TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Characterization of Vehicle Activity and Emissions From Heavy-Duty Diesel Vehicles in Texas

Prepared by the Texas Transportation Institute

August 2011

CHARACTERIZATION OF VEHICLE ACTIVITY AND EMISSIONS FROM HEAVY-DUTY DIESEL VEHICLES IN TEXAS

REVISED FINAL

Prepared for the
Texas Commission on Environmental Quality
Air Quality Planning and Implementation Division

Prepared by the
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Task 4 – Emission Inventory of Emissions by Pass-Through and Local HDDVs
For 2008 through 2030

August 2011

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TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

With the anticipated U.S. Environmental Protection Agency's (EPA) announcement of a revised ozone standard, Texas is expected to have more areas designated as nonattainment. Local Texas control programs only have an effect on the vehicle miles traveled (VMT) produced by locally registered heavy-duty diesel vehicles (HDDVs). Knowing the limit on rule effectiveness due to non-local vehicles traveling into Texas provides information to better estimate control program emissions reductions and the possible need for additional programs.

The purpose of this project is to estimate the VMT proportions of pass-through HDDVs, or combination trucks (long-haul and short-haul), and other local HDDVs that would affect local control programs in Texas. The Texas Transportation Institute (TTI) estimated the total summer weekday emissions produced by the HDDVs from the 2008 through 2030 analysis years in the current and potential nonattainment areas. This was achieved by comparing local versus non-local, including in-state versus out-of-state, VMT produced by HDDVs.

These VMT proportions and emissions estimates provide the Texas Commission on Environmental Quality (TCEQ) with the information to assess, evaluate, and forecast the effectiveness of local, regional, and statewide control strategies for HDDVs. This information will also assist TCEQ in analyzing the rule effectiveness of local Texas control programs for HDDVs.

BACKGROUND

Diesel engines emit large amounts of oxides of nitrogen (NO_x) and particulate matter (PM). The accuracy of estimating NO_x, an ozone precursor, and PM is critical for state implementation plan (SIP) modeling and control strategy development. TCEQ is in the process of preparing for the revised ozone National Ambient Air Quality Standards (NAAQS). This project is part of the effort to ensure that accurate and detailed mobile source emissions inventories are produced on a schedule to ensure availability of all inventories required to support SIP development and overall TCEQ planning activities. HDDVs are significant NO_x contributors in metropolitan areas throughout Texas. Therefore, it is necessary to separate HDDVs that are operated and registered locally from those that pass-through the areas of consideration. Current data sets allow for satisfactory estimates of overall HDDVs activity but are not able to distinguish between local and pass-through HDDVs. Quantifying this difference between local and non-local HDDVs would also be essential for estimating the magnitude of possible control strategies affecting local HDDVs.

This project is a follow-up to a project from fiscal year (FY) 2004 completed by Cambridge Systematics for TCEQ that studied the activity from the pass-through HDDVs within each of the major Texas metropolitan areas. It is also a follow-up tp a study completed in FY 2008 by TTI for TCEQ that performed a preliminary review of HDDV activity from long-haul pass-through trucks. Based on the previous experiences, time, and budget, the best approach for this project is to use the Texas Department of Transportation (TxDOT) data and source use type methodology developed by TTI in the project entitled, "*Methodologies for Conversion of Data Sets for MOVES Model Compatibility,*" completed for TCEQ in August 2009.

ACKNOWLEDGMENTS

Dennis Perkinson, Ph.D., Martin Boardman, L.D. White, and Jason Beesinger, of TTI, contributed to the development of the MOVES emissions factors and estimates. Dr. Perkinson produced the VMT mixes used to divide fleet VMT activity into MOVES SUT categories, and county VMT control totals. Gary Lobaugh, of TTI, was responsible for editing, design, and production of this Technical Note. Each member of the assigned TTI staff contributed to the quality assurance of the emissions analysis. Dr. Perkinson was the principle investigator for this project. This work was performed by TTI under contract to TCEQ. Kritika Thapa was the TCEQ project technical manager. She was assisted by Mary McGarry-Barber also of TCEQ.

TASK 2 – ESTIMATION OF PROPORTIONS OF PASS-THROUGH AND LOCAL HDDVS BY DETERMINING PROPORTIONS OF LOCAL VERSUS NON-LOCAL AND IN-STATE VERSUS OUT-OF-STATE HDDVS

The purpose of this task is not to estimate the actual vehicle counts but the proportions of vehicle types within the four MOVES roadway types – rural restricted access, rural unrestricted access, urban restricted access, and urban unrestricted access – using most recent available official TxDOT weekday vehicle classification count data. Vehicles that are not registered within the region are considered non-local. The classification as local or non-local involves separating observed vehicle classification counts by those attributable to vehicles registered in each regional area from the total observed based on existing data. All the HDDVs in the MOVES source use types listed in Table 1 are included in the analysis.

Table 1. MOVES HDDV Vehicle Definitions.

Category	MOVES Designation	Code
Combination Trucks	Combination Short-Haul 61	CSH61D
	Combination Long-Haul 62	CLH62D
Single Unit Trucks	Single Unit Short-Haul 52	SUSH52D
	Single Unit Long-Haul 53	SULH53D
	Motor Home 54	MH54D
	Refuse Truck 51	RFT51D
Buses	Transit Bus 42	TB42D
	School Bus 43	SB43D

Based on the definition of source use type, VMT for refuse trucks, transit buses, and school buses is local. Therefore, these vehicles are not separated into short-haul and long-haul. Conversely, motor homes are treated as entirely external. However, these are included in this analysis for completeness. The latest available data was used to estimate the proportion of local versus non-local HDDVs. This task includes current and possible nonattainment areas, and statewide, as defined in the following.

- 5-county Austin-Round Rock area (Bastrop, Caldwell, Hays, Travis, and Williamson counties);
- 3-county Beaumont-Port Arthur area (Hardin, Jefferson, and Orange counties);
- 2-county Corpus Christi area (Nueces and San Patricio counties);
- 12-county Dallas-Fort Worth area (Collin, Hunt, Hood, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Wise and Tarrant counties);
- El Paso area (El Paso County);
- 8-county Houston-Galveston-Brazoria area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties);
- Laredo area (Webb County);
- Lower Rio Grande Valley area (Cameron County);
- McAllen-Edinburg-Mission area (Hidalgo County);
- 5-county Northeast Texas area (Gregg, Harrison, Rusk, Smith, and Upshur counties);
- 4-county San Antonio area (Bexar, Comal, Guadalupe, and Wilson counties);
- Victoria area (Victoria County);
- Waco area (McLennan County); and
- An aggregate statewide region.

VMT MIX EQUIVALENT IN MOVES

"Fleet" and "activity" data are critical elements of the emissions estimation process. Fleet data refers to information characterizing the vehicle fleet such as population estimates, age distributions, survival rates, sales growth rates, and distribution across "source bins" used to estimate energy and emissions. Activity data refers to information characterizing how the fleet operates, such as VMT, VMT growth, average speed distributions, and driving patterns.

MOVES uses a "modal" approach to estimating energy and emissions based on discrete vehicle power bins, and characterizes energy rates on a time basis (e.g., grams per hour) instead of the traditional mile basis (e.g., grams per mile). This approach requires the assignment of activity data into modal bins, and for conversions of mile-based activity data (VMT) to time-based activity data (e.g., source hours operated [SHO]).

Under MOVES, vehicles are characterized both according to activity patterns and energy/emissions performance, and are mapped internal to the model. Thus, the model uses data for both the activity and energy/emissions methods of characterization.

On the activity side, vehicles are grouped into "Source Use Types," or use types, defined as groups expected to have unique activity patterns. Because HPMS data are a fundamental source of activity, the MOVES use types are defined as subsets of the HPMS vehicle classifications. The majority of MOVES-related activity data are based on these classifications. Table 2 provides a summary of the MOVES Fuel Types and Table 4 shows the MOVES Source Use Types (SUTs).

Table 2. MOVES Fuel Type Definitions.

