

# Appendix 4A

List of Potential PM<sub>2.5</sub> Control  
Measures Reviewed by CTDEP

## List of Potential PM2.5 Control Measures Reviewed by CTDEP

	Measure Name	Pollutant			Description
		NOx	SO2	PM2.5	
<b>Mobile Sources</b>					
Public Outreach	Public Outreach and Education - Air Quality Action Days (Mass Marketing Campaign)	X	X	X	Encourage the public to take a variety of actions on Air Quality Action Days to reduce emissions and improve air quality (emphasizing free transit, telework, carpool). Education surrounding fueling practices. This may include implementing a Strategic Communication Campaigns to increase public awareness about reducing vehicle use (marketing efforts involving advertising campaign in print media and on world wide web.) Encourage liberal leave policies for businesses, local, state and federal employees on Air Quality Action Days, permitting employees to work from home or take unscheduled leave.
Public Outreach	Clean Commute/Try Transit Week	X	X	X	Promotes use of alternative transportation, including transit, by daily commuters for one week per year.
Public Outreach	No Drive Days	X	X	X	Odd/Even License Plate no Drive Days. Prohibit drivers from traveling during certain periods, based on vehicle tags or other easily identifiable criteria. Can be a permanent or episodic control.
I/M	Encourage Vehicle Maintenance:	X	X	X	Identify eligible high emitting vehicles between biennial smog check and offer vehicle owners financial incentives to complete the necessary repairs. Or pay motorists to relinquish any vehicles that fail a smog check emissions inspection. (Eligible vehicles must be taken to a registered dismantler to be recycled.)
Clean Vehicles	Tax incentives to encourage the purchase of hybrid, alternative fueled, electric and ZEV vehicles	X	X	X	Consider use of tax incentives to accelerate adoption of low-emission vehicles. However influence on purchasing behavior may be minimal. Most legislative sessions include such proposals.
LEV	Fleet ILEV for light-duty gasoline vehicles	X		X	Require fleets operating in nonattainment area to be comprised of a percentage of Inherently Low Emission Vehicles (ILEV).
Cleaner Fuels	Low-Sulfur On-Road Diesel Fuel		X		Require Use of Low-Sulfur On-Road Diesel Fuel
Cleaner Fuels	Low NOx Diesel Fuel and Fuel Additives to reduce NOx and SO2	X	X		Require regional use for on-road diesel fuel
Cleaner Fuels	CARB Diesel Fuel		X	X	Implement CARB Diesel Fuel Standards
Commuting	Support Development of Rail between Hartford and New Haven	X	X	X	Provide funding to develop rail services between Hartford and New Haven.
Commuting	Transportation Control Measures (Rideshare, van pools, telecommuting, rail-to-trail, park/ride, decrease drive alone, mixed development, car sharing programs etc.)	X	X	X	Encourage rideshare, van pools, telecommuting, rail-to-trail, park/ride, decrease drive alone, mixed development, etc.) May involve: HOV lanes; free reserved parking spaces for all carpools and vanpools; providing incentives for businesses to provide employee shuttle service to the nearest rail or transit stop; providing free rides home in event of unexpected emergency or unscheduled overtime to commuters using public transport; Fund incentives for new car sharing customers (i.e., Flexcar or Zipcar services). Even aggressive measures likely to provide only a very small percent of the emissions reductions needed for attainment and at considerable expense. See 2001 RACM Analysis for Southwest CT Nonattainment Area.
Commuting	Promote Bicycling and Walking as modes of Transport	X	X	X	Provide incentives to developments that improve bicycle/ pedestrian access. This includes improvements to sidewalks, curb ramps, crosswalks, lighting, funding construction of additional bicycle/pedestrian paths in the region. etc. Install bicycle racks at various locations throughout the region, including expanding existing bike lockers at train stations, install bicycle storage spaces in park-n-ride lots. Provide external bike racks on local transit buses. Conduct ongoing bike to work events. Provide outreach activities, education on the bike-to-work option, and assistance in trying bike-to-work. Encourage employers to provide one bicycle per 50 employees for mid-day business or personal use. Consider restricting private vehicle use in certain areas during business hours, encouraging pedestrian, bicycle, and transit use. Implement a safe pedestrian and bicycle routes to school program to reduce VMT.
Commuting	Changed Scheduling to reduce motor traffic demands	X	X	X	Encourage employers to adopt a shorter work week, with employees working 4 10-hour days. Extend peak-period service on so commuter trains run more frequently between 6-11 am and 3-8 pm.
Commuting	Increase Commuter Options & Frequency	X	X	X	Increase frequency of commuter service to major work centers; Expansion of regional bus services; Enhance reverse commute options; Expand express bus service; Add parking at major transit centers; Buy new busses to accommodate increases in ridership
Commuting	Transit-Flow Improvements	X	X	X	Various Options: Dedicate roadway lanes for use by buses; Construct additional HOV lanes on regional freeways; Regularly optimize traffic signals to reduce idling and low-speed emissions. From midnight until 5am, set intersection signals to flashing yellow in predominant direction and flashing red in minor direction for all low volume intersections where safety permits; Install roundabouts in place of signals at low volume intersections; Provide queue jumps for buses at over-capacity signalized intersections throughout the region.
