DEVELOPMENT OF A STRATEGIC PLAN FOR REDUCING EMISSIONS ASSOCIATED WITH FREIGHT MOVEMENT IN CONNECTICUT

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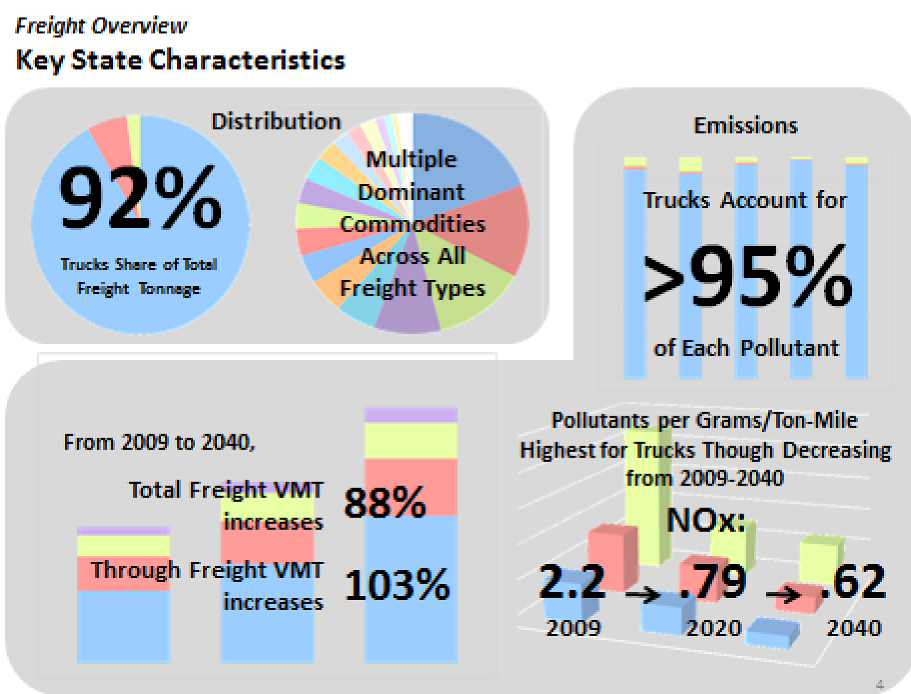
July 10, 2011

EXECUTIVE SUMMARY

Connecticut is non-attainment for the current ozone standard, and EPA will likely tighten the standard in the future. Connecticut has already implemented stringent emission controls on stationary and mobile sources, so it is becoming increasing difficult to further reduce emissions and attain the ozone standard. Freight movement has been identified as a significant source of emissions in Connecticut and may present opportunities for additional emission reductions. The Connecticut Department of Energy and Environmental Protection (DEEP) commissioned this study to identify effective strategies to reduce emissions associated with moving freight.

The following chart provides an overview of freight movement in Connecticut. Heavy-duty diesel trucks currently carry 92% of the freight that's moved into or through Connecticut. Based on analysis of freight databases, multiple commodities are moved; there is no single commodity that dominates freight movement. Trucks account for over 95% of the pollutants emitted by freight movement activities. Vehicle miles travelled (VMT) associated with truck travel is expected to increase by 88% from 2009 to 2040, exacerbating existing pollution and congestion problems. In terms of pollutants emitted per ton/mile, trucks emit the most, but are expected to show significant decreases from now until 2040.

Situation Summary



The chart below provides the summary of the most promising strategies. Strategies are broken down into short-term, those that can be implemented immediately, medium-term, those that can be implemented in 5-10 years, and long-term, those that will require 10 or more years to implement. The most promising short-term strategy is a stringently enforced ban on idling, particularly idling in long-haul trucks. Based upon EPA's emissions models, extended idling will double emissions of oxides of nitrogen (NOx) from trucks in 2020 and later years unless measures are implemented to eliminate this activity. The most promising medium-term strategy is to implement a remote OBD inspection and maintenance program. With this program, transponders are plugged into the on-board diagnostics system on heavy-duty trucks and receivers along the roadside or at weigh stations to continuously monitor OBD status. This strategy will keep trucks operating at minimum emission levels, thereby significantly reducing emissions. In the long-term, the most promising option is to coordinate with shippers, other states and the federal governments and identify means to switch more of the freight from truck to rail. Congestion associated with trucks is predicted to increase, so shifting freight to other modes should help alleviate the air quality and congestion issues. This strategy will improve the efficiency of freight movement in addition to reducing road congestion.

Summary of Most Promising Strategies

Name	Description	Rationale	TPD Reduction	Costs
Short Term (1-5 years)				
Idling Ban	Extend infraction authority for idling to public safety agencies, Post signs and conduct a marketing campaign to raise awareness.	Long-Haul Trucks generate a lot of emissions because they often idle for hours. Curbing all idling enhances the benefits.	5 TPD NOx	Cost Savings
Medium Term (5-10 years)				
Remote OBD I/M	Plug transponders into OBD port and continuously monitor OBDII status.	Keeps trucks operating at low emission levels.	2-4 TPD NOx Significant PM and hydrocarbon (HC) benefits	~$2,000 per ton
Long-Term (10+ years)				
Switching from Trucks to Rail	Coordinate with other states and federal government to develop rail infrastructure	Freight will continue to increase necessitating a switch to more efficient modes	CO2, NOx and PM benefits	To be determined. Too high for CT to do it alone.

Following are the key findings of this study:

- Freight movement is critical to the economy of Connecticut and other states. It is estimated that freight movement accounts for 3% of Connecticut's jobs[1].
- Currently, most freight in Connecticut is moved by trucks, contributing to congestion and road maintenance costs. Vehicle miles traveled (VMT) associated with freight movement is projected to increase by 88% from 2009 to 2040, assuming current movement trends continue. In addition, over half of the VMT associated with freight movement in Connecticut is from trucks passing through Connecticut. Through freight movement is projected to increase by over 100% from 2009 to 2040.
- EPA standards will result in cleaner trucks in the future, but problems associated with congestion as well as greenhouse gas emissions will remain.
- The most promising short-term strategy is reducing extended idling from heavy-duty trucks. Longer term strategies are needed to take advantage of stringent EPA standards, such as developing programs to ensure trucks and other freight equipment are well maintained.

[1] Connecticut Department of Economic and Community Development (DECD)

- Value added freight and other strategies can improve the efficiency of freight movement and help shift freight movement from trucks to more efficient and lower polluting freight movement modes.
- Effective implementation of all freight movement strategies will require regional coordination with other states. Steps are under way already to coordinate these activities.

WORK PLAN

DEEP commissioned this study to identify effective strategies to reduce emissions associated with moving freight in Connecticut. de la Torre Klausmeier Consulting (dKC) studied freight movement and associated emissions and analyzed applicable control strategies. Following are the key steps in this study:

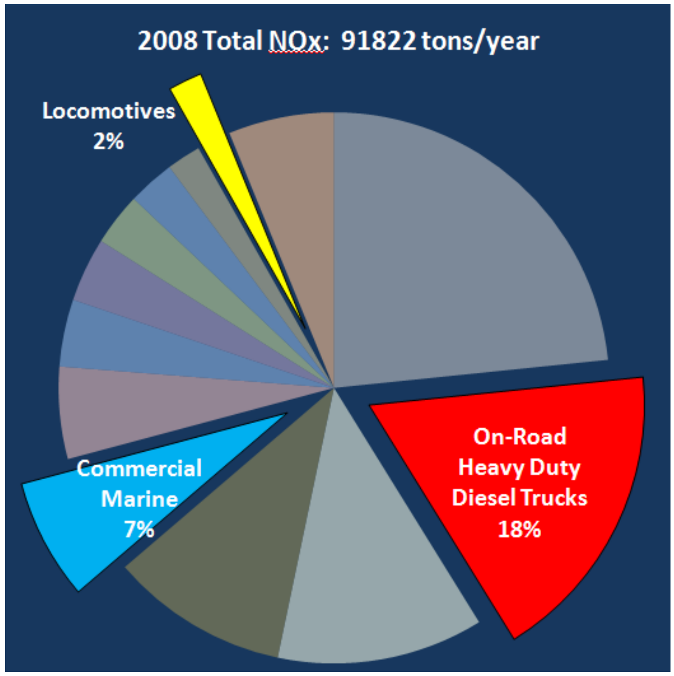
- Using Transearch and other databases, dKC evaluated freight movement activity in the State. Activity was analyzed in terms of commodity and origin/destination. Origin/destination refers to whether the freight passed through the state, into the state, out of the state, or is locally based.
- dKC applied EPA's recommended emission factors to activity data to estimate emissions.
- dKC interviewed stakeholders involved with freight movement to obtain feedback on potential strategies as well as obstacles to implementing these strategies.
- dKC evaluated control strategies. Since the evaluation demonstrated that trucks are the main mode of freight movement, the strategies focused on trucks. Strategies were broken down into strategies that reduce pollution per ton-mile of freight and strategies to reduce truck VMT.

WHY ARE WE CONCERNED ABOUT FREIGHT MOVEMENT?

Freight movement is a significant contributor to a variety of air quality problems, including the following:

- Ozone and particulate matter, as determined by $PM_{2.5}$ (which is particulate matter less than 2.5 microns):
    - Ozone and PM2.5 cause airway irritation, reduced lung capacity, asthma aggravation, and permanent lung damage. Freight movement accounts for up to a third of statewide NOx according to EPA estimates (Figure 1). NOx is a major ozone precursor.
    - $PM_{2.5}$ has been implicated in incidents of irregular heartbeats, heart attacks, and premature death in individuals with heart and lung disease.
- In June 2012, the International Agency for Cancer Research classified diesel exhaust as a human carcinogen.
- EPA estimates significant financial benefits from attainment in addition to improving health. EPA estimates the annual costs for ozone non-compliance is 2-17 billion dollars and for $PM_{2.5}$, 17-35 billion dollars.

