

Chapter 12: Promotion of Energy Efficient and Sustainable Transportation

Introduction

The promotion of energy efficient and sustainable transportation systems is an issue that has increasingly become a priority both regionally and nationally. Higher fuel costs and increased concerns related to the conservation of fossil fuels, have contributed to a renewed focus on reducing personal use of automobiles and also on utilizing new and developing technologies which take advantage of more fuel efficient and cleaner burning vehicles.

Energy efficient transportation systems and the reduction of single occupancy vehicle use has been a priority for the Franklin region in past Regional Transportation Plans. However, the development of new initiatives and technologies has prompted the inclusion of this topic as a stand alone chapter.

The goal of sustainable transportation is to efficiently move people, goods and services. This chapter will discuss initiatives which encourage sustainable transportation by influencing the behavior of individuals such that they rely less on vehicular travel in their daily lives. Behavior based programs are those which are intended to influence human behavior towards choosing transportation options that are more energy efficient. Land use planning which creates development patterns that make using public transportation or alternatives (such as walking or bicycling) easier is an example. In addition, new technologies that are less polluting and use less fossil fuel are also discussed.

Existing Conditions

The FRCOG recognizes the rural nature of the Franklin County region and acknowledges that traveling by automobile is often the most convenient or only option. However, with increases in the cost of fuel and more attention being focused on environmental issues and the conservation of natural resources it is important to discuss options for reducing dependence on single occupancy vehicles and increasing alternative transportation options whenever possible. It is also critical for the region to take advantage of newer cleaner burning and more efficient vehicles as they become available. There are many existing programs and technologies that are geared towards energy conservation. In addition, it is important to recognize that there may be additional opportunities or technologies in the future.

Current Activities

Behavioral Based Programs to Promote Energy Efficient Transportation

Behavioral based programs are intended to encourage the use of more efficient transportation through a demand management approach or by diversifying options. Such programs include programs that provide incentives for individuals to choose an alternative form of transportation such as employer-based incentives for car pooling or taking public transportation to work. Another strategy involves improving access by diversifying transportation options, giving people more choices as to how they meet their access needs. Behavioral based programs can also seek to reduce travel demand by encouraging land use and development patterns that make it possible for individuals to go about their daily lives without relying on automobiles. There are a number of programs that are in existence in Franklin County which are intended to encourage individuals to use alternative forms of transportation.

MassRIDES

MassRIDES is a statewide program operated by the Executive Office of Transportation (EOT) that provides free assistance to employees, employers, students, and other travelers who are interested in learning about commuting alternatives. The information is intended to help individuals save money, save time and improve their commute by providing them with information on alternatives that do not rely on the use of single occupancy vehicles. MassRIDES helps businesses to structure their own program that works best for their individual situation. MassRIDES provides information and assistance in establishing carpooling, vanpooling, preferential parking, transit, teleworking, flexible work hour programs, or other cost-saving programs that encourage employees to reduce auto use.

At the request of an employer, MassRIDES will come to a job site and conduct a commuter fair in order to educate employees of commuting options that are available to save them time and money. MassRIDES will also provide public relations materials such as customized posters, paycheck stuffers, and other promotional items to help employers provide their employees with information about the advantages and cost savings related to these commuting options. For further information on MassRIDES contact Brittany Burnside at 888-4commute or brittany.burnside@state.ma.us. The MassRIDES website is www.commute.com.

Park and Ride Lots

Park and Ride lots provide an opportunity for individuals who do not live on or within walking distance of public transit routes to travel to an intermediary location and take public transportation or carpool with other commuters. There is a park and ride lot on Route 2 in Charlemont which was established by MassHighway in 2002. In addition, MassHighway is currently in the process of establishing a park and ride lot in the Town of Whately which will be easily accessible to Routes 5/10, Route 116 and Interstate 91. It will be serviced by the Franklin Regional Transit Authority's (FRTA) Valley Route. A conceptual design has been completed for the project, and MassHighway is in the process of securing funding for the construction.

