-30% if carsharing is located in or near a residential building
Walkability	Walking environment quality	Reduce requirements 5-15% in walkable communities, and more if walkability allows more shared and off-site parking
Demographics	Age and physical ability of residents or commuters	Reduce requirements 20-40% for housing for young (under 30) elderly (over 65) or disabled people
Income	Average income of residents or commuters	Reduce requirements 10-20% for the 20% lowest income households, and 20-30% for the lowest 10%
Housing tenure	Whether housing is owned or rented	Reduce requirements 20-40% for rental versus owner occupied housing
Pricing	Parking that is priced, unbundled or cashed out	Reduce requirements 10-30% for cost-recovery pricing (i.e. parking priced to pay the full cost of parking facilities)
Unbundled parking	Parking sold or rented separately from building space	Unbundling parking typically reduces vehicle ownership and parking demand 10-20%
Parking & mobility mgmt.	Parking and mobility management programs implemented at a site	Reduce requirements 10-40% at worksites with effective parking and mobility management programs

This table summarizes various factors that can allow parking supply and zoning requirements to be reduced.

Extensive research indicates that parking requirements really do increase housing costs and reduce affordable housing supply (Jia and Wachs 1998; Litman 2012). For example, Manville (2010) found that when parking requirements were removed in downtown Los Angeles, developers provide more housing and less parking, and a greater variety of housing types: housing in older buildings, and lower-priced housing with unbundled parking. Similarly, analysis of 23 recently completed Seattle-area multifamily housing developments reveals that parking subsidies increase monthly rents approximately 15% or $246 per month for each occupied unit; that approximately 20% of occupants own no motor vehicles, and during peak periods 37% of parking spaces are unoccupied (London and Williams-Derry 2013). The authors conclude that "the practice of providing abundant "cheap" parking actually makes rental housing more expensive."

Reduced and more flexible parking requirements, with more efficient parking management, reflects a new parking planning paradigm. The old paradigm assumed that "transportation" consists primarily of automobile travel so the primary planning goal is to make driving inexpensive and convenient. The new paradigm recognizes the value of other modes, particularly in urban conditions, and recognizes the significant costs that abundant parking and the increased vehicle traffic it creates, and so considers excessive and underpriced parking to be inefficient and unfair, particularly for lower-income households which tend to own fewer than average vehicles.

Allow Development On Existing Parking Lots

Many urban areas have conveniently-located, underutilized parking facilities which can provide excellent affordable housing building sites (CNT 2006).

Improve Affordable Transportation

Improving affordable transport modes (walking, cycling, public transit, taxi and carsharing) provides direct savings to households and, by reducing residents need to own and travel by automobile, reduces parking and traffic problems which decreases neighbors' objections to infill development.

Discourage or Prohibit Rental Restrictions

Some condominiums have covenants that forbid or significantly impede owners from renting their units. This reduces the supply of affordable rental units. Regulations or tax policies can discourage such restrictions.

Affordable Housing Maintenance and Rehabilitation Programs

Many communities have an existing stock of affordable housing, some of which is poorly maintained and may become uninhabitable. Targeted assistance can help maintain and restore this housing stock. This can include low-interest loans home improvement loans that must be repaid when the building is sold. Such programs can favor housing in accessible locations to increase the supply of affordable-accessible housing.

Summary

Table 15 summarizes these affordable-accessible housing development strategies. It indicates that there are many possible ways to increase housing affordability, but they vary significantly in their total benefits and costs. Some affordability strategies increase other household costs, such as house operating expenses and transportation costs, including vehicle expenses, travel time and traffic accidents. Some strategies increase external costs, such as costs to governments and businesses of providing public infrastructure, and the traffic congestion, accidents and pollution emissions caused by increased per capita vehicle travel. Some strategies require financial subsidies. In general, the strategies that are most cost effective and beneficial overall are those that reduce housing and transportation resource costs, including land consumption, infrastructure requirements, vehicle ownership and total travel.

Some of these impacts vary depending on analysis scale. For example, infill development can increase local traffic and parking congestion, but affordable-accessible housing tends to generate 50-80% fewer vehicle trips and parking demand than conventional traffic models predict (Metro Vancouver 2012; Millard-Ball 2015). These repercussions can be further reduced with traffic and parking management strategies, and by reducing total vehicle ownership and use, tends to reduce regional traffic and parking congestion.

Table 15 Affordable-Accessible Housing Strategies

Strategies	Impacts
Ineffective and Sometimes Harmful	
Urban blight	Reduces housing costs but harms communities and concentrates poverty
Cheap suburban development	Reduces housing costs but increases transport and sprawl costs
Rent control	Benefits existing residents but reduces lower-priced housing development
Restrict rental-to-owner conversions	Benefits existing residents but reduces lower-priced housing development
Effective But Costly	
Support housing development and purchase	Primarily benefits affluent homebuyers. May do little to increase affordability
Inclusionary zoning (affordability mandates)	Subsidizes housing for some households but increases costs to others
Targeted housing subsidies	Benefits people who receive subsidies, but this may displace others
Subsidize urban fringe transportation	Is costly and exacerbates traffic problems
Sweat equity and volunteer construction	Potential is generally small compared with total affordable housing needs
Most Effective and Beneficial	
Raise allowable densities and heights	Allows more affordable, compact, infill development
Allow and support compact housing types	Allows more affordable, compact, infill development
Minimize & prorate fees for inexpensive housing	Reduces costs of inexpensive, infill housing development
Expedite development approval and permitting	Reduces costs and encourages development of lower-priced housing
Density bonuses and requirements	Encourages developers to build more affordable housing
Lending reforms and incentives	Reduces development financing costs
Identify parcels suitable for infill	Helps developers build infill housing
Provide free or inexpensive land	Helps developers build affordable housing
Targeted tax and fee exemptions	Reduces affordable-accessible housing development costs
Brownfield remediation	Makes contaminated land available for development
Land value tax and undeveloped land surtax	Encourages more compact urban development, reduces land speculation
Reform development and utility fees, and taxes	Encourage more compact and affordable housing development
Affordable housing targets/improve design	Encourages communities to accept affordable housing
Address community concerns	Reduces neighborhood opposition to affordable housing
Allow smaller lots and urban parcel subdivision	Increases the supply of smaller urban lots
Dynamic zoning	Allows communities to respond to increased affordable-accessible housing demand
Improve building design	Reduces neighborhood opposition to affordable infill development
Improve building efficiency	Reduces operating costs, which increases long-term affordability
Address neighborhood concerns	Reduces community opposition to affordable infill development
Smart growth reforms	Encourages more compact development and reduces infill development costs
Traffic and parking management	Reduces traffic and parking problems, and therefore opposition to infill development
Unbundle parking	Reduces development costs and vehicle ownership
Reduced and more accurate parking requirements	Reduces parking costs, particularly for affordable-accessible housing, and may allow parking lots to be converted to housing
Allow development on parking lots	Often provides excellent sites for affordable-accessible housing
Improve affordable transportation options	Improves accessibility, reduces household transport costs, reduces traffic impacts
Discourage or prohibit rental restrictions	May increase the number of rental units available in a community
Affordable housing maintenance programs	Preserves existing affordable housing stock

This table summarizes various ways to support affordable-accessible housing development.

Examples

Examples of affordable-accessible housing development policies and projects are described below. Also see the Affordable Housing Best Practices (www.huduser.org/portal/bestpractices) website.

Analysis

Location Efficient Development and Mortgages

The Housing and Transportation Affordability Index (http://htaindex.cnt.org) and the *Institute for Location Efficiency* (www.locationaffordability.info) promote *location efficient development*, housing located in accessible areas with low transport costs, and *location efficient mortgages*, which means that lenders recognize these savings when evaluating households' borrowing ability, allowing higher limits for homes in more accessible location reflecting their transport cost savings.

Austin Smart Growth Matrix

Austin, Texas uses a *Smart Growth Matrix* (www.ci.austin.tx.us/smartgrowth) to analyze development proposals. It evaluates a development's location, proximity to transit, urban design, compliance with neighborhood plans and projected tax revenue. Financial incentives may be available for developments with high scores, such as waiver of development fees and public investment in infrastructure.