Figure 1



Source: EPA 2008 National Emissions Inventory (version 2; released April 10, 2012)
Most emissions from the heavy duty diesel truck, commercial marine and locomotive categories are freight-related

As shown on Figure 2, the Northeast states have high cancer risks associated with mobile sources, with the risks being along the I-95 corridor. In addition, Figure 3 shows that exposure to diesel exhaust in Connecticut is high and EPA has identified diesel exhaust as an air toxic of concern. The area along the I-95 corridor fails to meet the health-based ozone standard of 75 ppb (Figure 4). NOx from freight contributes to the region's exceeding this standard.

Figure 2

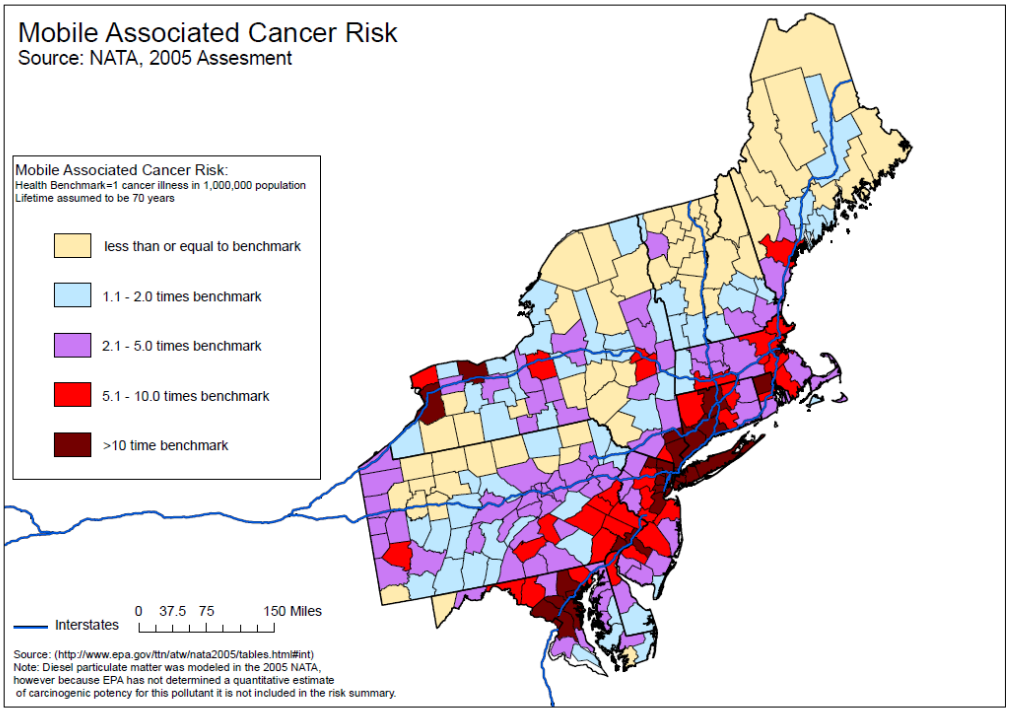


Figure 3

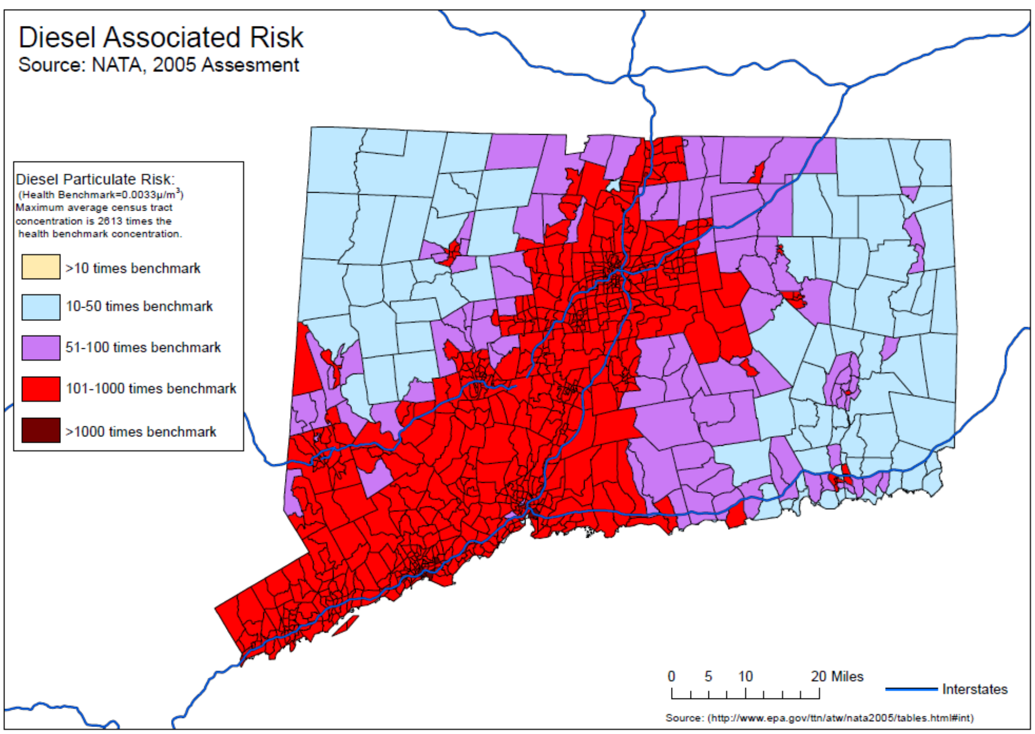
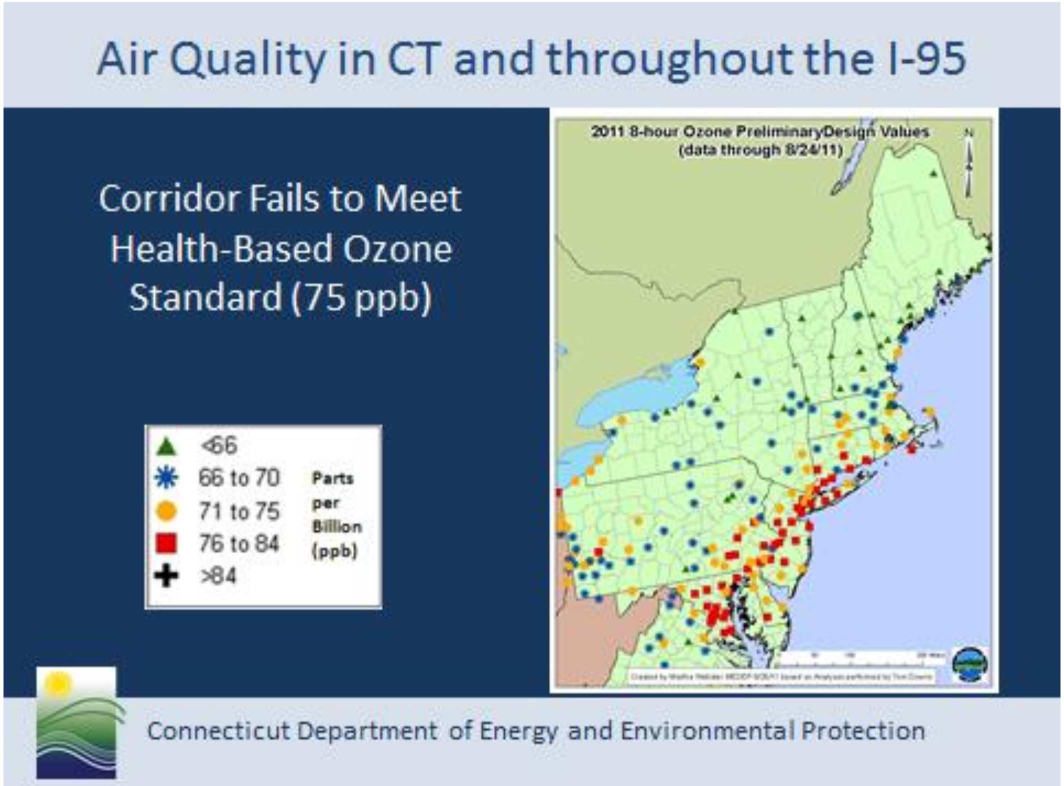


Figure 4



CHARACTERISTICS OF FREIGHT MOVEMENT IN CONNECTICUT AND THE NORTHEAST

Outside of California, the Northeast region accounts for a bulk of the freight movement in the United States. This is shown on Figure 5. New York is expected to continue to be the primary trade port in the United States.

