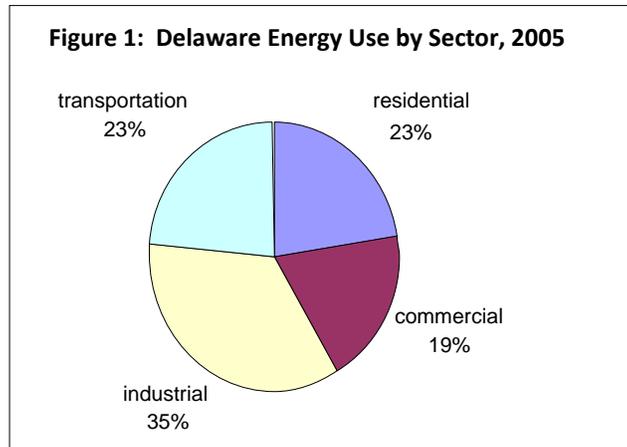


## Reducing Delaware’s Transportation Energy Use Work Group Report to Governor’s Energy Advisory Council

Although not included in the 2003 *Bright Ideas for Delaware’s Energy Future* report, reducing transportation energy use is key to reducing Delaware’s overall energy use. Transportation accounts for almost one-quarter of all energy use in Delaware.



### **WORK GROUP COMPOSITION**

The work group was developed to represent a diverse group of transportation related organizations and businesses, energy suppliers, state and local government, universities, energy or environmental non-profits, citizen groups and other stakeholder groups. Members of the workgroup are shown in Appendix A.

### **WORK GROUP PROCESS (May through December, 2008)**

The work group held monthly meetings, initially focused on providing background information and education to work group members on relevant topics, then identification of potential recommendation topics, review and discussion of recommendation strawmen developed by work group members, and finally, decisions on recommendations to forward to the Governor’s Energy Advisory Council.

Presentations given to the work group and meeting notes were posted on the energy plan website so members could keep up to speed if they needed to miss a meeting.

### **WORK GROUP GOAL**

The goal of the Reducing Transportation Energy Use Work Group is that by 2030, the total vehicle miles travelled in Delaware will not exceed current levels (2009).

**BACKGROUND INFORMATION**

Delaware’s Transportation System

Delaware’s transportation system includes 5,317 miles of roadways maintained by the Delaware Department of Transportation (DelDOT) (including 41 miles of interstate highway), 925 miles of other roadways, a state-wide bus system, 271 miles of commercial rail lines (mainly freight lines), including passenger service to Philadelphia which is contracted from SEPTA and subsidized by the Delaware Transit Corporation (DTC).<sup>1</sup>

Transportation system planning is done by DelDOT, with oversight by the Wilmington Area Planning Council (WILMAPCO) and the Dover/Kent County Metropolitan Planning Council. The bus system is operated by DART First State, the Delaware Transit Corporation.

Automobile Travel

Gasoline purchases in Delaware increased 73 million gallons from 2000 to 2007 (19%), an average annual increase of 2.6%. The Division of Motor Vehicles projects a steady 2% annual increase in fuel sales<sup>2</sup>. Even at that conservative estimate, by 2012, over 512 million gallons of gasoline will be purchased annually in Delaware.

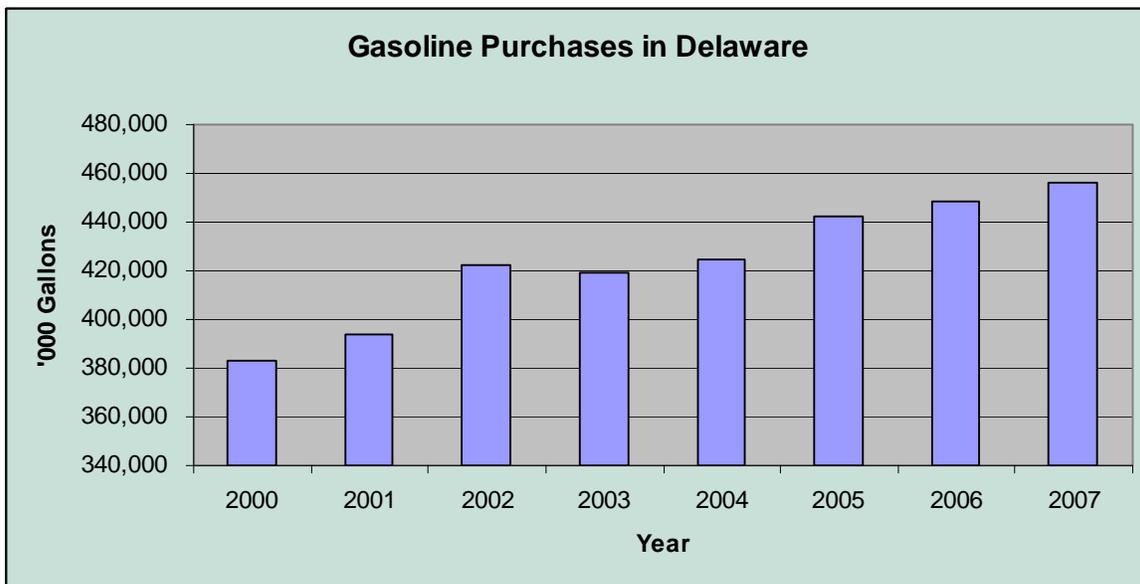


Figure 2

Source: Delaware Department of Transportation, Division of Motor Vehicles. Motor Fuel Tax Administration Report. March 6, 2008

The increase in gasoline purchases reflects the steady growth in vehicle miles travelled (VMT). Travel on Delaware’s major highways increased by 45% from 1990 to 2005 (6.5 billion VMT in 1990 to

<sup>1</sup> Road miles – calculated in one direction for each road.

<sup>2</sup> Delaware Joint Finance Committee hearing 2/29/2008

9.5 billion VMT in 2005). As shown in figure 3, vehicle travel is expected to increase by another 35 percent by 2020, reaching 12.8 billion VMT.<sup>3</sup>

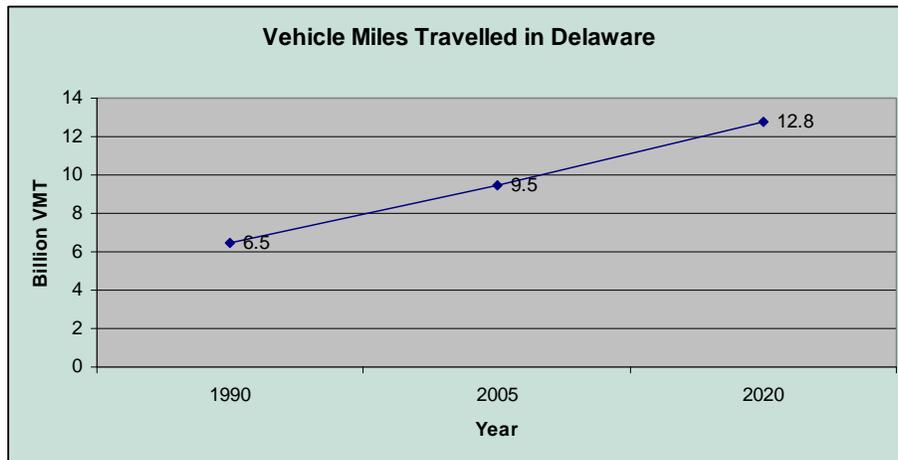


Figure 3

## Public Transportation

### Rail

Subsidized rail transit is provided from Newark, Churchman's Crossing, Wilmington and Claymont to Philadelphia on the SEPTA R2 line. SEPTA R2 ridership, as measured by passenger trips, has increased 42%, from 723 thousand in FY03 to 1 million in FY07. The Delaware Transit Corporation (DTC) is in the final engineering phase of the Commuter Rail Improvement Project (CRIP). The CRIP improvements are projected to double daily ridership from 3,000 to 6,000 passengers per day.

