

Transport and Land Use: Key Issues in Metropolitan Planning and Smart Growth

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1. Growing Smart

At the risk of appearing fashionable, I decided to stick “smart growth” in the title of my talk. I confess this is because I find smart growth to be a nice shorthand for “transport and land-use integration”. Stripped to its essentials, smart growth is mainly about better coordinating and integrating transportation and land development. “Smart growth” is a compressed (two-syllable) way of saying this.

In the United States, “smart growth” has gained a momentum of its own, fueled by progressive legislation in states like Maryland and Florida which ties infrastructure dollars to land-use management. No longer just a local issue, smart-growth rhetoric is today even heard on the national campaign trail.

In ways, smart growth is synonymous with sustainable development. As a rapacious consumer of natural resources and emitter of pollutants, the transport sector must be judged on the basis of sustainability – maintaining or improving, as opposed to harming, the natural environment. Sustainability argues for resource-efficient forms of mobility, such as metrorail systems that link planned urban centers in the case of big cities and dedicated carpool and bus lanes that reward efficient motor-vehicle use in smaller ones. Congestion pricing, parking restraints, and the development of alternative-fuel vehicles are other strategies that embrace sustainability principles.

Smart growth takes on all the more importance in a country like Australia where land is plentiful and, in physical and topographic terms, little stands in the way of American-style, spread-out patterns of growth. South East Queensland is a case in point, where the rapid-fire pace of consumptive land development along coastal areas and the hinterlands threatens natural environments and the future quality-of-life.

Of course, there are no shortages of naysayers who trivialize the importance of transport-and-urbanization linkages. Uncovering unsuccessful experiences is as easy as shooting fish in a barrel.¹ My own research shows in the U.S. rail investments, like BART, have exerted modest influences on urban form.² However this is less an indictment of the transport-land use nexus and more an indictment of gross mis-pricing of resources and institutional fragmentation. Singapore-like prices and Zürich-like public transport services would have led to radically different results in the case of San Francisco’s BART. But let’s not fool ourselves. Smart-growth doesn’t come easy. Something has to give. In Stockholm, middle-class residents give up private living space in return for more public open space and a high-amenity public realm. In Zürich, residents give up private cars in return for wonderfully efficient public transport services. Smart growth is not painless.

With smart growth, there must be some degree of private sacrifice, at least in part, for public gains. The public-private conundrum is revealed by the commuting statistics. Suburbanization has lengthened average commutes, but average driving speeds have gone up even faster. The only two U.S. cities that saw congestion levels fall from the mid-80s to the mid-90s were spread-out Houston and Phoenix. America's most traffic-snarled cities are also its densest and most transit-intensive. With smart growth, personal time losses incurred when switching from cars to transit are matched by societal gains like cleaner air and fuel savings.

Portland shows that containment policies like urban growth boundaries (UGBs) are a necessary pill to curb the sprawl disease. However, supply constraints have inflated land costs (both per square foot and per residence). Portland's experiences show that public gains (i.e., cheaper infrastructure per mile, cleaner air) are at the expense of private losses (i.e., higher housing and land costs). What remains unclear is how much cost inflation is due to constrained land-supplies versus Portland being an attractive place to live and do business, in no small part because of successfully linking transportation and land development.

This paper raises core issues at the center of the debate over coordinated transport and land use – that is, smart growth. I hope to shed light on promising avenues for advancing smart-growth principles and practice as well as to identify major hurdles that need to be overcome.

2. Need Decentralization = Sprawl?

Square one in advancing smart growth is acknowledging that decentralization is here to stay. Decentralizing trends wrought by advances in information technologies, rising affluence, and sheer population growth itself mean that metropolitan areas, worldwide, will continue to spread outward. Telecommunication advances continue to diminish the need for spatial proximity. The information highway, cyberspace, and the emergence of "smart" office parks laced with fiber optic cables and satellite dishes have freed many companies to spin off their lower-tier, back-office functions to the outer suburbs and beyond. Today's workers can handle routine communications and obtain information electronically from remote, less costly locations. What form, if any, this spread-out growth takes, and the economic and environmental sustainability of the evolving patterns, raises fundamental questions about the role of public-sector planning. Is decentralization to be largely private market (business-as-usual) shaped, or through public stewardship of resources, to take the form of concentrated, mixed-use centers?

In a motorized world, decentralization has mainly taken the form of sprawl, defined by its seven-S's – spread-out, skipped-over, segregated, shapeless, scattershot, strip-commercialized, and subsidized land development. Worldwide, sprawl stands as a serious threat to a sustainable future. This is in good part due to the fact that sprawl creates near total dependence on the private car. Between 1980 and 1995, the global fleet of cars, trucks, and buses grew by 70 percent, with a third of the increase occurring in developing countries.³ The ability of planet Earth to absorb astronomical increases in the population of cars and the distances they travel, in terms of both fossil fuel supplies and greenhouse gas emissions, is worrisome. Only 8 percent of the world's population presently owns a car. The 700-plus million motor vehicles worldwide represent just 10 percent of potential market saturation. The spread of U.S. auto ownership rates (750

vehicles per 1,000 residents) to citizens of Russia, India, and China (where fewer than one in ten own a car) would wreak havoc on the globe's finite resources.

