

Chapter Five: Locate Good Jobs Close to Affordable Homes

The daily commute by car to work, usually alone, is responsible for an increasing share of total US and Canadian greenhouse gas production. Short of an immediate increase in fleet efficiency (not possible) or a dramatic breakthrough in battery technology (not likely) this share is likely to continue its climb for years to come.

[Figure 5.1 in margin]

On the other hand, the relative contribution of other sectors to GHG production, notably industry, is declining because industry has made major efficiency gains in how it produces and uses energy per unit output.¹ The per square foot use of energy for buildings is also declining, particularly in the residential sector.² But these gains are more than offset by the increase in per capita vehicle miles traveled per person per day, a rate of increase that has held amazingly consistent since the 1940s, with tiny interruptions for the oil shock of the 1970s and spike in gas prices to over \$4.00 per gallon in 2008.³

As mentioned in chapter one, the construction of the interstate highway system, and the girdling of metropolitan regions with one, two, even three interstate highway ring roads, induced the dramatic rise in average commute distances, making the relationship between home location and job location irrelevant. Any point in the entire region could be accessed from any point in the region by car if the commuter was willing to drive up to an hour. At least, that is, until the inevitable increase in VMT traveled per capita overwhelmed the capacity of even this bloated system. Los Angeles, appropriately, became the first victim of this phenomenon. Now speeds on its most congested freeways

average only 12 mph during peak hours⁴ – ludicrous for a road engineered for 80 mph. Many Los Angeles drivers have taken to the surface arterials for commuting out of frustration with their long slow drives on clogged freeways. There they often find that the still robust system of former streetcar arterials delivers them to work in less time, despite numerous traffic lights.

Investment in transit is often posited as the long-term solution to this transportation crisis. Recent changes in US Federal transportation funding (SAFETEA LU, 2005)⁵ have allowed a proportionately small amount of “gas tax” money to be funneled to transit if states so desire, funds originally allocated exclusively to road construction. Metropolitan regions as unlikely as Dallas have devoted a portion of their transportation funds to new light rail systems as a result **[Figure 5.3 in margin]**. But virtually all of these expensive transit systems share a characteristic. They are “hub and spoke” systems that are designed to get people from the edge of the region to the center – in 40 minutes or less. This pattern is based on a false assumption: that people live at the edge of the region and commute to the center for work. As discussed in chapter two, this assumption may have been true between 1960 and 1985 in many U.S. and Canadian metropolitan areas, but is no longer the case.⁶ As a consequence of the overbuilding of freeways, the authority of older regional centers has been undercut. While jobs may continue to grow in center cities, their capture rate as a percentage of all new jobs in the region continues to decline. Most new jobs are located far from metropolitan centers, typically clustered around freeway ring road intersections. **[Figure 5.4 in margin]** While commuter rail lines may be reasonably close to many residential origins, they are usually very far from most new job sites, rendering them ineffective at drawing commuters from

their cars. Between 1990 and 2000 transit's work trip market share dropped 23 percent in Dallas, Texas. This decline continued until recently when ridership on DART's network of buses and trains began to increase. Between December 2007 and 2008 ridership on buses increased 3.4 percent while ridership on DART rail increased by 8 percent.⁷

Newer cities like Phoenix or the vast conurbations of Florida are structured in a way that makes them extremely hard to retrofit for transit. Regional transit authorities try hard to provide service to these auto dominated landscapes for the poor and infirm by providing on demand community shuttles to and from the store, but at enormous cost per ride. The cost of providing transit in our increasingly auto-centric metro areas have led auto enthusiasts from Demographia, the Reason Foundation and the Cato Institute to suggest that it would be cheaper to simply buy a car for every person in the US who is dependent on the bus (meaning mostly the poor).⁸ The sad truth is that given the impossibility of providing efficient transit in most new areas, they may have a point.