Code	Fuel Type
1	Gasoline
2	Diesel
3	Compressed Natural Gas (CNG)
4	Liquid Propane Gas (LPG)
5	Ethanol (E85 or E95)
6	Methanol (M85 or M95)
7	Gaseous Hydrogen
8	Liquid Hydrogen
9	Electricity

TxDOT classification counts classify vehicles into the standard FHWA vehicle classifications (based on vehicle length/number of axles) using best practice vehicle classification count methods. (Table 3).

Table 3.FHWA Vehicle Classifications

Code	Description
C	Passenger vehicles
P	Two-axle, four-tire single-unit trucks
B	Buses
SU2	Six-tire, two-axle single-unit vehicles
SU3	Three-axle single-unit vehicles
SU4	Four or more axle single-trailer vehicles
SE4	Three or four axle single-trailer vehicles
SE5	Five-axle single-trailer vehicles
SE6	Six or more angle single-trailer vehicles
SD5	Five or less axle multi-trailer vehicles
SD6	Six-axle multi-trailer vehicles
SD7	Seven or more axle multi-trailer vehicles

Table 4. MOVES Source Use Type Definitions.

HPMS Class	MOVES Source Use Type	Description
Passenger Cars	21 Passenger Car	All
Other 2 Axle / 4 Tire Vehicles	31 Passenger Truck	Mini-van, pick-up, etc., used primarily for personal transportation
	32 Light Commercial Truck	Mini-van, pick-up, etc., used primarily for commercial applications. Different annual mileage and hours of operation.
Single-Unit Trucks	51 Refuse truck	Garbage and recycling trucks. Different schedule, roadway, and hours of operation.
	52 Single-Unit Short-Haul	Single-unit trucks with the majority of operation within 200 miles of base.
	53 Single-Unit Long-Haul	Single-unit trucks with the majority of operation outside of 200 miles of base.
	54 Motor Home	All
Buses	41 Intercity Bus	City-to-city buses. Not transit or school buses.
	42 Transit Bus	Buses used for public transit.
	43 School Bus	School and church buses.
Combination Trucks	61 Combination Short-Haul	Combination trucks with the majority of operation within 200 miles of base.
	62 Combination Long-Haul	Combination trucks with the majority of operation beyond 200 miles of base.
Motorcycles	11 Motorcycle	All

TTI uses the original HPMS categories contained in the TxDOT classification counts. This approach defines MOVES SUT parameters that are unique to regional conditions. There are activity parameters and fuel type parameters. Table 5 and Table 6 show a summary of the activity and fuel type parameters, followed by Table 7 that presents a summary of the road type equivalents.

Table 5. Summary of Critical MOVES Source Use Type Activity Parameters.

MOVES Activity Parameter	Method
Passenger Vehicle versus Light Commercial	MOVES Default
Single-Unit Short-Haul versus Long-Haul	Registration versus Observed
Refuse Truck and Motor Home	MOVES Default
Combination Short-Haul versus Long-Haul	Registration versus Observed
Motorcycles	Nominal

Table 6. Summary of Critical MOVES Source Use Type Fuel Parameters.

MOVES Fuel Parameter	Method
Passenger Vehicle and Light Commercial Truck	Registration and MOVES Default
Single-Unit and Combination Truck	Registration
Refuse Truck, Motor Home, and Bus	MOVES Default

Table 7. Summary of MOVES Road Type Equivalents.

MOVES Road Type	HPMS Roadway Functional Classification
2 – Rural Restricted Access	1 – Rural Interstate
3 – Rural Unrestricted Access	2 – Rural Principal Arterial (Other) 6 – Rural Minor Arterial 7 – Rural Major Collector 8 – Rural Minor Collector
4 – Urban Restricted Access	11 – Urban Principal Arterial (Interstate) 12 – Urban Principal Arterial (Other Freeway)
5 – Urban Unrestricted Access	14 – Urban Principal Arterial (Other) 16 – Urban Minor Arterial 17 – Urban Collector

Texas registration data from TxDOT provides the basis for assessing both the short-haul versus long-haul aspects of fleet activity and fuel. For short-haul versus long-haul, the proportion of VMT attributable to a category of vehicles registered in a given area (e.g., regions as defined by member counties) is compared with the proportion of vehicles in that category observed (i.e., reflected in the classification counts). The locally-registered VMT is assumed to approximate short-haul activity, while the remainder is assumed to approximate long-haul activity (i.e., from outside the area). This calculation is performed for the two sub-fleets of interest (single units and combination trucks, see Table 8 and Table 9).

For single unit and combination trucks, fuel type is taken directly from the TxDOT registration data and applied in substantially the same manner as with MOBILE6. However, for the passenger vehicle group, no such information is available. For this group of vehicles (passenger vehicles and passenger trucks), a combination of model year distribution for TxDOT registration data and MOVES fuel fraction by model year is used, creating a Texas area-specific application of national passenger vehicle fuel type. This is a direct application of MOVES default values by model year. In MOVES, refuse trucks and motor homes are added, along with the passenger truck/light commercial split. The MOVES national defaults are used.

Future fleet age is not available, however, future fuel fractions are available. These are applied to reflect the analysis year. (Note that only gasoline and diesel fuels are included. Others are implicitly treated as *de minimus* at this time.)

Finally, road type under MOVES maps directly to the current roadway functional classifications used for the classification count data. No further manipulation is necessary, beyond the simple re-definition shown in Table 7.

This procedure provides a functional region-specific dissaggregate virtual link-level application of MOVES as currently configured. Figure 1 summarizes the computational process. Following is the detailed procedure. (Appendix G shows the definitions of the Federal Highway Administration [FHWA] vehicle categories and Table 1 shows the MOVES SUT definitions).

Basic Process Flow Outline

1. MOVES – Data files of MOVES default values extracted from MOVES databases or pro forma runs.

2. TxDOT Classification Counts – Data files of standard TxDOT classification data assembled and used for determining the in-use road fleet mix.

3. TxDOT Registration Data – Data files of standard TxDOT/DMV vehicle registration summary data assembled and used for determining the in-use road fleet mix.

4. Day of Week Factors by Urban Area – Data files of TxDOT Automatic Traffic Recorder data assembled and used to allocate VMT by season and day of week.

5. AgeReg_09X – Registration data files extracted for allocation of passenger vehicle and light truck fuel.

6. SUX_HDV9 – Procedure to separate Single Unit versus Combined Unit trucks by region based on registration data and classification counts.

7. SUX_HDX9 – Procedure to generate short haul and long haul combination truck proportions based on registration data. Short and long haul redefined as local and pass through for this application.

8. SUX_SSHZ – Procedure to separate single unit short haul versus single unit long haul using factors generated at SUX_HDV9. Short and long haul redefined as local and pass through for this application.

9. SUX_CSHZ – Procedure to separate combined short haul versus combined long haul using factors generated at SUX_HDX9. Short and long haul redefined as local and pass through for this application.

10. MX_Fuelyy – Procedure to generate passenger vehicle and light truck fuel allocation by year based on registration data.

11. SUX_HDV9 – Procedure to generate single unit and combined truck fuel allocation factors from registration data.

12. SUX_yydd – Procedure to generate Source Use Type proportions by year and day type.

13. Output file of MOVES Source Use Types by Region and Year.

Consistent with the Trends analysis, SUTs are estimated for multiple periods. Summaries of the proportion of SUTs of interest are provided for each period by road type by region. A total Short-Haul Diesel (SHD) is also provided. Full fleet proportions are used for estimating emissions.