GreenTRIP

The *GreenTRIP* (www.transformca.org/GreenTRIP) certification program for new residential and mixed use developments. It rewards projects that reduce traffic and greenhouse gas emissions. GreenTRIP expands the definition of green building to include transport to and from the buildings. Each certified project receives a *Project Evaluation Report* which describes the project location, details and inventories how the project meets GreenTRIP standards. This typically includes features such as an accessible and multimodal location, parking management, carshare services, discounted public transit passes, and affordable housing.

Economic Productivity Gains

Building on research concerning the economic productivity gains from large, compact cities, Hsieh and Moretti (2014) analyzed the economic losses caused by policies that limit development density in New York, Washington, Boston, Seattle, and the San Francisco Bay Area. They estimate that restrictions on denser, infill development in high productivity cities reduce aggregate national economic output by 13% or more, equivalent to several thousand dollars per worker.

Housing Affordability Studies

The mayors of Seattle (Murray 2015) and Victoria (Helps 2015) established task forces that included community and development industry representatives, and invited public input, to evaluate affordability problems, set targets, and identify specific policy reforms to increase affordable housing supply.

Location Efficiency Reduces Housing Foreclosure Rates

Rauterkus, Thrall and Hangen (2010) used a sample of over 40,000 mortgages in Chicago, Jacksonville, and San Francisco to model residential mortgage default rates based on home location factors. The analysis found that, after controlling for other factors such as household income, default rates increase significantly with the number of vehicles owned, and decreases with neighborhood WalkScores in high income areas but increases with higher WalkScores in low income areas. The results suggests that in most situations, smart growth policies can help reduce foreclosure rates, but these impacts are overwhelmed by factors associated with neighborhood poverty. Pivo (2013) found similar results for multi-family housing.

Policies

Mixed-Income Housing TOD Action Guide

The *Mixed-Income Housing TOD Action Guide* (CTOD 2009) describes many of the same strategies recommended in this report to help create more affordable-accessible housing:

- Adjust Zoning to Promote Diversity
- Brownfield Remediation.
- Community Land Trusts
- Condominium Conversion Controls
- Development Agreements
- Fast Track Permitting
- Fee Waivers, Reductions, Deferrals
- First-Right-of-Refusal Laws for Tenants and Nonprofits
- Implement physical transit-access improvements
- Improve transit knowledge
- Incentive-Based Zoning
- Inclusionary Zoning
- Joint Public/Private Development
- Land Banking
- Limited Equity Housing Co-ops
- Linkage fees
- Parking Maximums for Transit Areas
- "Project Based" Section 8 Preservation
- Provide greater access to transit discounts and resources
- Public Land Dedication or Write-Downs
- Public Land Disposition Plan
- Reduced Parking Requirements
- Regulatory Accommodation for Small Sites
- Rent Control
- Self-help programs
- Site parks & schools
- Site social service facilities
- Subsidized housing redevelopment/renovation
- Support start-up nonprofit developers
- Target-property Acquisition & Rehabilitation funds
- Tax Forgiveness for Back Taxes on Affordable Housing Opportunity Sites
- TOD-Targeted Homeownership Assistance
- TOD-Targeted Housing Financing
- Transfer taxes

Affordable-Accessible Housing in Chicago Suburbs

The report, *Quality of Life, (e)Quality of Place* (Saunders and Smith 2014), evaluates demand for affordable-accessible housing in Chicago's northern suburbs and identifies specific policy reforms and planning strategies to help meet those demands.

California Inclusionary Zoning Law

California state "density bonus" law requires that jurisdictions offer bonuses in exchange for affordable housing. This law requires cities to expand the normally-allowed building envelope in order to accommodate the additional units when requested by a developer, providing as much as 35% more dwelling units than what would otherwise be permitted in exchange for more affordable housing. Cities may also establish their own voluntary incentive programs to encourage affordable housing, such as Berkeley's "Voluntary Green Pathway" entitlement process that provides a streamlined development review process that would reduce uncertainty associated with gaining project approval in exchange for additional affordable housing, fair labor practices, energy efficiency and open space contributions.

Vancouver EcoDensity Program

The city of Vancouver's EcoDensity Program (www.vancouver-ecodensity.ca) is implementing various policy reforms and programs to encourage affordable, high quality, attractive, and energy efficient infill development in accessible areas. Research indicates that such development tends to significantly reduce motor vehicle ownership and use (Wong 2012).

Multi-Family Tax Exemption

Seattle, Washington's Multifamily Property Tax Exemption Program (www.seattle.gov/housing/incentives/mfte.htm) provides tax exemptions for multifamily development in targeted areas in exchange for 20% of units being provided below market prices to eligible households.

Compact Neighborhoods Policy

Massachusetts offers incentives for municipal governments to develop compact, diverse, walkable neighborhoods (http://tinyurl.com/pa4dl3u). The State offers preferred treatment for state funds for projects in districts with zoning that promotes mixed land uses, housing for a range of incomes, and homes for "diverse populations," including families with kids, people with disabilities, and the elderly.

Accessible Suburban Multi-Family

Nearly a quarter of suburban housing is multifamily, but it often has poor accessibility due to inadequate connections (sidewalks, paths and roads) to nearby destinations. The enclaved nature of most suburban multifamily housing results, in part, from regulatory and planning practices. Various policy and planning reforms can improve suburban accessibility including increased street connectivity, improved walkability to facilitate active transport both within development and to adjacent destinations, and better parking facility design (Larco 2010).

Residential Garage Conversions

Santa Cruz, CA has a special program to encourage development of *Accessory Dwelling Units* (ADUs, also known as *mother-in-law* or *granny* units) to increase housing affordability and urban infill (www.ci.santa-cruz.ca.us/pl/hcd/ADU/adu.html). These often consist of converted garages. The city has ordinances, design guidelines and information for such conversions. A Vancouver, BC firm *Smallworks* (www.smallworks.ca) specializes in small lane-way (alley) housing, typically converted garages.

Redeveloping Parking Lots

The study, *Paved Over: Surface Parking Lots or Opportunities for Tax-Generating, Sustainable Development?*" (CNT 2006) evaluates the potential economic and social benefits if surface parking lots around transit stations were developed into walkable, mixed-use, transit-oriented developments, with case studies of nine suburban communities with rail transit service. The analysis concludes that such development could help meet the region's growing demand for affordable, workforce, senior, and market rate housing near transit, and provides various other benefits including increased tax revenues and reduced per capita vehicle travel.

Attracting Residents to Transit-Oriented Neighborhoods

The report, *Choosing Where We Live: Attracting Residents to Transit-Oriented Neighborhoods* (MTC 2010), identifies various housing market segments and describes ways to make urban development more attractive in response to each groups' specific needs and preferences. It includes specific recommendations for improving walking and cycling condition, transit service quality, neighborhood livability (quiet, cleanliness and safety), school quality and accessibility, parking management, and urban housing affordability.

Developing Countries

Housing inaffordability is a problem in developing as well as developed countries (Aribigbola 2011). Analysis of household expenditures in Qom City, Iran indicates that suburban-area households spend a significantly larger portion of their monthly income on housing and transport than in central districts (Isalou, Litman and Shahmoradi 2014). This illustrates the feasibility of applying housing and transport affordability analysis in developing country cities to help identify truly affordable and sustainable development.

A McKinsey Global Institute report, *A Blueprint For Addressing The Global Affordable Housing Challenge* (Woetzel, et al. 2014) recommends a combination of increased urban densities, reduced construction costs, improved operations and maintenance, reduced financing costs, and government subsidies to ensure that housing is affordable in developing countries.

Projects

Travel Time and Housing Price Maps (www.mysociety.org/2007/more-travel-maps/morehousing)
This interactive mapping system shows both travel times to the city center and housing costs for various locations in London. It can be used to identify neighborhoods that have a desired combination of accessibility by different modes and housing affordability.

Cochrane Affordable Development (www.abag.ca.gov/services/finance/fan/cochrane.htm**)**
Cochrane Village is an affordable housing development in the Morgan Hill Ranch Business Park in the city of Morgan Hill, California. In the late 1980s the business park struggled to find business occupants, in part because of high employee housing costs, so businesses, local government and a non-profit developer cooperated to build 96 apartments and town houses, a playground and daycare facility, located with convenient access to retail shops.

