

REPORT OF THE TRANSPORTATION GROUP

GHG emissions associated with transportation in the Louisville Metro Area in 2006 were found to be responsible for 29.2% of anthropogenic GHG emissions. Transportation sources include all road and nonroad (e.g., construction equipment, lawn care, agricultural, marine) vehicles. Together these mobile sources were responsible for 5.6 million tons of CO₂e emissions in Jefferson County. Since the Transportation sector was found to be responsible for so much of the GHG emissions (second only to electricity generation nationally, and in the Louisville Metro area – the largest sector – residential was slightly less at 28.9%), it warrants a close look into how these emissions might be reduced. A significant portion of these transportation related emissions can be attributed to single occupancy vehicles.

Nationally, according to 2006 Environmental Protection Agency (EPA) inventory data, transportation is a source of 29 percent of total U.S. greenhouse gas (GHG) emissions, exactly mirrored locally. Transportation is the fastest-growing source of U.S. GHGs, accounting for 47 percent of the net increase in total U.S. emissions since 1990. Transportation is also the largest end-use source of CO₂, which is the most prevalent greenhouse gas.¹ Production of CO₂ is related to the amount of fuel combusted and the fuel's carbon content, and its emission rate cannot be affected by vehicle emissions control technologies. CH₄ and N₂O, also significant GHG's, can be affected; however they only account for a small percent of the transportation GHG total (2% nationally in 2003²).

Sixty years ago the picture was very different. Louisville was a more compact city, better suited to walking and the use of mass transit. For instance, in 1950 Residents took 90 million trips on buses owned by the Louisville Transit Company (LTC). At that time the population of Jefferson County was just shy of 485,000, meaning the average resident took 186 trips on transit each year. Today, there are over 700,000 of us living in Jefferson County, yet in 2008 we only took 16 million trips on buses owned by successor to the LTC, (the Transit Authority of River City (TARC)), an average of 23 trips per resident.³ What caused that tremendous change in behavior, and what impact has the change had on GHG emissions?

Much of the development that has occurred in the greater Louisville region over the last 50 years has been predicated on automobile ownership. As a result, the percentage of people who travel by car for work during 2007 was 96.3%⁴, and total trips by public transit (TARC) in 2009 is estimated to be only 2.4%.⁵ Since 1980 the amount of driving we do in Kentucky rose at a rate 4.6 times the rate of population growth. Nationally the number of miles driven

¹ These estimates of transportation GHGs do not include emissions from additional lifecycle processes, such as the extraction and refining of fuel and the manufacture of vehicles, which are also a significant source of domestic and international GHG emissions: <http://www.epa.gov/otaq/climate/>.

² <http://www.epa.gov/otaq/climate/420r06003.pdf>, which includes a discussion of all greenhouse gases related to transportation.

³ In much of the country mass transit service was provided by the private sector through the 1950s. As cities lost population to their surrounding suburbs, most communities were forced to step in and purchase transit companies in order to maintain service for citizens who remained in "carless" urban neighborhoods.

⁴ ACS Census, 2007.

⁵ Using current KIPDA and TARC statistics and projections for county and public transit trips for Jefferson County, Kentucky.

has grown three times faster than population. As stated in the Urban Land Institute’s report, *Growing Cooler*, “For 60 years, we have built homes ever farther from workplaces, created schools that are inaccessible except by motor vehicle, and isolated other destinations – such as shopping – from work and home. From World War II until very recently, nearly all new development has been planned and built on the assumption that people will use cars virtually every time they travel.” In Louisville we are beginning to see a shift in that trend. Even before fuel prices began their dramatic rise, new cultural and residential development in the urban core has accelerated.

The recommendations that follow attempt to address locally the goals expressed in the U.S. Mayors’ Climate Protection Agreement, especially the primary goal of reducing GHG emissions 7% below 1990 levels by 2012. Most of the following recommendations, therefore, propose transportation and connected land-use policies and practices that will reduce air pollution and GHG emissions in and around our city by:

- Promoting and supporting the development and transit, bicycle, and pedestrian-friendly neighborhoods;
- Substantially reducing the number of miles Residents drive while making mobility more affordable, easier and more accessible;
- Supporting the use of renewable bio-based vehicle fuels and electric vehicles such as plug-in hybrids; and
- Significantly increasing the overall efficiency of (our) transportation system for both people and goods.

This report presents analysis and strategies in order to help the Louisville Metro area meet the primary GHG reduction goal mentioned above, as well as acting as a guide for improving Metro Louisville’s quality of place, recognizing that by implementing the best planning practices, a metro area provides the environment for both residents and local businesses – everybody ‘wins.’ The more livable a metro area is, the more population retention it experiences, and also the more prosperous it becomes by attracting and retaining vital industry and business interests.

Strategies intended to reduce transportation sector emissions often depend more on policies and programs shaped at the national, state, and regional level than the local level. Nevertheless, as the “*Greater Louisville Project, 2005 Competitive City Agenda*” has clearly stated: “NOW is the time to forge a broad community consensus to formulate a comprehensive mobility strategy.”

5.4.1 REDUCING ANNUAL VEHICLE MILES TRAVELLED (VMT) THROUGH MODE SHIFT

5.4.1.1 INTEGRATE LAND-USE AND TRANSPORTATION PLANNING

The promotion of compact and transit-oriented development patterns is potentially one of the most effective strategies to reduce GHG emissions from transportation in

the long-term, but it also requires a great degree of collaboration among agencies and among plans. While transportation planning has long considered future land use patterns in the development of travel demand forecasts, there has been less success in ensuring that transportation investment decisions support a regional vision for growth. Transportation planning can consider cross-linkages with land use plans and involve agencies with jurisdiction over land use plans.

The Louisville region needs a well thought out and coordinated transportation plan. *Horizon 2030*, our region's Long Range Transportation plan, is simply a listing of projects sponsored by individual agencies of the local and the state governments. The *Cornerstone 2020 Comprehensive Plan's* chapter titled "Mobility Strategy" addresses many of the factors identified below, but lacks the specific roles/responsibilities, priorities, implementation activities, and schedule that a strategy requires.

Recommendation 1: *LMG and KIPDA should develop a mobility strategy for Louisville. The new strategy will form the foundation of an integrated multi-modal transportation plan focused on mobility for people and freight.*

5.4.1.2 TRANSIT ORIENTED DEVELOPMENT

Well planned communities that offer a variety of transportation options and attractive urban neighborhoods are better positioned to sustain long-term investment prospects. Cities like Austin, Denver, Madison, and Chicago have programs underway that integrate economic development, transportation, and land use strategies. A transportation strategy that consciously meshes with initiatives for economic development and land use is an integral part of planning for a vital city.

There is a reciprocal relationship between transportation policies (and specifically transportation infrastructure development) and land use policies. "... One of the major reasons why freeways around the world have failed to cope with demand is that transport infrastructure has a profound feedback effect on land use, encouraging and promoting new development wherever the best facilities are provided (or are planned)... [and] momentum develops which is very hard to stop. The obvious response to the failure of freeways to cope with traffic congestion is to suggest that still further roads are urgently needed. The new roads are then justified again on technical grounds in terms of time, fuel and other perceived savings to the community from eliminating the congestion. This sets in motion a vicious circle...of congestion, road building, sprawl, congestion and more road building. Local zoning ordinances tend to reinforce this tendency, which are primarily geared toward euclidean zoning which separates land uses and requires transit to move people, goods and services."⁶

⁶ Nozzi, Dom. (Date unknown). "Livability and Auto Dependency." Available from <http://www.cartage.org.lb/en/themes/arts/Civcarts/Landscapeoftrafficways/architectureoftrafficways/livability/livability.htm>

Most development in Louisville is occurring at densities and locations which do not support multi-modal activity or mass transit. This needs to be addressed by promoting high density/mix-use development along transit service routes to encourage reduction of vehicle miles traveled (VMT) through transit oriented development (TOD).