In addition, MassHighway will be looking to locate other park and ride lots throughout the region in order to expand the alternative transportation options available to commuters in Franklin County. Due to the rural nature of the region, it is a challenge to provide car-free travels options to such a large geographic area with dispersed destinations; however, park and ride lots allow commuters to take advantage of public transportation and carpooling opportunities.

Shared Vehicle Programs

Car sharing is joint access and ownership of a car. For individuals who do not need a car everyday, it is a way to have a car when you really need one while relying on alternatives for most trips. “Zipcar” is a vehicle sharing program that is available in Massachusetts. An occasional driver membership is available for a one-time \$25 application fee and an annual fee of \$50. The use of the vehicle costs from \$7 per hour or \$55 per day depending on the car model. Zipcar has vehicles located in Northampton and Amherst in Western Massachusetts. The cars can be reserved for a few hours or for an entire day by members either on-line or over the telephone. Once you are a member you receive a “Zipcard” and when you pick up the car you hold the “Zipcard” to the windshield, and the doors unlock. For further information the Zipcar website is <http://www.zipcar.com/>.

Smart Growth and Other Land Use Related Incentives to Reduce Automobile Use

Smart growth and other land use related strategies seek to reduce travel demand by encouraging land use and development patterns that make it possible for individuals to go about their daily lives without relying on automobiles therefore creating more sustainable development patterns rather than those that rely on personal automobile use to complete every daily task. The goal of smart growth (or sustainable development) is to encourage growth to occur where it makes the most sense: in and around central business districts or traditional city/town centers; near transit stations; or in areas that have been previously developed for commercial, industrial or institutional uses. Another goal of smart growth is the protection of natural resources.

The Commonwealth of Massachusetts established a Smart Growth Program in January 2003, with the creation of the Office for Commonwealth Development (OCD). OCD was established to manage the built and natural environments by promoting sustainable development through the integration of energy, environmental, housing and transportation policies, programs, and investments. Through this program, the state has been working to encourage towns to implement smart growth initiatives and policies. The primary objective has been the incorporation of the “Sustainable Development Principles” into the policies and programs of all state agencies to ensure that infrastructure investments encourage smart growth. Consequently, smart growth principles have been incorporated into many state policies and programs including:

- The new Highway Project Development and Design Manual;
- The Statewide Long Range Transportation Plan, A Framework for Thinking - A Plan for Action;

- The transportation project evaluation criteria that are used to review and prioritize all transportation improvement projects that use federal money;
- The Commonwealth Capital policy which endorses planning and zoning measures that are in accordance with smart growth policies, and encourages municipalities to implement smart growth policies by linking state spending programs to municipal land use practices;
- The Fix-It-First policy which is a statewide commitment to the repair and maintenance of our existing infrastructure over than the construction of new infrastructure;
- Land Use Statutory Reform to update state zoning regulations so that they are more supportive of the principles of smart growth;
- The Smart Growth Leadership Awards honor communities and the organizations that provide models for all 351 cities and towns in Massachusetts;
- The Smart Growth Technical Assistance Grant Program offers grants to the Commonwealth's municipalities and Regional Planning Agencies in support of their efforts to implement land use regulations that are consistent with Massachusetts' Sustainable Development Principles. These grants to cities and towns provide assistance in redrafting land use regulations.
- Regional discussions were held throughout the Commonwealth to discuss smart growth and its regional impacts at "Smart Growth Seminars" organized in partnership with Massachusetts' Regional Planning Commissions;
- Smart Growth Zoning Law (Chapter 40R) is a new state statute that offers a framework and financial incentives for municipalities to create "smart growth zoning districts" in eligible locations (City, town, village centers/commercial districts, around transit stations, and in other appropriate smart growth locations);
- Double Housing Starts is a housing strategy is to substantially increase production while simultaneously re-directing growth to transit nodes, downtowns, and commercial and industrial districts appropriate for mixed-use redevelopment; and
- Chapter 43 of the Act of 2003 authorized the District Improvement Financing Program (DIF) which is a public financing alternative available to all cities and towns.

