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Summary of Point and Area Source Measures Quantification: NO_x

Measure #	Name	Short Description	Affected Sources (category, location)	Affected Emissions (tpd)	Expected Emissions Reduction		Est. Cost Effectiveness \$/ton
					Pct.	tpd	
68	Aggregate Kilns	Control of NO _x from Aggregate Kilns	Unknown	Unknown	50	Unknown	850
69	Brick Kilns	Control of NO _x from Brick Kilns	1 kiln located in Denton and 2 Kilns located in Parker County	0.3	50	0.13	790 to 1,920
96A	Stationary IC Engines	Replace engines with lower emitting units as older units are retired	Manufacturing, schools, universities, 9 counties	7.6	70-90%	6.3	\$187-\$5,100
143	NxEAT Software	Compliance assistance. install software to increase energy efficiency	Refineries & Chemical Plants, 9-counties	na	na	na	na
170	Small boilers & heaters	Replace boilers & heaters with better controlled units	Commercial and institutional buildings; 9 county)	Deferred to TCEQ measure development			
7	ICI Boilers	80% control of medium and large boilers	Reduce NO _x Emissions by 80 %, all 9 counties	1.5	25	1.2	960 to 6,880
9A	ICI Boilers	Control of NO _x from all sizes of ICI Boilers	Expand to 9 County DFW Area	0.24	70-avg.	0.15	960 to 10,090
9B	ICI Boilers	Control of NO _x from all sizes of ICI Boilers	Apply HGB Controls to 9 County DFW area	2.0	70-avg.	0.40	960 to 10,090
10	Refinery Boilers and Heaters	NO _x reductions from refinery boilers, steam generators, and process heaters	Process Heaters (all 9 counties)	0.52	80	0.41	2,430 to 16,400
70	Lime Kilns	Control of NO _x from Rotary Kilns	One Large Source in Johnson County	2.8	80	2.2	3,370
73	Alternate Energy Sources	Reduce EGU NO _x via reduced load	EGUs	Unk.	Unk.	Var. (avg. 1.84 lb/MWh avoided)	Var.

DRAFT

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56	Area Source Credits for Energy Conservation and Efficiency	Incentivise energy savings by providing emission credits	EGUs	Unk.	Unk.	Unk.	Unk.

DRAFT

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					Pct.	tpd	
21	Architectural & Industrial Coatings	Require low VOC coatings	Over 40 categories of coatings in 9-county area	32.7	21-38%	6.7-12.5	\$6,400-\$20,000
37	Consumer Products	Adopt CA Phase I and II rules as well as mid-term measures	Consumer product manufacturers, 9 counties	48.5	22.9%	11.1	\$4,800
109	Fuel Hose Permeation	Replace hoses with marine hoses	Gasoline refueling, Stage II; 9 county)	0.11	Up to 57%	0.06	\$14,000-\$16,000
41	Glycol Dehydrators	Control or recycle vented VOC	Natural gas production (all 9 counties)	0.47	Up to 95%	unknown	\$280-\$570
144	Oil & Gas Production	Better identify and repair leaking components	Oil & gas production and gas processing; 9 county)	Unknown, detailed inventory information not available	Up to 82%	Unknown	\$600 per ton
48	Cold Cleaning Regulations	Require low VOC solvent	Degreasing, cold cleaning (all industries; 9 county)	1.88	38%	0.71	< 1,400

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					Pct.	tpd
2, 3, 4, 8, 13, 31, 48, 47, 46, 44, 43, 42, 41, 40, 39, 7, 16, 23, 24, 25, 26, 27, 32, 33, 34, 35, 1, 18, 19, 20, 21, 22	Bicycle and Pedestrian	Infrastructure projects with various program support to maximize infrastructure usage.	North Texas Nonattainment Area light-duty vehicles	75.59	0.09%	0.07
54, 55, 59, 66, 70, 71, 73, 75, 78, 589, 53, 187	Clean Vehicle Programs	Clean Fleet Vehicle Procurement Policy/Clean Fleet Program, Financial Incentives for Clean Vehicles - Retrofit/replacement of on-road heavy-duty vehicles	North Texas Nonattainment Area heavy-duty vehicles	95.57	1.05-9.42%	1-9
102	Freeway Incident/Roadway Construction Management	Reduced Occurrence of Incidents - Freeway Bottleneck Removal Program	North Texas Nonattainment Area freeway vehicles	107.21	0.19%	0.2
102	Freeway Incident/Roadway Construction Management	Reduced Occurrence of Incidents - Arterial Bottleneck Removal Program	North Texas Nonattainment Area arterial vehicles	62.45	0.08%	0.05