The Historic Relationship between Work and Home

Even if a zero GHG electric auto that could travel long distances were widely available, the resources demanded to continue to build over a 60 million personal autos a year⁹, autos that last less than ten years on average¹⁰, would drain the planet - not to mention the cost and consequences of adding an additional 25% per capita of electric power to fuel such an electric fleet. Finally, when a full assessment of the GHG consequences of not just the automobile use, but its manufacture, the concrete used for its roadways, the mining processing and distribution of materials and petroleum is included, the true GHG costs are significantly higher than direct tailpipe emissions.¹¹

There was a time, in the US and Canada, when jobs and homes were much closer together. With transportation distances constrained by walking distances and later by the reach of the streetcar, there was no alternative. Early North American jobs and housing patterns were not unlike those of Venice, Italy where each neighborhood was dominated by a trade or a “guild” of craftsmen who lived and worked, sometimes within the same building, always within a two- minute walk distance. Later in England, during the height of the Industrial Revolution, complete industrial communities were planned and built— notably Port Sunlight near Liverpool, the city organized around Lever Corporation’s giant factory.

[Figure 5.7 in margin]

This same intimate relationship between living and working was imported to industrial North America, most famously in Lowell Massachusetts, an industrial city on the Merrimack River. Lowell was built all at one time to include industrial, commercial, civic, religious, and residential spaces.

[Insert Figure 5.8 in margin]

Lowell and other planned North American industrial communities have been extensively studied, but other less formally planned industrial communities had the same characteristics. Brockton Massachusetts, the author’s home town, is one of many eastern US examples, where commercial, residential, and industrial spaces organically organized

themselves within easy walking and streetcar distance. Literally hundreds of workshops and factories profited by providing various parts of the chain of materials and machinery necessary to make shoes. These shops ranged from small tool and die machine shops with just a few workers, to medium sized tanneries, to large shoe last manufacturers, to massive shoe factories employing thousands. Within the city there existed an entire capitalist ecology, with shops and factories competing with each other to supply the larger manufacturers, while the larger manufacturers competed on the continental scale via a new coast-to-coast rail network.

[Figures 5.9a and 5.9b in margin]

This intimate industrial and community ecology was broken with the end of WWII, and the subsequent construction of the interstate highway system. The economic logic of industrial ecologies such as those found in Brockton were undercut, first by the accessibility to the bigger factories of previously remote suppliers, suddenly brought closer by trucks moving rapidly across the continental landscape. They were undercut even further by the national then international trend towards an industrial economy no longer tethered to adjacency efficiencies, which ultimately bankrupted even the largest domestic apparel manufacturers in the rest of the US and Canada. Now in cities such as Brockton virtually none of the industry that built this once thriving city still operates (Brockton's last shoe company finally closed in 2009).

There was one more drastic consequence of the destruction of place-based industrial ecologies. Much has been made of the arrangement of the modern metropolis in conformance with the “drive till you qualify” phenomenon (see chapter 1). But a second aspect of the same phenomenon is what might be called the “drive to bed” phenomenon, where poor families move to wherever they can afford shelter, no matter where they work. They too might be spending hours driving to work on congested freeways, cursing the congestion and competing for lane space with the middle class and the rich. The difference is they are probably in older less dependable (and for them less affordable) cars. In Massachusetts this phenomenon is particularly dramatic. Poor families are disproportionately located in the formerly thriving industrial cities like Brockton, where the jobs are gone but the housing remains. They choose to live there not because it is close to work but because it is what they can afford. Job intensive sites close to freeway interchanges are far from Brockton and inaccessible by transit, forcing large car-related expenditures for these workers.