Rich Sorro Commons, San Francisco, California (USEPA 2006)
Rich Sorro Commons is a mixed-use project with 100 affordable units and approximately 10,000 square feet of retail. Conventional standards would require 130 to 190 parking spaces but it was constructed with only 85 parking spaces due to proximity to high quality public transit services, carshare vehicles in the building, and tenants' relatively low incomes. The avoided parking requirements free up space for a childcare center and more ground-level retail, which generate additional annual revenues (each 300 square-foot space avoided provides $7,740 in additional annual rent at $25.80 per square foot), making housing more affordable. Two carshare vehicles are available to residents, giving them access to a car without the costs of ownership – a particularly important benefit for low-income households.

Criticisms and Controversies

This section discusses various criticisms of affordable-accessible housing development.

Urban Expansion Advocates

Argument. Some experts argue that housing inaffordability results primarily from smart growth policies that discourage urban expansion, based on evidence from sources such as the *International Housing Affordability Survey* which indicate that housing inaffordability is associated with urban containment policies (Cheshire 2009; Cox and Pavletich 2015; Demographia 2009; Mildner 2014). They therefore advocate policies that encourage urban expansion instead of affordable-accessible housing.

Counter-arguments. This analysis reflects several omissions and biases.

- Their analysis fails to account for confounding factors: urban containment policies tend to be implemented in attractive and geographically constrained cities. That housing prices increase with such policies does not prove that they are the primary cause of those high prices, or that eliminating such policies would significantly increase affordability (Quigley and Rosenthal 2005). Other researchers conclude that constraints on compact, urban infill contribute more to housing inaffordability than urban containment, particularly in attractive, constrained cities with high housing prices (Ganong and Shoag 2012; Levine 2006; Lewyn and Jackson 2014; Manville 2010; Taylor 2015).
- Their analysis ignores operating and transportation costs, and tends to overweigh single-family housing prices and undercount more affordable, multi-family housing, and so exaggerates the affordability of older housing (which tend to have high operating costs), and urban-fringe housing (which tend to have high transport costs). More comprehensive analysis, described in this report, indicates that compact, infill development often has the lowest total household costs.
- Their analysis ignores additional costs of sprawl and benefits of compact development, and therefore additional reasons that communities should favor affordable-accessible over affordable-sprawl housing.
- They generally ignore evidence of growing demand for affordable-accessible housing.
- Their analysis fails to consider various ways that smart growth policies can reduce housing costs, as described in Table 16, and therefore possible ways to ensure that infill development is affordable.

Table 16 **Smart Growth Household Affordability Impacts**

Reduces Affordability	Increases Affordability
• Urban growth boundaries (reduces developable land supply) • Increases infrastructure design requirements (curbs, sidewalks, sound barriers, etc.)	• Increased development density (reduces unit land costs) • Reduced parking and setback requirements (reduces land requirements per housing unit) • More diverse, affordable housing options (secondary suites, apartments over shops, loft apartments) • Reduced fees and taxes for infill development, reflecting their lower costs • Reduced transport costs.

Many Smart Growth strategies can increase housing affordability.

Although urban expansion can reduce unit land prices, and some households prefer urban fringe locations, this does not reduce the value of affordable infill development. Virtually everybody benefits if the growing demand for affordable-accessible housing is served, so any household that wants can find an affordable compact home in an accessible, multi-modal neighborhood, rather than be forced to live at the urban fringe.

Preference For Single-Family Housing

Argument. Most North American households prefer single-family housing, as indicated by real estate market survey and the premium that many households are willing to pay to live in such housing. As a result, efforts to develop and market more compact housing types will be ineffective and fail to respond to consumer demands.

Counter-arguments. Although market studies such as the *National Community Preference Survey* (NAR 2013) and the *Home Location Preference Survey* (Pembina 2014), indicate that most households prefer low-density, single-family homes, they also indicate that a significant and growing portion would choose more compact housing types if they have suitable features including good designs, accessible and multimodal locations, attractive and safe neighborhoods, and low costs. Single-family housing is most preferred by families with young children; the number of such households is peaking while other types of households are growing which suggests that much of the growth in housing demand will be for more compact housing types, including urban apartments and townhouses suitable for young adults and seniors. Many of the attributes that attract people to lower-density, single-family housing are social features, such as perceived security, status and efficient public services, which are increasingly associated with more compact, urban housing.

This is not to suggest that all households will choose to live in city-center, high-rise apartments, but it does indicate that because North America has a large supply of lower-density, single-family housing, much of the growth in housing demand will be for more compact housing in urban neighborhoods, and that consumer demand for such housing will increase with policies that improve design, accessibility, amenities and public service quality of such housing. These policies would not only benefit the households that choose such housing, but by reducing single-family housing demand, can increase affordability for those households that do prefer single-family homes, particularly in attractive, geographically constrained cities where housing costs are particularly high.

Density Critics

Argument. Many people assume that dense urban development is physically and mentally unhealthy, causing problems such as poverty, crime, illness, depression and "nature deficit disorder."

Counter-arguments. There is actually little evidence that the densities that typically result from affordable-accessible housing development are unhealthy and cause social problems (1000 Friends 1999). Increased densities may increase some health risks, such as exposure to noise and local air pollutants, but reduces others, such as traffic fatalities and sedentary living. Suburban residents have more access to private greenspace (private gardens and lawns), but in well-planned cities residents have more access to public greenspace (public parks), and by reducing per capita land consumption urban residents help preserve total regional openspace. Residents of more compact, multimodal neighborhoods tend to be healthier and live longer than they would in more automobile-dependent, sprawled areas (Ewing and Hamidi 2014). There is no evidence that a middle-class household that moves from a sprawled area to a typical smart growth community will become poorer, less healthy or more criminal.

Local Residents

Local residents and their organizations often oppose affordable-accessible housing development due to concerns about direct impacts, such as construction disruption and increased traffic and parking congestion, and due to fears of social problems such as increased local crime and reduced school performance.

Counter-arguments. Some concerns are legitimate – larger buildings can shade neighbors, reduce privacy, and increase traffic and parking demands, although, with good planning such impacts can be minimized. Affordable-accessible housing residents tend to own fewer vehicles and drive less than average, which minimizes local traffic and parking problems and reduces regional problems compared with the same residents locating in more automobile-dependent locations. Negative neighborhood impacts may be offset by local benefits such as increased demand for services which can lead to more and better businesses, plus more affordable housing options that residents may value, for example, in order to age in place (continue living in their community after they downsize into a smaller home) or if they want lower-income friends or family members (such as adult children or elderly parents) to live nearby.

Most lower-price housing residents are responsible and law abiding; it is wrong to assume that in a typical situation, increasing affordable housing will significantly increase social problems and, to the degree that it reduces poverty concentration, it tends to reduce these problems overall.

Affordable Housing Advocates

Argument. Affordable housing advocates are sometimes skeptical that market reforms that reduce development costs can increase affordability since new housing is generally too expensive for lower-income households (Lewyn 2015). They tend to favor regulations and subsidies to provide social housing.

Counter-arguments. Although new housing is generally too expensive for lower-income households, it can increase housing affordability in three ways.

1. Some current occupants of lower-priced units trade-up to a more expensive new housing.
2. Some new owners rent their units at relatively low prices.
3. House prices tend to decline over time due to wear and changing styles, so relatively expensive housing eventually becomes affordable, provided that more is built each year to meet demand.

In most communities, available housing subsidies can only serve a minor portion of the total demand for lower-priced housing; a community that aggressively pursues all available funding sources might be able to build a few dozen subsidized housing unit annually, although the demand is generally in the thousands. Most lower-income households depend on market-produce housing; policies which affect the production of such housing affect the prices that households must pay.

Although some lower-income households require subsidized housing, this does not diminish the importance of the policy reforms described in this report which reduce housing development costs since they increase the number of households that can be served with a given subsidy budget. For example, a charity or agency with one acre of land and a two-million dollar budget to build social housing might be able to build six single-family homes with two-car parking garages, ten townhouses with one covered parking space per unit, twenty garden apartments with one parking space per unit, and thirty apartments with eight unbundled parking spaces available to households that need them.

Conclusions

A rational and compassionate society ensures that all households have affordable housing and transportation options. Many cities fail to do this. As a result, low- and moderate-income households are often forced to choose between inferior housing, isolated locations, or excessive financial burdens that leave insufficient funds for other essential goods. This study investigates causes and solutions to this problem.