Recommendation 2: *LMG, KIPDA, developers, and the public should promote and invest in transit oriented development as a way of planning for more livable, sustainable communities through the integration of transit and development at the regional, community, corridor and neighborhood levels.*

5.4.1.3 PUBLIC TRANSIT

Public transportation can be an attractive alternative to driving. Public transit can attract more riders in a variety of ways: through increased reliability and frequency, increased convenience and number of routes, improved customer service, and lower fares. All of these factors are contingent on the amount of funding available for public transportation. More funding would allow TARC to add vehicles to busy routes, add new routes, invest in customer service improvements, and keep fares low. But funding is secondary to providing a context in which mass transit can truly be successful.

Transit can become an important alternative to driving if we level the playing field on which it competes for our transportation dollars. In corridors where buses are given priority, as with designated lanes, traffic signal priority, and limited or even eliminated street parking, a context is created in which transit can be competitive. Once that context exists transit investments can lead to very significant reductions in GHG emissions, as illustrated in figure 2.

Recommendation 3: *The GCP should support increased funding for TARC services as well as a transportation strategy that consciously meshes with initiatives for economic development and land use as an integral part of full community planning.*

PUBLIC TRANSPORTATION MODE SHARE INCREASE (passenger vehicles)				
<u>Target Public Transportation Share (vmt)</u>	<u>Current Public Transportation VMT</u>	<u>Current Non-Public Passenger VMT</u>	<u>Passengers / Transit Vehicle</u>	<u>CO2e Savings (tons/year)</u>
20.00%	0.10%	85.00%	25	580,627
<i>10/31/08 - APCD, using 2008 data derived from Mobile6.2 and KIPDA data.</i>				

Figure 2

5.4.1.4 MULTIMODAL INFRASTRUCTURE

A well developed multi-modal infrastructure, that supports walking and bicycling as alternative modes of transportation, will result in reduction of VMT, and, therefore, GHG emissions. At the same air quality, citizen health and safety and the livability of the metro area will also improve.

Metro Louisville has already made strides in building bicycle lanes along a number of thoroughfares as well as multi-modal paths (such as the “Louisville Loop” now under development and partially completed). Those strides have led to a Bronze designation as a Bicycle Friendly City from the League of American Bicyclists.

Services and infrastructure that promote bicycling and walking include not only multi-use paths, dedicated bicycle lanes and accommodations for bicycles on public transportation systems (all of which Metro Louisville has been implementing to some degree already), but also could include public-private partnership arrangements that increase the availability and use of bicycles throughout Jefferson County.

Recommendation 4: *The GCP and public should fully support the expansion of services and infrastructure that promote bicycling and walking*

5.4.2 REDUCING VMT WITH TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management principles could be implemented in five specific categories to effect greenhouse reductions for the Louisville Metro area: PARKING, DRIVING REDUCTION INCENTIVES, TELECOMMUTING, COMPRESSED WORK WEEKS and SPEED LIMIT CHANGES.

5.4.2.1 PARKING

Minimum parking requirements are built into city codes. Locally, the Louisville Metro Land Development Code sets the Motor Vehicle Parking and Loading Standards⁷. By doing away with or adjusting the method of allocating land to parking purposes Louisville Metro would (at least partially) satisfy a number of sustainability goals while also addressing a root cause of traffic congestion and personal vehicle reliance⁸. Also, increasing parking lot albedo (energy reflectivity) with plantings and better (less heat absorbing and more reflective) design has a beneficial effect on area weather and local warming patterns – a factor in climate change.

⁷ *Louisville Metro Land Development Code: Motor Vehicle Parking and Loading Standards, Table 9/1/2 Chapter 9, Part 1.* (March, 2006). Available from <http://www.louisvilleky.gov/NR/rdonlyres/D21D1A76-75B1-4C45-9EF8-A263674F7FBA/0/C09P01March06.pdf>

⁸ for a typical example of the benefits argument, see <http://www.livableplaces.org/policy/parking.html>

Metro Louisville should consider eliminating minimum parking requirements and charging market rates for curbside and city owned parking. This can reduce the costs of urban development, improve walkability, reduce auto dependence and improves urban form⁹.

Metro Louisville should consider changing minimum parking requirements to reduce parking lot development (concurrent with the availability of other forms of transportation), resulting in a 10% reduction in the surface area of parking lots within the central business district by 2020.

5.4.2.2 DRIVING REDUCTION INCENTIVES

Guaranteed Ride Home programs can provide assurance to commuters where little or no transit service is offered during non-peak (rush) hours. These programs reimburse commuters for cab fare when alternatives aren't available.

Auto insurance that is based on actual miles driven is known as Pay As You Drive (PAYD) insurance.¹⁰ It is a market-based incentive endorsed by several environmental groups; the Environmental Defense Fund (EDF), for example, estimates that, where available, this type of auto insurance is expected to reduce driving and related emissions by 10-12%. One EDF study¹¹ finds that, in addition to being more efficient, this insurance structure is a more politically palatable way to reduce gasoline consumption than is a gasoline tax. In the Victoria Transport Policy Institute's (VTPI) review of the application of this approach in British Columbia Todd Litman notes that, "as opposed to many other approaches, it has no technological, financial or practical barriers, and could be implemented in time to help meet Kyoto targets."¹² Several countries and some states have already or are in the process of implementing this approach, and On-Star/GM also offers some similar private options.

Another idea is for the Metro to offer a 'downtown Eco-Pass' to support transit, bicycle rental and other low or no emission modes of transportation through employer subsidies.¹³

⁹ <http://shoup.bol.ucla.edu/SmallChange.pdf> .

¹⁰ Environmental Defense Fund. (May, 2008). "Pay-As-You-Drive (PAYD) Auto Insurance." Available from <http://www.edf.org/article.cfm?contentid=2205>

¹¹ Parry, Ian W.H. (2005). "Is Pay-As-You-Drive Insurance a Better Way to Reduce Gasoline Use than Gasoline Taxes?" Resources for the Future, Discussion Paper. Available from <http://www.edf.org/article.cfm?contentid=2205> .

¹² Litman goes on to argue that it is not a new fee but rather a new way of paying an existing fee that maximizes fairness since it is progressive with regards to income (assuming a correlation between lower miles driven and lower income) and since it shifts the burdens of driving to those who most value the option to drive (i.e., who drive the most regardless of costs); increases societal welfare by virtue of broader access to coverage; and, increases societal environmental welfare by targeting individuals' incentive to drive. In addition, Litman discusses PAYD linkage to registration fees as well as insurance rates; this is particularly interesting since registration fee schedules are more likely to be under the control of cities than are private-sector insurance companies' pricing policies. Ibid

¹³ See Denver, CO; Louisville, CO; Berkley, CA. <http://www.ci.louisville.co.us/Council/2008minutes/3june2008regmtgminutes.htm> .