These financially stressed families are, in Massachusetts and elsewhere, most likely to have been caught in the trap of sub prime mortgages. Foreclosure rates in Brockton are up to five times higher than in its surrounding communities. Brockton now has the single highest foreclosure rate in the state by far.¹²

Massachusetts has tried, with significant success, to correct this jobs/housing imbalance through a law passed almost 40 years ago: Chapter 40B, The Comprehensive Permit Law.¹³ Under this law developers have the right to overrule locale zoning rules with the assistance of state courts, if it can be shown that a community has less than 10% “affordable” workforce housing and that their zoning is exclusionary. Chapter 40B has

helped towns like Lincoln, Massachusetts to meet its 10% affordable housing target; but there is still a long way to go before this housing is located in complete and walkable districts. Most of the new 40B projects are built near the borders of the municipality, and/or close to freeway interchanges, making residents in these 40B projects as or more car dependent than any other suburban dwellers. Wealthy communities still stridently oppose 40B projects, objecting to what they see as an abrogation of the deeply embedded Massachusetts principle of "home rule". Often they succeed. There is still a long way to go before Massachusetts' suburbs cease to be segregated by income and class, but 40B provides some hope.

Solutions

Clearly any sustained attempt to create more sustainable economies, enhance our security through cutting our dependence on foreign oil, and cut our GHG production by 80% by 2050, must tackle the job-housing challenge. We find ourselves in an alarmingly vulnerable position. We have made the tremendous mistake of restructuring our metropolitan regions on the wrong assumptions: that fuel was unlimited and its use without environmental consequence, and that we could always build enough roads to eliminate congestion. Neither is true. The treasure of our progeny is currently being wasted to prop up this gluttonous and inequitable urban landscape, and a devastated planet will be the legacy. A suite of clear and powerful policy tools equal to the gravity of the problem are needed—tools that operate at all levels of government. To fix the problem would require sustained application of such tools for decades. The solutions suggested below would be part of such a suite.

State and Provincial Legal Frameworks

The Massachusetts 40B law, while limited in its scope and thus its impact, provides an indication of future policy tools that might help solve this problem. A more aggressive application of this law or a strengthened version of a similar law, passed in every state and province within North America, would be a start. This law and others like it (Oregon's "Land Use Law" Senate Bill 100, passed about the same time as Mass. Chapter 40B, is another example) have survived constitutional challenge after constitutional challenge. Communities and land owners do *not* have the right to segregate their communities by class and income, any more than they have a right to segregate their communities by race.

National, State and Provincial Infrastructure Investments

The political ground under this issue is shifting. Notable changes have already occurred with the 2008 US presidential election. Barack Obama, the US's first "urban president" (meaning he mostly grew up in, worked in, and still lives in a major city, Chicago) since Teddy Roosevelt, has pledged to meet the linked security, energy, economic, and environmental goals in the context of a redirection of the national infrastructure funds away from new highways and towards infrastructure maintenance and green energy.

Even the conservative *New York Times* columnist and pundit David Brooks, for decades an enthusiast for the suburbs and author of books on the topic¹⁴ agrees that the model needs to be changed. In December 2008 he identified the problem and advanced solutions not unlike those presented herein. He suggested that we needed a new model for the suburbs, whereby they would become less car dependent and more complete:

To take advantage of the growing desire for community, the Obama plan would have to do two things. First, it would have to create new transportation patterns. The old metro design was based on a hub-and-spoke system — a series of highways that converged on an urban core. But in an age of multiple downtown nodes and complicated travel routes, it's better to have a complex web of roads and rail systems.

In the US government a fundamental change in thinking is taking hold. The Obama administration's Livable Communities Partnership will, for the first time in US history, align the actions of the US Environmental Protection Agency (EPA), the Housing and Urban Development agency (HUD), and the US Department of Transportation (DOT). At long last they will now be required to co-ordinate their activities, looking for synergy between their policies – policies that will enhance land use equity and efficiency, meet environmental goals, and advance the most efficient and low GHG transportation solutions.