Unaffordability can be evaluated in various ways that lead to very different conclusions as to the nature of the problem and how it should be solved. Many commonly-used indicators are incomplete or biased: they reflect average rather than lower-income household incomes and expenditures; many only consider house purchase prices, ignoring rental housing, and house operation (maintenance and utility) and transport costs; and some only consider single-family housing costs, ignoring more compact and affordable housing types such as townhouses and apartments. These biases can lead to sub-optimal housing policies, such as policies that encourage development of cheap housing in isolated areas with high operating and transport costs.

In the past, experts recommended that households spend less than 30% of their budgets on total housing, including rents or mortgages and operating expenses, but since households often make trade-offs between various costs, many now recommend spending less than 45% of budgets on housing and transport combined, recognizing that a cheap house is not really affordable if it has high operating or transport expenses, and households can afford to spend more to rent or purchase an efficient house located in an accessible, multi-modal neighborhood where transport costs are low.

This study investigated various factors that affect affordability, including land prices, density, construction costs, operating expenses (repairs, maintenance, insurance and utilities) and location (and therefore transport costs). It developed the *Housing Affordability Analysis Spreadsheet*, which can be used to evaluate how specific factors affect total costs.

There are several possible ways to provide affordable housing. Some communities have lots of cheap, older houses that tend to have high operation costs. Others build cheap urban fringe housing that tends to have high infrastructure and transport costs. A third approach is to develop more *affordable-accessible housing*, compact housing types (small-lot single-family, townhouses, apartments and secondary suites) in accessible, multimodal neighborhoods. Table 17 compares these three approaches.

Table 17 **Approaches to Affordable Housing Development**

Approach	Advantages	Disadvantages
Inexpensive older houses located in undesirable neighborhoods	Requires no public investment or policy initiatives.	Inferior (uncomfortable and inefficient), housing. Poverty is concentrated, which increases social problems such as crime and social exclusion.
Cheap new houses built on inexpensive urban fringe land	Allows lower-income households to have larger-lot housing, and avoids disruption of infill development.	Affordable housing is located in less accessible areas, which increases various transportation and sprawl costs.
Affordable-accessible housing (compact housing built in accessible, multimodal neighborhoods)	Minimizes transportation and sprawl-related costs.	Infill construction tends to be disruptive, and existing residents often oppose affordable housing in their neighborhoods, which increases development costs.

This table compares three major approaches to developing affordable housing.

Automobile dependency imposes significant costs, typically adding $3,500 to $5,000 annually for each additional automobile a household must own, which can typically finance $50,000 to $150,000 larger mortgages than would be possible in an accessible, multimodal location. More multimodal location also reduces travel time, accident risk and sedentary living, and provides economic resilience by providing cost savings opportunities available in ever needed. As a result, lower-income households can benefit significantly by living in an accessible, multimodal neighborhood where they can minimize their transport costs.

This analysis indicates that, considering both housing and transport expenses, affordable-accessible housing generally has the lowest total costs, and provides other benefits, as summarized in Table 18. Affordable-accessible housing is the opposite of gentrification: it creates communities where diverse type of households can live together. Businesses and governments also benefit from affordable-accessible housing that allows households to save on vehicle and fuel costs and spend more on housing, since housing expenditures provide greater developer profits, real estate commissions, property taxes and local economic activity.

Table 18 **Affordable-Accessible Housing Benefits**

Increased Household Affordability	Reduced Vehicle Travel	Reduced Sprawl
Households have cheaper housing and transport options	More multimodal neighborhoods reduce per capita vehicle travel	More compact housing types developed in more accessible locations
Improved housing options, particularly for disadvantaged households Household financial savings Reduced homelessness and associated social problems such as crime Creates more diverse neighborhoods, allowing "aging in place" Higher property values and tax revenues	Reduced traffic and parking congestion Reduced road and parking infrastructure costs Reduced traffic accidents Reduced chauffeuring burdens More efficient public transit services	Reduced per capita land consumption Reduced costs of providing public infrastructure and services Improved accessibility and economic opportunity for disadvantaged residents Energy conservation and pollution emission reductions More local economic development

Compared with unaffordable or sprawled housing, affordable-accessible housing provides numerous benefits.

Despite these benefits, affordable development faces significant obstacles. Current policies discourage affordable infill development; affordable housing types, such as small apartments with unbundled parking, are illegal to build in most urban neighborhoods reflecting the assumptions that "normal" households want single-family housing with garages, and low-priced housing attracts undesirable people, so public policies should exclude them from most neighborhoods. Policies that support affordable infill housing reflect more diverse demands and community goals, and more optimistic assumptions about lower-income households.

In most North American cities, a major share of affordable-accessible housing consists of low-rise apartment buildings built before 1975, after which increased construction costs, restrictive zoning codes, and neighborhood resistance created impediments to such development. This study investigated whether it is possible to develop such housing. Under favorable conditions (moderate land prices and construction costs, minimal fees and construction delays, unbundled parking) it is possible to build new, compact housing that is affordable to second-income quintile households, and these can become affordable to the lowest income quintile after two or three decades, provided that such development continues.

A key insight of this study is that increasing affordable-accessible housing supply does not necessarily require special incentives or subsidies, it simply requires increased development of moderate-priced housing, which becomes low-priced, affordable housing over time. Because developer profits tend to increase with housing prices, they will only produce moderate-priced housing if their costs are low. Analysis in this report indicates

that with supportive municipal policies, developers can earn reasonable profits building moderate-priced housing in accessible urban neighborhoods. Even if initially priced more than affordable to lower-income households, it tends to become affordable as it ages or if operated by a non-profit society.

There are many possible ways to support affordable housing development. Some strategies are better than others overall because they reduce the resource costs of building housing, and support other strategic objectives such as reducing traffic problems and sprawl. For example, affordable housing mandates reduce housing costs for some households but increase costs for others, and urban fringe development reduces land costs but increases infrastructure and transport costs. In contrast, increasing allowable densities and reducing parking requirements reduces overall development costs and provides other benefits.

Current residents often oppose affordable-accessible housing development. Some of this opposition reflects concerns about direct impacts, such as construction disruptions, reduced privacy and increased traffic, which can be mitigated with thoughtful design and management strategies. Infill development can benefit existing residents by increasing local services, reducing regional traffic problems, and because current residents may themselves want lower-priced housing options in their neighborhoods sometime in the future. Much of the opposition reflects fears that lower-priced housing will attract poor residents who increase problems such as crime and poor school performance. There is some truth and much inaccuracy in these fears. Although social problems tend to increase with concentrated poverty, most lower-priced housing occupants are responsible and law abiding low-wage workers, students and pensioners. Research described in this report indicates that affordable-accessible housing can help reduce overall crime rates by increasing passive surveillance, improving economic opportunities for at-risk residents, and reducing motor vehicle crimes.

Opposition to infill development tends to be effective due to a political power imbalance: development opponents tend to be well organized and politically powerful while the lower-income households that demand such housing are generally unaware of their interests and politically weak, resulting in less affordable-accessible housing development than is socially optimal considering consumer welfare impacts (including benefits to low-income households that will occupy the new housing) and regional benefits (including reductions in overall traffic and parking congestion, traffic accidents, pollution emissions and crime rates, plus increased business activity compared with more sprawled development).

There is considerable debate concerning the housing inaffordability causes and solutions. Some experts blame urban containment policies and so recommend more urban expansion, but most objective research indicates that in the attractive, growing, geographically-constrained cities where housing is least affordable, the primary cause of excessive housing prices is impediments to infill development, since such cities cannot expand outward sufficiently to significantly reduce prices but can grow upward by allowing and encouraging more compact housing types, and so recommend more affordable-accessible housing.

This analysis challenges conventional assumptions about how best to help disadvantaged people. Currently, conservative economists are primarily concerned with increasing their education and employment opportunities through economic expansion, while most liberal economists are primarily concerned with wealth redistribution through special targeted policies and programs; both want to help lower-income households afford larger homes and more vehicle travel. Affordable-accessible housing development emphasizes a different approach, it helps households be poor but happy.

References

1000 Friends (1999), "The Debate Over Density: Do Four-Plexes Cause Cannibalism" *Landmark*, 1000 Friends of Oregon (www.friends.org); at www.vtpi.org/1k_density.pdf.

AARP (2005), *Livable Communities: An Evaluation Guide*, AARP Public Policy Institute (http://assets.aarp.org); at http://assets.aarp.org/rgcenter/il/d18311_communities.pdf.

Abogo (http://abogo.cnt.org) indicates transport affordability for U.S. neighborhoods.