DRAFT

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					Pct.	tpd
205, 211, 201, 203, 209, 210, 202, 206, 207, 212, 133, 134, 139, 141, 144, 145, 309, 84, 88, 89, 94, 92, 90, 93, 95, 97, 98, 99, 101, 100, 103, 300, 302, 310, 329, 330, 333, 346, 347, 348, 349, 353, 354	Intelligent Transportation Systems	Improvements to regional ITS architecture and various program support to maximize system performance.	North Texas Nonattainment Area freeway vehicles	107.21	0.21%	4.866
118	Fuel Standards	Lower Reid Vapor Pressure (6.8 to 6.5 psi)	North Texas Nonattainment Area gasoline vehicles	83.19	0%	0
173, 179, 182, 619	High-Emitting Vehicle Detection and Programs	AirCheck Texas Repair and Replacement Assistance Program	North Texas Nonattainment Area light-duty gasoline vehicles	75.59	0.30%	0.2249
172, 173, 179, 183, 185, 186, 190, 191, 192, 620	High-Emitting Vehicle Detection and Programs	Enhanced AirCheck Texas Repair and Replacement Assistance Program	North Texas Nonattainment Area light-duty gasoline vehicles	75.59		
150, 151, 152, 153, 161, 162	High-Occupancy Vehicle (HOV)/ Managed Lanes		North Texas Nonattainment Area freeway vehicles	107.21		

DRAFT

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					Pct.	tpd
223, 224, 225, 233, 234, 263, 264, 268, 269, 227, 228, 229, 230, 231, 232, 241, 242, 249, 250, 253	Parking Supply and Demand Strategies	Parking Cash-Out	North Texas Nonattainment Area light-duty vehicles	75.59	0.52%	0.39
273, 274, 278, 280, 283, 284, 286, 288, 289, 291, 29	Pricing Measures	Pay-As-You-Drive Insurance	North Texas Nonattainment Area light-duty vehicles	75.59	1.22%	0.92
295, 296, 297, 299	Pricing Measures	Congestion Pricing	North Texas Nonattainment Area freeway vehicles	107.21	N/A	N/A
TCEQ	Speed	Truck Speed Reduction	North Texas Nonattainment Area heavy-duty vehicles	95.57	3.40%	3.25
314, 315, 317, 318, 321	Sustainable and Transit-Oriented Development	Tax and Financial Strategies – transit pass incentives	North Texas Nonattainment Area light-duty vehicles	75.59		
350, 351, 352, 355, 356, 359, 360	Traffic Flow Improvements	Traffic Signal Improvements	North Texas Nonattainment Area arterial vehicles	62.45	1.78%	1.11
366	Traffic Management	Drive-Thru Service Restrictions	North Texas Nonattainment Area light-duty vehicle idling			0.0225-0.0416
405, 426, 373, 374, 375, 377, 381, 382, 384, 386, 407, 428, 390, 431, 427, 429, 387	Transit	Transit infrastructure with various program support to encourage use of infrastructure	North Texas Nonattainment Area light-duty vehicles	75.59	0.09%	0.067
TCEQ	Transit	Fare-Free Transit, System Wide on Ozone Action Days	North Texas Nonattainment Area light-duty vehicles	75.59	0.94%	0.711