These programs and policies are intended to encourage sustainable development. In Franklin County, the Smart Growth Program has provided many of the towns with the resources to complete master planning initiatives and zoning bylaw revisions. In many cases, towns have been unable to complete comprehensive revisions to zoning bylaws due to lack of staff resources or financial resources to hire outside professionals to provide technical support. Many towns have undertaken to complete zoning bylaw revisions or master planning processes which will update town bylaws and incorporate the principles of smart growth or sustainable development. By doing so, these

communities can consider future development patterns that promote the development of a livable community.

The following ten principles express the characteristics of smart growth development:

- Redevelop first;
- Concentrate development;
- Be fair;
- Restore and enhance the environment;
- Conserve natural resources;
- Expand housing opportunities;
- Provide transportation choice;
- Increase job opportunities;
- Foster sustainable businesses; and
- Plan regionally.

While sustainable transportation planning includes land use planning that is intended to allow residents to be “vehicle-free”, this is not always possible in a more rural area such as Franklin County. However, in those areas of Franklin County that are more densely populated there may be opportunities to use regional buses, carpooling, bicycling and walking as an alternative to the single occupancy vehicle. When feasible, land use planning policies should promote the design of development that is pedestrian and bicycle friendly. In other instances, as technologies improve, some professions allow employees to take advantage of telecommuting options to complete their work at home and reduce the need for travel to an office.

Pioneer Valley Strategic Action Plan for Clean Energy

Recognizing that energy issues are affecting the economic and environmental well being of the Pioneer Valley (Franklin, Hampshire and Hampden Counties), the Franklin Regional Council of Governments and Pioneer Valley Planning Commission (PVPC) are working cooperatively to develop the Pioneer Valley Strategic Action Plan for Clean Energy.

The goals of the plan are to:

- Create 75-100 megawatts (MW) of clean energy in Franklin, Hampshire and Hampden Counties by 2010;
- Increase energy efficiency so that 200 MW of energy are conserved by 2010,
- Create jobs associated with clean energy;
- Reduce greenhouse gas emissions;
- Encourage the development of energy efficient (green) buildings; and
- Facilitate a more energy efficient and cleaner operating transportation fleet.

The draft plan's goal of generating 75 to 100 megawatts of clean, renewable energy by 2010 would constitute 10 percent of the State's goal of generating 750-1000 MW of new renewable energy by 2010.¹

To help develop the plan, the PVPC and FRCOG have organized an Advisory Committee to oversee the creation of the plan. The Pioneer Valley Renewable Energy (RE) Collaborative is made up of renewable energy experts and advocates representing a number of communities, utilities, organizations and agencies.²

The Pioneer Valley Strategic Action Plan for Clean Energy is being funded by the Massachusetts Technology Collaborative, and includes a process in which the public helps to shape the goals, guiding principles and strategies of the plan. The FRCOG and PVPC have garnered opinions of civic, business, and environmental and energy conservation leaders regarding potential locations for renewable energy facilities in the project area, means of reducing energy consumption, and methods of increasing energy efficiency. Specifically, the PVPC and the FRCOG completed the following as a part of this public participation process:

- Interviewed community and business leaders concerning the strengths, weaknesses, opportunities and threats related to renewable energy;
- Facilitated on-line discussions with renewable energy experts and advocates;
- Conducted surveys on the internet with reference to the goals, principles and strategies of the plan and by fax to the municipal officials from all 69 cities and towns; and
- Presented a series of public informational forums on renewable energy.

Energy consumption in the valley is projected to increase by 20% in the next 4 to 5 years. There is a need to reduce energy consumption and promote energy efficiency that will protect the environment and safeguard the public's health.

Regarding transportation infrastructure and choices, at this stage in the planning process, the input from the surveys and on-line polls indicate a preference for actions that reduce greenhouse gases as well as provide for a reduction in the use of petroleum. The inclusion of transportation-related goals and strategies was motivated by input from the general public as well as by members of the Pioneer Valley RE Collaborative. In its draft form, the plan currently identifies several sets of strategies that seek to: 1) provide incentives for citizens to reduce personal car use; 2) encourage the use of mass transit; 3) increase the number of fuel efficient vehicles on the road; 4) encourage citizens to commute to

¹ The Pioneer Valley has approximately 10% of the State's population, so 10% of the Commonwealth's new renewable energy generating facilities should be located in the region.