The CRIP consists of adding approximately 1.5 miles of new track (3<sup>rd</sup> Track) around the vicinity of Banning Park in New Castle County. The additional track will accommodate increased frequencies on the Delaware SEPTA R2 service terminating in Newark. Currently, only two tracks are available which create a choke point on this section of Amtrak's Northeast Corridor and limits the amount of train movements, especially during peak periods.

As part of the CRIP, a new Newark Train Station will be built at the current site of Newark Concrete. The new station will accommodate two SEPTA trains at one time. The new location will eliminate existing conflicts with freight traffic at the current Newark Station. The new station will have more parking and the location is better situated for eventual downstate commuter rail to Middletown and Dover.

DTC, as part of the CRIP, has also signed an agreement with SEPTA to purchase four commuter rail cars that will be used as part of the additional service once the CRIP is completed.

Rail service to more distant locations is provided by Amtrak from Newark and Wilmington where there are approximately 2 and 80 trains per day respectively. These services provide an additional estimated 800,000 trips per year.

<sup>3</sup> "The Cost of Traffic Congestion in Delaware: The State's 25 Worst Traffic Jams and Needed Steps to Relieve Traffic Congestion." TRIP, June 2007. <http://www.tripnet.org/DelawareCongestionReportJune2007.pdf>

Bus

Bus transit operated by DART First State includes both fixed route bus service and demand response service statewide. Between FY03 and FY07, fixed route ridership grew 11%, from 7.5 million passenger trips to 8.3 million. Over the same period, demand response trips grew 43%, from 569 thousand to 812 thousand.

DART also provides a service, RideShare Delaware, to assist commuters with finding and using alternative modes of transportation. The goal of the program is to reduce the number of single occupant vehicles (SOVs) traveling on Delaware’s roadways, thus improving our air quality. Initiated in 1997, RideShare Delaware is funded with a combination of Federal Congestion, Mitigation & Air Quality (CMAQ) and State dollars.

Air Service

Currently there is no commercial air service provided within Delaware. Residents frequently travel to Baltimore/Washington International Airport, the Philadelphia International Airport or to Salisbury, MD to access commercial air services.,

Transportation Related Air Emissions

In 2002, air pollution emissions from on-road sources (cars and trucks) were:

Table 1. Air Pollution Emissions from On-Road Sources

	NO <sub>x</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>
Tons per Year	21,341	584	415
Percent of Total Emissions	37.4%	0.7%	5.8%

Source: Delaware Department of Natural Resources & Environmental Control, Air Quality Management Section. Analysis of 2002 Emissions from Delaware Electricity Generating Units (EGUs). Email from David Fees, 2/19/2008.

On-road transportation (cars, trucks, buses, etc.) accounts for 21% of the State’s CO2 emissions; off-road transportation (shipping, rail, farm and construction vehicles, etc.) accounts for an additional 3%.<sup>4</sup>

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<sup>4</sup> Source: Delaware DNREC, Air Quality Management Section, 2005 GHG Inventory Summary 9-15-08

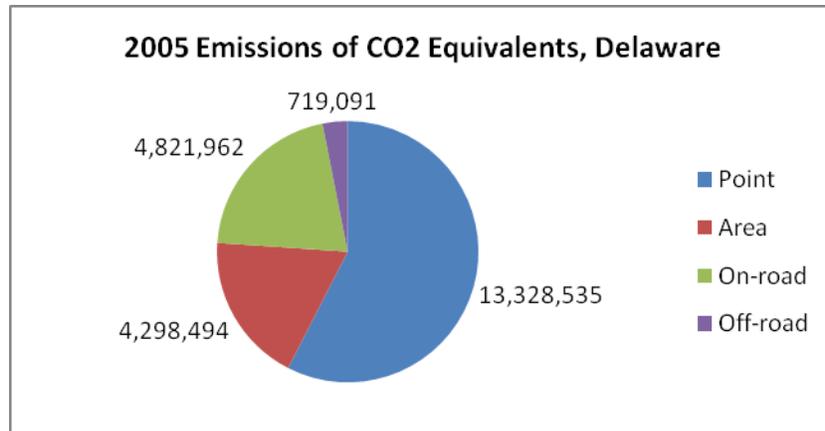


Figure 4

The DNREC Air Quality Management Section estimates the annual mobile emissions (cars) per household of that are projected for new developments. These are:

- 153.5 lbs of Volatile Organic Compounds (VOC)
- 127.1 lbs of NO<sub>x</sub>
- 93.8 lbs of SO<sub>2</sub>
- 8.3 lbs of Fine Particulate Matter (PM)
- 12,839.2 lbs of CO<sub>2</sub>

The location of the development affects the estimated vehicle emissions; emissions are higher for developments located in areas of the state designated as level 4 (the areas where growth is not desired, typically farther from towns and other communities). For example, a typical development of 100 units located 10 miles outside the growth zone will produce an additional 59 tons (not pounds) per year of VOC emissions, 77 tons per year of NO<sub>x</sub> emissions and 1 ton per year of PM emissions, compared to the exact same development built within the growth zone.

## **RECOMMENDATIONS**

There are two main approaches to reducing transportation energy use:

- Reducing Vehicle Miles Travelled (VMT)
- Reducing Energy Use per Mile of Vehicle Travel.

Approaches to reducing VMT include increasing use of car pools, van pools and mass transit, increasing alternative transportation such as bicycling and pedestrian travel, and changing land use and development patterns. Approaches to reducing energy use per mile can be achieved through such things as increasing vehicle efficiency, increasing use of alternative fuel vehicles and improving system infrastructure to increase travel efficiency.

## **RECOMMENDATIONS FOR REDUCING VEHICLE MILES TRAVELLED**

### **Recommendation 1: VMT Reduction Goal**

*The State should adopt a goal that by 2030, the total vehicle miles travelled (VMT) in Delaware will not exceed the levels in 2009.*

#### **Background**

VMT is one of three core factors in transportation energy use. National trend data indicates that not only has VMT grown substantially (outpacing population growth and vehicle registration), growth will continue, regardless of new federal proposed standards.<sup>5</sup> Indeed, the Department of Energy projects that by 2030, the number of VMT will be two times the 1990 level.<sup>6</sup>

CO2 emissions have risen, and will continue to rise, concomitantly.<sup>7</sup> Any effort to reduce the energy associated with transportation use must therefore include controlling VMT while also leveraging the use of new vehicle and fuel technologies to reduce transportation-related energy use. For that reason, the above goal is recommended, in harmony with policies that move the vehicle fleet towards more efficient fuels and technologies.

The objective of the goal is to serve as an inspiration and benchmark for policies, programs and activities to reduce transportation energy use (i.e. land use policy, vehicle standards, etc.). The expected benefit is better land use and related decisions that will result in fewer vehicle miles travelled, and reduced associated energy use and emissions.