Affordable Housing Best Practices Reports (www.huduser.org/portal/bestpractices/home.html), provides information on successful affordable-accessible housing development policies and programs.

Affordable Housing Design Advisor (www.designadvisor.org) provides information on affordable housing and smart growth development policies.

Affordable Housing Resource Center (www.novoco.com/low_income_housing/index.php) provides information on policy reforms to support affordable housing development.

AIA (2010), *Promoting Livable Communities: Examining The Internal Revenue Code And Reforming Its Influence On The Built Environment*, Smart Growth America (www.smartgrowthamerica.org) and the American Institute of Architects; at www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab083048.pdf.

Shlomo Angel (2011), *Making Room for a Planet of Cities*, Lincoln Institute (www.lincolninst.edu); at www.lincolninst.edu/pubs/1880_Making-Room-for-a-Planet-of-Cities-urban-expansion.

Afolabi Aribigbola (2011), "Housing Affordability as a Factor in the Creation of Sustainable Environment in Developing World: Example of Akure, Nigeria," *Journal of Human Ecology*, Vol. 35, No.2, pp. 121-131; at http://tinyurl.com/qcsj4lo.

Victoria Basolo (2013), "Examining Mobility Outcomes in the Housing Choice Voucher Program: Neighborhood Poverty, Employment, and Public School Quality," *Cityscape*, Vol. 15/2; at http://bit.ly/1AAc0bI.

Alain Bertaud (2014), *Housing Affordability and the Freedom to Build*, Urbanization Project (http://urbanizationproject.org); at http://bit.ly/1GBTfvh.

Ariel Bierbaum, Jeffrey Vincent and Deborah McKoy (2010), "Linking Transit-Oriented Development, Families and Schools," *Community Investments*, Vol. 22, No. 2: Federal Reserve Bank; at http://bit.ly/1DeyaB3.

Jill Black (2012), *The Financing & Economics of Affordable Housing Development: Incentives and Disincentives to Private-Sector Participation*, Research Paper 224, Cities Centre, University of Toronto, Neighborhood Change (http://neighbourhoodchange.ca); at http://bit.ly/1K6jCek.

BLS (2013), *Consumer Expenditures*, Bureau of Labor Statistics (www.bls.gov); at www.bls.gov/cex/home.htm.

David S. Bieri (2015), *Housing Affordability*, Urban & Regional Planning, University of Michigan (www.umich.edu); at www-personal.umich.edu/~bieri/docs/QOLHousingAffordability_Bieri_Springer14.pdf.

Cherise Burda and Geoffrey Singer (2015), *Location Matters: Factoring Location Costs into Home-buying Decisions*, Pembina Institute (www.pembina.org); at www.pembina.org/pub/location-matters.

Cherise Burda and Mike Collins-Williams (2015), *Make Way For Mid-Rise: How To Build More Homes In Walkable, Transit-Connected Neighbourhoods*, GTA Housing Action Lab (www.naturalstep.ca/gta-housing-action-lab), Pembina Institute (www.pembina.org) and Ontario Home Builders Association; at www.pembina.org/reports/make-way-for-mid-rise.pdf.

Cambridge Systematics (2010), *Measuring Transportation Network Performance*, NCHRP 664, TRB (www.trb.org); at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_664.pdf.

CBCYN (2014), *A Series on Affordable Housing in New York City*, New York City Citizens Budget Commission (www.cbcny.org); at www.cbcny.org/sites/default/files/NYC_Affordable_Housing/landingpage.html.

Alex Cecchini (2015), *Barriers to Small Scale Infill Development*, Streets MN (http://streets.mn); at http://bit.ly/1CsyjCR.

Paul Cheshire and W. Vermeulen (2009), "Land Markets And Their Regulation: The Welfare Economics Of Planning," *International Handbook Of Urban Policy, Vol. II: Issues In The Developed World*, Edward Elgar Publishing, ISBN 9781847204592; at http://bit.ly/1EnGDGp.

CHP (2014), *Paycheck to Paycheck*, Center for Housing Policy (www.nhc.org); at www.nhc.org/chp/p2p.

CNT (2006), *Paved Over: Surface Parking Lots or Opportunities for Tax-Generating, Sustainable Development?* Center for Neighborhood Technology (www.cnt.org); at www.cnt.org/repository/PavedOver-Final.pdf.

CNT (2008), *Housing + Transportation Affordability Index*, Center for Neighborhood Technology (http://htaindex.cnt.org).

CNT (2010), *Penny Wise, Pound Fuelish: New Measures of Housing + Transportation Affordability*, Center for Neighborhood Technology (www.cnt.org); at www.cnt.org/repository/pwpf.pdf.

CNU (2008), *Parking Requirements and Affordable Housing*, Congress for the New Urbanism (www.cnu.org); at www.cnu.org/node/2241.

Timothy L. Collins (2009), *Rent Regulation in New York: Myths and Facts*, Tenants & Neighbors (www.tenantsandneighbors.org); at http://bit.ly/1IJLnYz.

Cornerstone Partnerships (www.AffordableOwnership.org) provides practical guidance for keeping homes affordable and communities strong and diverse.

Joe Cortright and Dillon Mahmoudi (2014), *Lost In Place: Why The Persistence And Spread Of Concentrated Poverty--Not Gentrification--Is Our Biggest Urban Challenge*, City Observatory (www.cityobservatory.org); at http://cityobservatory.org/lost-in-place.

Wendell Cox and Hugh Pavletich (2015), *Demographia International Housing Affordability Survey*, Demographia (www.demographia.com); at www.demographia.com/dhi.pdf.

CTOD (2008), *Realizing The Potential One Year Later: How Has the Market Downturn Played Out Along Five Transit Corridors in Five Very Different Markets?*, Center for Transit Oriented Development (www.reconnectingamerica.org), Federal Transit Administration (www.fta.dot.gov); at http://bit.ly/1zKdAwQ.

CTOD (2009), *Mixed-Income Housing Near Transit: Increasing Affordability With Location Efficiency*, and *Mixed-Income Housing TOD Action Guide*, Reconnecting America and the Center for Neighborhood Technology (www.mitod.org); at http://bit.ly/1Cwuri6.

CTOD (2010), *Transit-Oriented Development: Tools for Metropolitan Planning Organizations*, Center for Transit-Oriented Development and Reconnecting America (www.reconnectingamerica.org); at http://reconnectingamerica.org/public/display_asset/ctod_mpotod_final.

CTOD (2015) *Mixed-Income Transit-Oriented Development Action Guide*, Center for Transit-Oriented Development (http://ctod.org); at www.mitod.org.

Deborah Curran and Tim Wake (2008), *Creating Market and Non-Market Affordable Housing: A Smart Growth Toolkit for BC Municipalities*, Smart Growth BC (www.smartgrowth.bc.ca); at www.smartgrowth.bc.ca/Portals/0/Downloads/SGBC_Affordable_Housing_Toolkit.pdf.

Kim-Mai Cutler (2014), *How Burrowing Owls Lead To Vomiting Anarchists (Or SF's Housing Crisis Explained)*, Techcrunch (www.techcrunch.com); at http://techcrunch.com/2014/04/14/sf-housing.

DHUD (2012), "Moving to Opportunity," *Cityscape: Journal of Policy Development and Research*, Vol. 14, No. 2, Department of Housing and Urban Development (www.huduser.org/portal/periodicals/cityscape.html).

Alan Durning (2013), *Apartment Blockers: Parking Rules Raise Your Rent*, Sightline Institute (www.sightline.org); at http://daily.sightline.org/2013/08/22/apartment-blockers.

EEFA (2015), *Program Design Guide: Energy Efficiency Programs in Multifamily Affordable Housing*, Energy Efficiency for All (www.energyefficiencyforall.org); at www.energyefficiencyforall.org/program-design-guide.

Envision Tomorrow Prototype Builder & ROI Model (www.envisiontomorrow.org/enhanced-roi) allows users to analyze the health, affordability and environmental impacts of policy and planning practices.

Reid Ewing and Shima Hamidi (2014), *Measuring Urban Sprawl and Validating Sprawl Measures*, Metropolitan Research Center at the University of Utah for the National Cancer Institute, the Brookings Institution and Smart Growth America; at www.arch.utah.edu/cgi-bin/wordpress-metroresearch.

Jonathan Ford (2009), *Smart Growth & Conventional Suburban Development: Which Costs More?* U.S. Environmental Protection Agency (www.epa.gov/smartgrowth/sg_business.htm); at www.morrisbeacon.com/images/documents/MBD%20EPA%20infrastructure.pdf.