3. Linking Transport and Land Use...ergo, Growing Smart

Smart growth is an antidote to sprawl. By their nature, smart growth strategies are *spatial*. They focus on *where* growth should best occur and in what physical form. Programmatically, they share four common traits. One, they embrace urban planning by anticipating and creating a vision of the future. Smart growth flourishes where a firm and well articulated image of the future is in place. Two of the most efficient and sustainable cities in the world, Copenhagen and Stockholm, adopted metaphors to articulate and market their visions of the future – the “Finger Plan” in case of Copenhagen, and a “Planetary Cluster” in the case of Stockholm.⁴ Second, smart growth balances the twin and often competing aims of urban design – form versus function. In designing and building places, functionality is reflected by the details and attention given to *sustainability* and *resourcefulness*. Form is expressed through the *livability* and *aestheticism* of neighborhoods and communities. Third, under smart growth, infrastructure investments are cleverly used to shape and leverage development. This can take the form of extending a rail line to a desired corridor of growth in advance of demand, a practice long employed in Scandinavia and Japan, or withholding public utilities from vulnerable and high-valued areas, like forests, wetlands, and hillsides. Lastly, areas that are growing intelligently and responsibly almost always have an institutional landscape that is conducive to dealing with spillover and cross-boundary problems. This often means some form of regional governance and oversight of local land-use decisions, whether in the form of regional master planning, tax-base sharing, environmental mandates, or zoning overrides. It also means having the capability of making guilty parties absorb at least some of the social and environmental costs they impose, such as through impact fees, exactions, concurrency programs, or externality pricing.

In the U.S., studying the costs of sprawl has become a cottage industry. Most focus has been on the costs of extending roads, sewer lines, school buses, and fire services to far-flung places. The public at-large ends up subsidizing peripheral development since newcomers rarely pay true marginal costs. Robert Burchell of Rutgers University recently reported that if one-third of America's future growth was directed toward central cities and inner suburbs and developed with modest changes (slightly higher densities, more mixed uses, traffic calming), the country would save approximately US\$250 billion over the next 25 years – about US\$10,000 per household.⁵ Be that as it may, most middle-class Americans prefer living in the suburbs because of better schools (which in the U.S., are locally supported), lower crime rates, and having like-minded people as neighbors. Clearly, smart growth is more than rearranging land uses. It is also community-rebuilding.

Ultimately, what distinguishes auto-centricity and sprawl from more sustainable development patterns is poor accessibility of co-dependent land uses from each other. Most thoughtful observers agree with the seminal research of Peter Newman and Jeff Kenworthy that concluded the key to reducing auto-dependence and promoting more sustainable patterns of urbanization lies with making cities more compact.⁶ For the middle class, the most evident effect of compact development is the giving up of private back-lot space for neighborhood shared-public space. Compact development needs to

be matched by amenities, open spaces, and quality design if they are to gain acceptance in affluent countries. Studies show that perceived densities can be increased by such treatments as varying building heights, rooflines, materials, and textures, or adding rear-lot, in-law units.⁷

4. Knowledge Gaps

Fragmented knowledge is the first hurdle we must face in coming to grips with sprawl. Even diagnosing the “disease” of “Los Angeles-style sprawl” is fraught with difficulties, much less trying to solve it. Kenneth Small shows, for example, metropolitan Los Angeles, long America’s poster child of sprawl, has the nation’s highest net population densities and the least amount of dis-contiguous development (it is uniformly amoeba-like in shape).⁸ By the definitions of sprawl’s critics⁹, Los Angeles is the antithesis of sprawl – it’s compact and filled-in.

Perhaps most problematic, all of us who research the impacts of sprawl are guilty of informing public policy based on partial analyses. Some do so through the narrow lens of examining just costs, particularly fiscal (taxpayer) outlays. My own research can be faulted for dwelling on the transportation and environmental costs of sprawl. What about the benefits of alternative urban forms? Until we can weigh fully tallied costs against fully tallied benefits, our diagnoses and prescriptions will remain woefully inadequate.

That said, the good news is evidence is beginning to trickle in showing smart growth tallies well on the benefit side of the ledger. Specifically, regions with well-managed growth seem to economically outperform all others. A recent study of 182 U.S. metropolitan areas, 26 of which have smart-growth programs, found growth-management to be positively associated with economic performance.¹⁰ I reached a similar conclusion in a recent study of 47 U.S. metropolitan areas – those with higher densities, good job accessibility, and greater primacy (shares of jobs in the central city) averaged higher labor productivity, all else being equal.¹¹

5. Mis-pricing and Fiscal Mis-allocations

Throughout the world, underpricing of scarce resources – fossil fuels, pristine landscapes, clean air, people’s time – has propelled sprawl. So has the politicalization of road projects – namely capacity additions aimed at appeasing car-owning suburbanites. Suburbs receive more highway dollar, in Sydney and elsewhere, because that is where traffic is growing the fastest. With most of their roads already in place, built-up cities need funds to repave and rehabilitate aging infrastructure. New highways are often valued as much for their political capital as their physical capital – compared to maintenance projects, they generate more jobs and appeal more to voters anxious for quick fixes.