Commuting	Enhanced Enforcement: Speed Limits	X	X	X	Speed Limit Restriction: Regional speed limit of 55 mph on all roads which previously had posted speeds of greater than 55 mph and Increase speed limit enforcement so that more vehicles are traveling at or below the posted limit. Automate speed enforcement and lower the speed limit to 55 mph for heavy duty vehicles.
Idling Reduction	Increased compliance with the anti-idling restriction; school bus and truck stop signage; state and local police enforcement	X		X	Signage and education to increase compliance is an ongoing effort. Increase enforcement of idling restrictions for on-road vehicles. DEP legislative proposal this session would add police enforcement of DEP's 3-minute idling restriction.

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Idling Reduction	Promote Installation of Anti-Idling Technology	X		X	Tax Incentives for Purchase and Installation of Anti-Idling Devices and electrified parking spaces.
Idling Reduction	Episodic Voluntary or Mandatory Closures of Drive Through Windows	X	X	X	Encourage or require Closure of Drive-through Windows on Days with Poor Air Quality.
Idling Reduction	Truck stop electrification	X		X	Many states have implemented pilot projects. Costs to implement truck stop electrification vary depending on the company that installs the electrification technology and how the truck is modified. <a href="http://www.eere.energy.gov/cleancities/idle/truck_elec.html">http://www.eere.energy.gov/cleancities/idle/truck_elec.html</a> CT DOT estimates 3,000 trucks idle overnight per night in CT. If all trucks were provided electrified overnight parking, 2.23 tons of NOx and 0.12 tons of PM2.5 would be reduced per day. (W. Menz calculation assuming 10 hours of idling per day.) Significant fuel savings are also achieved. A NYS Thruway project spent \$500,000 to install 44 TSE units.
Idling Reduction	Transport Refrigeration Units (TRUs)	X		X	The truck engine powers the refrigeration unit, so these trucks idle to keep their contents cold at distribution centers in residential areas and at truck stops. <a href="http://www.arb.ca.gov/diesel/tru/htm">http://www.arb.ca.gov/diesel/tru/htm</a>
Diesel Reduction	Electrification of airport ground-service equipment (GSE) and parking shuttles	X		X	Fifty-two commercial, certificated airports operate in the NESCAUM region. NESCAUM estimates that at least 3,369 ground service vehicles are in operation at these facilities, not including airport equipment owned and operated by foreign-based airlines, which are not accounted for in the current NESCAUM inventory. The cumulative emissions from all ground support vehicles at these facilities is considered to be significant. NJ notes that Newark Airport alone has approx. 4,700 pieces of GSE. CT 2002 inventory indicates state total annual emissions for GSE of 4.6 tons/VOC and 42.1 tons NOx.
Diesel Reduction	Restrict use of heavy-duty diesel off-road construction equipment	X		X	Contractors who use heavy duty off-road or on-road mobile equipment during the construction phase of an indirect source (such as residential dwelling units, commercial, office, retail, and roadway projects) would be required to comply with the rule. The primary compliance approach would be payment of a mitigation fee, which would be administered by CTDEP and used to purchase off-site emission reductions.
I/M	I/M for heavy-duty diesel vehicles	X		X	Decrease the weight of trucks tested to >6000 ;bs. GVW (from >26,000 lbs. GVW). The remainder of current tests and limits are identical to California. OTC MOU (1999) encourages state consistency. <a href="http://www.arb.ca.gov/msprog/hdvp/hdvp/htm">http://www.arb.ca.gov/msprog/hdvp/hdvp/htm</a>
I/M	California periodic heavy-duty diesel vehicle fleet inspection program	X			As a complement to periodic roadside inspections, HDDV fleet owners are required to perform annual inspections of their vehicles for emissions and tampering; emissions limits vary with age of vehicles; fleet owners' records of maintenance and inspection are audited at random for compliance. The program has cut the failure rate for California roadside inspections in half, to 6%. The CT 2003 failure rate was 17%.
Retrofits	Retrofits	X		X	Various Programs can target local vehicles, commercial vehicles, diesel school busses, diesel state vehicles, public fleets, private fleets, tour busses etc. Fit transit buses running on ultra low sulfur diesel with a quad-catalytic filter.
Retrofits	School bus retrofits, new low-emission school buses and use of ultra low sulfur diesel fuel	X		X	Program initiated in Norwich in 2003 and now underway in various communities throughout CT (Bridgeport, New Haven, Hartford, Newington, Fairfield, Stamford, Hamden, Region 18, Mansfield, Newtown). US EPA grant money available to increase the number of municipalities participating. For New Haven, emissions reductions estimates are 40 percent for fine particulates and carbon monoxide and 45 percent for hydrocarbons. In addition, a small reduction in nitrogen oxides is expected. Emissions reductions in Norwich are estimated at 60%-90% of particulate matter as well as 60%-80% of both hydrocarbon and carbon monoxide.