James C. Fraser, Deirdre Oakley and Diane K. Levy (2013), "Mixed Messages on Mixed Income," *Cityscape*, Vol. 15, No. 2, pp. 1-14; at www.huduser.org/portal/publications/Cityscape_Jul2013.pdf.

FTA (2008), *Better Coordination of Transportation and Housing Programs to Promote Affordable Housing Near Transit*, Federal Transit Administration, USDOT and Department of Housing and Urban Development; at www.huduser.org/Publications/pdf/better_coordination.pdf.

Peter Ganong and Daniel Shoag (2012), *Why Has Regional Convergence in the U.S. Stopped?*, Kennedy School of Government, Harvard University (http://ssrn.com/abstract=2081216).

Kevin C. Gillen (2012), *The Correlates of House Price Changes with Geography, Density, Design and Use: Evidence from Philadelphia*, Congress for New Urbanism (www.cnu.org); at www.cnu.org/sites/www.cnu.org/files/finalcnu_phila_report.pdf.

Edward L. Glaeser, Matthew E. Kahn and Jordan Rappaport (2000), *Why Do the Poor Live in Cities?,* Harvard Institute of Economic Research (http://econweb.fas.harvard.edu); at www.nber.org/papers/w7636.

Edward L. Glaeser, Joseph Gyourko and Raven E. Saks (2003), "Why Is Manhattan So Expensive? Regulation And The Rise In House Prices," *Journal of Law and Economics*, Vol. 48, No. 2, pp. 331-369; draft at www.nber.org/papers/w10124.pdf.

Edward L. Glaeser and Bryce A. Ward (2008), "The Causes And Consequences Of Land Use Regulation: Evidence From Greater Boston," *Journal of Urban Economics*, Vol. 65, pp. 265-278; at http://bit.ly/1DxrhK5.

Green Trip Program (http://transformca.org/GreenTRIP) is a certification program that rewards projects that apply strategies to reduce traffic and greenhouse gas emissions.

Peter M. Haas, et al. (2006), *Housing & Transportation Cost Trade-offs and Burdens of Working Households in 28 Metros*, Center for Neighborhood Technology (www.cnt.org); at http://bit.ly/1aQ09zj.

Jonathan Haughton and Shahidur R. Khandker (2009), *Handbook on Poverty and Inequality*, World Bank (www.worldbank.org); at http://go.worldbank.org/4WJH9JQ350.

Lisa Helps (2015), *Mayor's Task Force on Housing Affordability*, City of Victoria (www.victoria.ca); at www.victoria.ca/EN/main/city/mayor-council-committees/task-forces/housing-affordability-task-force.html.

Christian Hilber and Frédéric Robert-Nicoud (2013), "On The Origins Of Land Use Regulations: Theory And Evidence From US Metro Areas", *Journal of Urban Economics*, Vol. 75, pp. 29-43 (http://ideas.repec.org/p/cep/sercdp/0038.html); summary at http://bit.ly/1ODgKDR**.**

Bill Hillier and Ozlem Sahbaz (2006), *High Resolution Analysis of Crime Patterns in Urban Street Networks: An Initial Statistical Sketch From An Ongoing Study Of A London Borough*, University College London; at www.spacesyntax.tudelft.nl/media/Long%20papers%20I/hilliersahbaz.pdf.

Mark Hogan (2014), "The Real Costs Of Building Housing: An Architect Shows The Real Costs Of Building In The Country's Most Expensive City," *The Urbanist*, Vol. 530 (www.spur.org): at http://bit.ly/1dwzrdz.

HousingPolicy.Org (www.housingpolicy.org) provides information on housing affordability strategies.

Chang-Tai Hsieh and Enrico Moretti (2014), *Growth in Cities and Countries*, National Bureau of Economic Research (www.nber.org). Also see, "The Paradox Of Soil: Land, The Centre Of The Pre-Industrial Economy, Has Returned As A Constraint On Growth," *The Economist*, 4 April 2015; at http://econ.st/1MIn29r.

HUD (2008), *Impact Fees & Housing Affordability: A Guide for Practitioners*, Office of Policy Development and Research, Department of Housing and Urban Development (www.huduser.org); at http://bit.ly/1EpMmgC.

HUD (2014), *Rental Burdens: Rethinking Affordability Measures*, Office of Policy Development and Research, Department of Housing and Urban Development (www.huduser.org); at http://bit.ly/1yN2fLG.

David J. Hulchanski (1995), "The Concept Of Housing Affordability: Six Contemporary Uses Of The Housing Expenditure-To-Income Ratio," *Housing Studies*, Vol. 10 Is. 4, p. 471-492.

David J. Hulchanski (2010), *The Three Cities Within Toronto: Income Polarization Among Toronto's Neighbourhoods, 1970-2005*, Neighbourhood Change (www.NeighbourhoodChange.ca), University of Toronto's Cities Centre and St. Christopher House; at http://bit.ly/1HrWd4A.

A-P Hurd (2014), *How Outdated Parking Laws Price Families Out of the City: Bundling Parking With Living Space Structurally Raises The Cost Of Urban Life*, City Lab (www.citylab.com); at http://bit.ly/1KZZCYq.

ICC (semi-annual reports), *Building Validation Data*, International Code Council (www.iccsafe.org); at http://bit.ly/1AEvl9U; building type definitions at http://bit.ly/1AXmpS4.

Ali A. Isalou, Todd Litman and Behzad Shahmoradi (2014), "Testing The Housing And Transportation Affordability Index In A Developing World Context: A Sustainability Comparison Of Central And Suburban Districts In Qom, Iran," *Transport Policy*, Vol. 33, May, pp. 33-39; http://bit.ly/1DeBFrs.

JCHS (2013), *America's Rental Housing Evolving Markets and Needs*, Joint Center For Housing Studies Of Harvard University (www.jchs.harvard.edu); at http://bit.ly/18xoF48.

Wenya Jia and Martin Wachs (1998), *Parking Requirements and Housing Affordability; A Case Study of San Francisco*, Research Paper 380, University of California Transportation Center (www.uctc.net).

Blair Jenkins (2009), "Rent Control: Do Economists Agree?," *Economic Journal Watch*, Vol. 6, No. 1 January, pp 73-112; at http://econjwatch.org/articles/rent-control-do-economists-agree.

Sanjay Jog (2015), "Realty Sector Welcomes BMC's Proposal To Hike FSI In Greater Mumbai," *Business Standard* (www.business-standard.com); at http://bit.ly/1LvOEux.

David S. Johnson, John M. Rogers and Lucilla Tan (2001), "A Century Of Family Budgets In The United States," *Monthly Labor Review* (www.bls.gov/opub/mlr/2001/05/art3full.pdf), May, pp. 28-46.

Nikhil Kaza, Roberto G. Quercia and Chao Yue Tian (2014), "Home Energy Efficiency and Mortgage Risks," *CityScape*, Vol. 16, No. 1, pp. 279-298; at http://bit.ly/1PdaoNu.

Jed Kolko (2014), *Where Is Homeownership Within Reach of the Middle Class and Millennials?*, (www.trulia.com); at www.trulia.com/trends/2014/11/middle-class-millennials-report.

Nico Larco (2010), *Overlooked Density: Re-Thinking Transportation Options In Suburbia*, OTREC-RR-10-03, Oregon Transportation Research and Education Consortium (www.otrec.us); at http://bit.ly/1HS1ZNo.

Marc Lee, Erick Villagomez, Penny Gurstein, David Eby and Elvin Wyly (2008), *Affordable EcoDensity: Making Affordable Housing a Core Principle of Vancouver's EcoDensity Charter*, Canadian Center for Policy Alternatives (www.policyalternatives.ca); at http://bit.ly/1PdaxRb.

Let's Go LA (2014), *Dingbat Renaissance*, https://letsgola.wordpress.com/2014/12/04/dingbat-renaissance.

Jonathan Levine (2006), *Zoned Out: Regulation, Markets, and Choices in Transportation and Metropolitan Land-Use*, Resources for the Future (www.rff.org).