A transformational change along the lines now being discussed in Washington won't be easy; but, the reconstruction of our metropolitan regions has happened once before and can happen again. The construction of the Interstate and Provincial freeways in both the US and Canada led to an urban landscape utterly transformed. The cost of that effort in just the US has been estimated in the range of 600 billion in current dollars. A similarly dramatic investment, targeted to a different kind of infrastructure would likely produce similarly dramatic results.

Metropolitan and Community Scale

While it is hard to imagine the reconstruction of our metropolitan landscapes for job equity without the aforementioned policy and financial supports, *with* them anything can happen. Responsibility and power would then fall to the citizens and officials of regions to effectuate these changes over the course of the next five decades. Planning officials, developers, citizens and elected officials become increasingly important at this scale of enterprise. What would be the rules to guide such a regional and municipal planning effort? We might propose the following as well preceded rules for job new job site development.

Rule 1: Recognize That Most New Jobs Don't Smell Bad

Over the past five decades, U.S. and Canadian heavy manufacturing job growth has slowed to a crawl, with the auto industry only the latest casualty. One might argue that such a trend is unsustainable, requiring as it does the outsourcing of the manufacture of almost all of our material goods to foreign lands. Whatever the long-term trend, it is certain that this trend will likely continue for a number of decades, the same decades within which the retrofit of metropolitan areas must be set in motion. In the 1990s the Portland region saw manufacturing jobs rise by just 14 percent, while non-manufacturing jobs rose by almost 40 percent. The future looks even bleaker for manufacturing jobs. Between 1990 and 2010 Portland area manufacturing jobs are expected to drop 6.3 percent while non-manufacturing jobs are expected to increase by 54.6 percent.¹⁵ All of these non manufacturing job types can be fit into a community without threat of excessive noise, smoke, or pollution. This is a critical point, because throughout the U.S. and Canada, zoning codes have been based on the premise that the majority of

“industrial” zoned job sites should be segregated from other zones, confined to isolated areas usually close to freeways but to nothing else. This zoning habit has not caught up with the changing nature of jobs. Smelly dangerous noisy and industrial scale jobs, the ones that really require industrial zones, are increasingly rare. Most of the new jobs are clean, quiet, safe, and can easily fit on the second and higher floors of buildings close to streetcar city arterials.

The plan for the Damascus area near Portland, Oregon demonstrates this principle. This plan was produced at collaborative multi stakeholder charrette, held to explore how it might be possible to add 100,000 people to a 18,000 acre urban area expansion, while at the same time protect the sites ecology, provide alternatives to the car, and create job opportunities close to homes. This 2002 initiative took place in a region where a robust suite of policy tools provided a sophisticated planning context. Not the least of these policy tools was Portland Metro Planning District’s well known “Portland 2040 Plan,” a plan that for the first time identified the regional potential for jobs in both corridors and multi use nodes. In conformance with these general guidelines the resulting Damascus Area Design Workshop plan found jobs space for 100,000 new jobs, enough for every worker in the district and more – the excess intended for residents in adjoining parts of Clackamas County. The Design Workshop instructions assumed that 15% of all new jobs for the district would be in manufacturing. Those jobs were allocated to more isolated sites. But the other 85% of all jobs were service, light assembly, financial, education, health care, commercial, government, and other job types that do not need to be isolated. In fact they should be as deeply embedded into the hearts of mixed use communities as possible to insure synergies with housing and transit. The Damascus

plan illustrates how these 85,000 jobs were accommodated along the streetcar arterials and adjacent urban blocks of the plan.

The pattern of jobs/housing integration demonstrated in the Damascus plan is not new; prior to 1950 it was the rule rather than the exception. Then most jobs, even many types of manufacturing, were knit into the fabric of the city **[Figure 5.11 in margin]**. Absent a gradual return to this historic pattern, it is very difficult to imagine a region where access to jobs without a car is even possible. With such integration we may have a chance.