#### **Cost**

None.

### **Recommendation 2: Transit Investment**

*Raise fixed-route transit capital spending to 20% of total transportation spending in the region and create a dedicated funding stream for the system.*

#### **Background**

Reducing VMT will require an increased public investment in transit. The US Census estimates that 11,000 Delaware workers (2.7% of the State transportation mode split) utilized transit as their primary means of travel to work in 2007—making it the third most popular mode choice behind driving alone and carpooling. Transit is most utilized in the State's urban north (New Castle County), home to most of the routes, accounting for 10,000 (3.8% of county mode split) of the estimated 11,000 dedicated transit users in the State.

Transit use has increased during the last decade, while funding for system improvements has not kept pace. According to DART, fixed-route ridership has increased by 25% between 1996 and 2007. Ridership on SEPTA's R2 rail service from Newark to Philadelphia has increased by 116% during the

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<sup>5</sup> Federal Highway Administration (FHWA). "Vehicle Registrations, Fuel Consumption, and Vehicle Miles of Travel and Indices," Highway Statistics 2005. Washington, D.C.: U.S. Department of Transportation, 2006, <http://www.fhwa.dot.gov/policy/ohim/hs05/htm/mvfv.htm>.

<sup>6</sup> S. Winkelman (Center for Clean Air Policy) calculations based on EIA's Annual Energy Outlook 2008 (Early Release) and the Energy Independence and Security Act of 2007.

<sup>7</sup> Ibid.

same period. Capital spending on transit in the Wilmington metro region, home to the State's most extensive transit network, consistently has programmed about 10% of funding for transit in its Transportation Improvement Program (TIP) during the past decade. Funding for transit reached its high as a percentage of total funding in the FY 2006 TIP, when it reached 11.2% of total transportation spending; its lowest level was 6.5% in FY 2003.

To successfully reduce VMT statewide, Delaware's fixed-route transit system requires improvements in frequency, connectivity, accessibility and expansion of service. A recent WILMAPCO survey of low-income and minority communities found that 44% said the transportation system does not meet their needs. Many pointed specifically to transit as ineffective. For example, increased weekend service is necessary to provide better connectivity for low-income workers to their jobs—many of which require service at off-peak times. Increasing the frequency of weekday service to key employment centers is also necessary for building ridership. Further, ensuring the general accessibility of existing bus stops is crucial in encouraging ridership. A quarter of respondents in WILMAPCO's survey pointed specifically to dangerous crossings and broken sidewalks as deterring them from using the bus more often.

Raising fixed-route transit capital spending to 20% of total transportation spending in the region and creating a dedicated funding stream for the system, will allow for the improvements to the system which are anticipated to encourage greater overall usage and reduce VMT.

Most of DART's operating budget is funded from the State's transportation Trust fund, which relies on revenues collected from the Motor Fuel Tax. If efforts to reduce VMT and/or increase fuel efficiency are successful, less funding will be made available for transit due to falling volume of fuel sales. In addition, funding for transit is currently argued year-by-year against road funding for its percentage of the Transportation Trust Fund. A dedicated addition to the fuel tax would help fund transit expansion, whereby Transit could more viably offer an alternative to the single occupied vehicle (SOV).

#### Cost

This recommendation involves the redistribution of transportation funds and possible creation of a new funding source.

### **Recommendation 3: Bus Rapid Transit Feasibility**

*Explore the feasibility of creating a phased bus rapid transit system (BRT) throughout the Mid-Atlantic Area (Delaware, Maryland, Pennsylvania, New Jersey).*

#### Background

The objective of a bus rapid transit system would be to incrementally link communities, centers of commerce, and established systems of transportation. This would provide the following benefits: a more efficient land-use pattern, reduced traffic congestion, increase economic competitiveness of the region in today's global marketplace, and provide an environmental friendly solution to traffic management. Potential partners would include representatives from both the public and private sectors from Delaware, Pennsylvania, Maryland, New Jersey, and Federal agencies.

According to a November 2008 presentation at the University of Delaware's Institute for Public Administration, a typical heavy rail system in the US can cost \$200 million or more per mile to construct, and a typical light rail system can cost \$70 million per mile or more. By contrast, the most

expensive BRTs cost around \$25 million per mile. Some very competitive systems have been built for significantly less.

There are efforts currently underway regarding bus rapid transit. These have included:

- Identification of potential stakeholders
- Contact/communication of project concepts (one-on-one meetings)
- Information meeting/workshop

The following steps would be taken to implement the recommendation:

- Establish a steering/exploratory committee representing the variety of stakeholders and regulators who would have interest in this issue
- Develop a draft agreement among a public/private partnership; including commitment to fund development of a business plan that includes the institutional arrangement, proposal for phased development including recommendations for pilot areas, and a 5 and 25 year plan for implementation
- Engage all stakeholders in refining the draft agreement and supporting any necessary legislation/regulation

#### Cost

A feasibility study should cost between \$150-200,000.

### **Recommendation 4: Employer Trip Reduction Programs**

*The Governor, through the Secretaries of Natural Resources & Environmental Control and Transportation should convene a committee, including representatives of Delaware employers such as the State Chamber of Commerce, to develop standards and incentives for employer participation in commute alternatives programs.*

#### Background

The Goal of this recommendation is to encourage greater trip reduction efforts among employers statewide.

Employer-sponsored commute benefits have long been documented to have a significant impact on reducing vehicle miles traveled. Since the end of the Employee Commute Option (ECO) mandates of the early nineties, efforts have been in place throughout the state to engage business partners in the *voluntary* act of employee commute program administration. Many employers currently offer varying degrees of demand management programs ranging from minimal to aggressive efforts, the latter primarily as a result of a legally binding Traffic Mitigation Agreement. However, there remain a significant number of employers throughout the state who do not offer any level of benefit to their employees. Programs and support systems are presently in place that could easily support employers in program implementation.

The committee would engage business stakeholders in:

- Identifying minimum standards for employer trip reduction participation;
- Identifying the available and needed resources to support administration;
- Identifying existing and new tax incentives and administration processes to encourage their participation;

- Developing a recognition package to spotlight successes via local, regional and national venues.

The primary expected benefit of increasing the number of businesses participating in trip reduction efforts would be an increased reduction in vehicle miles traveled throughout the State, thus helping to achieve our energy reduction goals. Secondary and equally important goals are cost savings; expanded commuter choice options, aiding employer recruitment and retention efforts; and, improved air quality.

#### Cost

*To the State:* It is likely that this discussion would lead to a requested increase of the existing Travelink credit cap and/or the addition of a new one with an amount to be determined. The total amount of eligible credits allowed is \$100,000 in any State fiscal year. Additional costs could also potentially be needed to support expanded level of service to the business community.

*To employers:* Many initiatives would be at no- or low-cost. For those that are higher, costs could be offset by tax credits.

### **Recommendation 5: Bus Transportation System Improvement**

- Where possible, DART and other bus service systems should combine services in overlapping areas.*
- Add additional small bus/van routes to connect to longer distance, express oriented transit routes.*

#### Background

Integrated Bus Systems- there are other bus services throughout the state that operate on a daily basis. DART could achieve significant savings if these resources were better integrated with DART's overall service. An example of opportunity is in Newark with the University of Delaware's transit services and the Unicity service and DART's fixed route services. The bus systems are complementary to one another, serving areas both in common and distinct. The separate services can be coordinated with one another to achieve optimal efficiency for both the systems and the riders.