Jonathan Levine, Aseem Inam, Richard Werbel and Gwo-Wei Torng (2002), *Land Use and Transportation Alternatives: Constraint or Expansion of Household Choice?*, Mineta Transportation Institute, Report 01-19 (www.transweb.sjsu.edu); at http://tinyurl.com/lnr3nxh; also published as "A Choice-Based Rationale for Land Use and Transportation Alternatives," *Journal of Planning Education and Research*, Vol. 24, No. 3, pp. 317-330, 2005 (http://jpe.sagepub.com/cgi/content/abstract/24/3/317).

David Levinson and Ahmed El-Geneidy (2006), *Development of Accessibility Measures*, Report No. 1 in the Series: Access to Destinations (Mn/DOT 2006-16), University of Minnesota's Center for Transportation Studies (www.cts.umn.edu/access-study/publications).

Jonathan Levine and Lawrence D. Frank (2006), "Transportation And Land-Use Preferences And Residents' Neighborhood Choices: The Sufficiency Of Compact Development In The Atlanta Region," *Transportation*, Vol. 33, No. 6 (www.springerlink.com).

Michael Lewyn (2015), *Supply and Demand Denialism*, Planetizen (www.planetizen.com); at www.planetizen.com/node/73728.

Michael Lewyn and Kristoffer Jackson (2014), *How Often Do Cities Mandate Smart Growth or Green Building?* Mercatus Center (www.mercatus.org), George Mason University; at http://bit.ly/1E44vKc.

Jianling Li and Jack Rainwater (2000), *The Real Picture of Land-Use Density and Crime: A GIS Application*, ESRI International User Conference, San Diego, California, June 26-30, 2000; at http://arcg.is/1PF6Odv.

Todd Litman (2005), *Smart Growth Reforms*, VTPI (www.vtpi.org); at www.vtpi.org/smart_growth_reforms.pdf.

Todd Litman (2006), *Parking Management Best Practices*, Planners Press (www.planning.org). Also see, *Parking Management: Comprehensive Implementation Guide*, Victoria Transport Policy Institute (www.vtpi.org); at www.vtpi.org/park_man_comp.pdf.

Todd Litman (2007), *Evaluating Affordability for Transportation Planning*, Victoria Transport Policy Institute (www.vtpi.org); at www.vtpi.org/affordability.pdf.

Todd Litman (2009), *Where We Want To Be: Home Location Preferences And Their Implications For Smart Growth*, Victoria Transport Policy Institute (www.vtpi.org); at www.vtpi.org/sgcp.pdf.

Todd Litman (2011), *Affordable-Accessible Housing Photo Essay*, Victoria Transport Policy Institute (www.vtpi.org); at www.vtpi.org/aff_acc_photo.pdf.

Todd Litman (2012), *Parking Requirement Impacts on Housing Affordability*, VTPI (www.vtpi.org); at www.vtpi.org/park-hou.pdf.

Todd Litman (2013), *Evaluating Accessibility for Transportation Planning*, Victoria Transport Policy Institute (www.vtpi.org); at www.vtpi.org/access.pdf.

Todd Litman (2014), *The Mobility-Productivity Paradox: Exploring The Negative Relationships Between Mobility and Economic Productivity*, presented at the International Transportation Economic Development Conference, 9-11 April 2014, Dallas, Texas (https://tti.tamu.edu/conferences/ited2014); at www.vtpi.org/ITED_paradox.pdf.

Todd Litman (2015a), *Analysis of Public Policies that Unintentionally Encourage and Subsidize Sprawl*, in partnership with the LSE Cities program (http://lsecities.net) for the New Climate Economy (http://newclimateeconomy.net); at http://bit.ly/1EvGtIN.

Todd Litman (2015b), *Understanding Smart Growth Saving*, VTPI (www.vtpi.org); at www.vtpi.org/sg_save.pdf.

Todd Litman (2015c), *Housing Affordability Analysis Spreadsheet*, Victoria Transport Policy Institute (www.vtpi.org); at www.vtpi.org/Aff_acc_hou.xls.

Jesse London and Clark Williams-Derry (2013), *Who Pays for Parking? How The Oversupply Of Parking Undermines Housing Affordability*, Sightline Institute (www.sightline.org); at www.sightline.org/research/who-pays-for-parking.

Tim Loomans (2015), *Five Ways to Add Density Without Building Highrises*, Blooming Rock (www.bloomingrock.com); at http://bit.ly/1E8Ft1k.

Michael Manville (2010), *Parking Requirements as a Barrier To Housing Development: Regulation and Reform In Los Angeles*, UCLA Institute of Transportation Studies (www.its.ucla.edu); at http://bit.ly/1H3RbaH.

MDHCD (2012), *Compact Neighborhoods Policy*, Massachusetts Department of Housing and Community Development (www.mass.gov); at http://1.usa.gov/1DeE2KO.

Tom Means and Edward P. Stringham (2012), *Unintended Or Intended Consequences? The Effect Of Below-Market Housing Mandates On Housing Markets In California*, San Jose State University (www.sjsu.edu); at www.sjsu.edu/economics/docs/BMR.Mandates.2012.01.pdf.

Patricia C. Melo, Daniel J. Graham, and Robert B. Noland (2009), "A Meta-Analysis Of Estimates Of Urban Agglomeration Economies," *Regional Science and Urban Economics*, Vol. 39/3, May, pp. 332-342; at www.sciencedirect.com/science/article/pii/S0166046208001269.

Metro Vancouver (2012), *Metro Vancouver Apartment Parking Study; Revised Technical Report*, Metropolitan Planning, Environment, and Parks (www.metrovancouver.org); at www.metrovancouver.org/planning/development/strategy/Pages/Implementation.aspx.

Metro Vancouver (2012b), *What Works: Affordable Housing Initiatives in Metro Vancouver Municipalities*, Metro Vancouver Regional Housing (www.metrovancouver.org); at http://bit.ly/1IEnGif.

Metro Vancouver (2015), *The Metro Vancouver Housing and Transportation Cost Burden Study: A New Way Of Looking At Affordability*, Metro Vancouver (www.metrovancouver.org); at http://bit.ly/1IFrC18.

Adam Millard-Ball (2015), "Phantom Trips: Overestimating the Traffic Impacts of New Development," *Journal of Transportation and Land Use* (www.jtlu.org); at http://bit.ly/1OsKll4; summary at http://bit.ly/1HkHmt1.

Missing Middle (www.missingmiddlehousing.com) describes affordable, medium-density housing types, such as fourplexes and small apartment buildings, suitable for infill development.

MTC (2010), *Choosing Where We Live: Attracting Residents to Transit-Oriented Neighborhoods in the San Francisco Bay Area; A Briefing Book for City Planners and Managers*, Metropolitan Transportation Commission (www.mtc.ca.gov); at http://tinyurl.com/qcgg4o8.

Ed Murray (2015), *Housing Seattle: A Roadmap to an Affordable and Livable City*, Mayor's Office, City of Seattle, http://murray.seattle.gov/housing/#sthash.mZjssilm.QJYd5TBM.dpbs; at http://murray.seattle.gov/wp-content/uploads/2015/07/HALA_ActionPlan_2015.pdf.

NAHB Research Center (2007), *Study of Subdivision Requirements as a Regulatory Barrier*, US Department of Housing and Urban Development (www.huduser.org); at http://bit.ly/1yoPPJV.

NAR (2013), *National Community Preference Survey*, National Association of Realtors (www.realtor.org); at www.realtor.org/sites/default/files/reports/2013/2013-community-preference-analysis-slides.pdf.

National Housing Institute (www.nhi.org), is an independent nonprofit organization that examines causes of housing inaffordability and community decline in the United States.

Gregory L. Newmark and Peter M. Haas (2015), *Income, Location Efficiency, and VMT: Affordable Housing as a Climate Strategy*, California Housing Partnership (www.housingca.org); at http://bit.ly/1InQ8mz.

Njaimeh Njie (2015), *How Much Space Do You Get—And How Much Do You Have To Pay For It?*, Urbanful (http://urbanful.org); at http://bit.ly/1D4EZEG.

NMHC (2007), *Overcoming Opposition To Multifamily Rental Housing*, National Multi Housing Council (www.nmhc.org); at www.nmhc.org/Content/ServeFile.cfm?FileID=5717.

NPH (2003), *Community Acceptance Toolkit*, NonProfit Housing Association (www.nonprofithousing.org); at www.nonprofithousing.org/pages/housing-policy-and-advocacy/toolkits_community_acceptance.html.