Figure 5

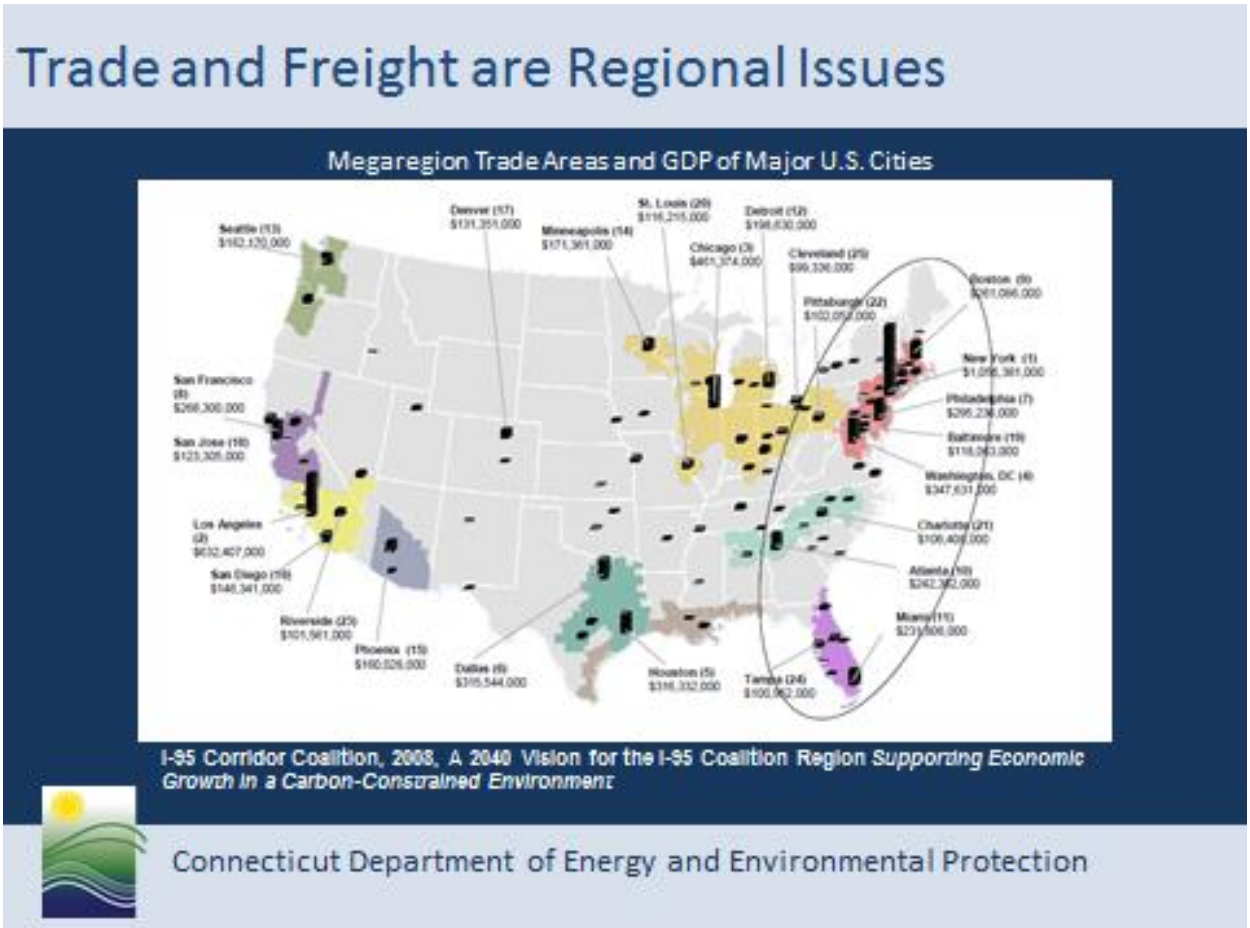


Figure 6 shows the quantity of freight flow in the Northeast. Freight flow appears to correlate well with ozone levels in the Northeast, with the highest levels being along the I-95 corridor. As shown on Figure 7, trucks dominate freight movement in Connecticut, accounting for 92% of the movement of all commodities.

Origin/Destination of Freight Moved in Connecticut

As shown on Figure 8, over half of truck vehicle miles traveled (VMT) associated with freight movement activity in Connecticut is from freight shipped through Connecticut, generally along its interstate corridors. Less than 10% of the freight in Connecticut is associated with local freight movement activities. Total freight related VMT is expected to increase by 88% from 2009 to 2040. As shown in Figure 9, the largest projected growth is in the through freight category, which is expected to increase by 103%.