Sprawl and road building insidiously feed off each other. Trying to build roads fast enough to keep pace with ever-escalating demands for mobility drains public coffers of monies that might instead go to improve schools. In America, sprawl has been as much a consequence of bad inner-city schools (a “push” factor) as it has been of free-flowing suburban highways (a “pull” factor). Increasingly, transportation is less and less an

agent of white flight and central-city abandonment. However, it can be a catalyst to urban reinvestment and gentrification, as cities like Portland, Oregon show. My home town, Oakland, is a case in point. Lousy schools have prompted many middle-class families to leave the city in favor of California's central valley, even if it means enduring two-hour commutes. The Bay Area's exorbitant housing prices have accelerated the exodus. Yet Oakland is blessed with great transportation assets, notably a thriving port and BART rail-transit stations with superb regional access. It is ludicrous that Bay Area workers must live in far-flung communities to find decent schools and affordable housing at the same time neighborhoods around Oakland's BART stations cry out for redevelopment. Fixing the schools and curbing random violence is part of the solution to Oakland's woes. But so is exploiting the city's transportation assets. This is happening in and around Oakland's Fruitvale BART station which is slowly but steadily evolving into a mixed-use "transit village". Transportation, and specifically rail transit, is the centerpiece of Fruitvale's economic transformation.

Sprawl is nurtured by inter-modal funding biases as well. This certainly has been the case in the U.S. where highway construction dollars are pegged to the steady stream of gasoline tax receipts whereas public transport support is subject to whims of political brokering. European-like transit systems will always be a pipedream unless European-like financial support is provided – only then might the morphologies of Australian and American cities become more European-like. Of course, cities like Sydney will never be as dense than their European and Asian counterparts. Sydney's inner area, with the high concentration of people in Australia, contains a half million inhabitants, about one-fifth the density of Paris.¹² But on the other hand, neither does Sydney need to be as thinly spread and car-dependent as Houston or Atlanta.

Economists often argue that proper pricing -- such as congestion fees, parking surcharges, and premature land-consumption taxes -- would eliminate the need for smart growth campaigns and public interventionism. Design movements like the New Urbanism, transit-oriented development, and jobs-housing balance would quickly become passé. With substantially higher road prices, people would move closer to jobs and transit stops to economize on travel, and shops would be warmly welcomed into residential neighbourhoods. So far, road pricing is something that makes good sense in theory but which finds absolutely no political constituency, at least not in the United States. Martin Wachs, as chair of a national committee that explored the possibility of implementing road pricing in the United States, concluded that "except for professors of transportation economics and planning -- who hardly constitute a potent political force -- I can think of few interest groups that would willingly and vigorously fight for the concept...".¹³ In the absence of true market-based pricing of transportation, public initiatives that reduce automobile dependence and thus help conserve finite resources must be turned to. In the jargon of economists, physical land-use planning becomes a second-best response to the inability to introduce first-best, pareto-optimal pricing.

6. Institutions and Politics

In America and to some degree Australasia as well, growing smart is complicated by messy institutional landscapes. Quite often, regional land-use patterns – which set the stage for travel – are the sum product of local, incremental decisions on where to locate a new shopping plaza, whether to rezone a particular land parcel, etc. Rarely do these decisions shape into a coherent vision of the future. One of many institutional

impediments to transportation-land use coordination is the mismatch between where decisions on land development are made -- locally -- and the transportation impacts are felt -- regionally. Travel, of course, knows no boundaries. The effects of poor coordination get played out all too often as inefficiencies, negative spillovers, and fiscal disparities. In America, for instance, it is not uncommon for fast-growing communities to place regional trip generators, like big box retailers that fatten local tax coffers, near their boundaries so that surrounding communities absorb much of the traffic burden.

Worldwide, transportation planning is mired by bureaucratic inertia and redundancies. Ideally, jurisdiction over transport and land-use matters would match commutersheds -- similar to the regional context in which water resources (watersheds) and air resources (airsheds) planning occurs. In practice, decision-making is fragmented across many jurisdictions and often multiple transportation service-providers (e.g., separate entities involved with public transport, highways, freight, ferry services, etc.).

Another institutional impediment to smart growth is the irregular pace of land-use change. Local and subregional growth often occurs incrementally, in fits and starts. Land-use maps are continuously changing because of zoning amendments, variances, and new subdivisions. In contrast, decisions on regionally important transportation improvements often occur in 2 to 3 year time increments, and are hard to reverse or change in response to unfolding land-use patterns. Thus whereas land use changes are fluid and on-going, large-scale transportation projects tend to be rigid and occur over much longer time increments.