Process Flow Summary

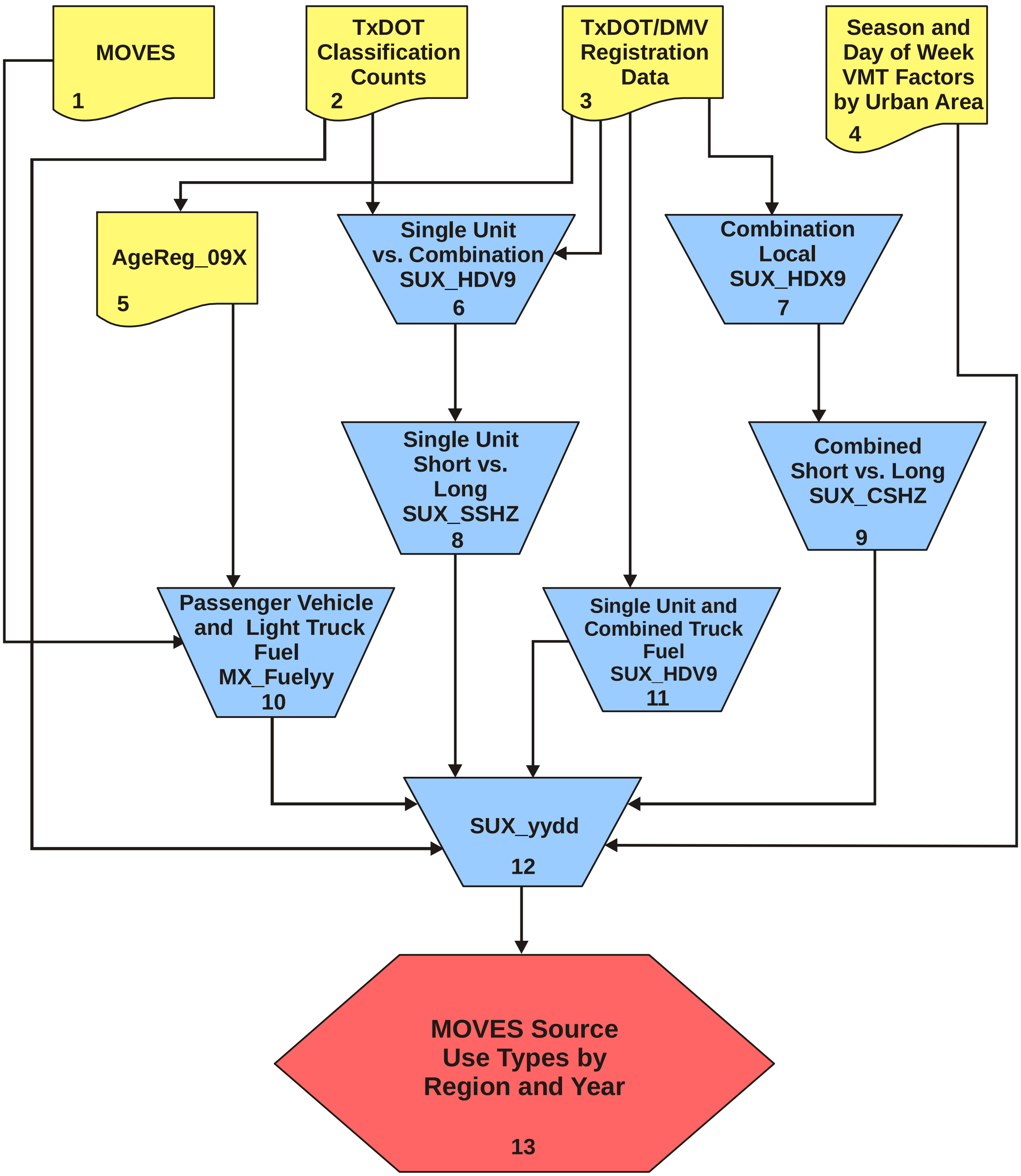


Figure 1. Computational Process Flow for Estimating MOVES Source Use Types.

Table 8. Local Diesel Category/SUT Definitions.

Source Use Type Description	Source Use Type Abbreviation[1]
Transit Bus	TB42D
School Bus	SB43D
Refuse Truck	RFT51D
Single Unit Short-Haul Truck	SUSH52D
Combination Short-Haul Truck	CSH61D

[1] The source use type/fuel type (SUT/fuel type) labels are the SUT abbreviation, the MOVES numeric ID number, and fuel type designation, e.g., RFT51D and SB43D are diesel-powered refuse trucks and diesel-powered school buses.

Table 9. Pass-Through Diesel Category/SUT Definitions.

Source Use Type Description	Source Use Type Abbreviation[1]
Single Unit Long-Haul Truck	SULH53D
Motor Home	MH54D
Combination Long-Haul Truck	CLH62D

[1] The SUT/fuel type labels are the SUT abbreviation, the MOVES numeric ID number, and fuel type designation, e.g., SULH53D and MH54D are diesel-powered single unit long-haul trucks and diesel-powered motor homes.

Table 10. Selected Source Use Type Proportions by Region and MOVES Road Type (2008 - 2019)

Obs	Region	RT	P_SUSH52D	P_SULH53D	P_RFT51D	P_MH54D	P_TB42D	P_SB43D	P_CSH61D	P_CLH62D	Local	Pass Through
1	Austin	RT2	0.02131	0.00234	0.00046	0.00119	0.00039	0.00135	0.04471	0.05144	0.06821	0.05497
2	Austin	RT3	0.02842	0.00312	0.00061	0.00159	0.00035	0.00122	0.01721	0.01981	0.04781	0.02451
3	Austin	RT4	0.02159	0.00237	0.00046	0.00120	0.00036	0.00126	0.02628	0.03024	0.04995	0.03382
4	Austin	RT5	0.00870	0.00096	0.00019	0.00049	0.00027	0.00094	0.00143	0.00165	0.01153	0.00309
5	BPA	RT2	0.03490	0.00211	0.00071	0.00186	0.00067	0.00232	0.06302	0.12582	0.10162	0.12979
6	BPA	RT3	0.03914	0.00237	0.00080	0.00209	0.00057	0.00199	0.02244	0.04480	0.06493	0.04926
7	BPA	RT4	0.03137	0.00190	0.00064	0.00167	0.00057	0.00200	0.04760	0.09504	0.08218	0.09861
8	BPA	RT5	0.02812	0.00170	0.00057	0.00150	0.00049	0.00170	0.00946	0.01888	0.04034	0.02208
9	Corpus	RT3	0.03711	0.00417	0.00079	0.00208	0.00063	0.00219	0.07200	0.07880	0.11272	0.08504
10	Corpus	RT4	0.02829	0.00318	0.00061	0.00158	0.00036	0.00125	0.01440	0.01576	0.04490	0.02052
11	Corpus	RT5	0.02879	0.00323	0.00062	0.00161	0.00041	0.00144	0.00331	0.00362	0.03457	0.00846
12	DFW	RT2	0.02391	0.00214	0.00050	0.00131	0.00029	0.00102	0.06754	0.09385	0.09326	0.09729
13	DFW	RT3	0.03411	0.00305	0.00072	0.00187	0.00023	0.00081	0.05573	0.07744	0.09160	0.08235
14	DFW	RT4	0.01897	0.00169	0.00040	0.00104	0.00019	0.00066	0.02483	0.03450	0.04504	0.03723
15	DFW	RT5	0.01614	0.00144	0.00034	0.00088	0.00029	0.00100	0.00863	0.01200	0.02640	0.01432
16	ELP	RT2	0.01954	0.00165	0.00041	0.00107	0.00050	0.00173	0.04716	0.09263	0.06933	0.09535
17	ELP	RT3	0.01060	0.00090	0.00022	0.00058	0.00161	0.00562	0.01154	0.02267	0.02960	0.02414
18	ELP	RT4	0.01578	0.00133	0.00033	0.00086	0.00024	0.00084	0.01895	0.03722	0.03613	0.03941
19	ELP	RT5	0.01610	0.00136	0.00034	0.00088	0.00064	0.00224	0.00875	0.01718	0.02806	0.01942
20	Houston	RT2	0.02272	0.00267	0.00049	0.00128	0.00030	0.00106	0.04946	0.04505	0.07403	0.04900
21	Houston	RT3	0.03195	0.00375	0.00069	0.00179	0.00036	0.00125	0.03193	0.02908	0.06617	0.03462
22	Houston	RT4	0.01871	0.00220	0.00040	0.00105	0.00041	0.00144	0.01930	0.01758	0.04026	0.02082
23	Houston	RT5	0.02220	0.00260	0.00048	0.00125	0.00045	0.00156	0.01047	0.00953	0.03514	0.01338
24	LRGV	RT3	0.02244	0.00266	0.00048	0.00126	0.00042	0.00147	0.03181	0.04111	0.05662	0.04503
25	LRGV	RT4	0.02414	0.00286	0.00052	0.00136	0.00058	0.00202	0.03066	0.03962	0.05791	0.04384
26	LRGV	RT5	0.01183	0.00140	0.00025	0.00067	0.00036	0.00125	0.00488	0.00631	0.01858	0.00838
27	Laredo	RT2	0.03450	0.00325	0.00073	0.00190	0.00101	0.00351	0.10088	0.11591	0.14063	0.12105
28	Laredo	RT3	0.04570	0.00430	0.00096	0.00251	0.00130	0.00456	0.05458	0.06271	0.10710	0.06952
29	Laredo	RT4	0.02574	0.00242	0.00054	0.00142	0.00055	0.00192	0.01704	0.01958	0.04578	0.02341
30	Laredo	RT5	0.05845	0.00550	0.00123	0.00321	0.00028	0.00098	0.06473	0.07436	0.12566	0.08308
31	SA	RT2	0.03006	0.00330	0.00064	0.00168	0.00049	0.00170	0.06889	0.08475	0.10178	0.08973
32	SA	RT3	0.03873	0.00426	0.00083	0.00216	0.00056	0.00197	0.02431	0.02990	0.06640	0.03632
33	SA	RT4	0.02123	0.00233	0.00045	0.00118	0.00035	0.00121	0.02240	0.02756	0.04565	0.03108
34	SA	RT5	0.01589	0.00175	0.00034	0.00089	0.00047	0.00165	0.01167	0.01436	0.03003	0.01699
35	Tyler	RT2	0.03262	0.00154	0.00066	0.00172	0.00051	0.00177	0.09490	0.18151	0.13046	0.18477
36	Tyler	RT3	0.03480	0.00164	0.00070	0.00183	0.00031	0.00110	0.02398	0.04587	0.06090	0.04934
37	Tyler	RT4	0.02958	0.00139	0.00060	0.00156	0.00051	0.00179	0.07103	0.13587	0.10351	0.13882
38	Tyler	RT5	0.02515	0.00119	0.00051	0.00132	0.00021	0.00072	0.01850	0.03539	0.04509	0.03790
39	Valley	RT3	0.01827	0.00192	0.00039	0.00102	0.00062	0.00218	0.02030	0.02741	0.04176	0.03034
40	Valley	RT4	0.02131	0.00224	0.00045	0.00118	0.00045	0.00158	0.02036	0.02749	0.04416	0.03091
41	Valley	RT5	0.01705	0.00179	0.00036	0.00095	0.00034	0.00118	0.01920	0.02592	0.03813	0.02866
42	Victoria	RT3	0.04771	0.00256	0.00097	0.00253	0.00078	0.00271	0.05386	0.08066	0.10602	0.08576
43	Victoria	RT5	0.04658	0.00250	0.00094	0.00247	0.00090	0.00313	0.07473	0.11191	0.12628	0.11688
44	Waco	RT3	0.02530	0.00196	0.00052	0.00137	0.00038	0.00134	0.02205	0.03596	0.04961	0.03930
45	Waco	RT4	0.02312	0.00179	0.00048	0.00125	0.00034	0.00117	0.04542	0.07407	0.07053	0.07712
46	Waco	RT5	0.01652	0.00128	0.00034	0.00089	0.00024	0.00082	0.00601	0.00980	0.02393	0.01198
47	State	RT2	0.02848	0.00218	0.00059	0.00154	0.00051	0.00179	0.07929	0.11642	0.11067	0.12014
48	State	RT3	0.03795	0.00290	0.00079	0.00205	0.00050	0.00175	0.04154	0.06099	0.08253	0.06595
49	State	RT4	0.02160	0.00165	0.00045	0.00117	0.00032	0.00113	0.02299	0.03376	0.04649	0.03658
50	State	RT5	0.02114	0.00162	0.00044	0.00114	0.00036	0.00125	0.01332	0.01955	0.03650	0.02231