² Center for Ecological Technology, Clean Water Action, Congressman John Olver's Office, Co-op Power, HAP (Housing Partnership for Hampshire and Hampden Counties), Massachusetts Department of Conservation and Recreation, Massachusetts Division of Energy Resources, Massachusetts Technology Collaborative, Mount Wachusett Community College, Northfield Energy Committee, City of Northampton Planning and Community Development, Northeast Utilities, SmartPower, Sustainable Step New England, University of Massachusetts Renewable Energy Research Lab.

markets and services by bicycle and foot; and 5) provide financing and funding to promote fuel efficiency.

The final report will be completed in the spring of 2007. FRCOG and PVPC will be presenting the plan to the general public in March of 2007 and will then be seeking endorsement of the plan by all 69 communities in the Pioneer Valley. Following its adoption, FRCOG and PVPC will work in partnership with the Renewable Energy Collaborative to oversee the implementation of the Action Plan. For example, FRCOG and PVPC will be applying to MTC for grant funding to develop special permit processes for locating renewable energy developments in Pioneer Valley communities.

Telecommunications

Telecommunications plays an increasingly important role in today's economy by changing the way people purchase goods and services, travel, and work. Instead, of driving to the store to buy an item people are ordering products and services online, and instead of commuting to work employees are working from home via email, the internet, and teleconferencing. "Telecommuting" saves time and money for businesses, agencies, and individuals; advances the health and safety of the public; and improves the environment by saving energy, reducing traffic congestion, and decreasing carbon dioxide emissions.

Telecommunications systems facilitate the transmissions of goods, services, and even workers through telecommuting. In order to transmit efficiently, sufficient internet infrastructure capacity is vital. Throughout much of western Massachusetts, there is a lack of access to affordable reliable broadband telecommunications services. In Franklin County; only 15 of the 26 towns have broadband access through a digital subscriber line (DSL) or cable television modems. Further, in several of the communities with access to broadband services, it is only available in a very limited area of town. Even in the Franklin County's most populous community, Greenfield, which has broadband access through DSL and cable television modem, this service is not available to all residents and businesses throughout the town. Many of the underserved towns, those without broadband access, only have the choice of dial-up modems, prohibitively expensive T-1 lines, or unreliable satellite service. Consequently, a number of projects are underway in order to expand access to affordable and reliable internet services throughout Franklin County.

Pioneer Valley Connect

To improve telecommunications in Franklin, Hampshire and Hampden Counties, the FRCOG established Pioneer Valley Connect (PVC), a regional initiative to create a more competitive and robust telecommunications landscape in the Pioneer Valley (Franklin, Hampshire and Hamden Counties). Modeled after Berkshire Connect (BC), its purpose is to provide greater access to broadband in traditionally, underserved areas to encourage economic development and promote improved communications systems for education, health care and public safety. The program is led by a steering committee with members from each of the three counties who represent varying fields including health care, education, economic development, manufacturing and small business.

The Underserved Communities Project

Pioneer Valley Connect and Berkshire Connect are working collaboratively to develop a long-term, sustainable solution to the problem of the lack of broadband access. With a 2006 award from the John Adams Innovation Institute, PVC and BC will build upon findings from a pilot project study completed in April 2006 by following up on “The Underserved Communities Project.” The findings of the pilot project study showed that the private sector has not been inclined to invest in infrastructure to serve the rural market. Generally, the low revenue generated is insufficient for the return on the initial capital investment. It became apparent that to implement a project in rural, underserved communities requires initial public investment in infrastructure to leverage private sector investment in the solution. The findings also recommended that the most efficient implementation is to use a sub-regional approach.

This next phase of “The Underserved Communities Project” will be completed during 2007 and 2008. PVC and BC will develop the criteria for defining the geographic sub-regions, and complete the technical design and business model analysis for these areas. Also, PVC and BC will recommend an organizational structure to manage public assets and determine the level of public investment needed to encourage private sector investment. This project will explore potential funding mechanisms to pay for the implementation of the model.