Figure 6

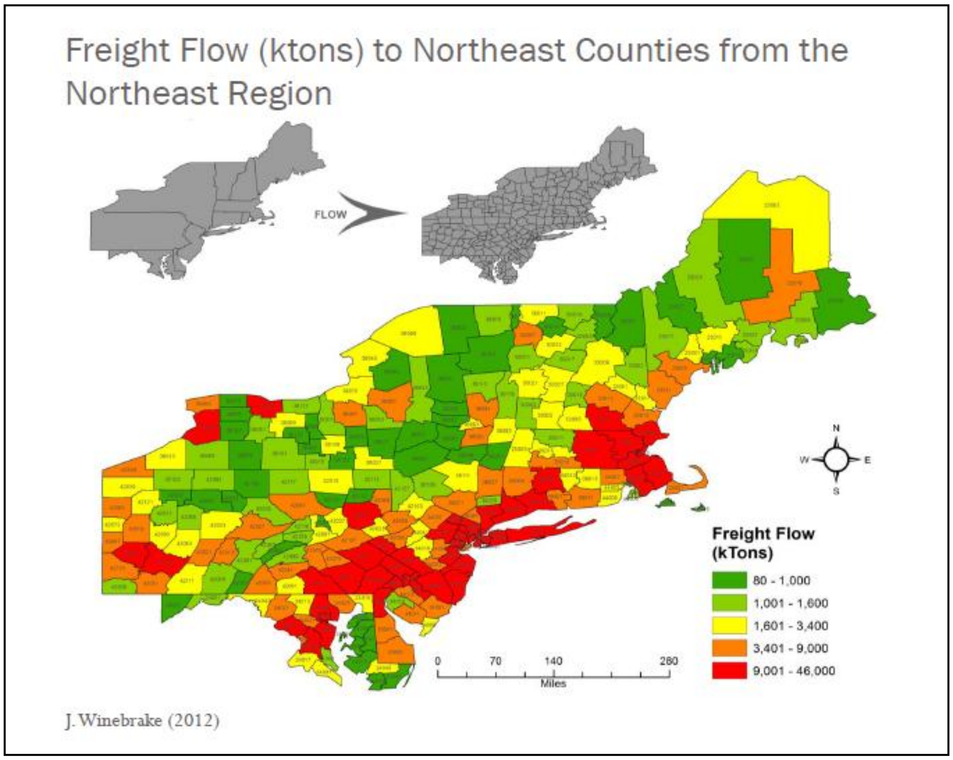


Figure 7

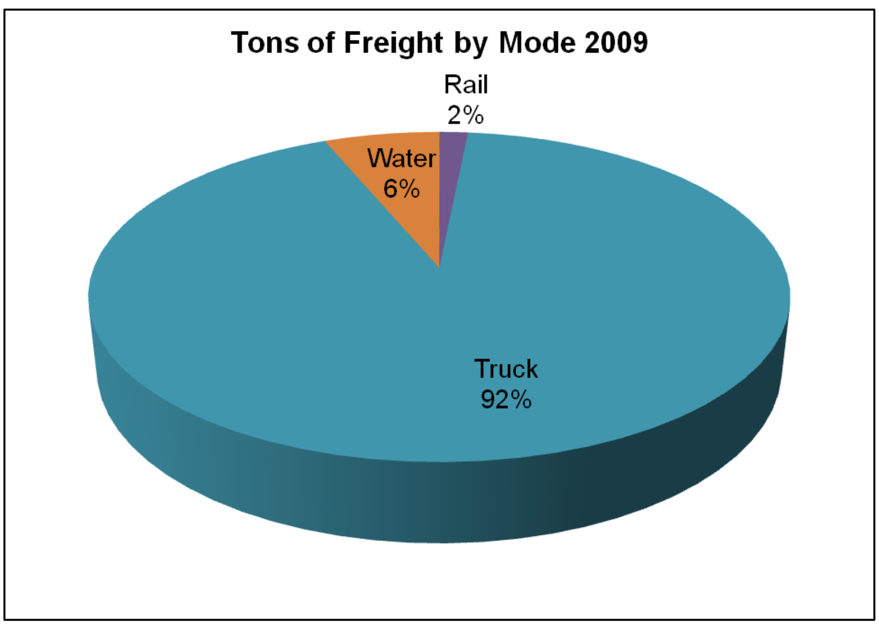


Figure 8

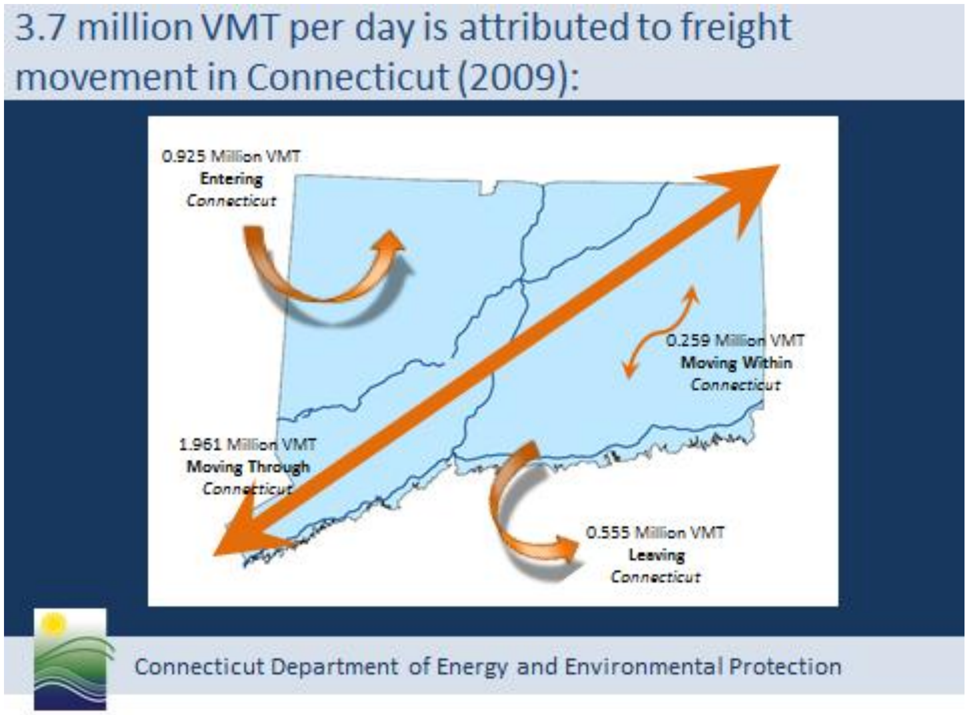
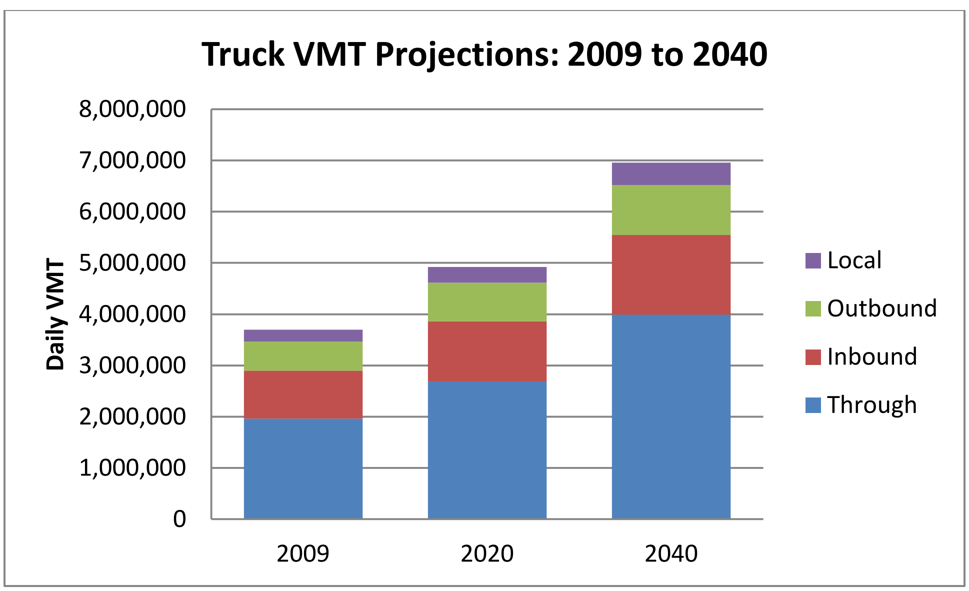


Figure 9



Commodities Transported in Connecticut

As shown on Figures 10 and 11, a wide variety of commodities are moved in the state. About half the VMT is associated with movement of food, secondary moves, which is movement of freight from primary outlets to secondary outlets, and movement of chemicals, paints and related products. The types of commodities expected to be moved in the future will not change significantly from the types of commodities currently being moved in the state (Figure 11).

Figure 10

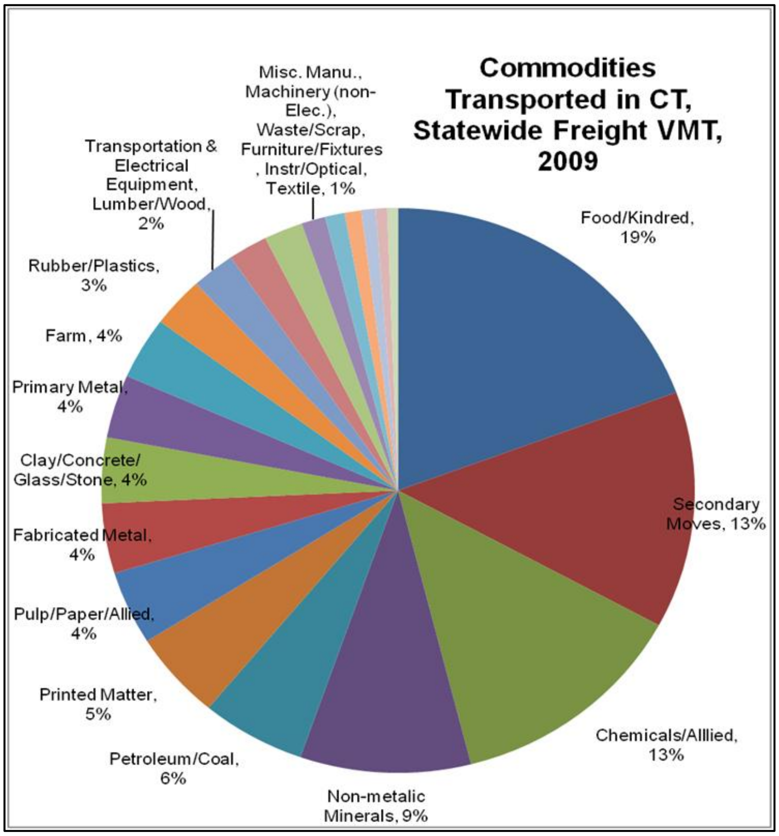
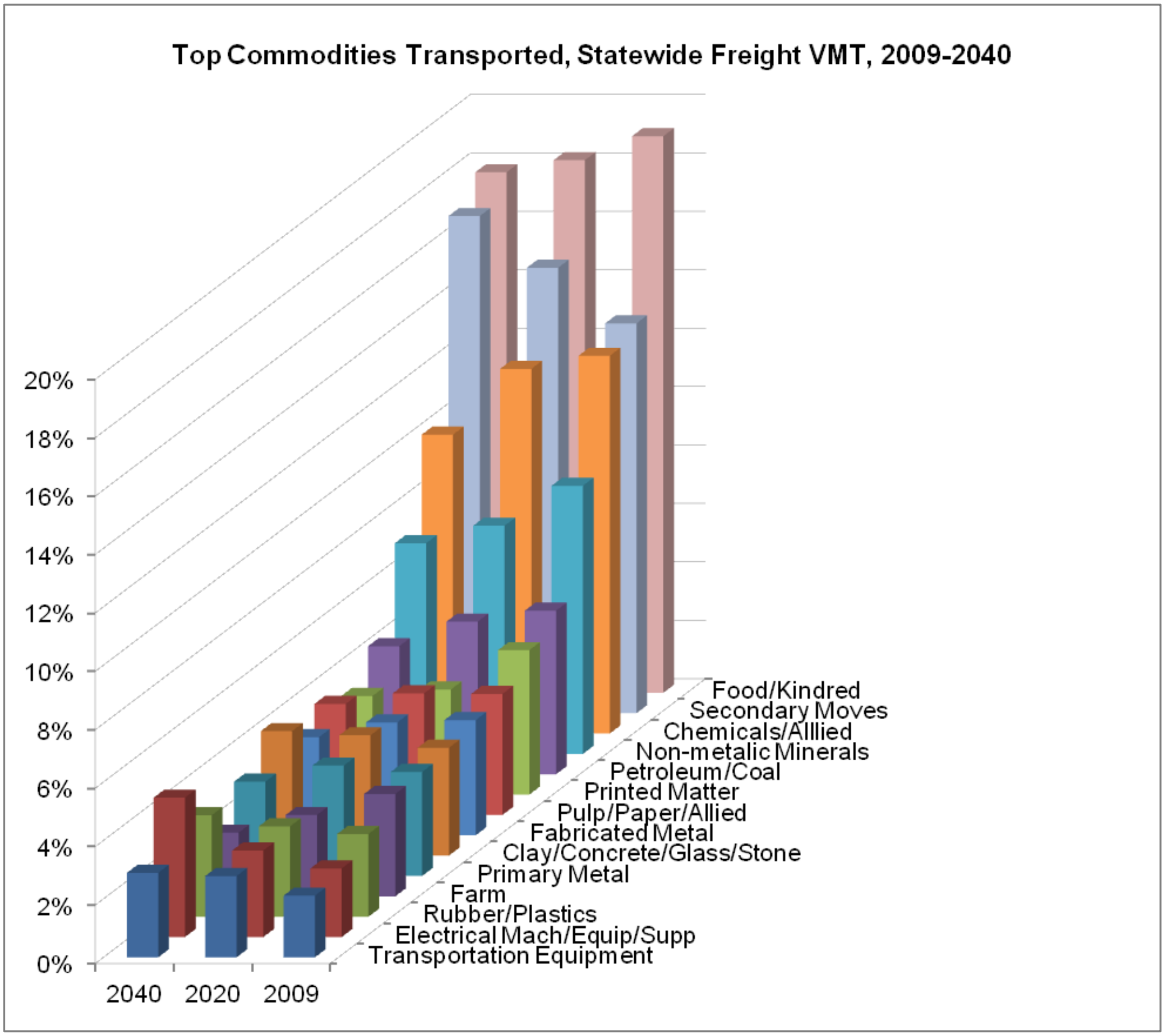


Figure 11



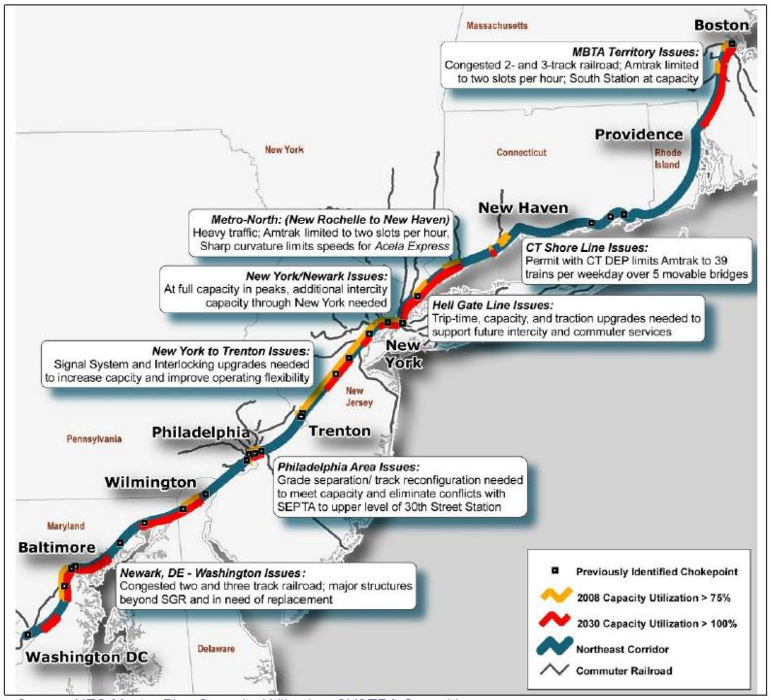
Impact of Increased Freight Movement in Connecticut

Estimates indicate that truck volumes in the Northeast Corridor will increase by about 100% by 2040. In addition, more freight is expected to come through the port of New York, adding to already congested traffic conditions. In Connecticut in 2011, congestion in urban areas caused an estimated 33 million hours of truck delays and cost 2.4 billion dollars[2].