Also hampering coordination is the reality that the benefits of careful transport-land use integration are often not evident until ten or more years in the future. This is inherently at odds with political systems that demand short-term payments, IMTO ("in my term of office"). Elected officials are much more likely to embrace a large-scale road project that immediately relieves congestion and generates lots of jobs and political capital than transit villages, jobs-housing balance, New Urbanism, and other land-use strategies with questionable near-term pay-offs.

Compared to the U.S., Australia's state governments have been far more progressive in coming to terms with auto-centric development. The New South Wales Government's integrated transport plan, *Action for Transport 2010*, sets a zero-growth VKT per capita target for the Sydney-Newcastle-Wollongong metropolitan area by 2011. Such bold measures require a clear understanding of the science of land use and travel behaviour. An important first step is better knowledge on trip generation and modal choice behaviour, such as being advanced by the NSW Government in a study of "Traffic Generating Developments". What is particularly imperative is learning more about how land-use arrangements "de-generate" trips and favour transit, walking, and cycling. Knowledge must then be put to practice, such as embodied in sliding-scale impact fee programmes and integrated transport-land use modeling.

South East Queensland has also made headway in integrating metropolitan planning under its Integrated Regional Transport Plan (IRTP), which has been given the highest institutional status by the Queensland cabinet. The state itself is vested in the enterprise of coordinated planning under Queensland's Integrated Planning Act of 1998. The Act binds the State to integrated regional planning.

In the United States, all eyes are on the state Georgia where an all-powerful regional transportation authority has recently been formed. Called the Georgia Regional Transportation Authority (GRTA), the organization not only oversees the planning and expenditure of funds for all urban transportation improvements in the state, but also has broad control over regionally important land uses, like shopping malls, industrial parks, and sport stadia. Local land-use decisions must conform to broader regional transportation and development goals, otherwise GRTA can effectively veto the decision by threatening to cut off all state infrastructure funds. GRTA's formation was largely in reaction to decades of poorly planned growth in metropolitan Atlanta, matched by ever-worsening traffic congestion. The announced plans of a large high-technology employer to relocate out of Atlanta because of unsustainable traffic congestion and a declining quality of life was a political wake-up call. The region's new planning philosophy – one of balancing urbanization and transportation investments -- aims to enhance mobility while also placing the region on a smart-growth pathway. The ability of GRTA to leverage the mix-use transformation of an in-city brownfield site abandoned by the Atlantic Steel company into a mixed-use village has been an important victory for smart growth. For purposes of securing Federal infrastructure funds currently frozen because of Atlanta's violation of air quality mandates, GRTA and others successfully argued that infill development would be less harmful to Atlanta's air basin than comparable growth on the car-dependent edges.

7. Transportation-Land Use-Air Quality Conundrum

Continuing on the air-quality theme, it not uncommon to hear “the solution to pollution is dilution” – i.e., sprawl poses fewer air pollution risks than compact development. One study found little difference in New Jersey's future air quality under sprawl or compact-city scenarios.¹⁴ The danger with such analyses is that they focus solely on local and ignore global pollution. Yes, exposure levels (and thus health risks) are lower with sprawl, but tailpipe emissions and fossil-fuel consumption are greatly increased. Sprawl must be judged not only in terms of ozone levels but also greenhouse gas emissions. In this respect, the U.S. is as much in denial as any nation. America, a laggard in the move to exact carbon taxes and set greenhouse gas emission limits, has under 5 percent of the world's population but is responsible for about a quarter of transportation VKT and a third of carbon-dioxide emissions. (As a signatory to the Kyoto Agreement, Australia is far more committed to greenhouse gas reductions, with a 2008-2012 emissions target for the country as a whole of no more than 8 percent above 1990 levels).¹⁵ Destructive weather patterns, some fear, are a harbinger of what's to come in a car-dependent world that emulates America's pattern of suburbanization.

8. Induced Demand

No issue has paralyzed highway programmes and side-tracked our ability to rationalize new road development as concerns over “induced travel demand”. Time and again, experiences show that building new roads or widening existing ones, especially in fast growing areas, provides only ephemeral relief – in short time, they are once again filled to capacity. A study using 18 years of data from 14 California metropolitan areas found every 10 percent increase in highway lane-miles was associated with a 9 percent increase in vehicle-miles-traveled four years after road expansion, controlling for other factors.¹⁶ Similar findings have been recorded in the United Kingdom.¹⁷ In the United

States, regional transportation plans, such as in the San Francisco Bay Area, have been legally contested by environmental interest groups on the very grounds that they failed to account for the induced travel demand effects of road investments and expansions.