With the successful development and expansion of telecommunications infrastructure in Western Massachusetts, broadband access will be achieved for businesses, households and municipal government buildings. In turn, more workers will be able to connect to their employers using the internet and e-mail. The increased use of telecommuting to conduct business has the potential to help alleviate traffic on the region’s roads and highways.

In addition, this expanded internet infrastructure will provide increased access for residents and local public officials to the transportation planning process. It will provide a greater capacity for communication and participation in the transportation planning processes at the regional and state level. Transportation planning documents are made available for review and comment on the internet through the FRCOG’s website. The dissemination of information on the internet has increased the potential for public involvement in the planning process. It is difficult and sometimes not possible for residents and local government officials that only have access to the internet over a dial-up connection to download and review these documents. Expanded access to the internet will allow for increased access to the regional transportation planning process.

Interstate 91 (I-91) Fiber and Conduit Project

The Interstate 91 (I-91) Fiber and Conduit Project is an integrated Intelligent Transportation System (ITS) project and a regional economic development project. The project will utilize the right of way of I-91 through Massachusetts (from the Connecticut border to the Vermont border) to install the infrastructure necessary to fully integrate I-91 into the state's ITS system and also to install empty conduit that will be available for lease to private fiber providers as a regional economic development project. The "fiber" component of the project proposes to install ITS infrastructure which will be integrated as part of the MassHighway's fully integrated statewide ITS system along I-91 from the Connecticut border to the Vermont border. This portion of the project includes the installation of variable message boards, cameras and fiber communication infrastructure to provide MassHighway with the capabilities to monitor traffic along this route. The "conduit" component of the project is an important regional economic development project. It will install the empty conduit which will be made available through an open bid to fiber providers for a long term lease. The conduit will be installed from the Connecticut border to Greenfield. This will provide economic development through the center of the Pioneer Valley and the Franklin County region through increased availability of internet infrastructure to previously underserved areas. The total cost of the project is estimated to be \$24 million dollars, and to date approximately \$12 million has been secured.

Future Directions

By developing and expanding the telecommunications infrastructure in communities throughout Franklin, Hampshire and Hampden Counties, PVC will insure that the region is economically competitive and participating more fully in decisions being made at all levels of government. Telecommuting has the potential to reduce dependence on automobiles by reducing the need for trips to the office, fostering the growth of home-based businesses, and allowing for a more centralized inventory of products and services.

Alternative Fuel Vehicles: Existing and Developing Technologies that are More Energy Efficient

Hybrid Vehicle Technology

In recent years, gasoline-electric hybrid cars have become increasingly popular. The gasoline-electric hybrid car combines both gas power and electric power. It achieves increased gas mileage and reduced emissions over a gas-powered car while overcoming the shortcomings of an electric car. Hybrid cars use an on-board rechargeable energy storage system and a fuelled power source for vehicle propulsion. Modern mass-produced hybrids prolong the charge on their batteries by capturing kinetic energy via regenerative braking.

The earliest hybrid vehicle dates back 1898 with major progress being achieved in their development during the 1950s and 1960s. Recently, automotive hybrid technology became successful in the 1990s when the Honda Insight and Toyota Prius became available. These vehicle models have a direct link from the internal combustion engine to the driven wheels, so the engine can provide acceleration power. Generally, these

vehicles have been in high demand since their introduction. Additionally, during 2005 and 2006 many automakers have introduced hybrid versions of their existing models. As a result, many more options are available for individuals interested in purchasing more fuel efficient and cleaner operating vehicles.

An R.L. Polk survey of 2003 model year cars showed that hybrid car registrations in the United States increased to 43,435 vehicles, which is a 25.8% increase from 2002 figures. California, the nation's most populous state, had the most hybrid cars registered (11,425). During the first eleven months of 2004, Honda, which offers Insight, Civic and Accord hybrids, sold 26,773 hybrid vehicles. From 1997 to November 2004, Toyota sold 306,862 hybrids, while Honda sold 81,867 hybrids during that same period.