DRAFT

Measure #	Name	Short Description	Affected Sources (category, location)	Affected Emissions (tpd)	Expected Emissions Reduction	
					Pct.	tpd
TCEQ	Transit	Transit Off-Peak Pass	North Texas Nonattainment Area light-duty vehicles	75.59	0.09%	0.067
496, 497, 499, 501, 503, 504, 508	Travel Demand Management – Regional Applications	Incentive Programs- Transit Subsidies	North Texas Nonattainment Area light-duty vehicles	75.59	0.49%	0.37
460, 461, 469, 473	Travel Demand Management - Employer Trip Reduction	Ridesharing - Carpooling	North Texas Nonattainment Area light-duty vehicles	75.59	0.03%	0.02
460, 461, 469, 473	Travel Demand Management - Employer Trip Reduction	Ridesharing- Vanpooling	North Texas Nonattainment Area light-duty vehicles	75.59	0.03%	0.023
463, 464, 465, 468, 470, 472, 476, 481, 482, 484, 493, 123, 124, 126, 128, 129, 128, 130,	Travel Demand Management - Employer Trip Reduction	Incentives for Employer Business Efforts - Best Workplaces for Commuters Program	North Texas Nonattainment Area light-duty vehicles	75.59	0.14%	0.104
496, 497, 499, 501, 503, 504, 508	Travel Demand Management – Regional Applications	Incentive Programs - Carsharing	North Texas Nonattainment Area light-duty vehicles	75.59	0.07%	0.056
551, 552, 553, 556, 555	Vehicle Emissions Standards	California Low Emitting Vehicle (LEV) II Standards	North Texas Nonattainment Area light-duty vehicles	75.59		
TCEQ	Vehicle Emissions Standards	CARB Zero Emission Vehicle (ZEV) Standards	North Texas Nonattainment Area light-duty vehicles	75.59		
TCEQ	Vehicle Emissions Standards	CARB 2007 On-Highway Diesel Engine Standards	North Texas Nonattainment Area diesel vehicles			

DRAFT

Measure #	Name	Short Description	Affected Sources (category, location)	Affected Emissions (tpd)	Expected Emissions Reduction	
					Pct.	tpd
583, 584, 586	Vehicle Idling	Idle Reduction Infrastructure	North Texas Nonattainment Area heavy-duty diesel vehicle idling			0.0627
573, 574, 575, 576, 577, 585, 572, 578, 579	Vehicle Idling Restrictions and Policies	Light-Duty Vehicle Idle Restrictions	North Texas Nonattainment Area light-duty vehicle idling			0.0206
573, 574, 575, 576, 577, 585, 572, 578, 579	Vehicle Idling Restrictions and Policies	Heavy-Duty Vehicle Idle Restrictions	North Texas Nonattainment Area heavy-duty diesel vehicle idling			.1180-.5430
589, 591, 605, 607, 608, 613	Vehicle Inspection and Maintenance	Policy	North Texas Nonattainment Area light-duty vehicles	75.59		
593, 594, 595, 601, 609, 610	Vehicle Inspection and Maintenance	Expanded I/M	North Texas Nonattainment Area diesel vehicles			
587, 590	Vehicle Inspection and Maintenance	Statewide Emissions Testing	North Texas Nonattainment Area light-duty vehicles	75.59		
TCEQ	Vehicle Inspection and Maintenance	I/M Pre-1975 Vehicle Exemption	North Texas Nonattainment Area light-duty vehicles	75.59		

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					Pct.	tpd
2, 3, 4, 8, 13, 31, 48, 47, 46, 44, 43, 42, 41, 40, 39, 7, 16, 23, 24, 25, 26, 27, 32, 33, 34, 35, 1, 18, 19, 20, 21, 22	Bicycle and Pedestrian	Infrastructure projects with various program support to maximize infrastructure usage.	North Texas Nonattainment Area light-duty vehicles	75.56	Not Quantified	Not Quantified
54, 55, 59, 66, 70, 71, 73, 75, 78, 589, 53, 187	Clean Vehicle Programs	Clean Fleet Vehicle Procurement Policy/Clean Fleet Program, Financial Incentives for Clean Vehicles - Retrofit/replacement of on-road heavy-duty vehicles	North Texas Nonattainment Area heavy-duty vehicles	5.72	Not Quantified	Not Quantified
102	Freeway Incident/Roadway Construction Management	Reduced Occurrence of Incidents - Freeway Bottleneck Removal Program	North Texas Nonattainment Area freeway vehicles	52.39	Not Quantified	Not Quantified
102	Freeway Incident/Roadway Construction Management	Reduced Occurrence of Incidents - Arterial Bottleneck Removal Program	North Texas Nonattainment Area arterial vehicles	43.43	Not Quantified	Not Quantified