Retrofits	Construction equipment retrofits with oxidation catalysts and particulate filters			X	Ongoing in CT: 195 New Haven Harbor Crossing Contract; Q-Bridge; Landfill SIP. According to NESCAUM, the construction sector is estimated to represent up to 11% of the PM and 16% of the region's total nonroad NOx emissions. In addition, much of this activity takes place during the summer months when ozone levels are at their highest. CT 2002 inventory attributes 1,425 tons VOC/yr and 7,976 tons/yr NOx to construction and mining equipment.
Diesel Vehicles	School Bus Replacement	X	X	X	All model year 2002 and older buses will be replaced with model year 2007 diesel buses
Diesel Reduction	Enhanced Enforcement of Mobile Source Regulations			X	Increase smoking vehicle enforcement. Publicize Smoking Vehicle Reporting Hotline.
I/M	Periodic Smoke Inspection Program for Heavy Duty Diesel Vehicle and Diesel Buses			X	Requiring owners of truck and bus fleets to perform annual inspection of their vehicles. Fleet owners are not required to inspect vehicles that are powered by engines in their first four model years. Random audit of fleets' maintenance and inspection records, and testing a representative sample of vehicles is performed to ensure compliance
Diesel Vehicles	Heavy Duty Diesel Fuel Program for Particulates			X	Require use of alternative fuels, such as biodiesel or emulsions, in public and publicly contracted fleets, such as Transit buses, school buses, Government Trucks, and Private Fleets to reduce emissions
Diesel Reduction	Remove Trash Trucks From Area Streets and/or Retrofit Trucks as appropriate	X	X	X	Reduce use of trash trucks through transport of trash by barge and use of retrofitted (Mandate Solid waste collection vehicles to install Diesel Oxidation Catalysts) trucks.
Diesel Vehicles	Enhance current opacity standards	X	X	X	Implementing an inspection program for units where retrofits have been added to determine if the retrofits were installed properly and in good working order
Diesel Vehicles	Opacity Cutpoint Revision	X	X	X	Age ranges and the assigned smoke opacity limits would be changed to be more restrictive on all vehicles
Diesel Vehicles	Establish a Medium Duty Vehicle Inspection Program	X	X	X	This would be a combination of On-board Diagnostics (OBD) and smoke opacity inspections for medium duty vehicles between 8,501 - 17,999 gross weight.

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Financial Incentives	Fuel Tax Increase	X	X	X	Implement a fuel tax on on-road gasoline and on on-road diesel.
Financial Incentives	Green Curb Initiative	X	X	X	Restricted Access/ "Green Curb". Differential fees and access permits applied during periods of high congestion. Target delivery/loading zones and carpool/vanpool pickup areas.
Financial Incentives	Establish Clean Air Fund	X	X	X	Sell Clean Air License Plates to fund air quality programs (similar to "Save the Sound" tags).
Financial Incentives	Financial Incentives: Mobile Source Mitigation Fees/Ozone Season VMT Surcharge/ Entry Fees/ Graduated Taxes, etc.	X	X	X	Various Options: Congestion Pricing on Low Occupancy Vehicles; Establish electronic tolling systems; Require a surcharge to be paid by drivers during the summer season based on the number of driving miles and/or collect fees from drivers to enter a pre-defined area; Assess graduated vehicle registration fee/car tax on every privately owned vehicle in the region. Households with multiple vehicles pay higher tax on each additional vehicle; Odometer Tax; Implement region-wide car tax for petroleum-fueled vehicles. Charge graduated car taxes based on a vehicle's EPA miles per gallon rating; Charge VMT fee for all vehicles registered or garaged in the region.
Financial Incentives	Financial Incentives: Make Parking Expensive to Encourage Use of Mass Transit	X	X	X	Various Options: Levy annual impact fee on every parking space in nonattainment area; Discourage developers from providing parking in excess of code minimum by imposing a graduated tax on excess spaces; Increase fees for parking garages and meter during episodes; Implement daily tax on employers providing free or discounted commuter parking spaces; daily tax on employees using commuter parking spaces.
Financial Incentives	Financial Incentives to Increase Train and/or Bus Use	X	X	X	Various Options: Develop an electronic card to allow users to pay fares on all rail and bus systems in the region (including parking in ParknRide lots) using one electronic card; Single price all public transit services with free transfers all day, 7 days per week; Institute free bus-to-rail transfer similar to free rail-to-bus transfer currently in place; Introduce discount programs reducing cost of multiple bus rides through purchase of pass books (e.g. 10-trip tickets); Free Use 10-3 on weekdays and all day on weekends.; Free transit passes for high school and college students, subsidized by schools or through student registration fee; Employers subsidize employees' monthly transit or vanpool costs and receive a tax credit for incurred expenses; Implement programs encouraging or requiring employers to provide the value of subsidized parking to employees who use alternative commute strategies.
