

**List of Emission Reduction Actions Which Might Be Used to Meet the
Emission Budgets in Ozone Early Action Compact Areas**
Third Draft for Tennessee Prepared by UT-CEE (2/20/03)

Emission Reduction Actions

1. Inspection and Maintenance Programs (with gas cap replacements)
2. Additional Controls on Electrical Utility Sources
(e.g. TVA's John Sevier Steam Plant)
3. Additional Controls on Industrial Sources
(e.g. VOC controls and low NO_x fuels & combustors)
4. Alternative Fuels for On-Road Mobile Sources
(e.g. ethanol, propane, or accelerate schedule for low sulfur fuels)
5. Low Emission Vehicles in Public & Private Fleets (LDVs & HDVs)
(e.g. ULEV & ZEV buses and fleets; tax exemptions for private fleets;
Permits and Air Quality Plan requirements of fleet owners)
6. Lower Speed Limit on Cars and Trucks
(i.e. from 70 to 55 mph on rural interstates)
7. Lower Speed Limit on Trucks Only (HDV's)
(i.e. from 70 to 55 mph on rural interstates)
8. Low NO_x Water Heaters (VOL)
9. Stage II Vapor Recovery at Gasoline Stations
10. Off-Road Mobile Sources, accelerate replacement of old equipment,
fuel switch to propane, or retrofit with catalytic converters and particulate traps.
Applies to compressors, dozers, graders, dump trucks, etc.
11. Lawnmower Rebate/Buy Back Program (VOL).
Could also apply to other small gasoline engine equipment.
12. Transportation Planning & Land Use Restrictions Designed to
Hold the VMT Growth Rate to the Population Growth Rate
(e.g. pay-as-you-drive insurance)
13. Incentive Programs to encourage purchase of ULEV/SULEV/ZEV vehicles (VOL)
(e.g. sales tax exemptions for purchasing ULEV/SULEV/ZEV vehicles)

The Following Actions are Transportations Control Measures (TCM's)
As Defined by the Clean Air Act –

14. Improve Transit (low emission buses and divert trips to transit)
15. Build High Occupancy Vehicle (HOV) Lanes with/without Park & Ride Lots
16. Traffic Flow Improvement Programs (e.g. traffic signal synchronization)
17. Area-wide Rideshare Incentives (VOL)
18. Parking Management with Preference to Car/Vanpools (VOL)
19. Work Schedule Changes to Reduce Peak Demands (VOL)
(Also restrictions on certain activities like construction/road-building).
20. Employer-based Transportation Management Plans (VOL)
21. Bike Trails and Bike Racks at Work Sites (VOL)
22. Pedestrian Greenways (VOL)
23. Truck Stop Electrification (VOL) to reduce idling HDDV
(Programs can also address other excess idling.)
24. Programs to Encourage Removal of Pre-1980 Vehicles & Super-emitters (VOL)
(e.g. remote sensing and scrappage programs, test impounded vehicles, deny registration to repeated I/M failures, enforce smoking vehicles, fund program with a license plate fee).
25. Land Use Programs to Enhance Emission Reductions
(e.g. roof color restrictions, landscaping without lawn-mowing, encourage trees)

Voluntary Actions are labeled (VOL): Emission credits from voluntary actions are limited to 3 percent of the emission reductions needed to achieve the NAAQS. The same actions, if mandated by law (i.e not voluntary) may possibly have emission reduction credits exceeding 3 percent. Voluntary or not, an analysis is required for each nonattainment area or early action compact area to estimate the emission reductions achievable with each emission reduction action.

**Preliminary Estimates of NO_x Emission Reductions Potentially Achievable in
Tennessee Ozone Early Action Compact (EAC) Areas**
First Draft - Prepared by UT-CEE (2/28/03)

Emission Reduction Actions	Area-wide Potential Reduction		Basis
	(Tons/Day)	(Percent)	
1. Inspection and Maintenance Programs (with gas cap replacements)	2.7	5% (2007) 35% (2025)	MOBILE6 Davidson Co.
2. Additional Controls on Electrical Utility Sources (e.g. TVA's John Sevier Steam Plant)	10–20/10,000 TPY Plant		LNB or SCR
3. Additional Controls on Industrial Sources (e.g. VOC controls and low NO _x fuels & combustors)		0.4 – 1.0%	GSU
4. Alternative Fuels for On-Road Mobile Sources (e.g. CNG & LNG yield 50% reductions in NO _x . Ethanol, propane, and biodiesel yield less reduction.)	0.06/100 Buses or 0.06/1000 Passenger Vehicles		EPA Fact Sheets
5. Low Emission Vehicles in Public & Private Fleets (LDVs & HDVs) (e.g. ULEV & ZEV buses and fleets; tax exemptions for private fleets; Permits and Air Quality Plan requirements of fleet owners)	0.06/100 Buses or 0.06/1000 Passenger Vehicles		MOBILE6 50% Reduc
6. Lower Speed Limit on Cars and Trucks (i.e. from 70 to 55 mph on rural interstates)	5.9	3.7%	Knox EAC MOBILE6
7. Lower Speed Limit on Trucks Only (HDV's) (i.e. from 70 to 55 mph on rural interstates)	5.74	3.6%	Knox EAC MOBILE6
8. Low NO _x Water Heaters (VOL)	NA	NA	NA