Some metropolitan areas are promoting voluntary “give your car one day off a week” programs. Salt Lake City offers a business tax deduction for employers who encourage this concept.¹⁴

Recommendation 5: *The GCP and public should reduce VMT by providing public and private incentives for public transit use and high occupancy vehicle trips.*

5.4.2.3 TELECOMMUTING

One of the best studied locations making use of telecommuting is Tokyo, Japan. Research into the growth of telecommuting in Tokyo estimates that this arrangement will result in a 6.9 - 10.9% reduction of traffic congestion by 2010.¹⁵

A different study looks at two years worth of empirical data on the pilot telecommuting programs (known as "ecommuter" programs) that were established in five major US metropolitan areas in 1999 under the National Air Quality and Telecommuting Act. The authors describe the major goal of the ecommute program: using economic incentives, tradable emissions credits from telecommuting in this case to promote behavioral change. The authors predict that this would not be a viable strategy for reducing VMT¹⁶; however, the GHG reduction benefit would be realized due to mitigation of congestion, despite a constant VMT.¹⁷

The GCP and Metro community should promote teleconferencing as well as the availability of pedestrian and bicycle transit and carpool options for business commutes and trips.

5.4.2.4 COMPRESSED WORK WEEK

A compressed work week can reduce GHG emissions and other air pollutants. For certain employers, four ten hour work days could reduce VMT. Alternating three day weekends with a 9 hour work day may be another option.

¹⁴ See <http://www.freshairfriday.com>.

¹⁵ Mitomo, Hitoshi and T. Jitsuzumi. (1999). *The Impact of telecommuting on mass transit congestion: the Tokyo case.* *Telecommunications Policy*, 23: 741-751. Available from http://www.sciencedirect.com/science?_ob=ArticleListURL&_method=list&_ArticleListID=750429584&_sort=v&_st=17&view=c&_acct=C000011238&_version=1&_urlVersion=0&_userid=134779&md5=02684911625d7986e2975ece10d90ea1

¹⁶ Nelson, Peter, et al., May, 2007, *Telecommuting and Environmental Policy*, Lessons from the ecommute program. *Transportation Research Part D: Transport and Environment*, 12(3): 195-207. Available from http://www.sciencedirect.com/science?_ob=ArticleListURL&_method=list&_ArticleListID=750429584&_sort=v&_st=17&view=c&_acct=C000011238&_version=1&_urlVersion=0&_userid=134779&md5=02684911625d7986e2975ece10d90ea1.

¹⁷ Barth & Boriboonsomsin, January, 2008, *Real-World CO₂ Impacts of Traffic Congestion*, Paper for the 87th Annual Meeting of Transportation Research Board, Washington, D.C. .

Recommendation 6: *The GCP and local partners should evaluate whether implementing a 4 day, forty-hour work week will reduce VMT and energy consumption.*

5.4.2.5 SPEED LIMIT REDUCTION

Vehicle speed affects fuel economy. 1984 model passenger vehicles had the best fuel economy at approximately 40 mph. With recent vehicle technology developments the maximum fuel economy has risen to approximately 55 to 60 mph.¹⁸ Therefore the current vehicle fleet mix in the Louisville Metro area, has its best fuel economy at speeds ranging on average from approximately 40 to 60 mph. With reduced fuel usage via more optimal fuel economy speeds, GHG emissions will automatically be reduced, barring increased congestion.

Recommendation 7: *The GCP and the public should advocate reduced speed limits on state and federal highways to improve fuel efficiency.*

5.4.3 FREIGHT MOBILITY

In less than 20 years, the nation's freight traffic is expected to increase by 67%, according to the U.S. Department of Transportation.¹⁹ Since 1980 the interstate lane-miles has increased by 16% while associated VMT has increased by 125%. Among the modes of freight transportation, trucks are used to haul about 70% of all commodities; since 1980, overall truck traffic has doubled.²⁰ Locally this is in evidence on the Kennedy Bridge, where trucks account for 12% of the total traffic during the peak hours, and on I-65 where, during non-peak hours (9:00am-3:00pm), trucks make up as much as 25% of the total traffic volume.

Transportation officials are expressing deep concerns over an impending freight capacity shortage on America's highways. Freight congestion problems are most noticed at bottlenecks on highways. Bottlenecks have been defined as highways serving major international freight gateways (ports) or major domestic freight hubs like Chicago; in major urban areas they occur where transcontinental freight lanes intersect congested urban freight routes. This is particularly important for Louisville given its economic reliance on UPS.

Congestion plays a central role in all major challenges to freight mobility. The limited visibility and attention that freight-specific projects receive in the process of planning and prioritizing transportation investments are the principal limitations in addressing freight mobility. Integrated freight transport planning is an important part of a larger transportation plan. 'Scenario' planning should accomplish this,

¹⁸ <http://www.fueleconomy.gov/feg/driveHabits.shtml> .

¹⁹ http://www.ops.fhwa.dot.gov/aboutus/one_pagers/freight_fpd.htm .

²⁰ <http://www.fhwa.dot.gov/infrastructure/asstmgmt/vmt01.cfm> .

along with an over-all sustainable and well thought out multi-year plan (which Horizon 2030 is generally represented to be).

Suggested goals for the Metro area:

- A survey of business leaders responsible for companies that move freight report a 90% satisfaction level or greater with freight mobility within Metro Louisville by 2020.
- Intra-Metro rail transport of freight increase by 5% (by volume) by 2015.
- The region's long range transportation plan identifies Freight Priority Corridors by 2010.

Recommendation 8: *LMG and KIPDA should integrate freight transport planning into the metro area transportation plan.*

5.4.4 REDUCING GHGs FROM EXISTING AND NEW SOURCES

5.4.4.1 VEHICLE OPERATING PRACTICES

Vehicle operator behavior and practices, such as unnecessary idling, contribute to GHG emissions.

Reduction in idling by city ordinance and/or education and outreach has been demonstrated in other communities as a viable way to significantly reduce emissions, including GHG. Louisville Metro Air Pollution Control District (APCD) has become a national resource for the compilation of idling restriction policies and practices. The APCD Idling Regulation Work Group is working with APCD Staff to provide community input for an idling regulation. The work group consists of a very diverse set of stakeholders with a variety of fleets, and, by the end of 2008, should produce regulation(s) which are expected to be implemented soon thereafter.

Recommendation 9: *The GCP and public should implement practices and policies to reduce unnecessary idling and acquaint Partner entity employees and the public with related regulations and APCD recommendations.*

5.4.4.2 VEHICLE TECHNOLOGY

Vehicle technology has evolved over the years to meet Environmental Protection Agency (EPA) National Ambient Air Quality Standards (NAAQS), which were established in order to reduce the impact of mobile vehicle emissions on human health. Better fuel formulations and vehicle emissions control technologies have greatly reduced emissions, especially from gasoline-powered passenger vehicles.