Federal tax incentives to encourage the purchase of hybrid vehicles were included as part of the Energy Bill that went into effect in January, 2006. The new Hybrid Car Tax Credit allows a \$400 to \$3400 tax credit (depending on the model). The tax credits phase out after the auto-manufacturer surpasses the sale of 60,000 vehicles. The amount of the tax credit is dependent on the type of vehicles. It is calculated based on how much fuel the car saves over 120,000 miles and its fuel economy as expressed by a percentage of the 2002 model year fuel economy for its weight class.

Some states have passed state tax incentives as well. The Massachusetts Legislature considered S.B. 2220 "An Act to Promote the Development of Alternative Fuels and the Use of Alternative Fuel Vehicles in the Commonwealth". This bill included various incentives for owners of hybrid vehicles as well as a state income tax deduction. Although the bill did not pass during the 2006 legislative session, there is a possibility that it will be resubmitted during the upcoming legislative session.

Electric Vehicles

In some situations electric vehicles have proven to be an efficient and viable transportation alternative; however, these vehicles do have limitations related to battery life. Electric vehicles use electricity for power. In these vehicles the electricity is stored in an energy storage device such as a battery. The limitations of electric vehicles are related to the capacity of the storage device and the availability and cost of electricity. Electric vehicle batteries have a limited storage capacity and their electricity must be replenished by plugging the vehicle into an electrical source. The electricity for recharging the batteries can come from the existing power grid or from distributed renewable sources such as solar or wind energy. One of the benefits of electric vehicles is that they have no tailpipe emissions. The emissions that would be attributed to an electric vehicle would be generated in the electricity production process at the power plant. In addition, electric vehicles have lower "fuel" and maintenance costs than gasoline-powered vehicles.

Biodiesel

Biodiesel is a renewable liquid fuel produced from new or used vegetable oils or animal fats. It is a clean burning alternative fuel that contains no petroleum, but can also be blended with petroleum diesel to create a biodiesel blend. It can be used in compression-ignition (diesel) engines with little or no modifications. Biodiesel is easy to use,

biodegradable, nontoxic, and essentially free of sulfur and aromatics. Biodiesel is a clean burning fuel that cuts down both on air pollution and green house gasses. Biodiesel can be used in any diesel engine without modification. It can be used as a pure fuel or blended with petroleum in any percentage. B20 (a blend of 20 percent by volume biodiesel with 80 percent by volume petroleum diesel) has demonstrated significant environmental benefits with a minimum increase in cost for fleet operations and other consumers.

The use of biodiesel in a conventional diesel engine results in substantial reduction of unburned hydrocarbons, carbon monoxide, and particulate matter compared to emissions from diesel fuel. In addition, the exhaust emissions of sulfur oxides and sulfates (major components of acid rain) from biodiesel are essentially eliminated compared to diesel. The use of biodiesel results in a substantial reduction of unburned hydrocarbons. A number of fleets across the country have adopted biodiesel blends including school buses, postal vehicles, roadway maintenance vehicles and public transportation.

Within the last year, biodiesel has been made available at a gasoline filling station in Greenfield. Prior to this, biodiesel was harder to purchase for individuals operating diesel engine automobiles. In addition, Northeast Biodiesel Company a subsidiary of Co-op Power, a consumer-owned cooperative serving New England and New York, was incorporated and has announced plans to build a biodiesel production facility (the Western Massachusetts Biodiesel Facility) in the industrial park in Greenfield, Massachusetts. Co-op Power was founded by 1,500 consumers as an engine for building sustainable energy resources. Through the plan, Co-op Power will produce five million gallons of biodiesel a year from recycled vegetable oil. Northeast Biodiesel is working to construct a continuous processing biodiesel production system which will use yellow grease and recycled vegetable oil as the raw material. The group has received \$750,000 in funding from the US Department of Energy, the National Renewable Energy Laboratory, and USDA Rural Development for the Western MA Biodiesel facility.

"Greasecar" Diesel Vegetable Oil Technology

Diesel engine cars can also be converted to allow them to run on vegetable oil. This system is an auxiliary fuel modification system that allows all diesel vehicles to run on straight vegetable oil in any climate. In Franklin County there are a number of diesel vehicles that have been adapted to run on this system.