In addition, connectivity is offered with SEPTA and Maryland's MTA, however these services could be better coordinated to provide more seamless travel patterns.

Smaller Buses /Vans connecting more heavily traveled routes- DART currently operates or contracts for several smaller cutaway vehicles on short routes that connect to longer distance, express oriented transit routes. Ridership productivity on these connective routes often coincides with the heavily traveled runs of the "parent" transit route. With current land use patterns in the state, using the smaller vehicles to collect riders and bring them to the commuter route is one way to "increase" population densities and grow transit ridership.

#### Cost

The costs of coordinating services are minimal. The costs of increasing the number of smaller buses/vans would include the capital costs for purchase of additional vehicles and operating costs (which are estimated by DART at approximately \$50/hour).

### **Recommendation 6: Non-ADA Paratransit Service**

*The Governor, through the Secretaries of Transportation and Health and Social Services, should convene an ad hoc panel to evaluate and recommend options to improve energy-efficiency and cost-effective implementation of the State's policies regarding non-ADA paratransit service.*

Background

An ongoing demographic shift, coupled with Delaware’s liberal acceptance standards have resulted in booming paratransit ridership throughout the State. In addition to an aging population, disabled citizens often chose to move to Delaware in part for the extensive paratransit service. For example, by 2030, seniors may account for nearly 21% the Wilmington area’s population, up from 11% in 2000. As disability rates increase dramatically with age, we can also expect to see more persons with disabilities. One outcome of this demographic shift is greater demand for paratransit services. Statewide, non-ADA trips were found to account for nearly 40% of all paratransit trips in a test month (December 2006).

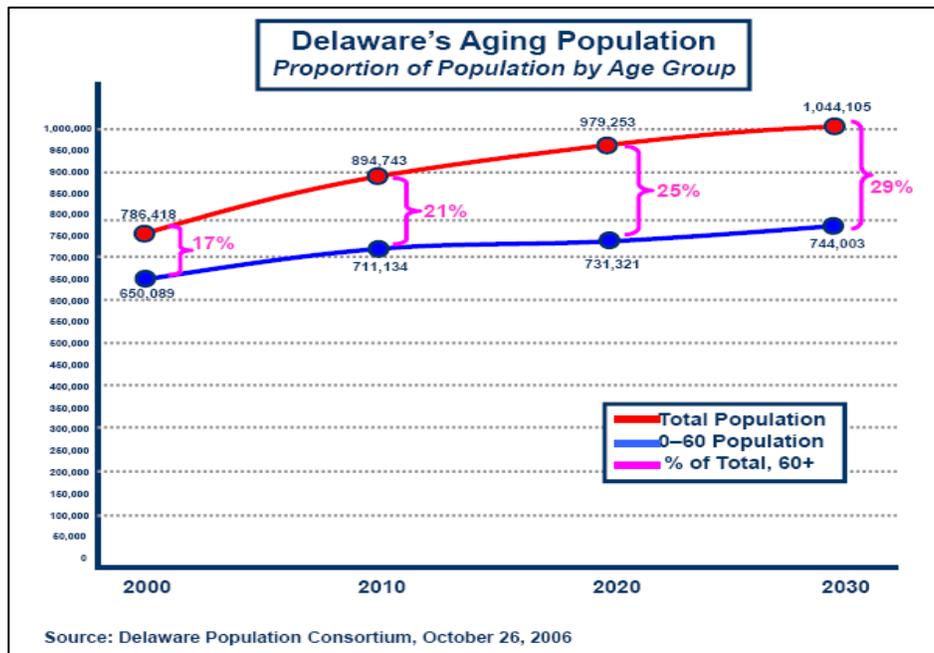


Figure 5

As shown in Figure 5, Delaware’s population is aging, with an increasing proportion of the population being over 60 years old, reaching almost 30% in 2030. This will result in an increasing demand for senior and paratransit services.

The average paratransit trip requires over six times the subsidy of a fixed-route trip. In fiscal year 2008, the average Delaware paratransit trip cost over \$48.00, while a fixed-route bus trip was roughly \$5.20 and rail \$6.80. For the same period, revenue per trip was \$2.32, \$0.67 and \$2.80, respectively. Thus, the State subsidizes 95% of paratransit trip costs, 87% of fixed route bus trip costs and 59% of rail trip costs. Given the cost of operating the current paratransit service, an increasing proportion of the DART budget is being shifted from the fixed route system to paratransit service. In addition, according to the 2008 Transportation Energy Data Book, the average paratransit trip consumes over four times the amount of energy (Btu per passenger mile) as an average car trip.

The panel would include representatives of The Elderly and Disabled Transit Advisory Committee (EDTAC), paratransit service users, DART, and other transportation service providers and would be charged with identifying various alternative approaches to providing non-ADA paratransit service consistent with State policies but at greater energy and economic efficiency.

### Cost

Cost for the committee would be minimal. Cost savings would be anticipated from the recommendations of the committee.

### **Recommendation 7: Bicycle and Pedestrian Transportation**

- A. *Encourage bicycling and walking as alternative transportation.*
- B. *Implement a "Complete Streets" requirement statewide by statute or Executive Order.*
- C. *Increase funding for pedestrian and bicycle transportation*

### Background

The US Census estimates that about 11,000 Delaware workers (2.7% of State mode split) utilized walking as their primary means of travel to work in 2007—making it the fourth most popular mode choice just behind transit. Walking is most utilized in the State's urban north with its greater density; nearly 8,100 (3.1% of county mode split) of the estimated 11,000 dedicated walkers in the State are in New Castle County. According to the Census, less people bike to work. In 2000, the latest available year, less than 900 residents (0.2% of the State mode split) used the bicycle as a primary means to get to work. About half lived in New Castle County. Additional people walk and bike every day, not captured by these data. They include school students or trips made by workers after or during work.

Increased use of bicycles and walking for transportation will reduce VMT. Delaware can take a number of steps to encourage more Delawareans to walk, including an increased focus on Safe Routes to Schools. The steps to encourage increased travel by bicycle include, among others, making roads safer for bicycles and enhancing education of riders and drivers on their respective responsibilities.

The recently developed Wilmington Bike Plan<sup>8</sup> provides a framework for comprehensive bicycle planning in the City. The Wilmington Bike Plan should be studied for the possibility of adopting elements of the plan into the State's planning efforts. While some of the Plan's proposals are applicable only to an urban environment, there are ideas in the Plan that are applicable to the whole State. State planning should include groups currently involved in bicycling issues, such as the Delaware Bicycle Council, WILMAPCO, county and local governments.