A growing number of vehicle options making market entry might significantly reducing emissions, such as:

- Hydrogen fuel celled vehicles:
 - UPS Trial of Fuel Cell Delivery Fleet
<http://www.csrwire.com/News/1842.html>
- High efficiency / smart cars:
 - Mitsubishi Fuso Canter Eco Hybrid regenerative braking, auto shut off when idling, hybrid diesel/electric
<http://www.mitfuso.com/pages/news-hevconcept.html>
- Engine retrofit for diesel trucks:
<http://www.fhwa.dot.gov/environment/cmaqpgs/retrom.htm>
- Compressed Natural Gas:
<http://www.consumerenergycenter.org/transportation/afvs/cng.html>
- Rotary Air: <http://www.engineair.com.au/airmotor.htm>
- Electrification (Jefferson County has no truck stops at this time but these types of technology could be useful at intermodal facilities):
 - IdleAire's ATE Advanced Travel Center Electrification system:
 - is being installed at 210 truck stops and fleet terminals nationwide
 - provides substitute power so diesel engines can be stopped during rest stops
 - eliminates 100 percent of idling emissions
 - 3,366 gallons of fuel saved per year with consistent use:
<http://www.nema.org/media/ind/20060330a.cfm>
 - Louisville Regional Airport Authority (LRAA) has already implemented gate electrification to reduce jet engine emissions.

In addition, more established alternative technologies continue to evolve and gain in consumer popularity such as hybrid vehicles made by Toyota, Honda, and Ford; there are also other innovative hybrid and plug-in electric vehicles being developed.²¹

The Louisville Green Fleets program is currently working to integrate the newest vehicle efficiency technologies for Green City Partners (GCP) vehicles as an example for the community.

Recommendation 10: *The GCP should expand their participation level in Green Fleets.*

²¹ Some examples include <http://www.flytheroad.com/> , <http://www.aptera.com/media.php> , Tesla motor cars, and others not yet available such as: <http://www.rmi.org/sitepages/pid191.php> .

Recommendation 11: *The GCP should adopt a high-efficiency vehicle purchasing policy.*

In addition, the GCP should support the requirement that long-haul trucks have installed aerodynamic devices and fuel-efficient tires.

5.4.4.3 FUEL AND ENERGY EFFICIENCY STANDARDS

Figure 3 presents the vehicle fuel economies and fuel mix for Metro Louisville (data used in MOBILE6 analysis work):

Figure 3 JEFFERSON Co. – 2002 Fleet Mix*	
<u>Vehicle Class</u>	<u>MPG</u>
LDG:	17.94
HDG:	8.21
LDD:	24.33
HDD:	12.2
MC:	50
All (average):	19

*derived from county VET and FWHA HPMS data
etOH (ethanol) : 10% at near 100% market share (reformulated gasoline)

LD = Light Duty HD = Heavy Duty G = Gasoline D = Diesel
MC = motorcycles

Fuel economy currently being recommended by the National Association of Clean Air Agencies (NACAA) is 35 mpg for passenger and non-passenger automobiles as a minimum by 2020, beginning with model year 2011. This stands in contrast to the National Highway Safety Transportation Administration’s (NHSTA) recommendation of 31.6 mpg by 2015 for cars and light trucks. Bio-diesel energy density is slightly less than that of normal diesel fuel. For example, “Vehicles running on B20 are therefore expected to achieve 2.2 percent (20 percent x 11 percent) fewer miles per gallon of fuel.²²” More important for the concern over GHG, however, is the carbon content of fuels. The California Air Resource Board (CARB) is spear-heading the work in this area, which will have profound consequences on U.S. efforts to address GHG problems. This is an emerging factor under study, and is being addressed in part by the EPA’s new Mobile Vehicle Emissions Simulator (MOVES) to enable better transportation planning, with the inclusion of GHG emission modeling.

²² EIA at <http://eia.doe.gov> , Biodiesel Performance, Costs, and Use by [Anthony Radich](#)

Currently CARB is striving to implement reductions in vehicle carbon fuel content and greater (vehicle class targeted) fuel efficiencies than federally mandated to affect significant GHG emission reductions from the transportation sector. CARB has demonstrated that these measures will result in greater reductions than the proposed federal standards. Other states have joined the effort.

Lower carbon fuel due to improved fuel formulation (mainly ethanol, with no significant market share of bio-diesel blends as yet) and improved vehicle technology has already resulted in a reduction of GHG emissions from 1990 to 2006 in Jefferson County; however the increase in VMT is rapidly displacing the gain from fuel formulation and vehicle technology improvements.

Bio-fuels

Biodiesel is the most common alternative fuel available in the U.S. today. The fuel mix ranges from B5 (5% ethanol biofuel) to B100 (100% ethanol). Principle concerns are the lubricity of the fuel and its energy density. Lubricity decreases as the sulfur content of the fuel (diesel or gasoline) is lowered to reduce exhaust emissions, and a greater percentage of ethanol (etOH) is added. Additives need to replace the lost lubricity properties of the fuel to prevent reduced engine life.

Fischer-Tropsch fuel

This fuel is also known as ‘synfuel’ or ‘liquified coal’ fuel. It has been used in certain sectors, such as military aircraft and some large diesel construction equipment (limited use).

Recommendation 12: *The GCP, public, state and federal governments should fully support the most stringent fuel efficiency and GHG reduction measures that either federal or individual states are seeking to implement.*

Recommendation 13: *The GCP should consider the energy replacement value, GHG emissions per mile/km and the complete life-cycle and upstream emissions impact when using bio-fuels in fleet operations.²³*

Recommendation 14: *The GCP should establish clear fleet operating policies including procurement, idling, and fuel use guidelines, and should make them publicly available as an example to other fleet operators.*

5.4.4.4 HEAT ISLAND EFFECT MITIGATION MEASURES

Current research is considering the linkages between ‘Urban Heat Island’ effects, higher energy use due to increased temperatures in urban areas and the amount of impervious cover. . Impervious cover "units" in the city, such as parking lots and sidewalks, decrease evapotranspiration (cooling effect from vegetation) and

²³ See work done by Center for Agricultural and Rural Development, Iowa State University, Iowa Ag Review online, http://www.card.iastate.edu/iowa_ag_review/fall_07/article1.aspx# .

increase solar reflectivity and heat storage capacity; this in turn prompts greater energy use (cooling, for example), which results in increased GHG emissions.

The Transportation Group considered parking lot design as a mitigation measure. Other related measures include cool roof and green roof installation, tree planting along sidewalks and throughout parking lots, and increased use of pervious materials to augment soil water holding capacity.

Recommendation 15: *The GCP should encourage measures to decrease the urban heat island effect caused by transportation infrastructure.*

5.4.4.5 CONSTRUCTION EQUIPMENT (NONROAD)

Construction equipment has been identified by air quality agencies as a significant source of emissions affecting the Metro area's ability to meet national air quality standards. GHG emissions from construction equipment in the Louisville Metro area were found to contribute approximately **7%** of the total transportation sector GHG emissions, and approximately 2% of the total community (Jefferson County) GHG emissions.

The metro area should seek ways to reduce construction GHG emissions with support for emissions control technology retrofits, fleet replacement, idle reduction practices, incentives and collaboration with state and federal agencies.

5.4.4.6 MARINE (NONROAD)

Nationally, marine diesel has been found to be a significant source of pollutants. As a river port city, the Louisville Metro area experiences some impact from river traffic emissions, especially barges, due to their diesel engine emissions. Pleasure boating and other recreational activities also contribute to GHG emissions.

Appropriate emission controls to reduce marine GHG's include port electrification, loading and unloading equipment emission controls, and other best practices.