The on-going construction of circumferential roads around Australian cities unavoidably raises concerns over induced demand impacts. The NSW Roads and Traffic Authority (RTA) is moving ahead with the Sydney Orbital series that will ring the city with a network of circumferential highways, including the M2 (to the Northwest Sector) and M5 (to the southwest). As with all beltways, the aim is to deflect through traffic out of the center, expedite freight movements, and accommodate lateral, tangential trips. Experiences show that in fairly congested settings like Sydney, the augmentation of road capacity shifts growth as developers seek to exploit newly added accessibility. Parcels near interchanges become particularly valued and sought out. In the near term, there is “triple-convergence” – motorists switch modes, routes, and times of day to exploit available capacity. Over the long term, new roads induce structural shifts – namely, realignment of land development and a tendency toward higher car ownership as a result of more auto-centric landscapes. It is largely for this reason that VicRoads recently shelved plans to build the Scoresby Freeway east of Melbourne.

8. Inequities and Environmental Justice

New road development also pits the interests of in-city dwellers against those of the suburbs. America’s legacy of radial superhighways that channel suburbanites to well-paying central city jobs has been at the expense of severing in-town communities, separating people by race and class, and social dislocation. Sydney’s F2 highway proposal has sparked similar controversy over the destruction of urban bush land, the isolation of neighborhoods, and infringement upon archaeological sites. For these and other reasons, the project was scrapped. Melbourne’s CityLink project (at \$A1.8 million, Australia’s largest single urban road project) has been faulted for similar reasons.

9. Regional Balance

Shaping regional growth to achieve public good has long been a central precept of sustainable planning principles, at least as early as Ebenezer Howard’s celebrated *Garden Cities of Tomorrow*.¹⁸ British, French, and Scandinavian post-war new towns embraced principles of balanced, self-contained growth as means of preserving natural landscapes and redressing social inequalities.¹⁹ Jobs-housing balance has found favor in some American regions as a means to “rationalize” commutersheds by internalizing larger shares of motorized trips within sub-regions. Australia’s much-ballyhooed multifunctional polis (MFP) – a high-tech, market-friendly urban prototype slated for bushlands north of Adelaide – similarly embraces balanced growth principles.

There is no better example of the efficiency and sustainability gains that come from balanced growth than Stockholm, Sweden. The last half-century of strategic regional planning has given rise to a regional settlement and commutation pattern that has substantially lowered car-dependency in middle-income suburbs. Stockholm planners have created jobs-housing balance along rail-served axial corridors. This in turn has produced directional-flow balances. During peak hours, 55 percent of commuters are typically traveling in one direction on trains and 45 percent are heading in the other

direction. Stockholm's transit modal share is nearly twice that found in bigger rail-served European metropolises such as Berlin and even higher than inner London's market share. Perhaps most impressive, Stockholm is one of the few places where automobility appears to be receding. Between 1980 and 1990, it was the only city in a sample of 37 global cities that registered a per capita decline in car use -- a drop off of 229 annual kilometers of travel per person.²⁰

In America, jobs-housing imbalances are fundamentally a problem of barriers to housing production in jobs-rich cities. One of many policy challenges to American planners in coming years will be to work toward breaking down barriers to residential mobility. Among the most promising remedies is tax-base sharing, wherein jobs-surplus cities share their local tax receipts with bedroom communities that end up housing their workers.²¹ In theory, this would remove the incentive to zone out apartments and other low tax-yielding/high service-demanding land uses. Another option tried in Boston and San Francisco with some degree of success is fair-share housing mandates. Prodding municipalities to "think regionally and act locally" remains a huge obstacle.

10. Privatization

Privatization of transportation facilities makes good sense in more than purely financial terms. The private sector largely dictates land development, and there is no reason it cannot successfully finance and integrate supportive infrastructure as well. Over the past century, there has often been a disconnect between privately-led land development and publicly provided infrastructure. The private sector is best positioned to ensure concordance between land and transport development. In America, this takes the form of *concurrency laws*, such as in the state of Florida, wherein private developers must furnish adequate infrastructure to accommodate their projects. In Australia, privatization has been mostly in the form of BOOT projects, like Sydney's M2 and Melbourne's City Link. While the promise of profiteering from tolls is partly behind private interests in road development, so is the prospect of ancillary real-estate development from land holdings near interchanges. While on the surface there is nothing wrong with this, the longer term implication is an acceleration of car-oriented development patterns. A public policy challenge is to elicit private participation in public transport development as well, at least as a counter-balance to privately built highways. Experiences in Tokyo and Osaka show privatization of suburban railway development can spur compact, mixed-use patterns of suburbanization.²² In Japan, suburban railway companies are mainly in the real estate business. Transportation is a loss-leader in that huge profits are derived from land sales near railway stations. Companies make handsome profits through value capture, but society at-large generally benefits from the close nexus between rail and land-use development.