Note: Table 10 and Table 11 list the SUTs local (short haul) and pass through (long haul) groups, respectively.

Table 11. Selected Source Use Type Proportions by Region and MOVES Road Type (2020 - 2030)

Obs	Region	RT	P_SUSH52D	P_SULH53D	P_RFT51D	P_MH54D	P_TB42D	P_SB43D	P_CSH61D	P_CLH62D	Local	Pass Through
1	Austin	RT2	0.02154	0.00237	0.00023	0.00116	0.00035	0.00135	0.04471	0.05144	0.06818	0.05497
2	Austin	RT3	0.02873	0.00316	0.00030	0.00155	0.00032	0.00122	0.01721	0.01981	0.04779	0.02451
3	Austin	RT4	0.02182	0.00240	0.00023	0.00118	0.00033	0.00126	0.02628	0.03024	0.04992	0.03382
4	Austin	RT5	0.00879	0.00097	0.00009	0.00048	0.00025	0.00094	0.00143	0.00165	0.01151	0.00309
5	BPA	RT2	0.03528	0.00213	0.00036	0.00182	0.00061	0.00233	0.06302	0.12582	0.10159	0.12978
6	BPA	RT3	0.03956	0.00239	0.00040	0.00204	0.00052	0.00199	0.02244	0.04480	0.06491	0.04924
7	BPA	RT4	0.03171	0.00192	0.00032	0.00164	0.00052	0.00200	0.04760	0.09504	0.08215	0.09859
8	BPA	RT5	0.02842	0.00172	0.00029	0.00147	0.00045	0.00171	0.00946	0.01888	0.04032	0.02206
9	Corpus	RT3	0.03751	0.00421	0.00040	0.00203	0.00057	0.00219	0.07200	0.07880	0.11267	0.08505
10	Corpus	RT4	0.02859	0.00321	0.00030	0.00155	0.00033	0.00125	0.01440	0.01576	0.04487	0.02052
11	Corpus	RT5	0.02910	0.00327	0.00031	0.00158	0.00038	0.00145	0.00331	0.00362	0.03454	0.00846
12	DFW	RT2	0.02416	0.00216	0.00025	0.00128	0.00027	0.00102	0.06754	0.09385	0.09324	0.09729
13	DFW	RT3	0.03447	0.00308	0.00036	0.00183	0.00021	0.00081	0.05573	0.07744	0.09158	0.08234
14	DFW	RT4	0.01917	0.00171	0.00020	0.00102	0.00017	0.00066	0.02483	0.03450	0.04503	0.03723
15	DFW	RT5	0.01631	0.00146	0.00017	0.00086	0.00026	0.00100	0.00863	0.01200	0.02638	0.01432
16	ELP	RT2	0.01974	0.00167	0.00020	0.00104	0.00045	0.00174	0.04716	0.09263	0.06930	0.09535
17	ELP	RT3	0.01072	0.00091	0.00011	0.00057	0.00147	0.00563	0.01154	0.02267	0.02947	0.02414
18	ELP	RT4	0.01595	0.00135	0.00016	0.00084	0.00022	0.00084	0.01895	0.03722	0.03612	0.03941
19	ELP	RT5	0.01627	0.00138	0.00017	0.00086	0.00059	0.00224	0.00875	0.01718	0.02802	0.01942
20	Houston	RT2	0.02296	0.00269	0.00024	0.00125	0.00028	0.00106	0.04946	0.04505	0.07401	0.04900
21	Houston	RT3	0.03229	0.00379	0.00034	0.00176	0.00033	0.00125	0.03193	0.02908	0.06614	0.03463
22	Houston	RT4	0.01891	0.00222	0.00020	0.00103	0.00038	0.00144	0.01930	0.01758	0.04023	0.02082
23	Houston	RT5	0.02243	0.00263	0.00024	0.00122	0.00041	0.00156	0.01047	0.00953	0.03511	0.01339
24	LRGV	RT3	0.02268	0.00269	0.00024	0.00123	0.00039	0.00147	0.03181	0.04111	0.05659	0.04503
25	LRGV	RT4	0.02439	0.00289	0.00026	0.00133	0.00053	0.00203	0.03066	0.03962	0.05787	0.04384
26	LRGV	RT5	0.01196	0.00142	0.00013	0.00065	0.00033	0.00126	0.00488	0.00631	0.01855	0.00838
27	Laredo	RT2	0.03487	0.00328	0.00036	0.00186	0.00092	0.00352	0.10088	0.11591	0.14056	0.12105
28	Laredo	RT3	0.04619	0.00435	0.00048	0.00246	0.00120	0.00457	0.05458	0.06271	0.10701	0.06952
29	Laredo	RT4	0.02601	0.00245	0.00027	0.00139	0.00050	0.00192	0.01704	0.01958	0.04575	0.02341
30	Laredo	RT5	0.05907	0.00556	0.00062	0.00315	0.00026	0.00098	0.06473	0.07436	0.12564	0.08307
31	SA	RT2	0.03039	0.00334	0.00032	0.00164	0.00045	0.00170	0.06889	0.08475	0.10174	0.08973
32	SA	RT3	0.03914	0.00430	0.00041	0.00211	0.00052	0.00198	0.02431	0.02990	0.06636	0.03632
33	SA	RT4	0.02146	0.00236	0.00023	0.00116	0.00032	0.00121	0.02240	0.02756	0.04562	0.03108
34	SA	RT5	0.01606	0.00176	0.00017	0.00087	0.00043	0.00166	0.01167	0.01436	0.02999	0.01699
35	Tyler	RT2	0.03297	0.00155	0.00033	0.00168	0.00047	0.00178	0.09490	0.18151	0.13044	0.18475
36	Tyler	RT3	0.03517	0.00166	0.00035	0.00179	0.00029	0.00110	0.02398	0.04587	0.06089	0.04932
37	Tyler	RT4	0.02990	0.00141	0.00030	0.00152	0.00047	0.00179	0.07103	0.13587	0.10349	0.13880
38	Tyler	RT5	0.02542	0.00120	0.00025	0.00130	0.00019	0.00072	0.01850	0.03539	0.04509	0.03788
39	Valley	RT3	0.01847	0.00194	0.00019	0.00099	0.00057	0.00218	0.02030	0.02741	0.04172	0.03034
40	Valley	RT4	0.02153	0.00226	0.00023	0.00116	0.00042	0.00159	0.02036	0.02749	0.04413	0.03091
41	Valley	RT5	0.01724	0.00181	0.00018	0.00093	0.00031	0.00118	0.01920	0.02592	0.03811	0.02866
42	Victoria	RT3	0.04822	0.00259	0.00048	0.00247	0.00071	0.00271	0.05386	0.08066	0.10599	0.08573
43	Victoria	RT5	0.04708	0.00253	0.00047	0.00241	0.00082	0.00314	0.07473	0.11191	0.12624	0.11686
44	Waco	RT3	0.02558	0.00198	0.00026	0.00134	0.00035	0.00134	0.02205	0.03596	0.04959	0.03929
45	Waco	RT4	0.02337	0.00181	0.00024	0.00123	0.00031	0.00118	0.04542	0.07407	0.07051	0.07711
46	Waco	RT5	0.01669	0.00130	0.00017	0.00088	0.00022	0.00083	0.00601	0.00980	0.02392	0.01197
47	State	RT2	0.02879	0.00220	0.00030	0.00151	0.00047	0.00179	0.07929	0.11642	0.11064	0.12013
48	State	RT3	0.03836	0.00293	0.00039	0.00201	0.00046	0.00176	0.04154	0.06099	0.08250	0.06593
49	State	RT4	0.02183	0.00167	0.00022	0.00114	0.00030	0.00113	0.02299	0.03376	0.04647	0.03657
50	State	RT5	0.02136	0.00163	0.00022	0.00112	0.00033	0.00126	0.01332	0.01955	0.03648	0.02230