Recommendation 16: *LMG should seek ways to reduce nonroad greenhouse gas emissions by fully supporting regional and national efforts, as well as implementing local measures, to restrict GHG emissions.*

5.4.4.7 OTHER NONROAD

Other non-road sources of GHG in the Louisville Metro area are agricultural equipment, lawn care engines, wood-burning, outdoor grilling and chain saws. Airline services at the two airport locations in Jefferson County under the Louisville

Regional Airport Authority (Standiford, and less significantly in terms of GHG emissions, Bowman Field) accounted for 50% of the ‘entities vehicle fleet’ CO₂e emissions and 0.2% of the community transportation emissions.

Current efforts to reduce particulate matter emissions, as well as to maintain NAAQS compliance in the Louisville Metro area for ozone precursors and general air quality provide the imperative for the Louisville area community and GCP to look for ways to reduce these emissions as much as possible. Programs such as the Kentuckiana Air Education (KAIRE) lawn-care program²⁴ and other congestion mitigation and air quality (CMAQ) improvement program funded opportunities should be supported by the community and the GCP.

5.4.5 ADDITIONAL COMMUNITY BENEFITS OF PROPOSED RECOMMENDATIONS

5.4.5.1 ECONOMIC SECURITY

With gasoline prices recently as high as \$4.00+ per gallon, the cost of transportation approaches 25% of the average family budget. The cost of fuel is currently determined not only by unpredictable market forces and commodity pricing but also by ‘peak oil’ limits based on fuel production capabilities tied to remaining accessible oil reserves (and the cost of accessing undiscovered reserves). Families are paying a high price to meet their transportation needs, and families in areas with fewer transportation choices carry even greater burdens. Transportation policies should reduce the burden of these costs for families by investing in more transportation options.

According to the most recent Bureau of Labor Statistics’ (BLS) Consumer Expenditure Survey (CES, 2006), about 18.9% of the average American consumer unit (roughly equivalent to a household) budget is spent on transportation; the price of gasoline has fluctuated to more than doubled since then.

Key findings of a study, “Driven to Spend”, commissioned by the Surface Transportation Policy Project in Washington D.C., June 2005 include:

- Households in regions that have invested in public transportation reap financial benefits from having affordable and viable transportation options, even as gasoline prices rise.
- Low-income families are unduly impacted by higher transportation costs since transportation expenditures claim a higher percentage of their family budget, in many cases more than they spend even on food.

²⁴ <http://www.louisvilleky.gov/APCD/lawn-care/LawnCareRebates.htm> - a CMAQ funded program.

Rising gasoline prices are a concern, not for households, but also for local and state economies that suffer as household retail spending and consumer confidence is weakened by rising gas prices. A shift of expenditures to cover higher fuel prices means less spending in local stores, restaurants, healthcare, education, entertainment, etc.. Maintaining economic competitiveness and averting flight of capital from communities should be a concern for cities like Louisville.

Another recent study by CommonCurrent found Louisville ill-suited to deal with the effects of rising oil prices. Louisville was ranked No. 49 out of the 50 largest US cities surveyed for the ability to maintain economic viability and quality of life as energy prices soar. The study weighted a number of factors, including cities' public transportation systems, access to local retail services, and the availability of wireless networks.²⁵

Louisville area employers are shortening the work week (Key Electronics), planning to offer incentives such as tax-free flex accounts specifically for transportation expenses (Humana), and promoting carpooling. Employees who utilize these options are able to save a minimum of 1/5 of normal fuel costs, although several report much larger savings.²⁶

5.4.5.2 CONGESTION MITIGATION

In May of 2006, U.S. Secretary of Transportation Norman Mineta identified congestion as one of the single largest threats to the economy. Congestion kills time, wastes energy and costs money. Each year, Americans lose 3.7 billion hours and 2.3 billion gallons of fuel sitting in traffic jams for a total cost of \$63 billion (2004). Congestion affects our quality of life by robbing time away from family and friends, increasing pollution, and adversely affecting air quality. Recent studies demonstrate that emissions of CO₂, the primary GHG, increase with greater congestion.²⁷

Highway congestion has increased dramatically over the past two decades in extent, duration, and intensity. The problem is expected to get worse if left unattended. The United States of America is the only industrialized nation that is growing in population. The nation is young, it is expanding, and the population is growing at approximately 1% per year. A local example: should the current travel trends continue, the new Spaghetti Junction will be at or near capacity when it is totally reworked and opened to traffic by the year 2020. Congestion is spreading to suburban and rural areas, and no longer is viewed as the 'big city' problem. As a

²⁵ *Major US City Preparedness For an Oil Crisis Which Cities and Metro Areas are Best Prepared for \$4 a Gallon Gas and Beyond?*, March 4, 2008 By Warren Karlenzig, President Common Current www.commoncurrent.com, San Anselmo, CA, http://postcarboncities.net/files/CommonCurrents_Oil%20Crisis_final_4Mar08.pdf

²⁶ Full story from WHAS-11 News is available from http://www.whas11.com/news/local/stories/WHAS11_080603_Consumer_ScheduleChange.5b1facb7.html.

²⁷ *Real-World CO₂ Impacts of Traffic Congestion*, Barth and Boriboonsomsin, Nov. 15, 2007, Annual Meeting of Transportation Research Board, Washington, D.C., January 2008.

result, the American public has become increasingly frustrated with the performance of its highway network. In a 2005 National League of Cities survey, traffic congestion led all other categories - including education and healthcare- when subjects were asked to identify the most deteriorated conditions in their cities over the last 5 years.

Louisville’s traffic congestion is bad and rapidly getting worse. Our congestion is growing in severity faster than our population is growing in size. We spend almost one work week a year sitting in traffic jams. The annual price tag is \$ 865 per driver, or approximately \$335 million for the entire local population. Louisville is among the top 25 metro areas in terms of congestion.²⁸

Congestion should not be viewed as a fact of life. It is not a scientific mystery, or an uncontrollable force. Congestion results from poor policy choices and a failure to embrace new solutions or adapt to changes. A confluence of trends however, provides a ripe opportunity to address congestion. Chief among them are:

- Public dissatisfaction
- Development of new transportation technologies
- Congestion pricing strategies
- Private sector participation in providing transportation services
- Challenges to the supply chain revolution

Current transportation planning does make efforts to mitigate congestion. However, if the general problem of sprawl is not addressed, attempts to relieve congestion through transportation engineering will result in more traffic (and thus increased VMT and associated GHG emissions), contributing to an endless new congestion loop.

Recommended goals:

- VMT are reduced by 5% by the year 2012, 10% by 2015, 20% by 2020. This would result in CO₂e reductions listed in the table below :

	base year 2009	2012	2015	2020
Daily VMT	21,542,590	20,465,461	19,388,331	17,234,072
CO₂e gr/mi (all vehicles)	530.6	530.6	530.6	530.6
% VMT reduction		5.0%	10.0%	20.0%
tons/year CO₂e reduced from 2009 base year		229,949	459,898	919,797

²⁸ Texas Transportation Institute report.

Hypothetical relative savings only. The above does not factor in the current projected increase in VMT, which would add another 11.1% to be reduced by 2020.

- By 2020, Louisville ranks in the lower 25% of cities in the Texas Transportation Institute's annual survey of the most congested urban areas in the U.S.

Recommendation 17: *LMG and KIPDA should develop a network of High Occupancy Vehicle lanes, Bus Only lanes, or "Green Lanes" throughout Jefferson County.*

5.4.5.3 SPATIAL MISMATCH BETWEEN JOBS AND WORKERS

According to the 2000 census, nearly 100,000 workers commute to Louisville for their jobs. Bullitt County led, with more than 20,000 commuters, followed by Clark County with 16,300 and Oldham County with 12,700. The figures confirm that Louisville is the economic engine for the region, and that people are increasingly living in nearby communities and commuting to Louisville for work. The current trend represents a 38 percent increase over the 1990's when 72,100 people commuted to Louisville for their jobs.