11. Bus-Based TODs

Because of Australia's generally low population densities, outside of central Sydney and Melbourne, bus-based transit offers more promise than rail in wooing motorists out of cars. However, buses suffer from the stigma of second-class forms of mobility, though Europe's mass introduction of low-floor, bubble-glass equipment could soon change that image. There remains a popular perception that bus stations are not attractive places for compact village development – whether for reasons that diesel fumes are

unattractive (though CNG buses can fix this problem) or too many undesirables hanging around bus depots. The absence of much TOD (transit-oriented development) along Adelaide's northwest track-guided busway (Tea Tree Gulley, notwithstanding) lends credence to this view. However, what ultimately drives development is accessibility gains – whether in the form of rubber tyres on concrete or steel wheels on steel rail. Cities like Ottawa, Canada and Curitiba, Brazil show that bus-based TODs can be every bit as successful as rail TODs as long as they are accompanied by forward-looking, intelligent planning. Brisbane is attempting to emulate these successes by using bus rapid transit to shape growth. As the nation's fastest growing city, Brisbane has as much to gain from smart growth as any Australian city.

11. Resourcefulness

Smart growth is intimately tied to smart pricing and being resourceful. Countries like France, Denmark, and Sweden have held sprawl in check by heavily taxing electricity and petroleum consumption at a rate three to four times higher than in the United States. Besides encouraging the use of smaller cars and appliances, pricing that reflects the scarcity value of resources encourages the commingling of land uses. In Europe, this takes the form of workplaces situated within convenient reach of residences, and in-neighborhood shops and restaurants that reduce the need for gigantic, electricity-hungry refrigerators and freezers.

In the U.S., car parks are arguably the most wasteful of all land consumers. Zoning codes -- notorious for inflating parking supplies that in turn drive up the cost of development – bear much of the blame.²³ Over-zoning is particularly problematic in the suburbs where surface parking often consumes twice as much land as the footprint of buildings. Many German cities lower mandatory parking requirements depending upon how close a new development is to a high-quality public transport node. Zürich, Switzerland has constrained parking supplies so much that over a third of middle-income families do not own cars, relying on a combination of car-sharing and superb public transport (which enjoys signal priority throughout the city).

A good example of being resourceful is adaptive re-use of urban spaces. Sydney's soon-to-be transformation of the Olympic village at Homebush Bay into a transit-oriented village promises to be a showcase of resourcefully recycling valuable in-city land. Through intelligent design and planning, Vancouver managed to successfully transform what was a moribund waterfront into a vibrant mixed-use village in the wake of the 1986 World Expo.

Even in the U.S., adaptive re-use is gaining currency, mainly taking the form of re-using superfluous surface parking lots. Car parks are proving to be a blessing in disguise for they provide large swaths of pre-assembled land. Most attractive are surface parking lots at train stations since they enjoy great accessibility. Many were originally overbuilt, thanks to generous federal funding for rail development. As areas have matured and surrounding land values have increased, market pressures are prompting U.S. transit agencies to sell off at least portions of them as a means to both create a ridership base and to reap windfalls in the form of value capture. Often, the profits earned are more than enough to cover the cost of replacement structured parking, freeing up land for infill development. Surface parking conversion, then, is a back-door form of land-banking,

which in many European cities, including Stockholm, has been a principle means of leveraging transit-oriented development.

The city of San Jose, California and the Santa Clara Valley Transportation Authority (SCVTA) recently joined forces in designing a mid-rise, mixed-use project on the park-and-ride lot at the Ohlone-Chynoweth light rail station. Historically, the region's light-rail system has struggled to build a ridership base in large part because much of its service territory is the Silicon Valley, a landscape of sprawling office campuses and car-oriented shopping plazas. However, as the demand for affordable housing with good access to the Silicon Valley has intensified, local policy-makers have come to the realization that parking-lot infilling was too good of an opportunity to pass up. At the time of project development, only 30 percent of the 1,140 original parking spaces at the Ohlone-Chynoweth station were used. Already, 500 parking spaces have been converted to 195 units of two and three story town homes, a retail plaza, a child-care facility, and a community recreation center.

Another promising area is to smartly re-use antiquated and dysfunctional shopping centers. The trend in retailing toward warehouse-shopping, e-commerce, and mega-entertainment malls has led to the closure of many out-dated 1960s and 1970s shopping centers across the United States. Like rail parking lots, one of the biggest assets of dying shopping centers is their huge amount of pre-assembled real estate. One of the more successful adaptive re-uses of a shopping center and integration with rail transit is The Crossings project in Mountain View, California. The Crossings is an 18-acre compact, mixed-use, and walkable neighborhood near a commuter rail line some 30 miles south of San Francisco. It replaced a slowing dying shopping center and movie theater that were surrounded, in big-box fashion, by a huge, underutilized surface parking lot. The project's 540 housing units have commanded a rent premium, partly because of proximity to rail and partly because of the high-quality of urban design. Many well-paid young professionals with jobs in downtown San Francisco and the nearby Silicon Valley have opted to buy into The Crossings, drawn by its ambience and exceptional accessibility to transit. Generous landscaping and public spaces punctuated by an internal pathway network have created a highly attractive urban milieu, notwithstanding residential densities of 30 units per acre, fairly high by suburban California standards. Zero-lot lines and rear-lot parking have allowed such densities to be achieved. As a gateway to the Mount View CalTrain station, The Crossings stands as one of the few transit villages oriented toward commuter rail.