*Complete Streets Policy:* A complete street is a road that is designed to be safe for drivers, bicyclists, transit vehicles and users, and pedestrians of all ages and abilities. "Complete streets' focuses more on road users and is about making multimodal accommodation routine so that multimodal roads do not require extra funds or extra time to achieve. The intent is to change the everyday practice of transportation agencies so that every mode should be part of every stage of the design process in just about every road project-whether a minor traffic signal rehabilitation or a major road widening. The ultimate aim is to create a complete and safe transportation network for all modes."<sup>9</sup>

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<sup>8</sup> <http://www.wilmapco.org/BikeWilmington/index.htm>

<sup>9</sup> Complete Streets: We Can Get There from Here, Institute of Transportation Engineers. ITE Journal, May 2008 by Laplante, John, McCann, Barbara, [http://findarticles.com/p/articles/mi\\_qa3734/is\\_200805/ai\\_n25501805](http://findarticles.com/p/articles/mi_qa3734/is_200805/ai_n25501805)

Current DeIDOT policy provides for planning to integrate bicycling into the development and management of the transportation system.<sup>10</sup> The policy should be evaluated and revised, as necessary, to implement the concept of Complete Streets.

There are a number of steps that Delaware can take that would encourage more citizens to travel by bicycle. Key examples of these include:

*Bicycle route planning and bike path building:*

- Connect and incorporate greenways with bike paths and connect bike paths to regional paths. There are a number of pathway projects currently underway.
- Develop a direct bicycle route between Wilmington and Newark and a safe bicycle crossing for the C&D canal;
- Consider how to turn existing streets into Complete Streets on a case by case basis, as determined by need.

*Improve safety for bicycle travel:*

- Ensure that road shoulders are free of debris and that multi-use paths have regularly scheduled maintenance.
- Mark shared roads with the 'shared use marking' and bicycle lanes with bike lane symbols and directional arrows, with symbol repainting, as necessary, to maintain clear visibility.
- Ensure that bike lanes are not blocked with traffic islands.
- Provide for cyclist detection at demand-actuated traffic signals. Without this sensing, bicycles are sometimes unable to trip lights at intersections and thus cannot get a green light;
- Provide bicycle lanes at intersections to help cyclists and motorists position themselves correctly to increase safety.

*Facilitate bicycle commuting:*

- Provide more bicycle parking in the form of racks and lockers. A number of sites in Delaware already provide lockers, such as the train stations at Newark and Churchmans Crossing.
- Foster bicycle commuter training programs that teach safe cycling in traffic.
- Provide incentives for bicycling commuters per the Bicycle Commuter Act.

*Publicity and education:*

- Educate all citizens about laws and responsibilities of drivers and riders and about bicycle safety. This education could be part of standard drivers' education.
- Use publicity to remind drivers and cyclists of the importance of cooperating with each other.
- Publicize and enforce the State law that requires motorists to remain five feet away from bicyclists.

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<sup>10</sup> DeIDOT Bicycle Policy, P.I. Number: D-06. Available at:  
[http://www.deldot.gov/information/community\\_programs\\_and\\_services/bike/biking\\_in\\_delaware/deldot\\_policy.shtml](http://www.deldot.gov/information/community_programs_and_services/bike/biking_in_delaware/deldot_policy.shtml)

- Publicize the benefits of bicycling including the health benefits, the cost savings, the reduction in personal contribution to climate change, and increasing the number of well-publicized, fun "Bike to Work" days.

#### Cost

While the primary mode of travel to work for about 3% of residents in the Wilmington region is non-motorized, non-motorized spending typically does not exceed 1% of transportation spending in the region's Transportation Improvement Program. Increasing the non-motorized share to 2-3% of total transportation spending in the Wilmington region, and indeed throughout the State, will encourage greater overall usage of the pedestrian and bicycle system and reduce VMT. This would be a redistribution of existing transportation funding, not additional funding.

The cost of implementing a Complete Streets policy will vary depending upon existing conditions.

## **RECOMMENDATIONS CONCERNING LAND USE**

This section presents recommendations for a comprehensive, strengthened strategy on Smart Growth and then follow-up recommendations for inclusion in the strategy that are specifically targeted to reducing transportation energy use.

### **Recommendation 8: Smart Growth**

*Strengthen Delaware's efforts to effectively direct growth into growth zones and require Smart Growth.*

#### Background

Fundamentally reversing trends in sprawling land use is the linchpin for achieving reductions in VMT. Greater density enables a more effective and efficient public transit system and non-motorized transportation network<sup>11</sup>. Single-occupancy vehicle trips will drop as density increases. Smart Growth is characterized by interconnectivity; compact development; a mix of housing, commercial and retail; walkable neighborhoods; and a variety of transportation choices.

With Smart Growth, more residents will live closer to their workplaces and other destinations. A two-thirds reduction in VMT per person has been shown in compact neighborhoods, versus areas in which housing is at 1-2 dwelling units/acre. Conversely, the number of transit + walking + biking trips per household climbs steeply as nearness to jobs increases. Nearness to transit is also important. Research suggests a 42% reduction in VMT for households within ½ mile of transit and a 21% reduction in VMT for households between ½ and 1 mile.<sup>12</sup>

An extensive review of the literature has led to the conclusion that "*one of the best ways to reduce vehicle travel is to build places where people can accomplish more with less driving.*" New technology in either automobiles or with cleaner fuels won't get us to the kind of reductions in carbon dioxide that we will need in order to curb global climate change. With a nationwide projected 23%

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<sup>11</sup> The minimum density usually considered necessary to support frequent public transit service is about 12 dwelling units per acre.

<sup>12</sup> Walters, Jerry, "Measuring the Effects of Land Use on Travel Behavior and Climate Change," address at Haagen-Smit Symposium, April, 2008.

increase in population and a 48% increase in VMT by 2030, taking into consideration new technology in automobiles and cleaner fuels, we will still be 30% over 1990 levels by 2030, unless we develop more dense and compact communities.<sup>13</sup> Delaware's projected 2030 population will experience a 21% increase, fairly close to the national increase.<sup>14</sup> In compact urban neighborhoods where there are transportation options beside cars, people drive a third fewer miles than in automobile-centric neighborhoods.<sup>15</sup>

Delaware has been pursuing Smart Growth approaches through Livable Delaware. Although there has been considerable progress made (i.e. the designation of growth zones, requiring comprehensive plans with implementation of future growth plans through zoning code modifications at the County and local levels, incentives and processes to encourage Smart Growth, state approval processes for annexations, and improved coordination within and among levels of government), the overall effort has not been as successful as it needs to be to be truly effective in reducing VMT.

According to data from a University of Minnesota study, "aggressive" Smart Growth policies will result in a 5.3% reduction in VMT for that state, while what they call "comprehensive" policies will reduce VMT by 3.4%; their study suggests that even "limited" Smart Growth policies will take down the VMT by 1.5%.<sup>16</sup> The 2007 New Castle County Comprehensive Development Plan Update showed that under current land use trends, there would be 78,100 transit riders/day and a daily VMT of 15.5 million/day by 2030. However, if growth were steered into a centralized core south of the C&D Canal and into a redevelopment corridor in the northern section of the county, the analysis shows about 80,000 transit riders/day and a daily VMT of 14.5-15 million. Under the more restrictive development patterns, the analysis also showed better traffic flow, a reduction in volatile organic compound (VOC) emissions, a greater percentage of the population living near a bus stop, and far fewer acres consumed by development when compared to the current trend scenario.<sup>17</sup>

Contrary to the ideal and despite Delaware's efforts to date, population growth continues to rise outside of traditional centers. WILMAPCO has also shown that a decreasing percentage of New Castle County residents are within walking distance of bus stops as low-density developments continue to spring up outside DART's service area.