Between 1982 and 1992, Metro Louisville urbanized land much faster (by a factor of ten) than it added population; the region's population increased six percent while the amount of land developed grew sixty percent. This has negative impact on the viability and sustainability of the community. Accommodating and providing transportation infrastructure and services in newly developed areas competes for resources needed to preserve and sustain existing transportation infrastructure.

Metro Louisville should put in place zoning and support for high-density multi-use development with resources and entertainment within walking distance. There needs to be a plan for high density centers of development for better transit efficiency.

5.4.5.4 THE AGE WAVE AND TRANSPORTATION ACCESS

Another factor involved in mass transit planning is the concern for age demographics. One in every five Americans, or 20% of the population, will be in the "over-65-years" age category in the next 10-15 years. This figure is closer to one in every four citizens in Kentucky or 25% of the total state population. As the ability to drive is diminished as a result of aging, this population segment will require different means of transportation to maintain mobility. Mobility security will be demanded to sustain the basic essentials of life, such as access to medical services, employment, grocery shopping, visiting relatives and friends, and attending social and religious gatherings.

Today's transportation system, if unchanged, will not be able to respond to the mobility needs of the aging and elderly population. Why? Our pattern of development, where we live in relation to where services are provided, requires us to use private cars. Some minimal and basic transportation services are offered through public or private social service provider agencies; however, this effort lacks coordination, is for the most part under-funded, is not prepared for the age wave, and is inherently inefficient. Our public transportation service is under-funded and overextended, and as a result it does not provide the desired unified/comprehensive coverage. The most basic and fundamental form of transportation, walking, is frustrated by the conditions of the majority of our streets. One-half of our main thoroughfares, not counting local streets, do not have sidewalks and another 20% have partial/disconnected sidewalks. Transit routes in the city, especially in the outer or suburban parts of the community are inaccessible and lack fundamental and basic infrastructure to make them accessible and practical for the public.

The challenge in the Louisville Metro area is to develop a supportive and informed community through education and outreach efforts as viable transit plans are presented to better serve the metro area. The Pedestrian Summit program this year (2008) is an example of the metro-public partnership where an informed public can be supportive of multi-modal transportation needs of the metro communities. Gasoline prices are also driving the need for public transit and should help shift many to be more active users

5.4.5.5 PUBLIC HEALTH CONCERNS

Although GHG are not generally studied for their direct effects on health, other concurrent emissions from transportation have been linked to cardiovascular disease, involving direct effects on the lung and cardiovascular system and indirect effects mediated through pulmonary inflammation and oxidative stress. Urban air pollution is associated with inflammation, oxidative stress, blood coagulation and autonomic dysfunction simultaneously in healthy young humans, with sulfate and O₃ as two major traffic-related pollutants contributing to such effects. . Auto dependency also correlates with decreased mobility: relative to adults in non-car households, adult drivers lose 56 minutes of walking time per week which equates to 28 additional pounds of body weight over the course of decades. Relative to 1975 walking habits, current walking patterns account for an increase of 5.7% of all passenger car emissions.²⁹

The impacts of transportation policy on human health goes far beyond highly-visible road accidents to include decreased access to health care providers, vendors of medicines and nutritional foods, and community support services such as counseling and recovery. In the absence of an adequate public transportation system, the end

²⁹ Summarized in Professor Arnold's Matrix (2008). "Unfit for Purpose: How Car Use Fuels Climate Change and Obesity," Institute for European Environmental Policy, 2007. Available from [http://www.lowcvp.org.uk/assets/reports/IEEP%20-%20Unfit%20for%20purpose_transport%20climate%20change%](http://www.lowcvp.org.uk/assets/reports/IEEP%20-%20Unfit%20for%20purpose_transport%20climate%20change%20)

result could be intense isolation and the widening of the disparities between car and non-car households that is likely to most seriously affect the poorest of the poor³⁰.

Civil rights and equity issues affecting minorities have been found to be structural in nature since they are outcomes of transportation policy decisions that give funding preference to projects (such as light rail and highways), serve suburban and/or wealthier commuters, and consistently ignore and under-fund the infrastructure that is most valuable to poor and minority populations. One interesting fact offered by Sanchez et al is that "In 1998, those in the lowest income quintile, making \$11,943 or less, spent 36 percent of their household budget on transportation, compared with those in the highest income quintile, making \$60,535 or more, who spent only 14 percent."³¹

Health benefits (and consequent savings to individuals and society) are not but should be included when calculating the costs of various transportation options³². The modes of transportation in a 'built environment' have a clear impact on the levels of physical activity depending upon the modes of transportation receiving investment and the location choices for new development. Therefore, there is a definite relationship between land use policies, transportation and individual activity level choices³³.

It is important that the Metro area continue to support multi-mode transportation. Bike Louisville is part of the Mayor's Health Hometown Initiative³⁴. A shift of even 1% of vehicle-based trips to bicycle or walking will reduce emissions, leading to cleaner air and the exercise will improve general health and well-being of Louisville residents. This mode-shift necessitates a supportive infrastructure. High-density multi-use development with resources and entertainment within walking distance will support transportation mode-shift to walking and bicycling

Recommended goals:

- Bicycle and pedestrian accidents involving vehicles are reduced 25% by the year 2015.

³⁰ Wolff, SP and CJ Gillham. (January, 1992). "Public Health Versus Public Policy: An Appraisal of British Urban Transport Policy." *Public Health*, 105(3): 217-28. Available from <http://www.ncbi.nlm.nih.gov/pubmed/2062994>

³¹ Sanchez, Thomas, et al. (June, 2003). "Moving to Equity: Addressing Inequitable Effects of Transportation Policies on Minorities." *Joint report of the Civil Rights Project and the Center for Community Change*. Available from http://www.civilrightsproject.ucla.edu/research/transportation/trans_paper03.php

³² Dora, Carlos. (June, 1999). "A Different Route to Health: Implications of Transport Policies." *BMJ: Education and Debate*, 318:1686-1689. Available from <http://bmj.bmjournals.com/cgi/content/full/318/7199/1686>

³³ Frank, Lawrence and Peter Engelke. (date unknown). "How Land Use and Transportation Systems Impact Public Health: A Literature Review of the Relationship Between Physical Activity and Built Form." *ACES: Active Community Environments Initiative*, Working Paper #1. Available from

<http://64.233.167.104/search?q=cache:0CbXq9HfaKIJ:www.cdc.gov/nccdphp/dnpa/pdf/aces-workingpaper1.pdf+health+standards+transportation+policy&hl=en&ct=clnk&cd=13&gl=us&client=firefox-a>

³⁴ <http://www.louisvilleky.gov/BikeLouisville/>

- Bicycle travel option has increased by 10% by the year 2020. This would result in reduction of CO₂e by approximately 459,898 tons annually.³⁵
- Sidewalk coverage inside I-264 has reached 75% level by the year 2020.
- Sidewalk coverage and access to trails outside I-264 has reached 50% level by the year 2020.