Pivotal to the success of growth is the rewarding of socially and ecological responsible behaviour. This might take the form of granting credits to impact fees, targeting complementary public improvements, fast-tracking development permits, and offering tax concessions. Zürich, Switzerland rewards efficiency by dedicating the majority of road rights-of-way to trams, buses, and bicycles.²⁴ Advanced monitoring and information technologies have also been used to give preferences to trams and buses at virtually all signalized intersections as well as to provide a continuous flow of information to customers about when transit vehicles are expected to arrive. Minimum-delay, surface-street transit connections have won over most Zürich residents to public transit, producing one of the highest per capita ridership levels in the world. Zürich is also one of the world's wealthiest cities on a per capita basis. Who says compactness, prosperity, and ecological transportation can't go hand in hand?

12. Multi-Sectoral Planning

Coping with transport problems through the narrow perspective of transport planning is a recipe for failure. Transport problems are also housing problems. Why many young couples and first-time home-buyers reside on the metropolitan fringes and endure ultra-long commutes has a lot to do with the unaffordability of decent in-city housing. Peripheral communities like Baulkham Hills and Belgrave owe their existence, in part, because many families are displaced from the middle-class housing markets of Sydney and Melbourne. The Ultimo-Pyrmont area near Sydney's Darling Harbor is a good example of infill housing development based on low car ownership and high environmental quality.

Linking transport and housing policy makes good financial sense. Together, transportation and housing often make up a good half or more of household consumption expenditures. To the degree less is spent on transport, more income is freed up for housing consumption. This is partly the philosophy of Europe's successful car-limited settlements and car-sharing schemes. In the U.S., the concept of Location Efficient Mortgages (LEMs) has gained currency. If transit-oriented living lowers transportation by relieving residents of the need to own a second car, this frees up more earnings for housing consumption. This should be reflected by commercial banks when qualifying applicants for home mortgages. Demonstration programs, co-sponsored by Fannie Mae (federal mortgage insurance agency) and several private banks, are currently under way in Chicago, Seattle, and Los Angeles to pilot-test the location-efficient mortgage concept.

13. Accessibility Planning

Accessibility reflects the ability to efficiently and conveniently reach frequently visited places. It can be enhanced either by increasing travel speeds or by bringing urban activities closer together, or some combination thereof. Replacing automobility planning with accessibility planning means social and community considerations take precedence over individualistic ones. It also recognizes what cities are about, first and foremost – *people and places, not movement.*

Decentralization pressures are working against accessibility throughout the world. Work trip lengths in eleven large European cities increased from 8.1 km in 1980 to 9.6 km in 1990, an 18.5 percent rise.²⁵ In Shanghai, journeys-to-work lengthened, on average, from 6.2 km in 1981 to 8.1 km ten years later.²⁶ Trip distances in Santiago are rising by 1.3 percent a year. Longer trips have increased automobile dependence -- motorized travel per person in greater Santiago doubled between 1977 and 1991 and the automobile's mode share has risen from 10 percent in 1977 to 25 percent today.²⁷

Efficient, well-managed cities minimize the need to travel, enabling residents to spend time more productively at desired destinations rather than fighting traffic. Accessible communities bring activities closer together by in-filling, inter-mixing land uses, and promoting tele-travel. Broadening our objectives to include accessibility inescapably leads to a wider array of approaches to physical planning, including better land-use management.

The co-development and integration of land-use and transportation can substantially enhance accessibility. Curitiba, Brazil is a case in point. Curitiba, widely viewed as one of the world's most sustainable, well-managed metropolises, is also one of the most accessible -- a product of some forty years of carefully integrating urbanization and transportation improvements. By emphasizing planning for people rather than cars, Curitiba has evolved along well-defined linear axes that are intensively served by dedicated busways. Along some corridors, elephant-trains of double-articulated buses haul 16,000 passengers per hour, comparable to what much pricier metro-rail systems carry.²⁸ A design element used to enhance accessibility is the "trinary" -- three parallel roadways with compatible land uses. An important benefit of mixed land uses and transit service levels along these corridors, besides phenomenally high ridership rates, has been balanced, bi-directional flows, ensuring efficient use of available bus capacity. On a per capita basis, Curitiba is Brazil's second wealthiest city yet it averages considerably more transit trips than much-bigger Rio and São Paulo. It also boasts the cleanest air among any Brazilian city, despite being a provincial capital with a sizable industrial sector. The strong, workable nexus that exists between Curitiba's bus-based transit system and its linear settlement pattern deserves most of the credit.

The Dutch take the concept of accessibility-based planning to the ultimate degree through their A-B-C programme. Dutch planners draw *mobility profiles* for new businesses which define the amount and type of traffic likely to be generated. They also classify various locations within a city according to their *accessibility levels*. A study showed that putting businesses that generate lots of traffic per square meter of development in transit-oriented locations results in, on average, a 41 percent transit mode split versus just 12 percent if the same business is placed in an otherwise comparable auto-centric location.²⁹

14. Livability

Along with accessibility and sustainability, smart growth advances the goal of "livability". Livability applies principles of sustainable planning to the scale of the neighborhood. It is about the human need for social amenity, health, and well-being.