Note: Table 8 and Table 9 list the SUTs in local (short haul) and pass through (long haul) groups, respectively.

TASK 3 – ESTIMATION OF VMT BY PASS-THROUGH AND LOCAL HDDVS

The pass-through and local HDDV portions from Task 2 are used to estimate the VMT in the areas defined in Task 2. This task used the latest available data. For consistency purposes, the methodology for VMT proportion estimates in this task are consistent with the methodology used to calculate VMT in the trend inventories. The VMT estimated for each area described previously is applied to the proportion of vehicles in that category to determine local versus non-local VMT. Similarly, statewide VMT is applied to the heavy-duty vehicle proportion observed in the state.

ESTIMATION OF VMT

Summer weekday VMT is estimated for each county and analysis year. TTI forecasts VMT as a function of both annual historical HPMS annual average daily traffic (AADT) VMT and population projections. Adjustments are applied using seasonal day-type-specific activity factors and hourly distributions.

Data Sources

There are two major traffic data sources used for developing the VMT estimates (and traffic volume estimates for operational speed modeling, discussed later) and their associated adjustment and allocation factors. These are automatic traffic recorder (ATR) counts and HPMS VMT estimates. Both are collected and developed by TxDOT on a formal and on-going basis as part of the larger HPMS data collection program. In addition to these traffic data, U.S. Census and Texas State Data Center (TSDC) county population statistics and projections were also used in developing the VMT forecasts.

HPMS VMT estimates are developed based on traffic count data collected according to a statistical sampling procedure specified by the FHWA designed to estimate VMT. TxDOT compiles and reports Texas HPMS data in its annual Roadway Inventory Functional Classification Record (RIFCREC) reports. A wide range of traffic data is collected under the HPMS program; the focus for this application is specifically the VMT, centerline miles, and lane miles estimates made as part of the HPMS program. The HPMS roadway data were categorized by seven roadway functional classifications and four area types (shown later in the estimation of speeds section).

TxDOT collects ATR vehicle counts at selected locations on a continuous basis throughout Texas. These counts are available by season, month, and day type, as well as on an annual average daily basis (i.e., AADT). Since they are continuous, they are well suited for making seasonal, day-of-week, and time-of-day comparisons (i.e., adjustment factors), even though there may be relatively few ATR data collection locations in any area.

HPMS VMT estimates are available by county. ATR data are available for most but not all counties. Consequently, the ATR data are aggregated by region.

Seasonal Day-Type VMT Adjustment Factors

Since the VMT data are AADT (i.e., Monday through Sunday, January through December), the seasonal day-type-specific activity factors are needed to convert from AADT to traffic volumes characteristic of the season and day type.

Multiple years of regional ATR vehicle count data were aggregated to develop a set of season and day-type-specific VMT adjustment factors for each region. The factors were calculated as the ratio of average period "day type" volumes to the AADT volumes.

Development and Road Type Group Allocation of County VMT

County AADT VMT estimates are forecast for each year. Each regional set of seasonal day-type factors is multiplied by the AADT VMT estimates for each county. The same factors are used for all years. These county-level VMT totals for each day type and analysis year are subsequently disaggregated to the MOVES road type groups for each county.

County VMT Control Total Estimates

TTI uses an HPMS and population-based method to forecast aggregate county AADT VMT estimates for each year. With this method, the AADT VMT forecast is produced as the combination of two intermediate forecasts — one based on population projections, and the other based on the historical, actual HPMS AADT VMT.

The VMT per-capita-based forecasts were developed using VMT-to-population ratios (based on population and AADT VMT) applied to official TSDC population projections. The growth-based VMT forecasts were developed using traditional regression analyses on historical HPMS AADT VMT data (i.e., from 1990 through 2008). Population-based forecasts (i.e., VMT per capita) tend to under estimate future VMT, especially in small counties adjacent to large urban areas. Conversely, historical-based (i.e., growth trend) forecasts tend to overestimate future VMT, especially in areas where there has been recent atypical rapid growth. These two forecast streams, however, form the range of credible results. The HPMS and population-based VMT forecasting method combines the population-based and historical VMT-based forecast streams with equal weight, and then calibrates the combined forecast result to the latest HPMS historical VMT data using a step-function adjustment.

The summer day-type factors were multiplied by the county AADT VMT forecasts to produce the county and the four summer day type VMT control totals for each year.

Road Type Group VMT Estimates

The county, aggregate VMT totals are disaggregated to the road type groups proportionally to the county HPMS AADT VMT, using the proportions from the latest available TxDOT RIFCREC data.

The following provides summaries of aggregate VMT and HDDV VMT, in this case using Table 10 and Table 11, for the state. Detailed (region and county) VMT estimates are provided as appendices.