5.4.6 REQUIREMENTS TO FACILITATE RECOMMENDATIONS

5.4.6.1 POLITICAL / INSTITUTIONAL FACTORS

[Kentucky and Indiana Regional Planning and Development Agency](#) (KIPDA) is the Metropolitan Planning Organization (MPO) for Jefferson County (as well as for Clark, Floyd, 1/10th of a square mile in Harrison counties in Indiana, and Bullitt and Oldham counties in Kentucky), and is responsible for implementing the [Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users \(SAFETEA-LU\)](#) in this (MPA) Metropolitan Planning Area (MPA). The [Transportation Policy Committee \(TPC\)](#) is the policy board responsible for carrying out key MPO policy functions and directing the transportation planning process for the Louisville (KY-IN) Metropolitan Planning Area (MPA) in accordance with the Federal Transportation Act, SAFETEA-LU.

The [Transportation Technical Coordinating Committee \(TTCC\)](#) is responsible for providing technical advice and assisting the TPC in carrying out the responsibilities assigned to the MPO. The Metropolitan Housing Coalition Report of 2007 details recent public interaction with KIPDA and Federal oversight in the process³⁶.

In order for the recommendations of this committee to be successful, these institutions, and the public at large, must undergo a shift in culture. The National Surface Transportation Policy and Revenue Study Commission's report to Congress³⁷ provides an example regarding "cultural shift": *Our Nation will need to put more emphasis on transit and intercity passenger rail and make them a priority for our country. A cultural shift will need to take place across America to encourage our citizens to take transit or passenger rail when the option is given.* ([volume I, p.1](#))

Recommended goals:

- Louisville in close coordination with southern Indiana, Oldham and Bullitt Counties directs transportation decision making process on all infrastructure investments.
- Engage the broader community to participate in the decision making process.

³⁵ Based on 10% VMT mode shift from passenger vehicles to bicycles in Jefferson Co. (Mobile6.2 emission factor), 2009 base year.

³⁶ State of Metropolitan Housing Report 2007, Metropolitan Housing Coalition; Louisville, KY, www.metropolitanhousing.org.

³⁷ http://www.transportationfortomorrow.org/final_report/

- Metro Louisville is project manager and sponsor for design and implementation of at least 80% of new/modified road projects on local roads, collectors, and arterials within its boundaries by 2015.

5.4.6.2 TRANSPORTATION PROJECT FUNDING

Federal agencies report that receipts from gasoline taxes flowing into the transportation trust fund are running far short of projections and that this shortage will threaten promised funding under the 2005 reauthorization of the federal surface transportation law. The fund, based on the federal gas tax, provides dedicated funding for the nation's surface transportation program. The Government Accountability Office and the legislative branch are increasingly concerned over the future of the transportation trust fund as gas tax revenue into the fund will be insufficient to cover funding authorization in SAFETEA-LU. The situation may well worsen as high gas prices lead a number of states to consider cutting fuel taxes that fund transportation projects. In addition, the introduction of fuel efficient cars, coupled with advances in hybrid vehicles undermines the funding projections that constitute the primary source of funding for nearly all transportation projects. In Jefferson Co. alone, the Kentucky Transportation Cabinet's (KYTC) 2005 estimate of unfunded road projects is \$1.54 billion, excluding the Ohio River Bridges Project.

While the renewed investment in the physical fabric of our cities is compelling, our task is more daunting. The issue is not simply more money but better public policy that leads to better investment. The challenge is to reinvent both how we invest and what we choose to invest in so we can make better long-term use of what has proved to be limited funding availability.

Despite record gas prices leading more and more people to use the transit, public transportation is still funded at a fraction of highway spending. In Kentucky, legal barriers still exist that prevent use of state road tax funds for transit. Funding for transit is also falling far short of the need. While demand for transit service is growing, with an 8 percent increase in ridership in FY 2006, TARC's resources are stretched thin. There is an immediate need for \$7 to \$10 million to buy replacement buses. Another \$2-3 million in additional operating funds will be needed each year to sustain the current service levels.

Costs are growing faster than inflation and income. Fire, police protection, patching of the potholes, and paving of the streets can not be outsourced: the cost of service provision must be met. In addition, primary materials used in infrastructure - steel, asphalt, and concrete - have risen sharply in price.

There exists in the Louisville Metropolitan area a disjuncture between land use and transportation planning typical of many U.S. cities of its size. The 1956 Federal Highway Act and the Federal Housing Administration's (FHA) mortgage financing

and subdivision regulation are largely responsible for helping to create this pervasive condition. Together, FHA policies and successive Highway Acts produced the multi-centered, low-density, automobile-dependent metropolises that we know today. “Market-driven development continues apace, with transit infrastructure struggling to serve such far-flung growth. Unfortunately, even for planners and civic leaders who realize the important connection between transportation and land-use, there often exists few opportunities to integrate the two³⁸.”

From 2005 to 2010, the federal government will allocate over \$286 billion for transportation projects across the country. State gasoline taxes provide additional funding sources: in Kentucky, the tax contributes over \$1 billion annually to state road and highway projects, with multiple sources of funds (each with its own set of regulations) at both federal and state levels³⁸”. Recently the state gasoline taxes have begun a downturn, however.^{39, 40}

Dade County, Miami, Florida is a good example of a transit system with a stable funding source.

Louisville Metro should develop transportation funding mechanisms that support sustainable development as well as maintain existing needed transportation infrastructure. As suburban sprawl is discouraged through zoning, tax and development incentives, inefficient structures can be converted or rebuilt to support higher-density multi-use development. Development of innovative state/local/regional funding may need to compensate for the current state and national transportation funding shortfalls. “Public-private partnership” arrangements should be carefully reviewed with ample opportunity for public comment to prevent short-term gain over long term loss for communities involved.

Louisville Metro area transportation planning agencies should consider more integrated (alternative) transportation planning that allocates (prioritizes) resources toward a more sustainable infrastructure that reduces sprawl (which become VMT increase spirals).

Recommended goals:

- At least one alternative transportation project is funded through innovative financing by the year 2010.
- At least one alternative transportation project is funded as a demonstration project by the year 2010

³⁸ State of Metropolitan Housing Report 2007, Metropolitan Housing Coalition, Louisville, KY, www.metropolitanhousing.org .

³⁹ KENTUCKY Transportation News Vol. XX, No. 14 Published by Kentuckians for Better Transportation June 10, 2008 http://www.kbnet.org/uploads/TransportationNews2008_06_10.doc

⁴⁰ Dade County, Miami, Florida is a good example of a transit system with a stable funding source. “½ cent sales tax to fund community transit: <http://www.miamidade.gov/citt/> The People’s Transportation Plan (PTP) is in action and Miami-Dade made it happen at the ballot box on November 5, 2002. By a margin of two to one, Miami-Dade voters approved the People’s Transportation Plan and the half-penny transportation surtax, paving the way for a dedicated funding source exclusively for the improvement of transportation. Many improvements have been made to Miami-Dade County’s bus and rail service. Since passage of the surtax, the following programs and services have been implemented: . . . “

5.4.7 TRANSPORTATION SUMMARY CONCLUSION

Recent data with respect to climate change and GHG's necessitates a greater environmental concern in addition to the growing societal and logistical problems of sprawl, congestion, fuel resources and related costs. The Louisville Metro area needs a true visionary and integrated transportation plan to meet the current and future needs of its citizens, and to augment its economic prosperity in a way that enhances the health, vibrancy and livability of its neighborhoods. This report with recommendations is presented in order to provide guidance for this development.