Financial Incentives	"Cash for Clunkers" Taxicab Replacement - Conventional Vehicles	X	X	X	Replace taxicabs with new "conventional" LDGVs.
Financial Incentives	"Cash for Clunkers" Gas Caps Program	X	X	X	Provide free replacement gas caps to light- and medium-duty vehicle owners.
Clean Vehicles	Encourage Vehicle Maintenance:	X	X	X	Eliminate all waivers and exemptions in the I/M program, including the motorcycle smog check exemption; Implement a smoke testing and/or Inspection/Maintenance Program for on-road heavy-duty diesel engines; Voluntary vehicle repair programs (identify eligible high emitting vehicles between biennial smog check and vehicle owners will be offered financial incentives to complete the necessary repairs. ); Accelerate fleet turnover by providing incentives to retire the oldest most polluting vehicles ("Cash for Clunkers" incentives to relinquish any vehicles that fail a smog check emissions inspection. Eligible vehicles must be taken to a registered dismantler to be recycled); Provide Assistance to Low Income Individuals to Repair Vehicles; implement program to Replace Tires and Ensure Proper Tire Inflation.
Mobile: Fugitive Dust	Roadway Dust Control: Construction Trackout Mitigation Requirements			X	Control Roadway Dust by Mitigating Trackout from Road Construction Sites and Using PM-efficient street sweepers.
NOx	NOx cap for mobile sources	X			Program administration requires considerable resources.
Smart Development	Smart Growth and Infill Development Programs	X	X	X	Change zoning ordinances to allow neighborhood-serving retail establishments in residential areas. Encourage development/redevelopment of land in designated growth areas, encouraging local governments to place greater emphasis on land development near transit stations. Include incentives for mixed-use development at transit centers to reduce sprawl and VMT. Restrict construction of new parking at employment centers based on distance from transit and urban core.
Behavior Modification	Restrict Parking at Schools	X	X	X	Restrict high school students from driving to and parking at high schools when bus service is available.
<b>Area Sources/ Non-Road Sources</b>					
Agriculture	Agricultural Equipment Retrofits	X	X	X	Require agricultural equipment to be retrofitted with emissions controls.
Airport	Airport GSE Initiatives	X	X	X	Subsidize adoption/retrofits of electric ground service equipment; Develop voluntary program to encourage operators to limit idling of airport ground service equipment.
Airport	Airport Emission Cap	X	X	X	Establish Agreement with Airports Authority to Cap or Reduce Emissions.
Airport Idling	Airport APU Initiatives	X	X	X	Seek voluntary agreement to reduce use of aircraft APUs through use of gate-provided services or other strategies
Airports Idling	Idling restrictions for ground transportation/support fleet at airports	X	X	X	Enforce anti-idling rules for ground transportation fleets (Airports)
Behavior Modification	Lawn and garden equipment buyback and scrappage programs	X		X	Program encourages trading of gasoline-powered mowers by providing funds to offset the purchase cost of electric mowers (corded or uncorded). Some grant funds may be available through EPA. Arizona, Maryland and Oregon have offered programs including rebates towards the purchase of "environmentally friendly" equipment.

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		NOx	SO2	PM2.5	
Behavior Modification	Idling Restrictions for Lawn & Garden Equipment	X	X	X	Limit idling by commercial lawn & garden equipment.
Behavior Modification	Control Emissions from Lawn and Garden Equipment	X	X	X	Adopt measures to reduce lawn area and mower usage or encourage use of native plants as groundcover.
Behavior Modification	Low Maintenance Landscape Initiative			X	"Lawn Care for Cleaner Air": increase use of low maintenance landscapes.
Burning	Restrictions on wood stoves not subject to NSPS; no burn days			X	Prohibit wood stove use on moderate or higher ozone days, exempting stoves better controlled than EPA Phase II stoves from the prohibition. See CO Dept. of PH and Environment at : <a href="http://www.cdph.state.co.us/ap/woodhome.asp">http://www.cdph.state.co.us/ap/woodhome.asp</a> . Prohibit sale of stoves that are not certified as EPA Phase II (= certified to meet the July 1, 1990, EPA standards). <a href="http://www.epa.gov/compliance/monitoring/programs/woodstoves/">http://www.epa.gov/compliance/monitoring/programs/woodstoves/</a> Using emissions estimates from a MANE-VU Residential Wood Combustion Inventory, residential wood burning (includes wood stoves, fireplaces, wood-fired boilers and furnaces, chimineas, fire pits, BBQs) is responsible for annual CT VOC emissions of 41,068 tons/year; annual NOx emissions of 821 tons per year; annual PM2.5 emissions of 8,521 tons/year; and ammonia emissions of 470 tons/year.