DRAFT

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					Pct.	tpd
205, 211, 201, 203, 209, 210, 202, 206, 207, 212, 133, 134, 139, 141, 144, 145, 309, 84, 88, 89, 94, 92, 90, 93, 95, 97, 98, 99, 101, 100, 103, 300, 302, 310, 329, 330, 333, 346, 347, 348, 349, 353, 354	Intelligent Transportation Systems	Improvements to regional ITS architecture and various program support to maximize system performance.	North Texas Nonattainment Area freeway vehicles	52.39	3.79%	1.988
118	Fuel Standards	Lower Reid Vapor Pressure (6.8 to 6.5 psi)	North Texas Nonattainment Area gasoline vehicles	77.48	0.53-1.59%	0.41-1.23
173, 179, 182, 619	High-Emitting Vehicle Detection and Programs	AirCheck Texas Repair and Replacement Assistance Program	North Texas Nonattainment Area light-duty gasoline vehicles	75.56	0.02%	0.0125
172, 173, 179, 183, 185, 186, 190, 191, 192, 620	High-Emitting Vehicle Detection and Programs	Enhanced AirCheck Texas Repair and Replacement Assistance Program	North Texas Nonattainment Area light-duty gasoline vehicles	75.56		
150, 151, 152, 153, 161, 162	High-Occupancy Vehicle (HOV)/ Managed Lanes		North Texas Nonattainment Area freeway vehicles	52.39		

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					Pct.	tpd
223, 224, 225, 233, 234, 263, 264, 268, 269, 227, 228, 229, 230, 231, 232, 241, 242, 249, 250, 253	Parking Supply and Demand Strategies	Parking Cash-Out	North Texas Nonattainment Area light-duty vehicles	75.56	0.53%	0.4
273, 274, 278, 280, 283, 284, 286, 288, 289, 291, 29	Pricing Measures	Pay-As-You-Drive Insurance	North Texas Nonattainment Area light-duty vehicles	75.56	1.26%	.95
295, 296, 297, 299	Pricing Measures	Congestion Pricing	North Texas Nonattainment Area freeway vehicles	52.39	N/A	N/A
TCEQ	Speed	Truck Speed Reduction	North Texas Nonattainment Area heavy-duty freeway vehicles	5.72	-0.31%	-0.018
314, 315, 317, 318, 321	Sustainable and Transit-Oriented Development	Tax and Financial Strategies – transit pass incentives	North Texas Nonattainment Area light-duty vehicles	75.56		
350, 351, 352, 355, 356, 359, 360	Traffic Flow Improvements	Traffic Signal Improvements	North Texas Nonattainment Area arterial vehicles	43.43	7.07%	3.07
366	Traffic Management	Drive-Thru Service Restrictions	North Texas Nonattainment Area light-duty vehicle idling		Not Quantified	Not Quantified
405, 426, 373, 374, 375, 377, 381, 382, 384, 386, 407, 428, 390, 431, 427, 429, 387	Transit	Transit infrastructure with various program support to encourage use of infrastructure	North Texas Nonattainment Area light-duty vehicles	75.56	0.09%	0.068
TCEQ	Transit	Fare-Free Transit, System Wide on Ozone Action Days	North Texas Nonattainment Area light-duty vehicles	75.56	0.95%	0.715

DRAFT

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TCEQ	Transit	Transit Off-Peak Pass	North Texas Nonattainment Area light-duty vehicles	75.56	0.09%	0.067
496, 497, 499, 501, 503, 504, 508	Travel Demand Management – Regional Applications	Incentive Programs- Transit Subsidies	North Texas Nonattainment Area light-duty vehicles	75.56	0.05%	0.38
460, 461, 469, 473	Travel Demand Management - Employer Trip Reduction	Ridesharing - Carpooling	North Texas Nonattainment Area light-duty vehicles	75.56	0.03%	0.02
460, 461, 469, 473	Travel Demand Management - Employer Trip Reduction	Ridesharing- Vanpooling	North Texas Nonattainment Area light-duty vehicles	75.56	0.03%	0.026
463, 464, 465, 468, 470, 472, 476, 481, 482, 484, 493, 123, 124, 126, 128, 129, 128, 130,	Travel Demand Management - Employer Trip Reduction	Incentives for Employer Business Efforts - Best Workplaces for Commuters Program	North Texas Nonattainment Area light-duty vehicles	75.56	0.14%	0.107
496, 497, 499, 501, 503, 504, 508	Travel Demand Management – Regional Applications	Incentive Programs - Carsharing	North Texas Nonattainment Area light-duty vehicles	75.56	0.08%	0.058
551, 552, 553, 556, 555	Vehicle Emissions Standards	California Low Emitting Vehicle (LEV) II Standards	North Texas Nonattainment Area light-duty vehicles	75.56		
TCEQ	Vehicle Emissions Standards	CARB Zero Emission Vehicle (ZEV) Standards	North Texas Nonattainment Area light-duty vehicles	75.56		
TCEQ	Vehicle Emissions Standards	CARB 2007 On-Highway Diesel Engine Standards	North Texas Nonattainment Area diesel vehicles			