Summary of Aggregate State VMT by Year

Obs	Yr	Region	Wk_VMT	Yr_VMT
1	2008	State	702,041,677	238,343,121,285
2	2009	State	714,884,019	242,703,095,826
3	2010	State	727,756,149	247,073,183,419
4	2011	State	740,662,498	251,454,888,453
5	2012	State	753,598,042	255,846,505,072
6	2013	State	766,554,454	260,245,206,325
7	2014	State	779,525,078	264,648,732,931
8	2015	State	792,498,575	269,053,234,478
9	2016	State	805,480,297	273,460,528,713
10	2017	State	818,458,528	277,866,637,493
11	2018	State	831,436,531	282,272,668,975
12	2019	State	844,426,862	286,682,886,042
13	2020	State	857,408,725	291,090,227,767
14	2021	State	870,424,602	295,509,117,687
15	2022	State	883,468,936	299,937,668,536
16	2023	State	896,535,776	304,373,860,036
17	2024	State	909,623,832	308,817,254,587
18	2025	State	922,730,928	313,267,113,274
19	2026	State	935,857,477	317,723,575,995
20	2027	State	948,993,721	322,183,330,365
21	2028	State	962,136,258	326,645,221,285
22	2029	State	975,293,621	331,112,145,291
23	2030	State	988,454,143	335,580,142,201

Summary of Short Haul HDDV State VMT By Year

Obs	Yr	Region	Wk_VMT	Yr_VMT
1	2008	State	41,371,316	14,045,560,137
2	2009	State	42,128,115	14,302,493,437
3	2010	State	42,886,670	14,560,022,699
4	2011	State	43,647,241	14,818,236,577
5	2012	State	44,409,533	15,077,034,544
6	2013	State	45,173,054	15,336,250,009
7	2014	State	45,937,413	15,595,749,832
8	2015	State	46,701,941	15,855,307,108
9	2016	State	47,466,954	16,115,028,957
10	2017	State	48,231,761	16,374,680,947
11	2018	State	48,996,555	16,634,328,383
12	2019	State	49,762,075	16,894,222,474
13	2020	State	50,509,948	17,148,125,318
14	2021	State	51,276,713	17,408,442,123
15	2022	State	52,045,155	17,669,328,053
16	2023	State	52,814,923	17,930,664,095
17	2024	State	53,585,940	18,192,424,468
18	2025	State	54,358,079	18,454,565,643
19	2026	State	55,131,364	18,717,095,862
20	2027	State	55,905,220	18,979,819,992
21	2028	State	56,679,447	19,242,669,986
22	2029	State	57,454,547	19,505,816,479
23	2030	State	58,229,834	19,769,026,177

TASK 4 – EMISSIONS INVENTORY OF EMISSIONS BY PASS-THROUGH AND LOCAL HDDVS FOR THE YEARS 2008 THROUGH 2030

For this task, TTI developed and produced emissions estimates from 2008 through 2030 analysis years for the pass-through and local HDDVs for the areas identified in Task 2. TTI used VMT proportions obtained in Task 3 and emissions rates based on the latest available trend analysis (developed under a separate work order). The emissions rates, being developed under the separate work order, are based upon the latest available HPMS-based, 24-hour, average Monday through Friday weekday ozone season (aggregate June through August) data and the MOVES model for the following pollutants:

- NO_x, carbon dioxide, carbon monoxide (CO), sulfur dioxide (SO_2), volatile organic compounds (VOC), ammonia, PM with aerodynamic diameters equal to or less than 10 microns, and PM with aerodynamic diameters equal to or less than 2.5 microns; and
- benzene, ethanol, methyl tert-butyl ether, napthalene, 1,3 butadiene, formaldehyde, acetaldehyde, and acrolein.

The latest available VMT was used to calculate the emissions in this project.

OVERVIEW OF EMISSIONS ESTIMATION METHODOLOGY

Under a separate study [Development and Production of Annual and Summer Weekday On-Road Mobile Source Trend Emissions Inventories for All 254 Counties for 1990 and for Each Year from 1999 through 2030 (Umbrella Contract 90400-11-12: Task 2), "Trends" for short], TTI developed HPMS-based, 24-hour, ozone season (average June through August), Weekday (average Monday through Friday) emissions estimates and annual emissions estimates for each of the 254 Texas counties, for a range of years including the years covered by this analysis (2008 through 2030). For consistency and efficiency, the "Trends" emissions rates are used for this analysis. The method used for the Trends emissions rates is summarized here for completeness. Full details are available in the Trends report cited.

The level of detail in the emissions estimates is aggregate emissions by county and SUT/fuel type (vehicle categories). Estimates are 24-hour, typical ozone season (June, July, August), daily (Monday through Friday) emissions for each Texas county, for each analysis year.

Emissions from all MOVES gasoline-fueled and diesel-fueled SUTs (vehicle categories) are estimated for each analysis year and county using a 24-hour aggregate methodology for the ozone season Weekday emissions and an annual aggregate methodology for the annual emissions. These aggregate methods have four main components: VMT mix, VMT, off-network activity, and emissions factors in terms of grams per activity.

The 24-hour, MOVES road type-level VMT mix estimates were developed by TxDOT district for each analysis year. TxDOT vehicle classification count data and TxDOT vehicle registration data were used in combination with MOVES default gasoline/diesel fractions by year to estimate VMT mixes.

County VMT estimates consist of an historical year and a forecast year data set series (2008 through 2030). Historical year HPMS annual average daily traffic (AADT, i.e., Monday through Sunday, January through December) VMT estimates are from the TxDOT RIFCREC reports for that year. Forecast year AADT VMT estimates are developed using a bimodal forecast procedure, based on the linear regression of historical HPMS AADT VMT estimates and VMT per capita estimates with TSDC population projections. The full series of county total AADT VMT estimates converted to summer weekday using TxDOT district-level AADT factors based on TxDOT ATR data. To maintain consistency with the other inputs required to estimate the emissions using the aggregate methods, county totals for all years were disaggregated by MOVES road type using county 2008 HPMS data.

The off-network activity consists of the summer weekday and annual hourly county-level source hours parked (SHP), starts, and extended idle hours (SHI) by SUT/fuel type for each analysis year. Although the analysis year county-level vehicle population by SUT/fuel type is not required directly in the emissions estimation, the county-level vehicle population does play a vital role in estimating the off-network activity. The county-level vehicle population was estimated using county-level TxDOT registration data, SUT/fuel type population factors, and scaling factors for those years where actual registration data does not exist. For those analysis years where actual registration data exists, the county TxDOT registration data for the analysis year was aggregated into registration data categories, which was then divided into the SUT/fuel type vehicle populations using SUT/fuel type population factors (derived from an all road types VMT mix). For those analysis years where actual registration data does not exist, a base set of registration data was used to estimate the base county-level vehicle population and scaling factors (ratio of base summer Weekday VMT to analysis year summer weekday VMT) were applied to estimate the SUT/fuel type vehicle populations.

The summer weekday hourly county-level SHP by SUT/fuel type for each analysis year was estimated as county-level SUT/fuel type total source hours (hours a vehicle exists) minus the summer weekday county-level SUT/fuel type source hours operating (SHO). Since the SHP calculation was at the hourly level, the county-level vehicle population by SUT/fuel type was used for the hourly SUT/fuel type total source hours. The summer weekday county-level SUT/fuel type SHO was estimated by disaggregating the county-level summer weekday VMT to each MOVES road type (using county 2008 HPMS data). The MOVES road type VMT was disaggregated to SUT/fuel type using the VMT mix.

Using an average speed distribution, the MOVES road type VMT by SUT/fuel type was then disaggregated to each average speed bin, which was then divided by the average speed bin speed to estimate the SHO by MOVES road type, SUT/fuel type, and average speed bin. This SHO was then aggregated to the SUT/fuel type level, which was used in the SHP calculation. In the event that the SHO was greater than the source hours, the SHP was set to zero.

The summer weekday hourly county-level starts by SUT/fuel type for each analysis year are based on the MOVES national default starts per vehicle and the analysis year county-level vehicle population by SUT/fuel type. The MOVES default weekday starts per vehicle were multiplied by the analysis year county-level vehicle population by SUT/fuel type to estimate the summer weekday hourly county-level starts by SUT/fuel type for each analysis year. County-level annual expansion factors (ratio of annual VMT to summer weekday VMT) were applied to the summer weekday hourly county-level starts to estimate the annual hourly county-level starts by SUT/fuel type.