Emission Reduction Actions	Area-wide Potential Reduction		Basis
	(Tons/Day)	(Percent)	
9. Stage II Vapor Recovery at Gasoline Stations	0	0	VOC Only
10. Off-Road Mobile Sources, accelerate replacement of old equipment, fuel switch, or retrofit with catalytic converters and particulate traps. Applies to compressors, dozers, graders, dump trucks, etc.	9 (2006) 19 (2015)	1% 2.1%	Los Angeles Los Angeles
11. Lawnmower Rebate/Buy Back Program (VOL). Could also apply to other small gasoline engine equipment.	0.9 1.3	0.1% 0.2%	Los Angeles Atlanta/GSU
12. Transportation Planning & Land Use Restrictions Designed to Hold the VMT Growth Rate to the Population Growth Rate (e.g. pay-as-you-drive insurance)	NA	NA	NA
13. Incentive Programs to encourage purchase of ULEV/SULEV/ZEVs (VOL) (e.g. sales tax exemptions for purchasing ULEV/SULEV/ZEV vehicles)	0.06/100 Buses/Trucks 0.06/1000 Passenger Vehicles		MOBILE6 50% Reduc
The Following Actions are Transportations Control Measures (TCM's) As Defined by the Clean Air Act –			
14. Improve Transit (low emission buses and divert trips to transit)		0.25% per 1% Reduction in VMT	
15. Build High Occupancy Vehicle (HOV) Lanes with/without Park & Ride Lots		0.25% per 1% Reduction in VMT	
16. Traffic Flow Improvement Programs (e.g. traffic signal synchronization)	0.43	0.07%	AtlantaCMAQ
17. Area-wide Rideshare Incentives (VOL)		0.25% per 1% Reduction in VMT	
18. Parking Management with Preference to Car/Vanpools (VOL)		0.25% per 1% Reduction in VMT	

Emission Reduction Actions	Area-wide Potential Reduction		Basis
	(Tons/Day)	(Percent)	
19. Work Schedule Changes to Reduce Peak Demands (VOL) (Also restrictions on certain activities like construction/road-building).	0	0	NA
20. Employer-based Transportation Management Plans (VOL)		0.25% per 1% Reduction in VMT	
21. Bike Trails and Bike Racks at Work Sites (VOL)	0.018		Philadelphia CMAQ
22. Pedestrian Greenways (VOL)	Included in 21		
23. Truck Stop Electrification (VOL) to reduce idling HDDV (Programs can also address other excess idling.)	2.1		Los Angeles
24. Programs to Encourage Removal of Pre-1980 Vehicles & Super-emitters (e.g. remote sensing and scrappage programs, test impounded vehicles, deny registration to repeated I/M failures, enforce smoking vehicles, fund program with a license plate fee). (VOL)	0.03 per 1000 vehicles/year		EPA Doc
25. Land Use Programs to Enhance Emission Reductions (e.g. roof color restrictions, landscaping without lawn-mowing, encourage trees)	NA	NA	NA

Voluntary Actions are labeled (VOL): Emission credits from voluntary actions are limited to 3 percent of the emission reductions needed to achieve the NAAQS.

Abbreviations Used to Describe the Basis for the emission reduction estimates:

MOBILE6 = EPA's MOBILE6 emissions model.

LNB = Low NOx Burners with 37% NOx reduction.

SCR = Selective Catalytic Reduction with 75% NOx reduction.

GSU = Georgia State University study of emission reductions possible in the 13-County Atlanta Non-attainment Area

EPA Fact Sheets = EPA Fact Sheets on Alternative Fuels at: www.epa.gov/otaq/consumer/fuels/altfuels/altfuels.htm#fact

Footnotes Continued:

Knox EAC = Knoxville EAC multi-county area with 158 tons NO_x emissions per day.

Davidson Co. = Davidson County (only) with 54 tons/day of on-road mobile NO_x emissions.

VOC Only = Stage II controls effect only volatile organic compound emissions, not NO_x.

Los Angeles = Data taken from the South Coast Air Quality Management Districts Draft 2003 Air Quality Management Plan

(www.aqmd.gov/aqmp/#03aqmp)

CMAQ = Taken from the USEPA Report “*Summary Review of Costs and Emissions Information for 24 Congestion Mitigation and Air Quality Improvement Program Projects*” available at www.epa.gov/otaq/transp/traqmodl.htm

EPA Doc = Data taken from EPA Document “*Guidance for the Implementation of Accelerated Retirement of Vehicles Programs*” – EPA420-R-93-018.