Rule 2: Discourage Job Site Space Pigs

After 1950, as jobs moved out of urban blocks and away from streetcar arterials to isolated sites, the density of jobs per acre on those sites also declined. Multi story manufacture, warehouse and distribution facilities went out of style in auto-oriented sprawl. One story buildings for all uses became the rule. Since everyone now had to drive to work, overly large parking lots now consumed a large percentage of job sites. Required landscape buffers, a well intentioned attempt to beautify new job site areas, had the unintended consequence of making the jobs to acres ratio even lower. For these and other reasons, the density of jobs per acre was reduced by over 80% in just a few decades.¹⁶ In the Damascus study an average job density of 15 – 20 jobs per acre was eventually set. This was considered to be an aggressive target, as it is about twice as high as many conventional job site planners assume and higher than the ambitious goals set by the 2040 plan.¹⁷ This number, while representing progress in increasing job density on sites is still influenced by sprawl land use assumptions. This becomes absurdly obvious when you consider that general industrial and “tech flex” jobs require only 500 square feet of

interior space per job on average.¹⁸ If such a building covered 100% of its site even at one story it would provide 800 jobs per acre! A more suitable jobs density appropriate to the GHG crisis we find ourselves in would be that of the more recent City of North Vancouver carbon neutral plan that called for 1.5 jobs per dwelling unit.¹⁹

Rule 3: Link Jobs to Streetcar Arterials.

New job sites rarely link to transit. In rare cases transit comes out to meet the more mature “edge city”²⁰ jobs centers, as in current proposals to tie Tyson’s Corner Virginia, into the Washington district metro system [Figure 5.12 in margin]. But providing this kind of retrofit after the fact can only be partially successful, and comes at a monumental cost per worker served. In certain cases enlightened corporations, with the assistance of local authorities successfully link mixed-use job sites to regional transit systems, as in the case of the Atlantic Station in Atlanta.²¹ These laudable efforts are the harbingers of a new opportunity, but one that must be systematized. A regional system of streetcar arterials close to all districts, where the 85% of jobs that are non polluting could advantageously be located, is the next step. Existing and new state and provincial policy can and must mandate that municipalities zone mixed use job sites near streetcar city type transit corridors, within an interconnected street network, rather than at freeway interchanges.

If an interconnected street system and the streetcar city pattern discussed in chapter two has been hopelessly compromised, then jobs must at the very least be accessible by bus. Unfortunately the configuration of most new job sites makes them extremely difficult to serve by bus or any other kind of public transit. They are not on the way to anything else, and their circuitous interior road configurations doom bus drivers to

long winding trips to serve what would be a small handful of riders [Figure 5.13 in margin]. Even in the otherwise vanguard Portland Metro area, the political attraction of such job sites has rendered any other consideration moot, as shown in figure 5.13, at the junction of Sunset Highway and NW Cornelius Pass Road, to the west of Portland.

A much more sustainable alternative configuration is shown in figure 5.14, drawn from the Damascus project. [Figure 5.14 in margin here] This configuration allows for a jobs node but one that is knit into the block and street pattern of the surrounding community with job intensive blocks attached to, or one block away from, a major transit corridor. When compared to conventional office park configurations, this plan provides easy access to transit lines – transit lines that serve both these job sites and other land uses along the line.

Rule 4: Understand That Jobs Fit into Blocks. Really They Do!

Some say that modern job sites cannot fit into traditional block and street patterns. This is simply not true. Assuming a more or less standard North American block size of 320 by 640 feet, it can be shown that most jobs intensive buildings, even the types now used in office parks, will easily fit into the four acres provided. The occasional larger building can fit within two blocks combined to create a 640 x 640 foot 10-acre block. Finally, should a community find itself with the happy circumstance of needing to accommodate a building or buildings that demand an even larger site, blocks up to 640 x 1280 feet can be provided for a site of 20 acres without dramatically overloading the streets in surrounding blocks.