Recommended goals:

- 100% of all new/modified road projects are designed with context sensitive solutions by 2012.
- Maintaining annual transportation GHG emission levels to 10% below 1990 levels at minimum. The GHG inventory found GHG emissions for Jefferson County for 2006 to already be 10.7% below that of 1990, though current projections estimate transportation GHG emissions to be at approximately 5.5% below 1990 levels by 2012.

ADDITIONAL REFERENCES AND INFORMATION

5.4.1 REDUCING ANNUAL VMT THROUGH MODE SHIFT

5.4.1.1 INTEGRATE LAND-USE AND TRANSPORTATION PLANNING

Shoup provides a solid overview of the many problems - including traffic management challenges, trip inflation, lifetime environmental impacts, etc - associated with minimum parking. For a review of the costs (in British Columbia, anyway) of parking provision and a discussion about the ways in which these costs are externalized see

<http://www.vtpi.org/tca/tca0504.pdf>

For an interesting example of an alternative approach to parking provision, see the presentation and notes made available from

<http://www.livableplaces.org/policy/NoFreeParking.html>

Shoup, Donald. (1999). "The Trouble with Minimum Parking Requirements."

Transportation Research Part A, 33: 549-574. Also available from

<http://www.vtpi.org/shoup.pdf>

EPA Guidance: Improving Air Quality Through Land Use Activities, January 2001 (EPA420-R-01-001) .

5.4.2 REDUCING VMT WITH TRANSPORTATION DEMAND MANAGEMENT

For a comprehensive list of TDM strategies see: <http://www.vtpi.org/tdm/index.php#TDM>

This study examines the joint use of market-based strategies (including congestion pricing, emissions fees, and reduced-emissions vehicle modifications) for reducing traffic congestion. The author describes the problems and benefits of attempting to use such strategies to simultaneously pursue the multiple and related goals of reducing congestion, improving urban air quality, and reducing road fatalities⁴¹.

A historical overview of TDM policies and practices in the USA with a focus on the federal context. Estimation of the effectiveness of different strategies (see Tables 2 and 3, in particular) for reducing use of private transportation⁴².

5.4.2.1 PARKING

Greenville, SC has introduced a tree, shrub and ground cover requirement. The interior parking lot requirements specify one tree per 2000' sq. of parking & shrubs per every 500' sq. of parking area, planted in islands spaced no more than 20 spaces apart. Impacts: improve livability, reduce heat island effect.

5.4.2.2 DRIVING REDUCTION INCENTIVES

Litman, Todd. (October, 2007). "Pay-As-You-Drive Pricing in British Columbia: Backgrounder." *Victoria Transport Policy Institute*. Available from <http://www.vtpi.org/paydbc.pdf>.

SpaceShare provides software-based coordination of ride sharing. It uses user-friendly, proprietary software that allows individual members of organizations and event participants to quickly survey their ride sharing options and coordinate with other interested persons. RideShare keeps its services cost-effective by only contracting with organizations that have a critical mass of potential ride-sharing commuters. <http://www.spaceshare.com/>

Freewheelin is a Humana program in Louisville that provides 27 bikes for its employees to borrow. 27% of the 8,000+ employees signed up. <http://1world2wheels.org/blog/happenings/humana-happenings/>

⁴¹ Shefer, Daniel. (August, 1994). Congestion, air pollution, and road fatalities in urban areas. *Accident Analysis and Prevention*, 26(4): 501-509. Available from http://www.sciencedirect.com/science?_ob=ArticleListURL&_method=list&_ArticleListID=750429584&_sort=v&_st=17&_view=c&_acct=C000011238&_version=1&_urlVersion=0&_userid=134779&md5=02684911625d7986e2975ece10d90ea1.

⁴² Meyer, Michael. (September/November, 1999). "Demand management as an element of transportation policy: using carrots and sticks to influence travel behavior." *Transportation Research Part A: Policy and Practice*, 33(7-8): 575-599. Available from http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VG7-3X6B557-5&_user=134779&_coverDate=11%2F30%2F1999&_alid=750429584&_rdoc=55&_orig=mlkt&_cdi=6031&_sort=v&_st=17&_docanchor=&_view=c&_ct=56&_acct=C000011238&_version=1&_urlVersion=0&_userid=134779&_fmt=full&md5=cbf553757001a20e3c1d09520b7f0807#toc9.

Companies and universities can establish special partnerships with car-sharing companies such as ZipCar. Although details vary a bit, the basic idea of these programs is that the company (i.e. ZipCar) own a fleet of vehicles that it parks permanently at easily-accessible locations. These cars are available on short notice to any person who has purchased a membership with the company. The membership price, which covers access, insurance, and maintenance of the vehicles, is significantly reduced by partnership relationships.

<http://www.zipcar.com/> <http://www.carsharing.net/>

5.4.5 ADDITIONAL COMMUNITY BENEFITS OF PROPOSED RECOMMENDATIONS

5.4.5.5 PUBLIC HEALTH CONCERNS

The Institute of Medicine's "Meeting 13" focused links between fuel and engine types and human health impacts. The presentations are available for online viewing at:

<http://www.iom.edu/CMS/3793/4897/46788/49193.aspx>

The entire Sept/Oct 2003 issue of the *American Journal of Health Promotion* was dedicated to scholarship on "health-promoting community design." The article by Ewing et al (*Relationship between Urban Sprawl and Physical Activity, Obesity and Morbidity*) is particularly relevant for transportation planning. Table of contents linked to article text is available from

<http://www.activelivingresearch.org/resourcesearch/journalspecialissues/ajhp2003> .

DOT hosted a round table to promote collaboration between planners and health care professionals with the goal of developing policies that incorporate health goals into transportation planning. Some policy recommendations are included in the report.

<http://www.planning.dot.gov/Documents/Health/IntHealthTA.htm> .

Friedman and Minjares. (date unknown). "The Public Health Effects of Sprawl: A Compelling Case for Addressing Public Health in Transportation and Land Use Policy," Environmental and Energy Study Institute. Congressional Briefing Summary available from

<http://www.eesi.org/publications/Briefing%20Summaries/10.2.03%20Sprawl%20Briefing%20Summary.pdf>

5.4.6 REQUIREMENTS TO FACILITATE RECOMMENDATIONS

5.4.6.1 POLITICAL / INSTITUTIONAL FACTORS

Seattle Mayor Encourages Drivers to Cut Car Trips Announces public campaign to "Give Your Car the Summer Off." Mayor Greg Nickels announced a public campaign encouraging residents to drive their cars 1,000 miles less a year and combat global warming by walking, biking, car pooling and taking transit. "Give Your Car the Summer Off" enlists the support of the Seattle Art Museum, Woodland Park Zoo, Seattle Aquarium, local businesses and others to offer discounts for people who pledge not to

drive alone. People giving up their cars for a month or a year will also receive special incentives. [Full press release](#)

Maibach summarizes Rothchild's continuum of options for achieving behavioral changes at the group population level. Describes how to design a successful campaign to promote more active and sustainable transport options and particularly how to choose and focus the message and deal with the competition (e.g., private transportation reliance). Interesting and useful article if you read past the first page⁴³.

⁴³ Maibach, Edward. *Recreating Communities to Support Active Living: A New Role for Social Marketing*, American Journal for Health Promotion, 18(1). Available from http://www.activelivingresearch.org/alr/files/AJHP_16_Maibach.pdf