Currently, the rail system in the Northeast corridor has many constraints, which makes it difficult to switch from truck to rail (Figure 12). In addition, the condition of the rail system in the Northeast is worsening, which reduces the capability to handle more freight by this mode.

[2] Reference: NYMTC, The Basics of Freight Transportation in the New York Region

Figure 12



Source: NEC Master Plan Capacity Utilization, SYSTRA Consulting

CURRENT AND FUTURE EMISSION ESTIMATES

Emissions associated with freight movement were estimated for 2009, 2020, and 2040. To estimate emissions, activity factors were applied to EPA-recommended emission factors:

- Transearch and other databases were analyzed to estimate truck VMT and rail/marine freight activity.
- EPA's mobile source emissions model, MOVES, was run for 2009, 2020, 2040 to generate on-road emission factors.
- EPA's recommended procedures were used to generate emission factors for rail and marine freight activity.

On-road trucks account for almost all the emissions associated with freight movement activities (Figures 13 to 15). As shown on Figure 13, CO2 emissions from on-road trucks are projected to increase significantly from 2009 to 2040. Reductions in CO2 emissions per mile do not offset future increases truck VMT. NOx emissions from trucks drop significantly from 2009 to 2020 due to large reductions in emissions per mile. NOx emissions from on-road trucks begin to increase between 2020 and 2040, due to projected increases in truck usage. NOx is a major contributor to the formation of ozone. PM2.5 emissions from trucks are projected to drop significantly from 2009 to 2040, primarily due to EPA's stringent PM emission standards for diesel-powered on and off-road vehicles.

Figure 13

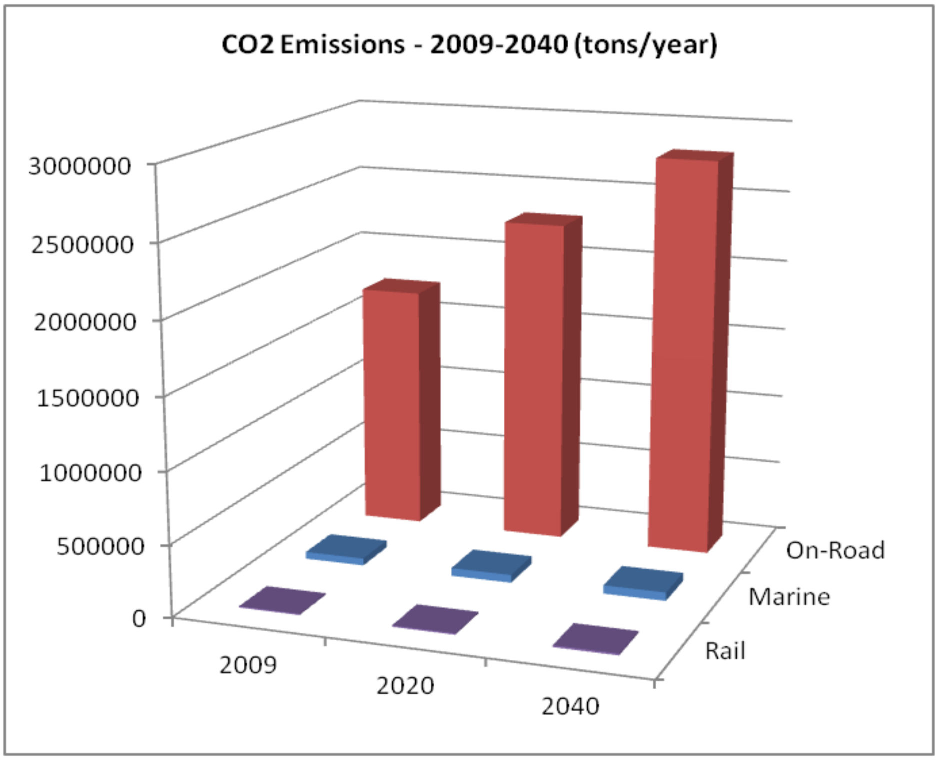


Figure 14

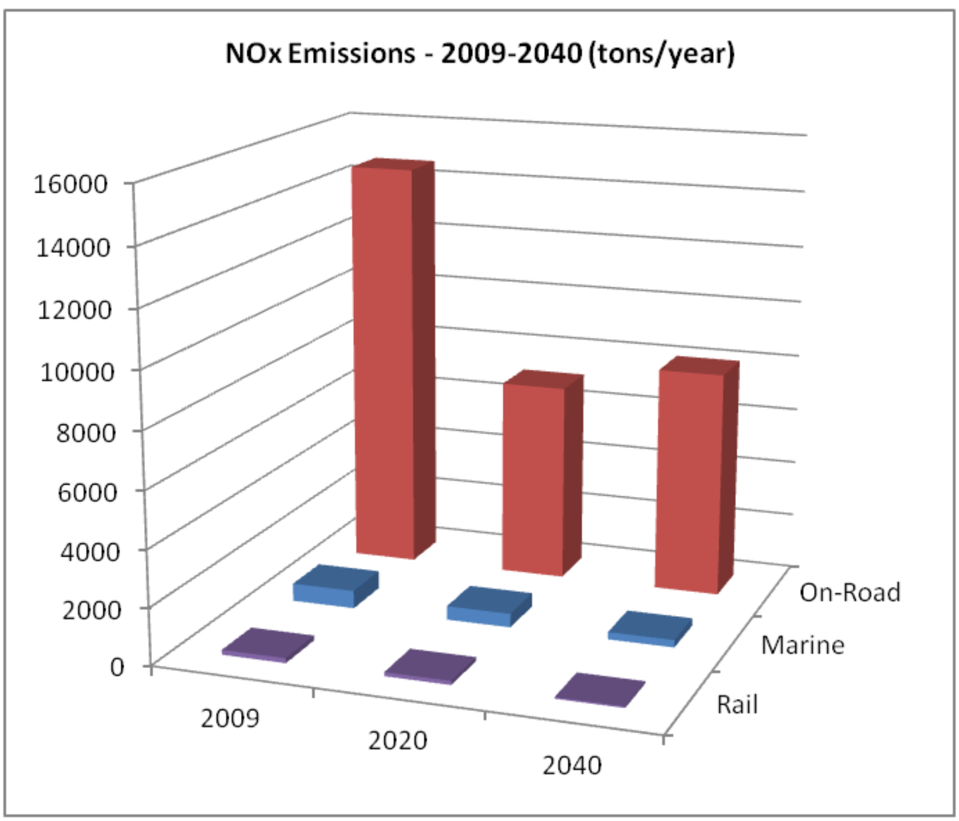
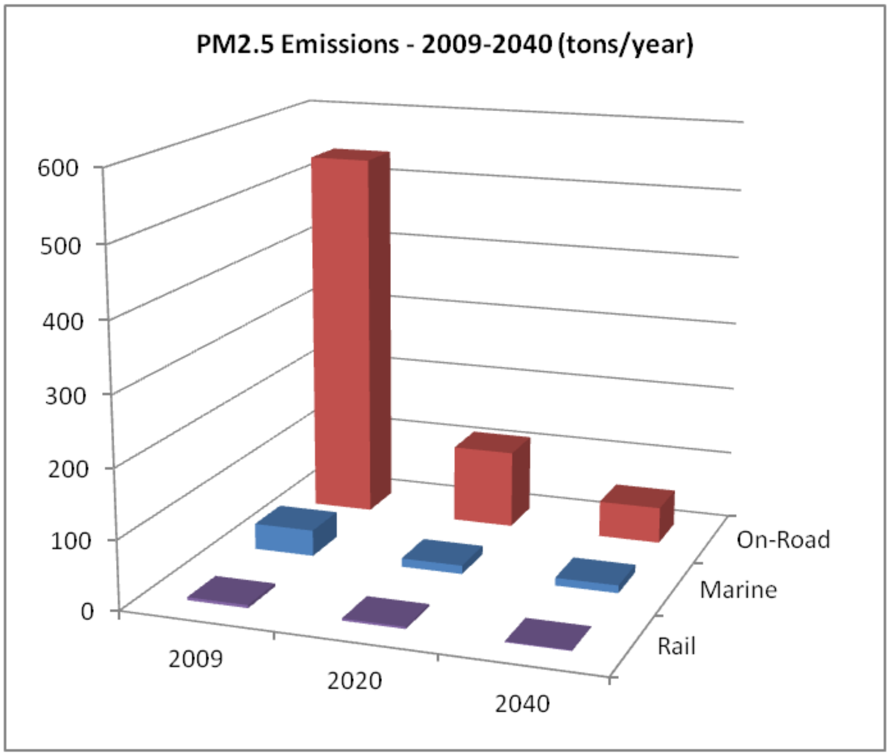


Figure 15



Impact of EPA Initiatives on Emissions from Freight Movement

EPA has enacted stringent emission and fuel standards for all mobile sources including heavy-duty trucks, locomotives and marine vessels. These actions will significantly reduce the emissions associated with freight movement, as shown on Figure 16. From 2007 to 2020, NOx emissions, for example, are estimated to drop by 52% due to EPA emission and fuel standards. Table 1 summarizes the EPA initiatives by freight movement mode. All modes will benefit from stringent emission and fuel standards.