Rule 5: Accept That No Home Run is Coming

But finally we have what is often the most difficult barrier to sensible integration of jobs into communities. It is the habit, common in many communities, of hoping for the “jobs home run”. Communities will often protect very large sites, through zoning for industrial use and placing minimum lot size restrictions on parcels so designated, in hopes of landing the massive Intel plant or the like. This happens often enough to whet the appetites of municipal and regional officials (in a way not unfamiliar to purchasers of lottery tickets). Thus they stridently resist plans for interconnected street networks and traditional urban scale blocks. Meanwhile over 95% of job sites consume far smaller sites, sites that can easily fit into 5, 10, or the 20 acres.

Rule 6. Understand That Commercial Strips are Your Friend

Finally, the reality is that in most first and second ring suburban communities, their land is used up. Where are they to find the acres required for even high job density facilities? Brownfield sites are an option, but seldom found in suburban areas and at most covering less than 1 percent of all urban lands. But there is one type of land that is much more common, and is ripe for redevelopment in many forms, including jobs intensive uses. Low density strip commercial areas, a legacy of the fifties sixties, and seventies, are only marginally viable in present market circumstances. These strips are either former streetcar or interurban corridors in degraded form, or the product of freeway induced devolvement on formerly rural roads **[Insert Figure 5.15 in margin]**. Such sites consume 10% or more of the land in first and second ring suburbs, land that is ripe for redevelopment and usually has advantageous location within the region. They are also almost always located on transit corridors, no matter how weak is their current ridership,

and are typically very suitable locations within which to re-establish the “streetcar city” form discussed in chapter two.

Conclusion

Of all the relationships that force our current overuse of energy, and our consequent enormous per capita production of GHG, the chaotic and tortured relationship between jobs and housing, and the impossibility of reasonably connecting them, is the worst. It is of course unlikely that the historical pattern where all workers lived close to their jobs will be restored. But it is also true that no real progress in living more sustainably will be made unless we begin to reverse a trend that allows fewer than 5% of all workers in U.S. and Canada to conveniently access their jobs via transit; no amount of transit investment can solve the problem if the metropolitan matrix cannot be adapted for more equitable distribution of jobs and housing. No amount of good will can get workers on transit if the backbone of the region’s transportation infrastructure remains the freeway and the single purpose and often exclusionary landscapes that are the inevitable spawn of such a system. No amount of good will or heroic efforts at the local level will succeed without a policy context that enhances integration rather than thwarts it. Finally, none of these can hope to succeed unless federal, state, and provincial monies are redirected towards a fundamental greening of the machinery of the metropolitan region— its transit and transportation infrastructure. Fortunately simple and constitutional means exist that are equal to the challenge. Regional planning laws to induce housing and jobs equity are no dream, they exist. Oregon’s land use law, after thirty years of struggle threat and progress, has produced America’s best current example of a coordinated jobs, housing, and transportation strategy. Largely because of this law the Portland region is the only North

American region that is on track to meeting its own Kyoto related greenhouse gas reduction targets.²² Expecting a sea change in the criteria for allocating federal infrastructure dollars is no longer naïve, such a change is already underway. In the Canadian context, the Vancouver region's Livable Region Strategic Plan, for all of its struggles and flaws, has produced a region where well over half of all new housing is in higher density form in areas that are transit friendly.

With these policy and financial structures more broadly in place – not just in Vancouver, not just in Oregon, but in every state and province – local planners, developers and designers would have the support necessary to cure the disease. It won't happen in ten years, it won't even happen in 20. Changes to cities take much longer than that. But in fifty years? Yes. It has been done before, it can be done again. Policy tools exist that if strengthened could produce equitable and low GHG communities, communities that provide jobs and housing in equal balance, provide reasonable options to the car for getting to work, districts that integrate jobs seamlessly into the network of complete communities. The six rules listed above for achieving this end, or other ones grounded in the same principles, provide a logical and practical way to heal our regions of a sickness that drains our people of their money and energy, while enforcing an economic segregation that violates our democratic principles.