The summer weekday hourly county-level SHI by SUT/fuel type for each analysis year was estimated based on information from the TCEQ *Extended Idling Study* (*Heavy-Duty Vehicle Idle Activity and Emissions Characterization Study*, ERG, August 2004), that produced 2004 summer weekday extended idling hours estimates by Texas county, which were used as the summer weekday 24-hour 2004 base SHI estimates. These summer weekday 24-hour 2004 base SHI estimates were scaled to the summer weekday 24-hour analysis year SHI estimates using county-level analysis year expansion factors, which were the ratio of the county-level summer Weekday 24-hour 2004 SUT 62, fuel type 2 (combined long-haul truck [CLhT]_Diesel) VMT to the county-level summer Weekday 24-hour analysis year Combination Long-Haul Truck – Diesel vehicle VMT.

To calculate the initial summer weekday hourly county-level SHI by analysis year, SHI hourly factors (estimated as the inverse of the hourly VMT factors) were applied to the summer weekday 24-hour analysis year SHI estimates. The initial summer weekday hourly county-level SHI was then compared to the summer weekday hourly county-level SHP for Combination Long-Haul Truck – Diesel vehicles. If the SHI was greater than the SHP, then the summer weekday hourly county-level SHI was set equal to the SHP. Otherwise, the summer weekday hourly county-level SHI was set to the initial SHI. County-level annual expansion factors (ratio of annual VMT to summer weekday VMT) were applied to the summer weekday hourly county-level SHI to estimate the annual hourly county-level SHI by SUT/fuel type.

The emissions factors were developed using the current version of EPA's MOVES model (MOVES2010a, September 23, 2010). Using the model's emissions inventory calculation mode, MOVES runs for county groups (comprising all 254 Texas counties) were performed. For the summer weekday emissions factors, the MOVES 24-hour emissions were divided by the 24-hour activity and Texas Low-Emissions Diesel (TxLED) factors were applied, where applicable.

The summer weekday emissions for each analysis year using the 24-hour aggregate method were calculated by multiplying the summer weekday emissions factors by the appropriate summer weekday activity, either VMT or off-network activity. For the VMT-based emissions, the county-level summer weekday VMT was disaggregated to each MOVES road type using the county 2008 HPMS data. The MOVES road type VMT was further disaggregated to SUT/fuel type using the VMT mix, which is the activity used to calculate the VMT-based emissions. For the off-network emissions, the activity used to calculate the summer weekday emissions was the 24-hour summer weekday SHP, starts, and SHI by SUT/fuel type.

EMISSIONS ESTIMATION METHODOLOGY

The county-level summer weekday emissions for each scenario and analysis year were calculated using a 24-hour aggregate method by multiplying the MOVES-based summer weekday emissions factors (in terms of rate per activity) by the appropriate summer weekday activity, either VMT or off-network activity. For the VMT-based emissions, the county-level summer weekday VMT was disaggregated to each MOVES road type using the county 2006 or 2008 HPMS data, depending on the analysis year. The MOVES road type VMT was further disaggregated to SUT/fuel type using the VMT mix, which is the activity used to calculate the VMT-based emissions.

For the off-network emissions, the activity used to calculate the summer weekday emissions was the 24-hour summer weekday SHP, starts, and SHI by SUT/fuel type. The development of the VMT and VMT mix are discussed in the main document. This appendix describes the estimation of the off-network activity, estimation of the emissions factors, the emission calculations, and the emissions estimation utilities. Since the emissions factors used in this analysis were taken from the most recent emissions trends analysis performed by TTI (2011), the section describing the estimation of the emissions factors contains years other than those included in this analysis.

ESTIMATION OF OFF-NETWORK ACTIVITY

To estimate the off-network (or parked) emissions using the rates per activity emissions rates, county-level summer Weekday estimates of SHP, starts, and SHI are required by hour, SUT, and fuel type for each scenario and analysis year. One of the main components of the SHP and starts off-network activity is the county-level vehicle population (specific to each scenario and analysis year). The vehicle population, SHP, starts, and SHI off-network activity were included with the detailed emissions data provided.

The county-level vehicle population estimates were developed using the MOVESpopulationBuild utility. The county-level SHP by hour, SUT, and fuel type estimates were developed using the MOVEStrendsSHPcalc utility. The county-level starts by hour, SUT, and fuel type estimates were developed using the MOVEStrendsStartscalc utility. The county-level SHI by hour, SUT, and fuel type estimates were developed using the MOVEStrendsExtIdleHrsCalc utility. A description of these utilities is included in the final section of this appendix.

Estimation of Vehicle Population

The vehicle population estimates (by SUT/fuel type) are needed to estimate the SHP and starts off-network activity. The vehicle population estimates were produced for each scenario, analysis year, and county. The vehicle population estimates are a function of vehicle registration data (TxDOT registration data sets) and SUT/fuel type VMT mix.

For the analysis years where actual TxDOT registration data exists (analysis years 2008 through 2010), the vehicle population estimates are based on the TxDOT registration data for the analysis year. For the future analysis years where TxDOT registration data does not exist (analysis years 2011 through 2030), the vehicle population is based on the most recent year

(2010) TxDOT registration data set and a population scaling factor is applied to estimate the future year vehicle population estimate.

The scenario-specific VMT mix is an aggregate (i.e., all road types), Weekday VMT mix by scenario and analysis year. The VMT mix is by TxDOT district (i.e., each county within a TxDOT district uses the same VMT mix) and is estimated using a similar procedure to the VMT mix used to estimate emissions without the road type specification. The scenario-specific aggregate Weekday VMT mix was developed for 2008 and 2020, which were then spread across all analysis years. Table 12 summarizes the inputs used to estimate the vehicle populations.

Table 12. Vehicle Population Inputs Summary.

Analysis Year	Calculation Type	Registration Data Year	VMT Mix Year
2008	Historical	2008	2008
2009	Historical	2009	2008
2010	Historical	2010	2008
2011 - 2014	Future	2010	2008
2015 - 2030	Future	2010	2020

Historical Vehicle Population Estimates

The historical analysis year (2008 through 2010) county-level vehicle population estimates were calculated using the analysis year county-level mid-year TxDOT vehicle registrations and the assigned aggregate Weekday SUT/fuel type VMT mix (see Table 12). The vehicle estimation process assumes that all of the non-long-haul SUT category populations for a county are represented in the county vehicle registrations data. This process also estimates the long-haul category populations as an expansion of the county registrations. There are three main steps in the vehicle estimation process: registration data category aggregation, calculation of the SUT/fuel type population factors, and estimation of the county-level vehicle population by SUT/fuel type.

The first step in the scenario-specific vehicle estimation process is the registration data category aggregation. For each county, the analysis year vehicle registrations were aggregated in to five categories. Table 13 shows these five categories.

Table 13. Registration Data Categories.

Registration Data Category	Vehicle Registration Aggregation
1	Motorcycles
2	Passenger Cars
3	Trucks <= 8.5 K GVWR (pounds)
4	Trucks > 8.5 and <= 19.5 K GVWR
5	Trucks > 19.5 K GVWR

The second step is the calculation of the scenario-specific SUT/fuel type population factors. Using the scenario-specific analysis year aggregate SUT/fuel type VMT mix, SUT/fuel type population factors were calculated for each SUT/fuel type combination. For the non-long-haul SUT categories, the SUT/fuel population factors were calculated by dividing the SUT/fuel type VMT mix by the summed total of the SUT/fuel type VMT mix fractions in its associated vehicle registration data category. For example, the Light Commercial Truck - Diesel vehicle population factor using the VMT mix is Light Commercial Truck – Diesel vehicles/(Passenger Truck - Gas vehicles + Passenger Truck - Diesel vehicles + Light Commercial Truck - Gas vehicles + Light Commercial Truck – Diesel vehicles). For the long-haul SUTs, the SUT/fuel type population factors were calculated by taking the ratio of the long-haul and short-haul VMT mix values. For example, the Single Unit Long-Haul Truck – Gas vehicle population factor using SUT mix fractions is Single Unit Long-Haul Truck – Gas vehicles/Single Unit Short-Haul – Gas vehicles. Table 14 shows the vehicle registration aggregations and their associated MOVES SUT/fuel types.