Figure 16

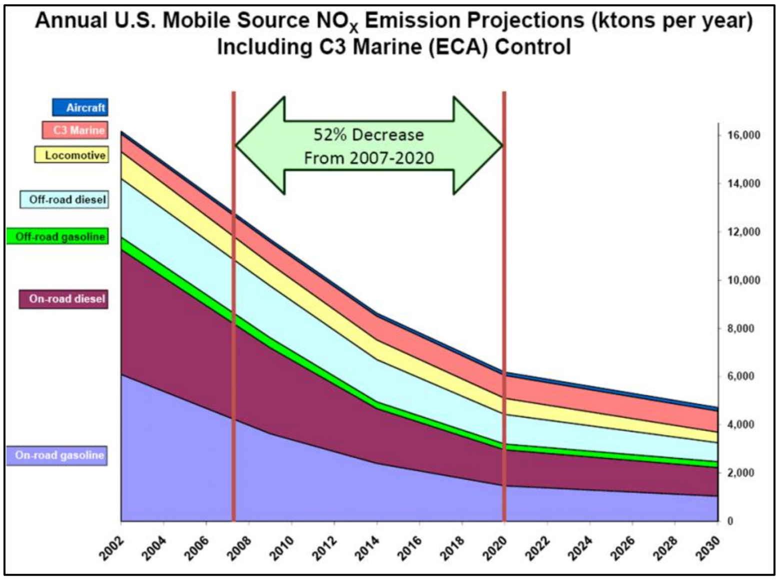


Table 1 -- EPA Initiatives by Mode

Truck	Rail	Ships
• Regulation: - 2006: Low sulfur diesel fuel (<15 ppm) - 2007: Heavy-duty highway engines and vehicles - 2010: NO_x and Non-Methane Hydrocarbons - 2011: Program to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles • Voluntary: - 2003: Smartway program	• Regulation: - 2008 Locomotive and Marine Emission Standards - 2008 Locomotive Idle Emissions Standards (new and rebuilt) • Voluntary: - Low emission switch engines (Gen-set, battery) - Electric cranes - EPA best practices tool under development	• IMO North American Emission Control Area - Reduces emissions by fuel switching (2012-2016) • EPA Marine Diesel Engine Standards - Varies with size - Phased in 2012 to 2017

Emissions per Ton-Mile by Freight Movement Mode

Estimates of carbon dioxide (CO_2), particulate matter (PM), and oxides of nitrogen (NOx) emissions by freight movement mode are shown in Figures 17, 18, and 19, respectively. With regard to CO_2 emissions, the most efficient mode per ton-mile is rail. CO_2 emissions associated with rail-transported freight are 20% of the emissions expected for transporting the same tonnage of freight by truck.

In terms of PM emissions, currently trucks emit significantly more per ton-mile than other modes. However, due to extremely stringent emission standards for new trucks, by 2020, PM emission rates for trucks per ton/mile are about the same as PM emission rates for rail. Rates for both of these modes in 2020 are slightly higher than rates for commercial marine vessels.

A similar trend is evident for NOx, where currently NOx emissions per ton/mile are significantly greater for trucks than for rail. But, as we move into the future, the discrepancy drops. Rail continues to have slightly lower NOx emissions, partly due to stringent standards being enacted for that mode, but the difference in the future is not as dramatic. Marine has slightly lower NOx emissions per ton-mile than rail.

Note that projected emissions reductions will only occur if older truck, rail and marine engines are replaced with new engines meeting the newer more stringent EPA standards.

Figure 17

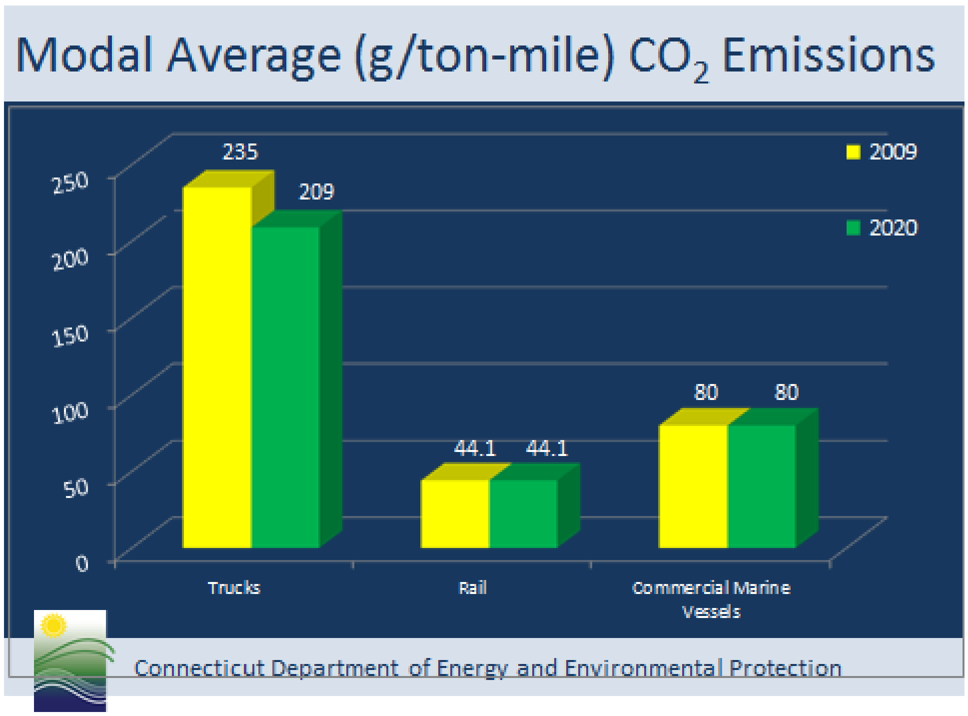


Figure 18

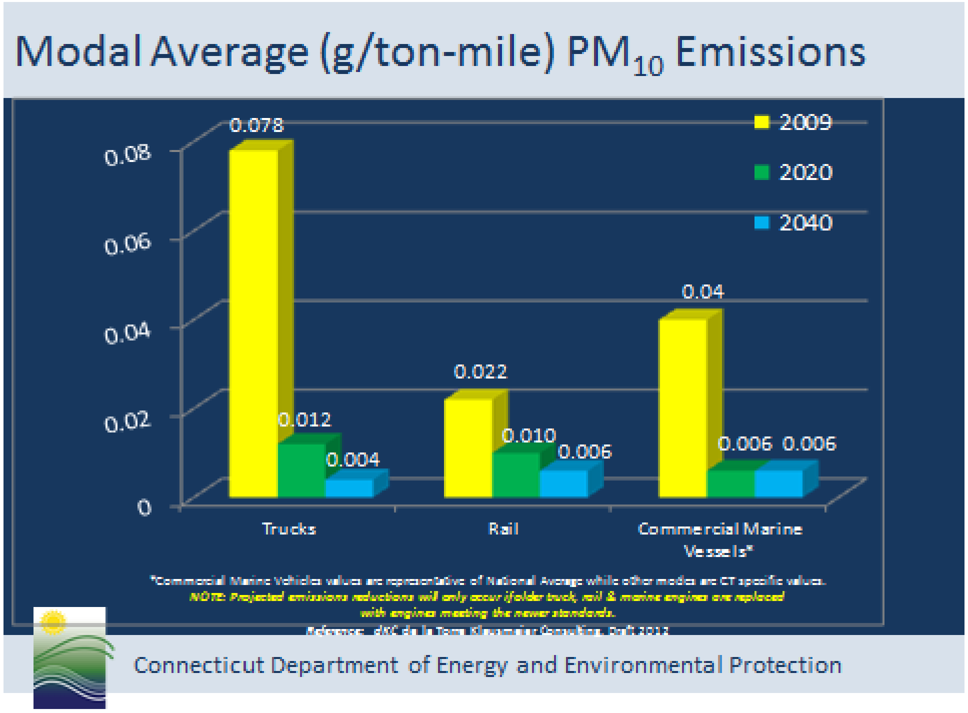
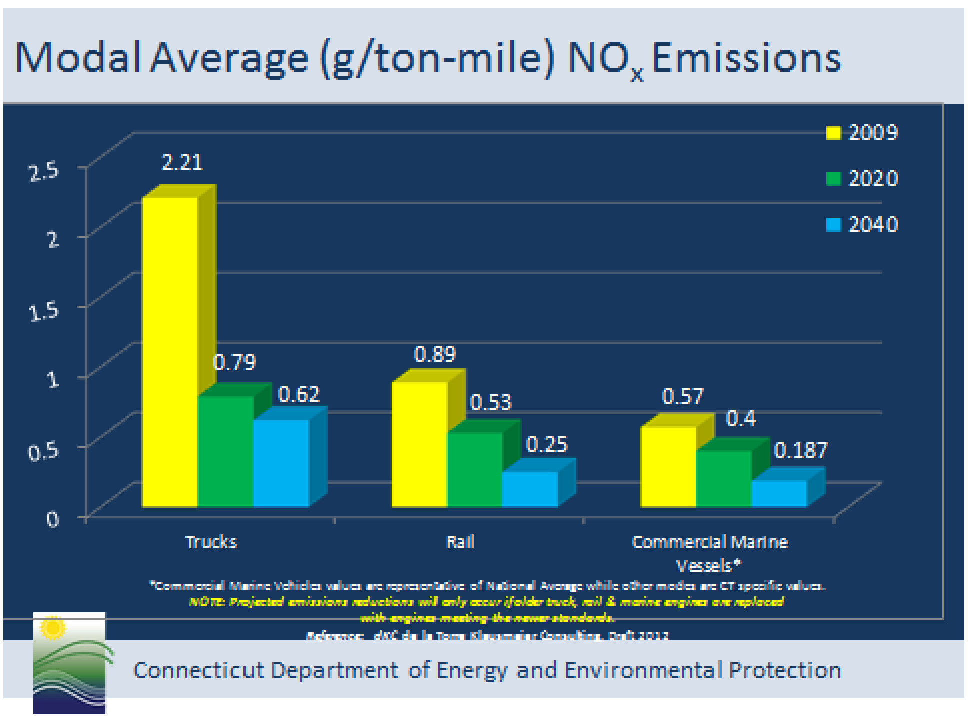