¹ Emissions from industry accounted for about 20 percent of US greenhouse gas emissions in 2007. Unlike electricity generation and transportation, emissions from

industry have in general declined over the past decade due to structural changes in the US economy (ie. a shift from manufacturing-based to service-based), fuel switching and efficiency improvements (EPA 2009). Globally, primary energy consumption and CO₂ emissions in the industrial sector are projected to continue increasing until 2010 when developed countries will peak and start declining (de la Rue du Can and Price 2008). Emissions from developing countries and economies in transition are forecast to continue their growth after 2010, although at a much slower pace (de la Rue du Can and Price 2008).

² The energy use per square foot for single-family detached housing dropped from 59,000 btu in 1980 to 42,000 btu in 2001 and 39,000 btu in 2005 (EIA 2004; US Department of Energy 2009)

³ FHA. 2009. Traffic Volume Trends. US Department of Transportation. Available online: <http://www.fhwa.dot.gov/ohim/tvtw/tvtpage.cfm>. Accessed July 2009; Valdez, Roger. 2009. "Easing off the Gas: Northwesterners Using Less Gasoline." *Sightline Reports*, June 30, 2009. Available online: <http://www.sightline.org/publications/reports/>. Accessed August, 2009.

⁴ By plotting speed and flow on lane 1 (the fast lane) in one section of I10-W in Los Angeles Chen and Varaiya (2001) found that by 7:00am in the peak morning period speed is a stop-and-go 15 mph and flow has decreased from a maximum of 2,100 vehicles per hour (vph) to 1,300 vph. The graph below shows similar results for this length of freeway at 7:30am where nearly half of the total distance is travelled at speeds

less than 20 mph (Choe 2001) **[Insert Figure 5.2]**. Even outside of peak hours, all day average traffic speed estimates for freeway travel in Los Angeles is the worst in the country at 34.6 miles per hour (TTI 2009). In 2007, congestion caused average annual delays of 70 hours per traveller in Los Angeles (TTI 2009).

⁵ The SAFETEA-LU bill is set to expire in the Fall of 2009. A draft of the House Surface Transportation Authorization Act 2009 that will replace it was released on June 22, 2009.

⁶ In the Greater Vancouver Regional District, the share of all office jobs located in the region's "regional town centres" declined from 12% to 10% between 1990 and 2000 while suburban business parks' share grew from 21% to 30% (Royal LePlage Advisors 2001). The Metropolitan core's (Downtown Vancouver and the Broadway corridor) share of office jobs declined from 68% to 60% over the same period (Royal LePlage Advisors 2001). In 2006, 22 percent of all employment in the Vancouver Metro area was located in the Vancouver Metro Core, 40 percent in all urban centres, 22 percent in frequent transit development corridors and 38 percent in other areas (Metro Vancouver 2009). Canadian metropolitan areas continue to have strong concentration of jobs in the downtown core, however the relative economic importance of the inner core declined in most CMAs (Heisz & Larochell-Cote 2005). From 1996 to 2001, areas located within 5 km of the city centre decreased their shares of employment and the average distance from a job's location to the city centre rose in nearly all CMAs (Heisz & Larochell-Cote 2005). Between 2001 and 2006, job growth in American suburbs grew 6 times faster between than in urban cores (Kotkin 2008).