Many European cities have brought livability to the forefront of transportation planning, opting for programs that tame and reduce dependencies on the private car. Traffic calming is one such approach, pioneered by Dutch planners who have designed in speed humps, realigned roads, necked down intersections, and planted trees and flowerpots in the middle of streets to slow down traffic. With traffic calming, the street is viewed as an extension of a neighborhood's livable space -- a place to walk, chat, and play. Automobile passage becomes secondary. After traffic-calming its streets in the early 1990s, the city of Heidelberg, Germany witnessed a 31 percent reduction in accidents and a 44 percent reduction in casualties.³⁰

15. Cyber-cities of Tomorrow

A prominent feature of tomorrow's accessible city will be the distributed workplace. The growth in communications industries, back offices, self-employed entrepreneurs, and cottage industries will spread more and more workplaces into the suburbs, exurbs, and rural hinterlands. New types of communities are already beginning to take form. Some,

like Montgomery far north of Toronto, have been developed and marketed as mixed-use communities suited to telecommuters who only need to make the 100-km long trek to their main office in central Toronto once or twice a week.

Some have speculated that home-working and tele-commuting will fail to bring about transportation and environmental benefits because people will adjust by making more and longer non-work trips; borrowing from time-budget theory, the suggestion is that people have an innate and insatiable desire to travel, and when denied this unalienable right, they compensate by driving more often to shopping malls or taking longer weekend excursions. A study of a pilot tele-commuting programme of 200 government employees in Sacramento, California found just the opposite.³¹ VMT went down among tele-commuters (to just 20 percent of the distance they normally travelled on commuting days), and on the one or two days a week when they went to their offices, they tended to make more efficient trips (e.g., chaining work, shopping, and personal business travel). Even greater reductions in travel were found several months into a tele-commuting demonstration program in Rijswijk, The Netherlands.³² A recent study of tele-work centers, which are neighborhood-based shared workplaces equipped with advanced communications facilities, in the greater Seattle-Tacoma area found VMT was cut by more than half.³³ Yet telecommunications has not proven to be the panacea that some had hoped for, in large part because most occupational roles are not suited for home-working, at least not on a regular basis. Management fears of losing oversight controls over tele-workers have also thwarted past initiatives. Another concern is that home-workers will feel cut off from office social life and promotion opportunities. It is for these reasons that part-time tele-commuting, say working at home one or two days a weeks and in the office the remaining workweek, has gained popularity.

Whether telematics and the internet will substitute for or stimulate physical travel is anyone's guess. What is abundantly clear, however, is that future travel will take on new shapes and forms: international trips (air travel) will increasingly substitute for intrametropolitan trips (car travel); with e-commerce, truck delivery trips will replace personal shopping trips; and real-time information on how to avoid congestion will enhance automobility. Such structural shifts, of course, will exert strong land-use influences every bit as much as did past transport innovations. E-commerce suggests the emergence of goods distribution centers in many pockets of the city. Cyber-work will exert pressures for in-neighborhood shops, services, and "watering holds" for those wanting a break from staring at the screen for four straight hours. Global-sourcing promises that airports and all the ancillary activities around them will become dominant activity centers and trip generators.

It is sometimes said transportation and land-use planning is today inconsequential because transportation is of weakening importance in location decisions. Such banter is totally blind to the reality that we are today in the midst of revolutionary changes in forms of transport – albeit more in the way of ideas and information than physical movement. While the canvass in which we are working with is vastly enlarged, the need for integrating land development and transportation is as great today and in the foreseeable future as anytime in our history.

16. Command-and-Control or Choice?

Smart growth is sometimes ridiculed for being tantamount to “command and control planning”. Clearly, living in compact, mixed-use, easily walkable communities is not for everyone. Middle-class and well-to-do households with several or more children and a preference for privacy and seclusion will continue to reside mostly in the suburbs and beyond. Back-office functions will continue to flock to outlying and far-flung places where real estate prices are cheaper. Big-box retailers and multi-plex cinemas will continue sprouting on the outskirts. Smart-growth initiatives in no way intervene in such free-market locational choices as long as those making the choice pay something which comes reasonably close to reflecting true social costs. Rather, smart growth – whether in the form of an infill housing project on a former transit parking lot or an edge city with a balance of jobs-to-housing and roads-to-busways – is mainly about expanding choices and offerings in a free market context. More variety in housing choices, in particular, is an adaptation to the steady growth in single-person households, childless couples, and empty-nesters, many of which prefer in-city, small-lot living in attractive environments that are well-served by public transport and easy to get around by bike and foot. Variety and choice is something that finds broad political and ideological appeal. It is precisely for this reason that smart-growth will ultimately prevail as the dominant paradigm of community-building in the twenty-first century.

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