Figure 19



BEST PRACTICES TO REDUCE EMISSIONS FROM FREIGHT MOVEMENT

There are two basic ways to reduce emissions from freight movement:

- Reduce emissions per ton-mile. These are termed Technology strategies.
- Reduce VMT by improving the efficiency of freight transport. These are termed VMT reduction strategies. This includes diverting freight from trucks to more efficient modes such as rail and possibly marine transport.

Using the emissions inventory and freight movement database, we evaluated the best Technology and VMT reduction strategies. This evaluation considered strategies that have been proposed to improve freight movement in Germany and Japan.

Table 2 shows Technology and VMT reduction strategies for the top commodity types transported to, from and within Connecticut. Table 3 shows the strategies organized by the origin and destination of the freight.

Table 2 – Strategies by Commodity Type

Commodity Type	VMT Reduction Strategies*	Technology Strategies**
Non-metallic minerals (sand, gravel, etc.)	• Facilities to transfer to rail • Rail-oriented land use • Reduce empty back-haul	• Extended idle reduction • Remote OBD I/M • Smart Way retrofits
Secondary moves (drayage, distribution, etc.)	• Reduce empty back-haul	• Extended idle reduction • Remote OBD I/M • Accelerated retirement of dray and other vehicles • Natural gas replacement
Petroleum	• Increase tanker truck weight limits	• Remote OBD I/M
Municipal solid waste	• Rail infrastructure improvements	• Replace with NG • Extended idle reduction • Remote OBD I/M
Other commodities	• Truck tolls or VMT fees • Rail infrastructure improvements • Reduce empty back-haul	• Extended idle reduction • Remote OBD I/M • Natural gas replacement • Smart Way retrofits

Table 3 – Strategies by Movement Origin/Destination

Origin/Destination	VMT Reduction Strategies*	Technology Strategies**
Through traffic	• Rail infrastructure improvements • Truck tolls or VMT fees • Reduce empty back-haul	• Extended idle reduction • Remote OBD I/M • Smart Way retrofits

Origin/Destination	VMT Reduction Strategies*	Technology Strategies**
Long distance inbound/outbound traffic	• Reduce empty back-haul • Rail infrastructure improvements • Rail-oriented land use and freight transfer facilities (bulk goods)	• Extended idle reduction • Remote OBD I/M • Smart Way retrofits
Short-distance and in-state traffic	• Reduce empty back-haul • Increase weight limits on tanker trucks	• Extended idle reduction • Remote OBD I/M • Natural gas replacement

*All types of freight benefit from value added freight activities and electronic systems to manage traffic and enforce weight compliance. Rail mode shift is only applicable for longer-distance moves of low-value commodities and shipping containers.

** EPA standards apply to movement of all commodities.

Technology Strategies

Technology strategies can reduce emissions from all vehicles used to carry freight in Connecticut. The most promising technology strategies for trucks, which account for most freight related emissions, are listed below:

- Extended idle reduction
- Remote OBD-IM
- Replacement of conventionally fueled vehicles with alternative fueled vehicles, in particular natural gas fueled vehicles
- Accelerated retirement of older model year heavy-duty vehicles
- Smart Way retrofit

Extended Idle Reduction – Extended idle reductions target long-haul trucks that typically park during the daytime or at night so that drivers can rest. According to EPA models, NOx emissions from extended idle activities will account for 40% of truck NOx emissions in 2020, and this percentage increases as we move further into the future. Reducing extended idling for long haul trucks has immediate air quality benefits, however, ensuring that Connecticut's ant- idling regulation is enforced for all motor vehicles allows for even greater benefits. Therefore, a promising option is to fund the development of a marketing campaign to increase awareness and concurrently, to extend infraction authority to public safety agencies so the ability to enforce against idling is shared by police. The most effective strategies to reduce extended idling are those that place equipment on the truck to power the auxiliary systems, allowing the engine, which the primary emissions source, to be shut down. This equipment includes:

- Auxiliary power units (APUs)
- Direct fired heaters
- Battery A/C systems

Truck-stop electrification was also evaluated as a means to reduce extended idling. We found that truck stops in Connecticut have limited parking spaces available, so truck stop electrification, although cost effective, will not be able to eliminate a significant portion of extended idling activities.

Remote OBD I/M – Engines used in heavy-duty trucks built since 2010 emit less than 5% of the NOx and PM emitted from a 2006 or earlier model engine. 2010 and later models are equipped with catalytic NOx controls and diesel particulate filters that greatly reduce emissions. However, these devices must be maintained to keep emissions low. Often this requires refilling a reagent tank. If the tank is not refilled, emissions increase dramatically.

2013 and later model heavy duty trucks will be equipped with OBDII systems that will identify trucks needing maintenance, including reagent refilling. Remotely monitoring OBDII systems (Remote OBD) by equipping trucks with wireless transponders will help assure continued low emission operation. Preliminary studies in other states are revealing that remote OBD I/M is emerging as a promising tool for reducing emissions of NOx, hydrocarbons (HC), and PM. HC and PM compounds are linked with toxic air pollutants. With remote OBD, trucks will be equipped with transponders that are plugged into the vehicle's OBDII port. These transponders transmit OBD status to receivers along the highway, e.g., at weigh stations. Remote OBD avoids the inconvenience of having to stop and undergo testing for each truck. Remote OBD inspections can be tied into other electronic initiatives that are being implemented to reduce inconvenience and lost revenue from enforcing truck regulations. Because it takes time for OBDII equipped trucks to be phased into the fleet, this strategy will not be effective until 2020. Coordination with other northeast states is crucial to enhancing the effectiveness of this strategy.

Replacement with Natural Gas Vehicles – Running on natural gas has potential to significantly reduce CO2 emissions. At present CNG and diesel prices, natural gas has potential to save fleet owners considerable fuel expense, resulting in a net payback for this strategy. However, a recent report that's being reviewed for publication by the National Academy of Sciences casts doubt on the overall global warming benefits from switching to natural gas. This report raises questions about leakage of methane throughout the lifecycle of natural gas-- from wells to wheels. The report indicates there may be a climate disbenefit from using natural gas in transportation applications, unless leakage can be reduced by 45 to 70%.

Accelerated Truck Retirement -- Early retirement of older model trucks with new diesel trucks has potential to significantly reduce emissions. For example, replacing 2006 and older model trucks in 2020 is estimated to lower PM and NOx emissions from the affected vehicles by over 75%. Fuel savings through efficiency improvements result in a payback to the owner/operator. Although it is not cost-effective to retire most truck fleets as a whole, the older vehicles in the fleet would be considered candidates for retirement. The air quality benefits are greatest when older (pre-MY2007) trucks in the fleet are replaced with new trucks. The current drayage fleet is much older than the average truck fleet, so most of the vehicles in the drayage fleet might be targeted for early retirement.

Smart Way Retrofit – Retrofitting in-use trucks with Smart Way-certified products reduces fuel consumption and NOx emissions. Smart Way products include the following:

- Aerodynamic treatments for tractor trailers (front, side, rear trailer fairings); front fairings for single-unit trucks
- Low rolling resistance (LRR) tires and aluminum wheels for all but light commercial trucks

Strategies for Rail and Ports – Cost-effective strategies have been identified for rail and ports, but the overall impact on the emission inventory will be small. Promising rail strategies include accelerated turnover of equipment, focusing on the following:

- New locomotives with low exhaust emissions and idle reduction technology
- Low emission switch engines (Gen-set, battery)

Promising strategies for ports include:

- Idle reduction

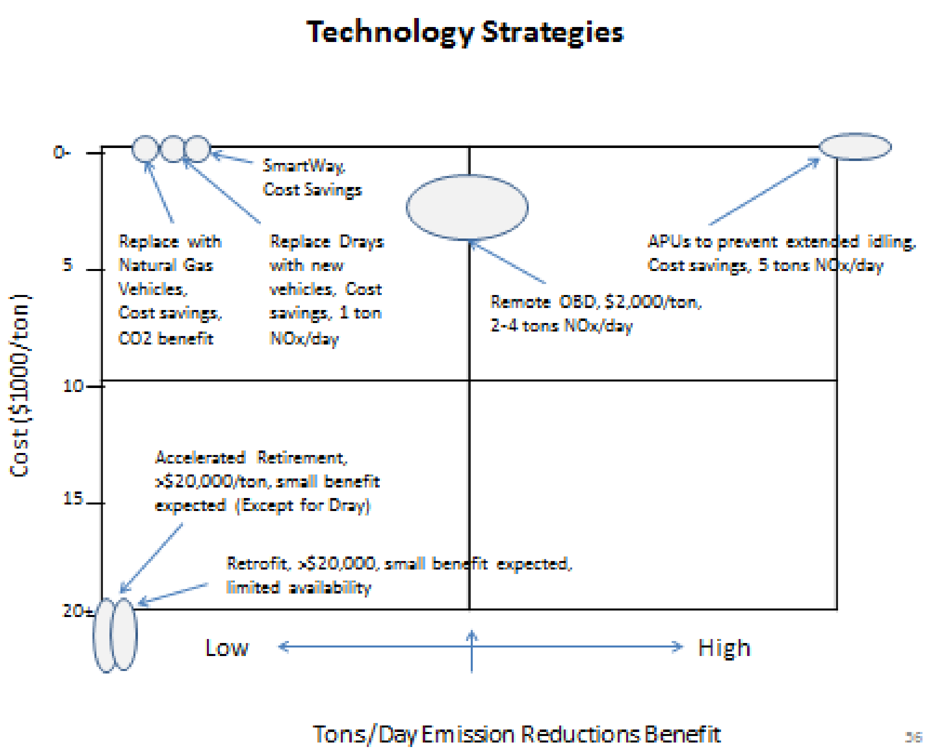
- Gate Management Systems -- systems that speed the flow of trucks and reduce idling (and emissions) by automatically recognizing and giving clearance to drivers and cargo, and allowing night and weekend gate hours
- Infrastructure for CNG and LNG to allow ports to operate on these fuels
- Maintenance programs to reduce fuel leakage and evaporation
- Clean freight handling equipment (e.g. cranes and forklifts)
- Harbor speed reduction

We evaluated use of shore power at ports, which is termed cold ironing, but this strategy does not appear to be cost effective.

Summary of Technology Strategies

Figure 20 summarizes technology strategies. The most promising strategies are those with low cost per ton and large emission reductions, i.e. the upper right hand quarter. Using these criteria, extended idle reduction and remote OBD I/M stand out as winners.

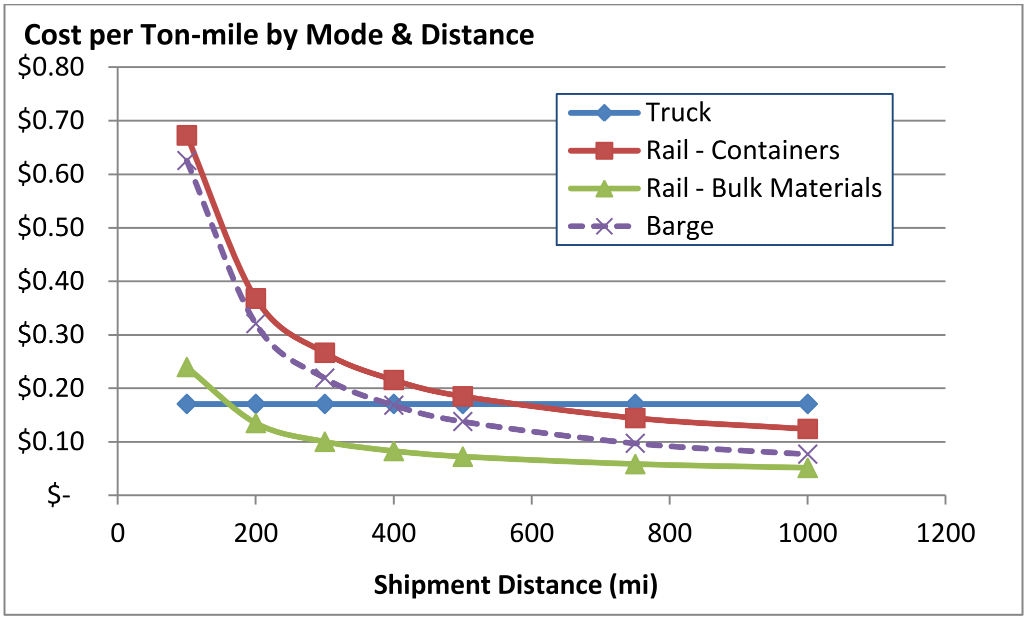
Figure 20



VMT Reduction Strategies

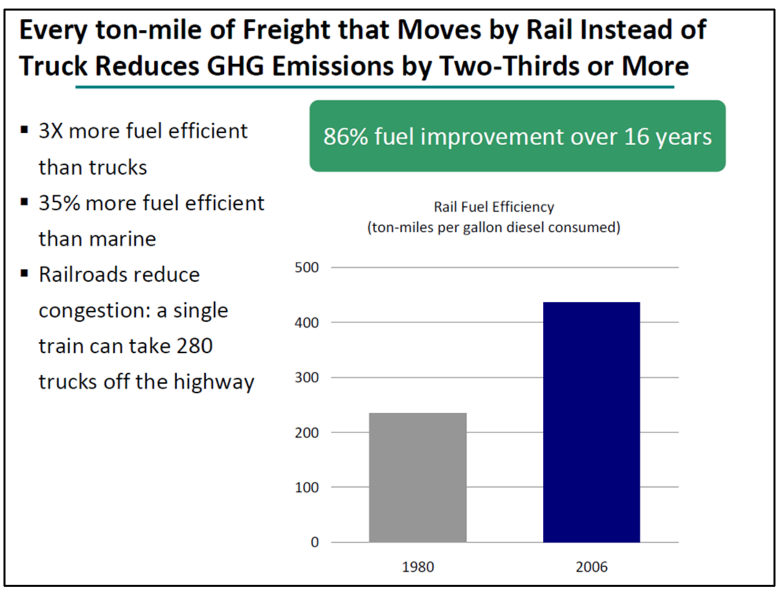
VMT reduction strategies are very specific to the freight origin/destination and commodity. Strategies must consider costs per ton-mile, which varies by mode and distance shipped (Figure 21). Rail and barge have the lowest costs for long distances, but trucks are cheaper for short distances.

Figure 21



With regard to through truck traffic, which currently accounts for about half the truck traffic associated with freight use in Connecticut, encouraging rail instead of truck transport through the State, by improving rail infrastructure, would reduce truck VMT. Improving rail would reduce CO2 emissions and accordingly greenhouse gas (GHG) emissions, as shown below on Figure 22. Through truck traffic could also be reduced by enacting truck tolls or VMT fees to discourage transport on Connecticut's roads. This strategy would reduce the impact of freight movement on ozone levels. However, unlike shifting to rail, enacting truck tolls or VMT fees will not reduce the impact of freight movement on global warming, as GHG emissions from out-of-state activity have the same impact of in-state GHG emissions.

Figure 22



Inbound and outbound truck VMT could be reduced by rail-oriented land use and freight transfer facilities that encourage shifting transport from truck to rail. Improvements to the rail system in Connecticut and the Northeast must be coordinated and partially funded by the Federal Government.

Truck VMT can be reduced by limiting empty back-hauls. It's estimated that there are seven empty backhauls for every ten deliveries in Connecticut, so this is an area where large VMT reductions are possible. However, it's difficult to formulate an effective strategy. A long-term strategy is needed in this area.

In-state measures include increasing weight limits on tanker trucks to cut down on the amount of VMT associated with fuel transport and optimizing waste management operations to reduce emissions associated with waste movement. Encouraging value added freight practices will streamline freight movement and reduce emissions. These practices include bypassing distribution centers and shipping directly to retail stores and customers.

As part of this project, we reviewed strategies being considered in Germany and Japan to improve freight movement and reduce emissions. As we have concluded in this study, Germany and Japan have recognized the need to improve infrastructure, particularly rail systems. One strategy being investigated to do this is segregating passenger and freight traffic on rail and highway networks. Systems to provide timely and comprehensive information on road conditions and traffic to reduce congestion are being developed there, as well as in the United States. In addition, systems to remotely enforce size and weight limits have been proposed in Germany, Japan and the Unites States. Germany is developing strategies to vary toll rates according to the route driven and time of day, which would be applicable if Connecticut starts charging tolls on major highways.

CONCLUSIONS AND OPTIONS

Conclusions:

Following are the key conclusions of this study:

- EPA initiatives will greatly reduce emissions from all modes of freight movement. New trucks emit less than 5% of the PM and NOx emissions that are emitted from 2006 and older models.
- Trucks have been and will continue to be the primary mode of freight movement. Trucks are the most economical way to transport goods over short distances (less than 200 miles). Since trucks will play a significant role in freight movement in Connecticut in the future, efforts not only to reduce idling and congestion, but also striving to have the newest, cleanest trucks on the road are necessary to achieve the clean air goal of reducing air pollution and meeting current and future air quality standards.
- Remote OBD I/M programs for heavy duty truck will optimize the effectiveness of EPA emission standards.
- The Smart Way Initiative will reduce CO2 and NOx emissions.
- Air pollution, as well as freight movement, are I-95 corridor issues and strategy development should continue to be coordinated with other states and the Federal Government.

Options for further consideration

- DEEP could consider implementing the following strategies:

    - Banning extended idling and extend infraction authority to public safety agencies
    - Remote OBD I/M
    - Replacement of aging trucks with new vehicles that meet stringent EPA standards.
    - Replacement of conventionally fueled 2006 model year and older vehicles with vehicles that run on alternative fuel, including natural gas, if research confirms the benefits.
- To address truck congestion, which will only worsen, DEEP and Connecticut Department of Transportation (CTDOT) could continue to encourage regional improvements to the rail system.
- DEEP and CTDOT could encourage value added freight and other ways to streamline freight movement.
- DEEP and CTDOT could conduct outreach to stakeholders to address the problem of empty back-hauls.
- DEEP and CTDOT could encourage truck owners to install Smart Way upgrades.