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					Pct.	tpd
583, 584, 586	Vehicle Idling	Idle Reduction Infrastructure	North Texas Nonattainment Area heavy-duty diesel vehicle idling		Not Quantified	Not Quantified
573, 574, 575, 576, 577, 585, 572, 578, 579	Vehicle Idling Restrictions and Policies	Light-Duty Vehicle Idle Restrictions	North Texas Nonattainment Area light-duty vehicle idling	75.56	Not Quantified	Not Quantified
573, 574, 575, 576, 577, 585, 572, 578, 579	Vehicle Idling Restrictions and Policies	Heavy-Duty Vehicle Idle Restrictions	North Texas Nonattainment Area heavy-duty diesel vehicle idling		Not Quantified	Not Quantified
589, 591, 605, 607, 608, 613	Vehicle Inspection and Maintenance	Policy	North Texas Nonattainment Area light-duty vehicles	75.56		
593, 594, 595, 601, 609, 610	Vehicle Inspection and Maintenance	Expanded I/M	North Texas Nonattainment Area diesel vehicles			
587, 590	Vehicle Inspection and Maintenance	Statewide Emissions Testing	North Texas Nonattainment Area light-duty vehicles	75.56		
TCEQ	Vehicle Inspection and Maintenance	I/M Pre-1975 Vehicle Exemption	North Texas Nonattainment Area light-duty vehicles	75.56		

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Summary of Off-Road NO_x Reduction Measures

Measure ID	Name	Description	Affected Source	Affected Emissions	Expected Emission Reduction		Cost Effectiveness (\$/ton)
					%	tpd	
28	Enhanced TERP program	Continue and increase TERP funded projects	Offroad without aircraft	99 tpd NO _x	25 – 50%	25 – 50	\$5,000 – \$10,000
3, 9	Aircraft Emissions Standards	Encourage lower emitting aircraft	Nonroad Aircraft	21 tpd NO _x	15 – 30%	3 – 6	Unknown
37, 38, 39, 41	Emission Reduction Contract Incentives with Public Funding	Encourage lower emitting engines used on Publicly-funded projects	Nonroad Construction – Public Funded Projects	6 tpd NO _x	20	1	<\$14,000
42	Limitations on idling of heavy-duty construction equipment	Reduce Idling from construction and all nonroad engines	Nonroad	40 – 72 tpd NO _x	1.4	0.5 – 1	\$4,000 - \$40,000
72	Hybrid-electric locomotives	TERP funded Green Goat	Nonroad – switching locomotive	8 tpd NO _x	75 – 90%	1.0 – 1.5	<\$5,000
73	Tier II	Tier II Locomotives	Nonroad – locomotive	7.9 - 26.8 tpd NO _x	30 – 50%	4 - 9.6	≥ \$5,000
75	Rail Efficiency	System efficiency improvement	Line-haul locomotives	18.9 tpd NO _x	4 – 16%	0.8 - 3	Unknown
79	Locomotive Idling Reductions	Install start/stop devices on locomotives	Nonroad – switching locomotive	26.8 tpd NO _x	5 – 30%	0.6-3	<\$1,000
87	California Portable Engine Rule	Registration and accelerated engine turnover	Nonroad engines	72 tpd NO _x	1-2%	1	\$200 – \$300
Tower 55	Rail Infrastructure Improvements	Reduce RR engine idling by increasing capacity at Tower 55	Nonroad – locomotives	?	n/a	0.35	\$51,914
63-66	Lawn & Garden Engines and Operations	Incentives for residential equipment upgrades	Nonroad – residential lawn & garden	? tpd VOC		0.56	\$3,000 - \$10,000