Burning	Restrictions on outdoor wood burning furnaces	X		X	Numerous legislative proposals this session to prohibit and/or further restrict operation. One idea is to establish moratorium through Legislation on sale and distribution of new OWBs until implementation of USEPA's regulations
Burning	Encourage USEPA to establish rules or standards for OWBs.			X	The complicated process of establishing testing methods, emission limits, and control devices and the potential of having several different sets of state standards for OWBs makes national regulation the ideal way to regulate OWBs. CT can join NJ to encourage USEPA to establish rules or standards for OWBs through recommendations
Burning	Voluntary wood stove and fireplace retrofit/change-out programs			X	Voluntary wood stove and fireplace retrofit programs for units manufactured pre 1992, including but not limited to replacing fireplaces with natural gas inserts and/or with non-catalytic certified wood stoves. Program would include financial incentives and public education to promote use of Gas Logs/elimination of wood burning. Set maximum moisture content for firewood sales.
Burning	Commitment to adopt State rules for OWBs in the absence of Federal action			X	Connecticut could consider State rules or standards, if after 5 years, the USEPA has not acted to implement rules or standards for OWBs
Burning	Limit burning to times when the air quality is good			X	This measure would limit burning to those times when air quality and meteorological conditions are most suitable for reducing impacts
Control Equipment/ Cooking	Require emissions control devices on conveyORIZED charbroilers in restaurant cooking operations			X	Restaurant operations include charbroilers, griddles, deep fat fryers, ovens, and other equipment. CA SCAQD is the only area in the country with controls for commercial charbroiling. Only chain-driven charbroilers are regulated although underfired charbroilers make up a higher percent of the total restaurant equipment. CA SCAQD requires control efficiencies of 86% for VOC and 83% for PM10 and PM2.5. Usually requires installation of a catalytic oxidizer. Replace underfired charbroilers with Smokeless broilers or an add-on scrubber to control emissions. ESPs or wet scrubber can also be used. Implement standard that mandates usage of chain-driven charbroilers equipped with control device, such as catalytic oxidizer. Reduce exemption level and set standards for unregulated bakeries. Most sources are small businesses and cost of controls may exceed cost of charbroiler. May be infeasible. No information available on the number of CT sources. NJ has determined that reductions are only feasible from chain-driven charbroilers to create a 0.3-0.6 ton per day reduction in PM in NJ. (Source: T. Key)
Cleaner Fuels	Fuel Switch: Oil to Natural Gas or Electricity for Hot Water Heaters and Furnaces	X	X		Encourage Purchase of Hot Water Heaters that Use Natural Gas or Electricity. Encourage Purchase of Furnaces that Use Natural Gas.
Emissions Control	Low-emission Natural Gas Water Heaters	X			Adopt SCAQMD Rule 1121: Control of NOx from Residential Type Natural Gas Fired Water Heaters.
Emissions Control	Low-emission Natural Gas Furnaces	X			Adopt SCAQMD Rule 1111: NOx Emissions from Natural Gas Fired, Fan-Type Central Furnaces (no more than 40 nanograms of NOx per joule of useful heat).
Energy Efficiency	Energy conservation and "green building" for residential and commercial building construction	X	X		Voluntary program to encourage homeowners to offer potential homeowners the option of constructing their homes with energy conservation and clean energy features prior to construction
Fugitive Dust	Strategies for controlling fugitive dust emissions (Amendment of RCSA Section 22a-174-18)			X	Strategies would control dust emissions from the following source categories: agricultural unpaved roads, agricultural windblown dust, cattle feedlot dust, harvest operations, livestock wastes, tilling dust, and windblown dust from pasture lands. Other fugitive dust sources that would be covered would include construction, demolition, excavation, extraction, carryout and trackout, etc.
Fugitive Dust	Limit application of anti-skid materials as safety permits to reduce emissions			X	Limiting the application of anti-skid materials to intersections, hills, and curves as safety permits to forming reduce emissions
Fugitive Dust	Paving unpaved roads, road shoulders, and parking areas to reduce fugitive emissions			X	Improvements such as paving will reduce fugitive dust from unpaved roads. Requiring 4 foot paved shoulders (i.e. the edges of the road) on all new or modified paved roads and 50% of existing paved roads with highest traffic. This measure will also require paved interior roads to be 100 feet long and full road width. Limit visible dust emissions to 20% opacity on unpaved parking areas receiving up to 100 trips per day. Requiring a low speed limit (25 miles) on unpaved roads particularly heavily traveled roads will reduce fugitive emissions.
Fugitive Dust	PM-efficient units for street sweeping			X	This measure would limit the purchase and/or use of new street sweepers to PM-efficient units

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Fugitive Dust	Practices to reduce wind erosion and fugitive emissions			X	Practices include using cover crops (traditional crops, such as grasses, wheat, sorghum, corn, legumes and cotton) to cover soil surfaces, mulching, use of windbreaks or barriers (like shrubs, trees, grass barriers and manmade fences), use of artificial wind barriers (fences constructed of board, bamboo, willow, rock or earth), and cross wind ridges or strip-cropping. Require practices that would reduce tillage during windy conditions to reduce fugitive emissions.
Fugitive Dust	Surface treatments on unpaved roads and parking areas to reduce fugitive emissions			X	Applying surface treatments such as watering and chemical suppressants (petroleum resin (most common), asphalt emulsions, acrylics, and adhesives) on unpaved roads and parking areas to reduce fugitive emissions.