These trends can be reversed. A plan to do this will require sound technical analysis, tough zoning-restrictions and a healthy dose of political will. New centers can be created within existing sprawl. The following are examples of successful Smart Growth approaches and techniques that could be utilized:

- Making well-planned Smart Growth a requirement.<sup>18</sup>
- Consistent enforcement by State and County governments of restrictions on growth outside designated growth zones.

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<sup>13</sup> Ewing, Reid, and Keith Bartholomew, Steve Winkelman, Jerry Walters, Don Chen, "Growing Cooler: The Evidence on Urban Development and Climate Change," Urban Land Institute. 2008

<sup>14</sup> State of Delaware Office of State Planning Coordination-Delaware Population Consortium, "Annual Projections," June 1, 2008

[http://stateplanning.delaware.gov/information/dpc\\_projections.shtml](http://stateplanning.delaware.gov/information/dpc_projections.shtml)

<sup>15</sup> Ewing, et al. op.cit. p.4.

<sup>16</sup> University of Minnesota Center for Transportation Studies, "Reducing Greenhouse Gas Emissions From Transportation Sources in Minnesota," June, 2008. <http://tzd.state.mn.us/Publications/ResearchReports/pdfdownload.pl?id=938>

<sup>17</sup> New Castle County, Delaware. 2007 Comprehensive Development Plan Update, Section II, "Future Land Use." Pp17, 18.

<sup>18</sup> Farr, Douglas, *Sustainable Urbanism: Urban Design with Nature*, p.149. Hoboken: John Wiley and Sons. 2007.

- Charging carbon impact fees on new development that create automobile-dependent neighborhoods.<sup>19</sup>
- Prioritizing public funding for improvements to facilities within identified growth zones.<sup>20</sup>
- Requiring that all city, county and state government buildings be built in growth zones.<sup>21</sup>
- Requiring that new schools be built within growth zones,<sup>22</sup> and as infill, where possible.
- Limiting transportation investments outside identified growth zones.
- Actively encouraging local governments to grant density bonuses and reduce or waive fees for building infill, for redeveloping in blighted areas, and for workforce housing which embodies Smart Growth characteristics, making certain that it is within designated growth zones and near transit.
- Utilizing Transfer of Development Rights (TDRs) regularly and effectively to save open space and provide for higher density in growth zones.
- Educating local governments on how they can utilize State Tax Increment Financing enabling legislation in growth zones, and particularly in redevelopment areas.<sup>23</sup>
- Developing better methods of assessing the traffic impacts (including Level of Service) of mixed-use developments and the accurate capture of the benefits of this development type.<sup>24</sup>

#### Cost

There is minimal or no direct government cost for implementation of policies; costs may be incurred in development of specific policy approaches.

### **Recommendation 8A: Transit-Oriented Development**

*The State should work with local governments to promote Transit Oriented Development (TOD) as an innovative strategy and design tool to create livable healthy communities that are integrated with public transit, linked to a network of walkable, bikeable streets.*

#### Background

TOD is a Smart Growth approach based around multi-modal transportation. The approach is designed to create communities that contain a rich mix of living, working, and commercial uses. With TOD, new residents have places to eat, shop, work, and play near where they live and have an alternative to the conventional suburban sprawl environment.

TOD includes complete streets, streets that are designed to be accessible for everyone: younger or older, walker or biker, and regardless of disability, facilitating people moving around without a car and thus keeping healthier by being able to bike and walk places. This leads to saving money on

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<sup>19</sup> Ewing, et al, op.cit., p.15.

<sup>20</sup> Wheeler, Stephen M., Planning for Sustainability: Creating Livable, Equitable, and Ecological Communities, p.15, New York: Routledge, 2004.

<sup>21</sup> Duany, Andres, and Elizabeth Plater-Zyberk, Jeff Speck, *Suburban Nation: The Rise of Sprawl*, p.227. New York: North Point Press. 2000.

<sup>22</sup> Duany, et al, op.cit., p.233.

<sup>23</sup> With tax increment financing, money raised from a bond sale is given to a developer as reimbursement for infrastructure costs on a project. The additional property tax generated as the value of the site increases goes to pay off the bond.

<sup>24</sup> WILMAPCO, through an initiative started by DeLDOT, has a committee working to develop such methods.

transportation and medical costs and allows people to live in a community with open space and a sense of place.

TOD can help redevelop in built-out and congested areas and leverage public-sector investment and capture potential future value. Properties within a 5 to 10 minute walk of a train stop sell for 20-25% more than comparable properties further away as people often prefer higher densities when they see what it can look like: For example Princeton as opposed to Brooklyn.<sup>25</sup> In turn the government saves money on road infrastructure and by providing resources that are less costly. Likewise, the private sector has the opportunity to leverage public sector investment, capture potential future value of the community, and to develop in built-out and congested areas. Wilmington's waterfront redevelopment around the train station is a TOD-type redevelopment, as is the proposed Claymont Renaissance and Fairplay at the Churchmans Crossing Rail Station.

Some strategies to maximize the effectiveness of TOD projects are for government to acquire land prior to TOD construction when land value is lower, then lease to others as land value increases. Other public-private partnerships unlock the value from undervalued and underutilized assets, such as having public ownership of land by the TOD site for the first decade to eliminate holding costs during the sometimes lengthy design and approval process.

While not applicable in every situation, there is a general rule of thumb regarding TOD districts or zones. The Gateway Zone is closest to the transit platform and contains open space and the highest density and building height. The Midway Zone has less intense development and has a more varied land use pattern. The Transition Zone is located at the periphery of the TOD district, where development transitions into the surrounding area.

TOD was a 2008 "Best Bet," according to Emerging Trends in Real Estate®, the real estate industry's most respected annual forecast<sup>26</sup>. Every \$1 million invested in public transportation leads to \$3 million in increased business sales, for both highway and transit users, and generates over \$6 million in local economic activity.<sup>27 28</sup> Further, TOD can help save money on resource and infrastructure costs that go along with sprawl development.

#### Cost

Costs are project specific.

### **Recommendation 8B: Emissions Standards for Development**

*Establish an "Emissions Standard and Mitigation Policy" for development.*

#### Background

The policy should establish emissions standards for development that occurs outside Level 2 and require, for any development plan whose pre-development analysis of emissions exceeds the cap, mitigations to meet or exceed the standard.

The DNREC Air Quality Management Section conducts analyses of the annual pounds per household of mobile emissions (cars) that are projected for new developments (discussed in the Background Information section of this report, p. 5).

<sup>25</sup> [http://www.publictransportation.org/reports/asp/land\\_use.asp](http://www.publictransportation.org/reports/asp/land_use.asp) Accessed 11/05/08

<sup>26</sup> A joint publication by PricewaterhouseCoopers and the Urban Land Institute.

<sup>27</sup> [http://www.apta.com/research/info/online/ben\\_overview.cfm](http://www.apta.com/research/info/online/ben_overview.cfm) Accessed 11/05/08

<sup>28</sup> <http://www.publictransportation.org/facts/> Accessed 11/05/08

When viewed in total, the evidence on land use and driving shows that compact development will reduce the need to drive between 20 and 40%, as compared with development at the outer suburban edge with isolated homes, workplaces, and other destinations.<sup>29</sup> To reduce transportation energy use, sprawl development must be controlled, and development that does occur must be more energy efficient.