Fuel Cell Electric

Vehicles that use an electrochemical system, know as a fuel cell, to produce onboard power are in development. Like battery-electric vehicles, fuel cell vehicles (FCVs) are propelled by electric motors. However, while battery electric vehicles use electricity from an external source (and store it in a battery), FCVs create their own electricity. Fuel cells onboard the vehicle create electricity through a chemical process using hydrogen fuel and oxygen from the air. FCVs can be fueled with pure hydrogen gas stored onboard in high-pressure tanks. They also can be fueled with hydrogen-rich fuels such as methanol, natural gas, or even gasoline, but these fuels must first be converted into hydrogen gas by an onboard device called a "reformer."

When run on pure hydrogen, fuel cells are zero-emission vehicles. Fuel cells that rely on gasoline, methanol, or other carbon-based fuels as a source of hydrogen produce small amounts of tailpipe emissions, with water and carbon dioxide being the major by-products. Compared with traditional combustion engines, methanol fuel cells cut smog-forming pollution more than 90 percent. Because of their efficiency, fuel cell vehicles can cut greenhouse-gas emissions by more than half. At this time fuel cell vehicles still have issues that prevent them from being a viable option; however, the technology is in development.

Ethanol

Ethanol is a clean-burning, high-octane fuel that is produced from renewable sources. Ethanol is grain alcohol, produced from crops such as corn. Generally, pure ethanol (100%) is not used as a motor fuel; however, a percentage of ethanol is combined with unleaded gasoline. The benefits of adding ethanol to gasoline are that it decreases the cost of the fuel, increases the octane rating, and decreases the harmful emissions. The most common blend is E10 which is 10% ethanol and 90% unleaded gasoline. E10 is approved for use in any make or model of vehicle sold in the U.S. Many automakers recommend its use because of its high performance, clean-burning characteristics. E85 which is 85% ethanol and 15% unleaded gasoline is an alternative fuel for use in flexible fuel vehicles (FFVs). There are currently more than 4 million FFVs on the road in the United States. When E85 is not available, these FFVs can operate on straight gasoline or any ethanol blend up to 85%.

A 1997 study by the U.S. Department of Energy concluded that compared with conventional gasoline, ethanol produced from corn reduced fossil energy use by 50-60% and greenhouse-gas emissions by 35-46%.

Methanol

Methanol, also known as wood alcohol, can be used as an alternative fuel in flexible fuel vehicles that run on M85 (a blend of 85% methanol and 15% gasoline). However, it is not commonly used because automakers are no longer supplying methanol-powered vehicles.

Natural Gas

Natural gas is best known as the fuel that heats homes and cooks food; however, natural gas is also successfully used in cars, trucks, and buses as a cleaner fuel alternative to diesel and gasoline. Compared to conventional diesel and gasoline, natural gas results in less tailpipe pollution and reduces our oil dependence. For heavy trucks and buses, a new (model year 2004) natural gas vehicle can cut toxic soot pollution by 75 to 90 percent, while smog-forming pollution is reduced by about 25 percent compared to conventional diesel vehicle.

Clean Cities Program

The Massachusetts Clean Cities Coalition and the National Clean Cities Program provide useful information on alternative fuel vehicles to organizations that maintain and operate vehicles fleets. The Massachusetts Clean Cities Coalition is a program that works to encourage the use of alternative fuel vehicles with the help of local businesses, organizations, and numerous state and federal agencies. The Coalition operates on the premise that we can change our communities for the better through cooperation and voluntary partnerships, working to improve air quality and reduce our reliance on imported oil. The Massachusetts Clean Cities Coalition is part of a nation-wide program sponsored by the United States Department of Energy called Clean Cities which also helps support the development of the necessary infrastructure to make alternate fuel vehicles a viable transportation option.