⁷ Data from: Public Purpose. 2002. "Dallas Transit Down, Car-Pooling, Telecommuting Up: Implications for Urban Transport Policy." Public Purpose. And DART. 2009. "DART Ridership growth trend continues." *DART News Release*, February 5, 2009 <http://www.dart.org/news/news.asp?ID=830>

⁸ Public Purpose. 2000. Urban Transport Fact Books: US Public Transit New Start Projects: FY 2000 Cost per New Passenger Trip. Available online: <http://www.publicpurpose.com/ut-2000rail.htm>

⁹ Data from the International Organization of Motor Vehicles indicate that in 2004, 65 million automobiles were manufactured around the globe. Projects released by IMF in 2008 indicate that the global car fleet is expected to drastically increase as China and India and other developing countries reach the earnings threshold at which car-ownership takes off (The Economist 2008) **[Insert Figure 5.5]**

¹⁰ The median age for passenger cars was a record high at 9.2 years in 2006 (R.L. Polk & Co. 2006). **[Insert Figure 5.6]**

¹¹ In 2006, direct fossil fuel combustion in the transportation sector accounted for 26.3 percent of the total greenhouse gas emissions in the United States (EPA 2008). However, total lifecycle emissions for the transportation sector are estimated to be 27-37 percent higher than direct fuel combustion emissions (EPA 2003). A report by Hyrdo-Quebec found that direct tailpipe emissions from fuel combustion accounted for 31 percent of Canada's GHG emissions in 2005 (Gagnon 2006). When production, air conditioning,

vehicle maintenance and infrastructure consequences were added to this figure the cumulative percent of total GHG emissions in Canada attributable to the transportation sector rose to an astonishing 52% (Gagnon 2006).

¹² In 2007, Brockton had the highest rates of foreclosure of any city/town in Massachusetts with 365 foreclosures and a foreclosure rate of 1.64 percent. **[Insert Figure 5.10]**

¹³ See <http://www.mass.gov/legis/laws/mgl/gl-40b-toc.htm> for details on the Regional Planning Law.

¹⁴ Brooks, David. 2004. *On Paradise Drive: How We Live Not (And Always Have) in the Future Tense*. New York: Simon & Schuster.

¹⁵ Yee, Dennis. 2009. 20 and 50 year regional population and employment range forecasts April 2009 draft. Metro, Research Centre.
http://library.oregonmetro.gov/files/2030-2060_forecast_april_09.pdf

¹⁶ Gordon et al. (2005) found that while some workplace types (such as Financial Districts and traditional Central Business Districts) had very high job density (ranging from 35 – 436 jobs per acre), the vast majority of California’s major metropolitan areas were characterized by job densities lower than seven jobs per acre. These included less centralized business and office centres, often located in the suburbs (seven jobs per acre); educational and civic centres (approximately 5 jobs per acre); industrial jobs (less than five jobs per acre); retail, entertainment and food workplaces (1.7 – 3 jobs per acre) and

exurban workplaces (one job per acre). The average across workplace types was only five jobs per acre. Scott (2001) compared American cities with European and Asian cities. He found that American cities average 2.8 jobs per acre, European cities average 12.6 jobs per acre and Asian cities average 28.7 jobs per acre.

¹⁷ See Damascus Community Design Workshop Design Package (2002) – page 14.

Available online:

http://www.jtc.sala.ubc.ca/Damascus/Design%20Package_finalMay16_02.pdf

¹⁸ See Damascus Community Design Workshop Design Package (2002) – page 14.

Available online:

http://www.jtc.sala.ubc.ca/Damascus/Design%20Package_finalMay16_02.pdf

¹⁹ These jobs are to be accommodated along major corridors (at 65 jobs per acre), in major employment nodes (at 77 jobs per acre) and within the residential fabric (at 20-32 jobs per acre).

²⁰ Garreau, Joel. 1991. *Edge City: Life on the New Frontier*. New York: Doubleday.

²¹ Atlantic Station residents have an average daily VMT 59 percent lower than the typical Atlanta resident and employees of Atlantic Station have a daily VMT 36 percent lower than the average employee in the Atlanta region (Winkelman et al. 2009).

²² Condon, Patrick, 2008. Planning for Climate Change. *Land Lines*. Lincoln Institute of Land Policy, January 2008. http://www.rpa.org/pdf/edgeless-city/2009/Planning_for_Climate_Change.pdf