The recommendation of an emissions mitigation policy aims to provide a strong disincentive to development outside the growth zones. First, it recommends that a benchmark be set for new development. Development that exceeds the benchmark will be met with on-site mitigation requirements that would deter exceeding emissions from development within the growth zone. Examples of mitigation measures include, but are not limited to, minimizing the need for external trips by including services/facilities within the project; maximizing energy conservation and improving the thermal integrity of buildings; providing adequate ingress and egress at entrances to public facilities to minimize vehicle idling at curbside, etc.

This may impact development decision-making, leading to substantial changes in site design, location, building practice, etc. that would not now currently be considered and/or to a net decrease in emissions from sprawl development. The expected benefit is better land development that uses less energy, both in and of itself and through associated transportation.

The policy would require a change in the memorandum of understanding (MOU) between New Castle County and the State, to require that land development plans in New Castle County be subject to the same emissions analyses to which projects in Kent and Sussex Counties will be. The recommendation will require the identification of meaningful and measurable mitigation measures.

The policy would be implemented through the State land use review process, (called PLUS). For development plans that exceed the emissions standards, developers will be required to submit, and have approved, a mitigation plan. Projects that cannot implement sufficient on-site measures to reduce project impacts on-site, may be allowed to do off-site mitigation.

#### Cost

The only cost to the state is that associated with policy development and the staff time involved for the additional reviews of New Castle County projects.

## **RECOMMENDATIONS TO REDUCE ENERGY USE PER MILE**

### **Recommendation 9: Alternative Fuel/Fuel Efficient Vehicles**

- A. *Establish high standards for fuel efficiency and environmental impacts for new fleet purchases by the State.*
- B. *Offer, through the Sustainable Energy Utility (SEU), economic incentives to encourage public and private fleet owners to purchase fleet vehicles that meet the State standards (developed in A above).*
- C. *Provide, through the SEU, economic incentives for home infrastructure options to encourage greater use of alternative fuel vehicles such as electric, compressed natural gas (CNG) and Vehicle-to-Grid (V2G).*

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<sup>29</sup> R. Ewing, R. Pendall, and D.Chen. Measuring Sprawl and Its Impact. Washington, D.C.: Smart Growth America/U.S. EPA, 2002, p.18.

*D. As new alternative fuel vehicle technologies become commercialized, the State Energy Office should conduct studies of options for making the support infrastructure available and convenient to the public in an economically feasible and environmentally safe manner.*

#### Background

The main approach to reducing the energy used per mile of travel is to improve the technology of the vehicle used, either by increasing fuel efficiency or switching to a cleaner burning, low or no carbon fuel. The technologies for such vehicles are improving constantly, from hybrid engines to hydrogen fuel cells, electric vehicles, and vehicles with V2G capabilities.

Adoption of new technologies often begins with fleet purchases. These purchases increase the demand for these new vehicles, allowing more to be built, driving down the costs of production.

Transportation energy use reduction is included in the charge of the Sustainable Energy Utility (SEU), created by legislation in 2007. Therefore, providing incentives for purchase of these lower energy using vehicles is well within the purview of this new institution.

Broad adoption of new technology vehicles by the general public is dependent upon the availability of the infrastructure to provide the fuel or charge for the vehicle and, for V2G vehicles, the ability to interact with the utility grid when the vehicles are not in use. To assist in this, the State Energy Office should, as new technologies are nearing full commercialization, conduct feasibility studies of the various options available for providing the necessary infrastructure to facilitate widespread adoption and success of the new technology. These studies should be done in conjunction with the DNREC's relevant regulatory programs, the Delaware Economic Development Office and Office of State Planning.

#### Cost

Vehicle purchase costs will likely increase, at least initially, based on the higher standards, but the increased purchase cost may be offset, all or in-part, by decreased fuel expenses.

The incentive programs would be operated by the SEU, within its planned budget, not requiring additional funding from the State.

Costs of the studies will vary and may be eligible for grant funding.

### **Recommendation 10: Vehicle Registration Fees**

*Develop and implement a sliding scale for vehicle registration and renewal fees to encourage purchase of more fuel efficient vehicles. Ideally the scale would be based on energy consumption per mile and miles driven per year.*

#### Background

This recommendation is intended to encourage the purchase of efficient vehicles for primary transportation by private vehicle owners in Delaware. Vehicle miles traveled is included to distinguish, for example, a person who drives a truck for his or her daily commute from a person who owns a truck but only uses it occasionally to move large items. The person who uses the truck daily has a much greater energy footprint than the person who uses a more efficient vehicle for the majority of his or her driving and should pay accordingly.

The registration fee would reflect the cost to society (in the form of pollution, fossil fuel depletion, greenhouse gas emissions, etc.) of the service the vehicle provides. There are a variety of

approaches that can be taken to determining the fees. Whatever approach is developed will need to be easily understandable by the public in order to be most effective.

A registration fee system based on energy consumption per miles driven has the same effect as raising the fuel tax; both represent an increase in cost to operate a vehicle that is proportional to the total energy consumed. The registration fee approach is preferable for several reasons, one being that vehicle registration fees have a psychological impact on people out of proportion to their actual value, as seen in the recent reaction to increased DMV fees across the board. A more significant reason is that fuel taxes have a higher disproportionate impact on low income car owners. A fuel tax increase of \$0.50/gallon (which might not be sufficient to cause much change in vehicle purchase behavior) would increase fuel cost for a 25 mpg gasoline vehicle driven for 10,000 miles by \$200. Vehicle registration fees are currently relatively low, \$40 annually for a passenger vehicle, and the incremental difference for a 25 mp vehicle is unlikely to come near to approaching that level.

The system can be designed to be revenue neutral, scaled by the average energy per mile for the vehicle fleet, which would result in no net change in registration fees collected by the DMV.

#### Cost

There would be minimal cost in development of the program. Implementation costs would include modification of the DMV's procedures and outreach on the system.

### **Recommendation 11: HOV (High Occupancy Vehicle) Lanes**

*As new roadways or expansions are planned, HOV lanes should be evaluated and incorporated into those plans as appropriate.*

#### Background

Highway congestion has increased dramatically over the past two decades. At its most fundamental level, highway congestion is caused by the lack of a mechanism to efficiently manage use of existing capacity. The objective of HOV lanes is to reduce the level of single-occupancy-vehicle (SOV) usage and encouraging multiple occupancy vehicles (carpools/vanpools/transit) on Delaware highways during peak periods of travel demand thus reducing congestion and energy use per mile travelled.

There are various HOV lane configurations in use today. Some types of HOV lanes, called concurrent flow lanes, are adjacent to, and operate in the same direction as, the general-purpose lanes. Others types, called contra-flow lanes, operate in the opposite direction of the adjacent general-purpose lanes effectively enabling HOV users to drive on the "wrong" side of the roadway with barriers separating them from oncoming traffic. HOV lanes are delineated by a variety of methods, including barriers, buffer areas, and pavement markings.

The success or failure of HOV lanes in managing travel flow is highly correlated with a roadway's operational density. An insufficiently congested roadway will not encourage the use of HOV lanes given the restrictions imposed on operators of SOVs.

A note raised by the work group was that new road constructions and expansions increase impervious surface area, creating negative environmental impacts. Those impacts should be taken into consideration when determining the need for new roads or roadway expansions.