Fugitive Dust	Trackout controls to reduce fugitive emissions			X	Installing a pipe or grate grid trackout control device or gravel bed trackout to remove dirt and mud from vehicle tires
Diesel Reduction	Episodic limits on asphalt paving and traffic marketing activities	X	X	X	Prohibit road paving and traffic marking on Air Quality Action days.
Fugitive Dust	Watering and planting methods to reduce fugitive dust emissions			X	Use watering and planting methods that will reduce fugitive dust emissions. These methods include using a point planter to reduce emissions from planting cotton, corn and lettuce. Using a laser-directed land plane to reduce emissions due to planing (flattening the land), and Aerial seeding, or dropping seeds from an airplane to reduce dust formation
Marine	Electified Ports	X	X	X	Electrical power will be provided to ocean-going vessels from the land-side, allowing them to shut down auxiliary diesel generators while they are docked. Possible SECA designation for coastal areas? <a href="http://www.arb.ca.gov/msprog/offroad/marinevess/harborcraft.htm">http://www.arb.ca.gov/msprog/offroad/marinevess/harborcraft.htm</a>
Marine	Reduce sulfur content of fuel burned in the auxiliary engines of large marine vessels		X		CT could adopt a regulation similar to CA to reduce the sulfur content of distillate fuel burned in the auxiliary engines of large ships when they are close to the port. Sulfur content limit will be reduced from 1 to 0.5%
Marine	Reduce sulfur content of fuel burned in smaller commercial and recreational vessels		X		Reduce the sulfur content of fuels burned in smaller commercial vessels such as harbor tugs, small commercial vessels, ferries and diesel powered recreational vessels from approx. 3000ppm to 500ppm or 15 ppm
Marine	Operational changes at Ports to reduce fuel usage	X	X	X	Operational changes that reduce truck queuing and idling, such as extending port hours and providing incentives for off-peak delivery, and better use of information technology to track containers and schedule pick-ups and deliveries, would contribute to increased efficiency and reduced fuel usage.
Marine	Mandatory repower program for Marine Vessels	X		X	This measure would establish in-use emission limits for both auxiliary and propulsion diesel engines on ferries, excursion vessels, tugboats, and towboats consistent with the USEPA Tier 2 or Tier 3 marine engine standards but not Tier 4 because of size limitations on some vessels. This measure would emphasize engine replacement (repower), rather than retrofits with diesel emission control strategies for commercial harbor craft.
Marine	Marine Diesel Engine Standards	X		X	Encourage new federal marine engine emission standards (EPA 2012).
Marine	Control Recreational Marine Emissions	X		X	Provide incentives for newer boats and engines.
Marine	Retrofits for Cargo handling equipment at ship builders and ports			X	Cranes, tractors, loaders and other equipment used in port activities are diesel powered and, like construction equipment, create significant amounts of PM pollution. 2002 CT ports data not available.
Marine	Control Commercial Marine Sources	X		X	Tug/Push Boat Activity Reductions.
Non-Road Behavior Modification	Episodic Restrictions on Lawn & Garden Equipment (mandatory)	X		X	Restrict use of lawn and garden equipment during Air Quality Action days including "No Mow Policy" on Code Red Days (voluntary)
Non-Road Behavior Modification	Episodic Restrictions on Recreational Equipment Use (mandatory)	X		X	Restrict use of recreational equipment during Air Quality Action days.
Non-Road Behavior Modification	Episodic Commercial and Industrial Equipment Use Restrictions (voluntary)	X		X	Encourage restricted use of commercial and industrial equipment during Air Quality Action Days.
Non-Road Behavior Modification; Marine	Episodic Recreational Marine Equipment Use Restrictions (voluntary)	X		X	Encourage restricted use of all recreational marine equipment on Air Quality Action Days. Ban idling by recreational marine equipment on Code Red Air Quality Action Days or throughout ozone season.
Non-Road Cleaner Fuels	Low Sulfur Fuel for Off-Road Applications		X	X	Require Low-Sulfur Fuel for Off Road Applications.
Non-Road Cleaner Fuels	Retrofit/Repower Locomotives	X		X	Provide financial incentives to retrofit or repower locomotives operating in the nonattainment area for cleaner burning diesel or alternative fuels.
Non-Road Cleaner Fuels	Purchase Natural Gas Off-Road Equipment	X		X	Encourage Purchase Natural Gas Off-Road Equipment.
Non-Road Cleaner Fuels	Require low-NOx fuel for recreational equipment	X			Require recreational equipment to use low-NOx fuel additives during ozone season.
Non-Road Cleaner Fuels	Low-NOx Fuel for Lawn & Garden Equipment	X			Require diesel-fired lawn & garden equipment to use low-NOx fuel additives during ozone season.

## List of Potential PM2.5 Control Measures Reviewed by CTDEP

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		NOx	SO2	PM2.5	
Non-Road Cleaner Fuels	Low-NOx Fuel for Recreational Marine Equipment	X			Require diesel-fired recreational marine equipment to use low-NOx fuel additives during ozone season.