The Massachusetts Clean Cities Program provides:

- Grant Funding Opportunities
- Discussion Forums for Alternative Fuels, Vehicles, and Related Infrastructure
- Information Pool and Vendor Base
- Technical Assistance with Alternative Fuels Projects
- Help with Planning and Implementing Alternative Fuels Events

The National Clean Cities Program supports local decisions to adopt practices that reduce the consumption of petroleum products in the transportation sector. The mission of the program is to advance the nation's and energy security by supporting local decisions to adopt practices that contribute to the reduction of petroleum consumption. Clean Cities carries out this mission through a network of more than 80 volunteer coalitions, which develop public/private partnerships to promote alternative fuels and vehicles, fuel blends, fuel economy, hybrid vehicles, and idle reduction. The Massachusetts Clean Cities Coalition is one of the 80 coalitions. The Clean Cities website (<http://www.eere.energy.gov/fleetguide/>) provides information of fuel efficient vehicles for organizations that operate vehicle fleets. The website features a Clean Fleet Guide that provides tools to help fleets make "green" vehicle and fuel decisions. The site offers specifications on available alternative fuel and advanced technology vehicles, tools to perform cost analyses based on specific locations, and information on other technologies that can help improve fuel economy. In addition, users will find "clean fleet" strategies they can use to build their own green fleet.

Resource Information

<http://www.nesea.org>

<http://www.eere.energy.gov/cleancities/index.html>

Massachusetts Clean Cities Program
Massachusetts Division of Energy Resources
100 Cambridge Street Suite 1020
Boston, MA 02114 617-727-4732 x40138 /
617-727-0093

Fleet Conversion to Cleaner and More Fuel Efficient Vehicles

There is a need to work to convert the fleets to cleaner and more efficient vehicles. This is a large undertaking that will require planning and consideration in order to take advantage of vehicle replacement opportunities as they arise. In many cases municipalities, transit authorities, school districts, private entities and organizations do not have sufficient funds to replace all of their vehicles at one time. However, as vehicles are replaced, there is an opportunity to choose more efficient models.

On December 18, 2006, the Massachusetts Executive Offices of Environmental Affairs and Transportation announced an agreement to pay \$22.5 million to reduce air pollution from every public school bus and regional transit bus in the state within four years. The announcement estimated that some 7,800 diesel-powered school buses and 600 regional transit buses will be retrofitted with filters that are expected to ultimately reduce emissions by as much as 90 percent when used with a cleaner fuel many of the vehicles are already using. As part of the deal, the state's transportation agency will pay \$7.5 million annually in 2007, 2008 and 2009 to retrofit the buses.

The Franklin Regional Transit Authority (FRTA) has a fleet of 66 vehicles. At this time, one of these vehicles is a hybrid electric car. However, the FRTA has expressed interest in converting its entire fleet to cleaner and more energy efficient technologies. As their vehicles are replaced and as funding is available the FRTA will be looking to make these conversions. In addition, the FRTA and the FRCOG are in the planning stages of a regional Transit Center Project and there has been discussion of the project being designed and constructed as a "green building". "Green building" design and construction techniques involve creating a building that addresses five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

In order to encourage other large fleet operators to convert to using more efficient vehicles, it is important to provide them with information on the advantages of such conversions. These large fleet operators include the towns, school districts and other private entities that operate many vehicles. It is important to provide these groups with information about the environmental benefits and cost savings related to the use of more efficient vehicles.

Future Plans/Recommendations

- To continue to explore viable options for promoting the use of alternative fuel (less polluting) vehicles in Franklin County.
- Continue to work with the towns in Franklin County to implement the Massachusetts Smart Growth Program components.
- Work with MassHighway District 2 Office to advance the Whately park and ride lot.

- Locate and work to develop additional park and ride lots.
- Support the advancement of the Western Massachusetts Biodiesel Facility.
- Explore bringing a Zipcar or other shared vehicle service to Greenfield and Franklin County.
- Complete a survey of public entities and their fleet needs. Identify potential for fleets that could be converted to more fuel efficient vehicles.
- Hold a forum on more fuel efficient and cleaner burning vehicle options to provide information to the towns in Franklin County and other organizations that operate large fleets.
- Explore funding options and alternatives for assisting towns and other large fleet operator to find funding to convert to cleaner burning vehicles.
- Assist the Franklin Regional Transit Authority in converting its fleet to cleaner burning and more fuel-efficient vehicles.