### Cost

The cost of incorporating HOV lanes into new roads and expansion projects will vary depending upon the HOV system utilized and the road configuration of the project. Incorporating HOV lanes into construction of new projects will be less costly than retrofitting current roadways.

## **STRAWMEN WHICH DID NOT ACHIEVE CONSENSUS**

The following strawmen were developed by work group members and presented to the work group. There was no consensus on action on the recommendation. Reasons for the lack of consensus are presented following each strawman.

### **Strawman: Improving Fixed-Route Transit Accessibility**

#### Recommendation

*Improve Accessibility to Current Fixed-Route Transit Service*

#### Background

Improving the accessibility of existing bus stops is an inexpensive way to promote transit usage, thereby reducing vehicle miles travelled (VMT). We must ensure that bus stops are accessible by pedestrians and bicyclists wishing to take a bus. Things like a broken stretch of sidewalk or a dangerous intersection have been shown to discourage transit use. In a University of Delaware study of the State's paratransit system, disabled interviewees reported that such non-motorized obstacles prevented them from reaching the fixed-route system. This forced them onto the more expensive paratransit system. Additionally, according to a recent WILMAPCO survey of low-income and minority residents, 26% said that pedestrian conditions inhibited them from using transit.

We should identify and address these accessibility concerns along the non-motorized network connecting residences and shops to bus stops.

A plan to do this should give priority to certain bus stops and then work down the system, if possible. Factors such as boarding data, housing and employment density and paratransit trips should be considered in the prioritization process. All bus stops should be ADA-accessible and their surrounding connectivity, from residential areas especially, should be studied. A review of previous plans and recommendations in the area of the bus stop should be completed before final recommendations are made to improve the stop's accessibility. Potential improvements include fixing deteriorating sidewalk, adding pedestrian signals at a nearby intersection, or painting a bicycle lane.

Much of this work should be folded into ongoing walkability studies of towns and cities. Those studying walkability should be encouraged to consider accessibility to bus stops in the study area, so as not to duplicate work.

Completion of identified improvements in the plan can again be prioritized based on factors such as use (boarding data) at each stop, and/or the non-motorized segment's performance in WILMAPCO's pedestrian priority network. Where possible, enforcement of existing sidewalk laws is recommended to make the improvement. Along identified segments where no such law exists, funding for recommendations must be identified.

#### Cost

Varies depending on the extent of the plan—the number of stops considered. Projects identified in the plan would be eligible for federal CMAQ funding, however, cutting costs to the State. In addition, funding could be passed on to developers where appropriate or to local government or property owners if a recommendation is found to be a violation of code.

Work Group Discussion

The work group agreed on the importance of making the routes to get to bus stops more accessible. There were concerns over lack of identification of actual additional costs to the state, nor identification of specifics regarding how far from the bus stop the improvements would be made. The other question was regarding the return on the investment regarding an increase in ridership and reduction in VMT. Additional detail regarding identifying bus stops where improvements would result in increases in ridership would be useful.

**Strawman: Mileage-based User Fees**

Recommendation

*Mileage-based user fees to replace traditional gas taxation*

Background

While the gas tax will remain the major source of revenue (53% of the Highway Trust Fund Revenues) for the near future, there is a growing need to find a replacement funding mechanism. Highway revenues are steadily declining with the increasing efficiency of vehicles. Coupled with a federal tax rate (18.4 cents/gallon) which has been unchanged since 1993, the tax has not kept pace with rising construction costs and inflation, reducing the purchasing power of the funds by 1/3. Looking further into the future the expansion of hybrid, alternative fuel and non-petroleum powered vehicles will further reduce the funds collected for using the same facilities. Below are examples of how fuel efficiency affects taxes collected for using the same facility annually:

- 15,000 miles @ 20 miles per gal. = 750 gallons of fuel used. Total tax paid (@18.4 cents/gal.) = \$138.00
- 15,000 miles @ 35 miles per gal. = 428 gallons of fuel used. Total tax paid (@18.4 cents/gal.) = \$78.50
- 15,000 miles @ 45 miles per gal. = 333 gallons of fuel used. Total tax paid (@18.4 cents/gal.) = \$61.27

A possible alternative would be to implement a VMT Tax is based on charging road users a fee based on total miles traveled rather than gallons of gas used. Below are a couple examples of the possible VMT tax collection would generate annually:

- 15,000 miles @1 cent per MILE = \$150.00
- 15,000 miles @0.9 cents per MILE = \$135.00

The system has the ability to set fees based on additional usage factors such as time of day of travel (congestion pricing), facility and/or jurisdiction of travel and vehicle type.

**How is it administered?** Currently there are two methods being considered. One is a centralized collection facility, most likely being part of the current DMV and more sophisticated “collect at the pump” method which would use an on-vehicle device which would add the appropriate fee while fueling at a retrofitted service station.

Benefits	Possible Issues
Higher fees for heavy trucks to reflect their share of pavement wear and tear.	Equity. How exactly would the new fee structure be established? Which vehicle type gets a reduced per mile fee?

A rush-hour premium to cover the cost of freeway congestion. (With in-vehicle based collection system)	Privacy issues: The technologies that enable mileage-based revenue systems will cause privacy concerns
Lower fees for alternative-fuel and low emission vehicles	Administration: Collecting mileage-based fees from all motorists will be much more complex than collecting fuel taxes from a limited number of wholesale fuel distributors. The states and the federal government will need time to develop and test efficient, cost-effective, and enforceable approaches
Enable states and local governments to manage congestion and more closely match investments to highway and transit system needs;	Political and public acceptance.

Cost

\$0

Work Group Discussion

The work group questioning of whether this should be a recommendation to be implemented at the state level or whether it would be better administered at the federal level. Additionally, there was concern that it is not yet technically feasible, and might not be within the five-year time frame of the Energy Plan.

**APPENDIX A**  
**Members - Reducing Transportation Energy Use Work Group**

Chair, Bill Osborne, Transportation Management Association Delaware  
Ron Bowers, Eagle Transportation Service  
Doug Brunner, University of Delaware Fuel Cell Bus Program  
Sarah Buttner, Energy Transition Consulting LLC  
Phil Cherry, DNREC  
Amanda Chi, Eastern Shore Natural Gas  
Dee Durham, S.A.V.E.  
Bernie Dworsky, University of Delaware Institute for Public Administration  
Tammy Ford, DART-RideShare Delaware  
Mark Glaze, DeIDOT  
Barbara Gonzalez, Pepco Holdings (first half of work group meetings only)  
David Hunt, Green Line Planning  
Gail Howard, Wilmington Trust  
Herb Inden, Delaware Office of Management & Budget  
Albert Loyola, Delaware Transit Corporation  
Stephanie McClellan, PhD, New Castle County Council  
James McGiffin, Dover City Council  
Harry Monck, Del-EASI, DATRA  
Harvey Nimmerichter, Pepco Holdings  
Ed O'Donnell, University of Delaware Institute for Public Administration  
Margo Perkins, League of Women Voters  
Ralph Reeb, DeIDOT  
Peggy Schultz, League of Women Voters of New Castle County  
Misty Seemans, DeIDOT  
Bill Swiatek, WILMAPCO  
Non-member Regular Attendee, Paul Sample, Technical Advisory Office, Legislative Council  
Consultant, Andrea Kreiner, A.Kreiner Company  
Staff, Suzanne Sebastian & Jacqueline Bryant