NonRoad Diesel	Emission testing and repair/maintenance program for nonroad heavy duty equipment	X		X	CTDEP could establish an emission testing and repair/maintenance program for nonroad heavy duty diesel equipment.
NonRoad Diesel	Idling reduction for locomotives	X	X	X	A statewide mandatory idling-reduction program, to eliminate all non-essential idling through the use of automatic shut-down devices (SmartStart - a microprocessor technology that automatically manages locomotive shutdowns and startups) and operational changes. Encourage new federal locomotive engine emission standards (EPA 2012).
NonRoad Diesel	California Diesel Fuel			X	California Diesel Fuel: Diesel fuel regulations to require the use of California diesel fuel in locomotives and marine vessels used exclusively in intrastate operations
Non-Road Diesel Reduction	Non-Road Diesel Engine Retrofit Program: Voluntary	X	X	X	Develop voluntary program encouraging retrofit of non-road diesel equipment in public and/or private fleets.
Non-Road Diesel Reduction	Control Off-Road Diesel Engines (smoke test)			X	Implement mandatory smoke testing program for heavy-duty (>50 hp) off-road diesel engines.
Non-Road Diesel Reduction	Control Off-Road Diesel Engines (Blue Sky)	X	X	X	Encourage the use of engines that are included in EPA's voluntary "Blue Sky Series" engine program.
Non-Road Diesel Reduction	Idling Restrictions for Commercial and Industrial Equipment	X	X	X	Limit idling by commercial and industrial equipment.
Non-Road Emissions Control	Clean Air Construction Initiative: Preference for Low-emissions Industrial Equipment	X	X	X	In bids for government contracts, award extra points to bidders using low-emission industrial equipment.
Non-Road Emissions Control	Light Commercial Equipment Retrofits	X	X	X	Require light commercial equipment to be retrofitted with emissions controls. Retrofit portable engines and generators with emission control devices.
Non-Road Emissions Control	Recreational Equipment Retrofits	X	X	X	Require recreational equipment to be retrofitted with particulate filters and/or oxidation catalysts.
Non-Road Financial Incentives	Control Recreational Equipment Emissions	X	X	X	Increase registration fee on recreational vehicles (dedicate fee to clean air fund).
Non-Road Financial Incentives	Graduated registration fees for recreational boats	X	X	X	Levee additional registration fee for registration of boats with old, high-emission engines.
Non-Road Financial Incentives	Airport Congestion Pricing	X	X	X	Charge higher aircraft landing fees during busy times of day to reduce airport delays and congestion.
Non-Road Financial Incentives	Gas and Diesel Tax Increase	X	X	X	Implement a fuel tax on off-road gasoline.
Non-Road Financial Incentives	"Cash for Clunkers" various programs	X	X	X	Implement a 2-cycle Engine Replacement Program. Offer cash for consumers to turn in old outboard motors and purchase new ones. Offer cash for consumers to turn in lawnmowers or lawn tractors and purchase electric or push mowers. Offer Cash to Construction Equipment Owners to Retire Old High Emitting Construction Equipment.
Outreach	Clean Air Partners: Public Outreach and Education	X	X	X	Implement Strategic Communication Campaigns to Increase Public Awareness (target lawnmowers, paints, refueling).
Smart Development	Implement Programs to Reduce the Urban Heat Island Effect: Roofs	X	X	X	Mitigate emissions from new development to reduce electricity demand for cooling.
Smart Development	Implement Programs to Reduce the Urban Heat Island Effect: Pavement	X	X	X	Increase Urban Tree Canopy and land use restrictions to reduce electricity demand for cooling.
Sulfur in Fuel	Home heating oil sulfur reductions		X		DEP legislative proposal to reduce the sulfur content from 3000 to 500 ppmw no later than June 1, 2010. Estimated PM reductions of more than 120 tons per year and SOx reductions of more than 10,000 tons per year. A uniform sulfur content value and maximum allowable SO2 emissions value for each of the grade of the fuel oil could be set throughout the state
<b>Stationary Sources</b>					
Diesel Reduction	Distributed Generation Resource General Permit			X	General Permit with particulate requirements
Agriculture	Control Agricultural Sources			X	Encourage agricultural best practices, including those that reduce pesticide use.
Behavior Modification	Solid Waste Recycling	X	X	X	Increase Recycling Rates to Reduce Trash at MSW Incinerators and reduce energy demand and associated emissions..
Cleaner Fuels	Low Sulfur Fuel Oil for Stationary Sources		X		Require Use of Low Sulfur Fuel Oil for Stationary Sources.

## List of Potential PM2.5 Control Measures Reviewed by CTDEP

	Measure Name	Pollutant			Description
		NOx	SO2	PM2.5	
Cleaner Fuels	Reductions from EGUs: Fuel Switch (Coal to Oil, Natural Gas, Biodiesel)		X		Encourage EGUs to Switch from Coal to Oil, Natural Gas, or Biodiesel.