Dan Parolek (2014), *Missing Middle Housing: Responding To Demand For Walkable Urban Living*, Opticos Design/Missing Middle (www.missingmiddlehousing.com); at http://bit.ly/1HB1C9Z.

Pembina (2014), *Home Location Preference Survey: Understanding Where GTA Residents Prefer To Live And Commute*, Royal Bank of Canada (www.rbc.com) and the Pembina Institute (www.pembina.org); at www.rbc.com/newsroom/_assets-custom/pdf/20140924-HLP-Survey.pdf.

PEW (2014), "Table 3.1 Preferred Community," *Political Polarization Survey*, Pew Research Center for People and the Press (www.people-press.org); at http://pewrsr.ch/1O3fOrT.

Gary Pivo (2013), *The Effect Of Transportation, Location, And Affordability Related Sustainability Features On Mortgage Default Prediction And Risk In Multifamily Rental Housing*, University of Arizona; at http://tinyurl.com/nojpkqy. Also see, *Walk Score and Multifamily Default: The Significance of 8 and 80*, Fannie Mae (www.fanniemae.com); at http://bit.ly/1CFg3CT.

Stephanie Pollack, Barry Bluestone and Chase Billingham (2010), *Maintaining Diversity In America's Transit-Rich Neighborhoods: Tools for Equitable Neighborhood Change*, Dukakis Center for Urban and Regional Policy (www.dukakiscenter.org); at www.dukakiscenter.org/storage/TRNEquityFull.pdf.

Portland (2012), *Cost of Onsite Parking + Impacts on Affordability*, Portland Bureau of Planning and Sustainability (www.portlandoregon.gov); at www.portlandoregon.gov/bps/article/420062.

Portland (2014), *Infill Design Project*, Portland Bureau of Planning and Sustainability (www.portlandoregon.gov); at www.portlandoregon.gov/bps/34024.

John M. Quigley and Larry A Rosenthal (2005), "The Effects of Land Use Regulation on the Price of Housing: What Do We Know? What Can We Learn?," *Cityscape*, Vol. 8, No. 1, pp. 69- 137, US Department of Housing and Urban Development; at http://urbanpolicy.berkeley.edu/pdf/QR2005.pdf.

Stephanie Y. Rauterkus, Grant I. Thrall and Eric Hangen (2010), "Location Efficiency and Mortgage Default," *Journal of Sustainable Real Estate* (www.costar.com/josre/default.htm), Vol. 2, No. 1, pp. 117-141; at www.costar.com/uploadedFiles/JOSRE/JournalPdfs/06.117_142.pdf.

Reconnecting America and CTOD (2007), *Realizing the Potential: Expanding Housing Opportunities Near Transit*, Reconnecting America (www.reconnectingamerica.org).

Regulatory Barriers Clearinghouse (www.huduser.org/portal/rbc) describes affordable housing policy reforms.

Caroline Rodier and Margot Spiller (2012), *Model-based Transportation Performance: A Comparative Framework and Literature Synthesis*, Report 11-09, Mineta Transportation Institute (www.transweb.sjsu.edu); at http://bit.ly/1ympFaN.

Walter Rybeck (2010), "How Re-Engineering the Property Tax Can Be Successful," *Public Management*, Vol. 92, N. 2 (www.icma.org); at http://tinyurl.com/kf4v3hg.

Rick Rybeck and Walt Rybeck (2012), "Break the Boom and Bust Cycle," *Public Management*, Vol. 94, No. 7 (http://icma.org/en/press/pm_magazine); at http://bit.ly/1MKXqDF and http://bit.ly/1Gl5eKf.

Brendan Saunders and Kyle Smith (2014), *Quality of Life, (e)Quality of Place*, Open Communities and the Center for Neighborhood Technology (www.cnt.org); at http://bit.ly/1EpPfOt.

Frank Schliewinsky (2013), *Condo Maintenance Fees by Size and Age of Unit*, REW (www.rew.ca); at www.rew.ca/news/condo-maintenance-fees-by-size-and-age-of-unit-1.134231.

Neil Sipe and Jago Dodson (2013), "Oil Vulnerability in the American City," *Transportation Beyond Oil: Policy Choices for a Multimodal Future*, (Renne and Fields, eds), *Island Press* (www.islandpress.com).

Robert J. Schneider, Susan L. Handy and Kevan Shafizadeh (2014), "Trip Generation for Smart Growth Projects," *Access 45*, Fall 2014 (http://bit.ly/1DHcCiG); also see the "*Smart Growth Trip-Generation Adjustment Tool*" (http://bit.ly/1z2q5Dd).

Wallace Francis Smith (1964), *The Low-Rise Speculative Apartment*, Report #25, Center for Real Estate and Urban Economics, Institute of Urban and Regional Development, University of California, Berkeley.

SPUR (2014), *8 Ways to Make San Francisco More Affordable: Proposals To Solve The Housing Affordability Crisis*, SPUR (www.spur.org); at http://bit.ly/1DxGsro.

SPUR (2015), "Getting to Know Your In-Laws," *The Urbanist*, No. 541 (www.spur.org); at www.spur.org/publications/article/2015-03-23/getting-know-your-laws.

Stats Canada (2014), *Survey Of Household Spending (SHS), Household Spending, Canada, Regions And Provinces, By Household Income Quintile*, Table 203-0022, Statistics Canada (www5.statcan.gc.ca).

Mac Taylor (2015), *California's High Housing Costs: Causes and Consequences*, Legislative Analyst's Office (www.lao.ca.gov); at http://lao.ca.gov/reports/2015/finance/housing-costs/housing-costs.pdf.

TransForm (2009), *Windfall For All: How Connected, Convenient Neighborhoods Can Protect Our Climate and Safeguard California's Economy*, TransForm (www.TransFormCA.org); summary at http://bit.ly/1FLn363.

Peter Tatian (2013), *Is Rent Control Good Policy?*, MetroTrends, Urban Institute; at http://urbn.is/1EpQcq5.

Benjamin Powell and Edward Stringham (2014), *Housing Supply And Affordability: Do Affordable Housing Mandates Work?*, Reason Foundation; at http://bit.ly/1z6FuwV.

ULI (2011), *What's Next? Real Estate in the New Economy*, Urban Land Institute (www.uli.org); at www.morpc.org/pdf/ULI_whatsnext_inRealEstate.pdf.

US Census (2013), "Table S-O4C-AO," *2013 American Housing Survey*; at http://1.usa.gov/11T1hhR.

US Census (2015), *2013 American Housing Survey*, U.S. Census Bureau (www.census.gov); at www.census.gov/programs-surveys/ahs/data/2013/national-summary-report-and-tables---ahs-2013.html.

USEPA (2010), *Smart Growth: The Business Opportunity for Developers and Production Builders*, U.S. Environmental Protection Agency (www.epa.gov); at www.epa.gov/smartgrowth/sg_business.htm.

USEPA (2014), *Smart Growth And Economic Success: Investing In Infill Development*, U.S. Environmental Protection Agency (www.epa.gov); at http://1.usa.gov/1JAUSId.

USHUD and USDOT (2015), *Location Affordability Portal* (www.locationaffordability.info), by the U.S. Department of Housing and Urban Development and U.S. Department of Transportation.

USGBC (2012), *Affordable Housing Initiative* (www.usgbc.org/DisplayPage.aspx?CMSPageID=2031), US Green Building Council. Provides guidelines for creating more energy efficient affordable housing.

Asha Weinstein Agrawal, et al. (2011), *Getting Around When You're Just Getting By: The Travel Behavior and Transportation Expenditures of Low-Income Adults*, Report 10-02, Mineta Transportation Institute (www.transweb.sjsu.edu); at http://bit.ly/1yglYC3.

Jonathan Woetzel, et al. (2014), *A Blueprint For Addressing The Global Affordable Housing Challenge*, McKinsey Global Institute (www.mckinsey.com); at www.mckinsey.com/insights/urbanization/tackling_the_worlds_affordable_housing_challenge.

Vanessa Yu Hay Wong (2012), *How Do Social Housing Locations Impact Transit Use In Family Households In the Cities Of Vancouver And Burnaby?* Thesis, Simon Fraser University (www.sfu.ca); at http://bit.ly/1O3fxVV.

Zillow (2015), *Zillow Home Value Index Methodology*, Zillow Real Estate Research (www.zillow.com); at www.zillow.com/research/zhvi-methodology.

www.vtpi.org/aff_acc_hou.pdf