Cleaner Fuels	Expand Use of Cleaner Fuels	X	X		Expand Use of Biodiesel Fuel; Ethanol Fuel; High-Cetane Fuel; low-NOx additives, and biodiesel. Require oil-burning stationary sources to burn ThermaNOx, a low-NOx No. 2 fuel oil emulsion, during ozone season.
Control Equipment	OTC Model Rule -- Maintenance requirements for industrial boilers	X			Model rule regulates units 5-50 MM/BTU. Approximately 2,100 units in the state. Most are small with very low actual emissions. The annual cost of compliance would be \$500-1,000, which may be a significant burden on the source owners/operators with little to no actual emissions reductions.
Emissions Control	Reductions from EGUs: OTC Model Rule		X		Adopt OTC Multipollutant Model Rule for EGUs. Upwind SO2 Reductions.
Emissions Control	Episodic Mandatory Facility Reductions	X	X	X	Require mandatory facility reductions on Air Quality Action Days. Require Curtailment Plan.
Emissions Control	Reductions from EGUs: Improved Start-up and Shut-down Procedures	X	X	X	Improve Start-up and Shut-down Procedures at Power Plants.
Emissions Control	Upwind SO2 Controls: Plant-by-Plant BACT Controls		X		Reduce Upwind SO2 Emissions by Requiring Facility-Specific Controls.
Emissions Control	State Multipollutant Legislation	X	X		Adopt State Multipollutant Legislation.
Emissions Control	Control Asphalt Facilities	X			Voluntary NOx emission limits on asphalt production facilities. (currently being worked on)
Emissions Control	Emission Reduction Credit Retirement Program	X	X		Establish program to retire emission reduction credits for stationary sources.
Emissions Control	Upwind Chemical Industry Controls	X			Reduce upwind NOx emissions limits in the manufacture of chemicals.
Emissions Control	NSR revisions to require more stringent BACT/LAER and encourage CHP and other clean technologies	X			The OTC should first consider whether or not the NSR thresholds should be revised.
Energy Efficiency	Various Renewable Energy Incentive Programs: Renewable Portfolio Standards; Solar Photovoltaic Programs; Wind Energy Purchases; Solar Hot Water Heating	X			Increase Purchases and installation of Renewable Energy (Solar Photovoltaic Programs; Wind Energy Purchases; Solar Hot Water Heating; Green Building; Ground Source Heat Pump; Energy Efficient LED Traffic Signals, LED Street Lights and Exit Signs) by Government and the Private Sector, with Commensurate Retirement of EGU NOx Allowances. Increase Use of Energy Performance Contracts in the Public and/or Private sector to Reduce Energy Consumption, with Commensurate Retirement of EGU NOx Allowances. Provide assistance to low income individuals to improve energy efficiency of residential dwellings. Require that developers offer clean energy and energy efficiency features in new homes.
Energy Efficiency	ECMB funded energy efficiency and renewable energy measures	X			Considerable barrier to obtaining credit is the NOx Budget cap; allowances would need to be retired to obtain credit. Substantial initial and continuing effort to quantify the reductions, monitor and verify the emissions reductions. Measures that are considered voluntary and emerging are limited to 6% of the needed reductions for ROP, RFP or attainment demonstration purposes. Electric grid dispatch must be taken into account to demonstrate that reductions will occur at generating facilities in the state.
Energy Efficiency	Climate Change Action Plan: Certain final recommended measures for residential, commercial and industrial sector	X	X	X	Measures include: appliance standards, appliance swapping, electric hot water heater replacement, weatherization program, Energy Star homes, high performance buildings, green campus initiative. Considerable barrier to obtaining credit is the NOx Budget cap; allowances would need to be retired to obtain credit. Substantial initial and continuing effort to quantify the reductions, monitor and verify the emissions reductions. Measures that are considered voluntary and emerging are limited to 6% of the needed reductions for ROP, RFP or attainment demonstration purposes. Electric grid dispatch must be taken into account to demonstrate that reductions will occur at generating facilities in the state.
Energy Efficiency	Emissions performance standards and NEPOOL control area tracking	X	X	X	Standards provide little to no pollutant reductions over permit requirements for in-state EGUs. Reductions are most likely to occur in out-of-state generators supplying electricity at retail in CT. Location of generator difficult to determine due to operation of electric grid and NEPOOL tight dispatch system. Demonstration of air quality benefit to CT nonattainment area challenging.
NOx	OTC-wide reduction of state NOx Budget caps	X			Without such a reduction or retirement of NOx allowances, the ability to take credit for emissions reductions for many other measures will be limited by our ability to demonstrate the reductions are surplus. What is the level of interest in pursuing this in the OTC?
NOx	Reductions on NOx RACT for non-NOx Budget units	X			Moderate-size industrial and commercial units. Reduction efforts could include emissions standards based on the OTC Model Rule for Additional NOx Control Measures, combustion modification requirements and standards for or encouragement of the use of CHP.