Table 14. TxDOT Vehicle Registration Aggregations and Associated SUT/Fuel Types for Estimating SUT/Fuel Type Populations.

Vehicle Registration[1] Aggregation	Associated MOVES SUT/Fuel Type[2]
Motorcycles	Motorcycle – Gas
Passenger Cars	Passenger Car – Gas Passenger Car – Diesel
Trucks <= 8.5 K GVWR (pounds)	Passenger Truck – Gas Passenger Truck – Diesel Light Commercial Truck – Gas Light Commercial Truck – Diesel
Trucks > 8.5 and <= 19.5 K GVWR	Refuse Truck – Gas Refuse Truck – Diesel Single Unit Short Haul Truck – Gas Single Unit Short Haul Truck – Diesel Motor Home – Gas Motor Home – Diesel Intercity Bus – Diesel Transit Bus – Gas Transit Bus – Diesel School Bus – Gas School Bus – Diesel
Trucks > 19.5 K GVWR	Combination Short Haul Truck – Gas Combination Short Haul Truck – Diesel
NA[1]	Single Unit Long Haul Truck – Gas Single Unit Long Haul Truck – Diesel Combination Long Haul Truck – Gas Combination Long Haul Truck – Diesel

[1] The four long-haul SUT/fuel type populations are estimated using a long-haul-to-short-haul Weekday SUT VMT mix ratio applied to the short-haul SUT population estimate.
[2] The mid-year TxDOT county registrations data extracts were used (i.e., the three file data set consisting of: 1 – light-duty cars, trucks, and motorcycles; 2 – heavy-duty diesel trucks; and 3 – heavy-duty gasoline trucks) for estimating the vehicle populations.

The third step is the estimation of the scenario-specific county-level vehicle population by SUT/fuel type. The non-long-haul SUT/fuel type vehicle populations were estimated by applying their SUT/fuel type population factors to the appropriate registration data category. For the Combination Long-Haul – Gas vehicles, the vehicle population was set to 0. For the remaining three long-haul SUT/fuels (Single Unit Long-Haul Truck – Gas vehicles, Single Unit Long-Haul Truck – Diesel vehicles, and Combination Long-Haul Truck – Diesel vehicles), the vehicle populations were calculated as the product of the corresponding short-haul category vehicle population and the associated long-haul population factor (e.g., Single Unit Long-Haul Truck – Gas vehicle population = Single Unit Short-Haul - Gas vehicle population x [Single Unit Long-Haul Truck – Gas SUT mix fraction/ Single Unit Short-Haul – Gas vehicle mix fraction]).

Future Vehicle Population Estimates

The process for estimating the scenario-specific future analysis year (2011 through 2030) county-level vehicle population estimates is very similar to the historical vehicle population estimates except that instead of using the analysis year registration data sets, the most recent (2010) mid-year TxDOT registration data sets were used. Using these registration data sets and the assigned aggregate Weekday VMT mix (see Table 12), the base SUT/fuel type population for 2010 was calculated. To estimate the scenario-specific future analysis year county-level vehicle populations, scenario-specific future year county-level vehicle population scaling factors were applied to the base SUT/fuel type population for 2010. These scenario-specific future year county-level vehicle population scaling factors were calculated as the ratio of the scenario-specific county-level weekday VMT for the analysis year to the scenario-specific county-level weekday VMT for the year of the most recent (2010) mid-year TxDOT registration data (i.e., vehicle population increases linearly with VMT).

Estimation of SHP

The first activity measure needed to estimate the off-network emissions using the grams per activity emissions rates are summer weekday, county-level estimates of SHP by hour and SUT/fuel type for each scenario and analysis year. For each analysis year and hour, the weekday county-level SHP by SUT/fuel type was calculated using the total available hours by SUT and fuel type and the SHO by SUT/fuel type. If the SHO is greater than the total available hours, the SHP is set to 0. Otherwise, the SHP was calculated as the total available hours minus the SHO. Since this calculation was performed at the hourly level, the total available hours by SUT/fuel type is the same as the vehicle population by SUT/fuel type. The SHO was calculated using the county-level analysis year Weekday VMT, an assigned county-level average speed distribution, an assigned RIFCREC data set, hourly VMT fractions, and an assigned SUT/fuel type Weekday VMT mix (by MOVES road type).

The county-level analysis year Weekday VMT is the same VMT used to calculate emissions. The county-level average speed distributions were developed using virtual link VMT and speeds for 2008, 2012, and 2018. The average speed distribution assigns proportions to each MOVES average speed bin by SUT, MOVES road type, and hour. The RIFCREC data set is the same data set used to develop the analysis year's respective average speed distribution. The hourly VMT fractions, which are by TxDOT district, were used to distribute the data to each hour of the day. The scenario-specific VMT mix is by TxDOT district (i.e., each county within a TxDOT district uses the same VMT mix) and is the same VMT mix used to estimate the emissions. The Weekday VMT mix was developed for 2008 and 2020 (one set for each scenario), which were then spread across all analysis years. Table 15 summarizes the inputs to the estimation of SHP that vary by year.

Table 15. SHP Inputs Summary.

Analysis Year	RIFCREC Data Year	Average Speed Distribution Year	VMT Mix Year
2008 - 2011	2008	2008	2008
2012 - 2014	2008	2012	2008
2015	2008	2012	2020
2016 - 2030	2008	2018	2020

Total Available Hours by SUT/Fuel Type

The total available hours by SUT/fuel type is typically calculated as the vehicle population times the number of hours in the time period. Since this calculation was performed at the hourly level, the scenario-specific total available hours by SUT/fuel type for each analysis year was set equal to the scenario-specific vehicle population by SUT/fuel type for the analysis year.

SHO by SUT/Fuel Type

The calculation of the scenario-specific county-level analysis year hourly Weekday SHO by SUT/fuel type was a three-step process. The first step was the calculation of the MOVES road type VMT proportions. The county-level VMT from the assigned RIFCREC data (by RIFCREC road type/area type) was aggregated by MOVES road type, which was then converted to the MOVES road type VMT proportions. Table 16 shows the RIFCREC road type/area type to MOVES road type designations.

Table 16. RIFCREC Road Type/Area Type to MOVES Road Type Designations/

<table>
<tr><th>RIFCREC Road Type</th><th>RIFCREC Area Type</th><th>MOVES Road Type (Code - Name)</th></tr>
<tr><td>Interstate</td><td rowspan="7">Rural (<5,000)</td><td rowspan="2">2 - Rural Restricted Access</td></tr>
<tr><td>Urban Freeway</td></tr>
<tr><td>Principal Arterial</td><td rowspan="5">3 - Rural Unrestricted Access</td></tr>
<tr><td>Minor Arterial</td></tr>
<tr><td>Major Collector</td></tr>
<tr><td>Minor Collector</td></tr>
<tr><td>Local</td></tr>
<tr><td>Interstate</td><td rowspan="2">Small Urban (5,000-49,999)</td><td rowspan="6">4 - Urban Restricted Access</td></tr>
<tr><td>Urban Freeway</td></tr>
<tr><td>Interstate</td><td rowspan="2">Large Urban (50,000-199,999)</td></tr>
<tr><td>Urban Freeway</td></tr>
<tr><td>Interstate</td><td rowspan="2">Urbanized (200,000+)</td></tr>
<tr><td>Urban Freeway</td></tr>
<tr><td>Principal Arterial</td><td rowspan="5">Small Urban (5,000-49,999)</td><td rowspan="15">5 - Urban Unrestricted Access</td></tr>
<tr><td>Minor Arterial</td></tr>
<tr><td>Major Collector</td></tr>
<tr><td>Minor Collector</td></tr>
<tr><td>Local</td></tr>
<tr><td>Principal Arterial</td><td rowspan="5">Large Urban (50,000-199,999)</td></tr>
<tr><td>Minor Arterial</td></tr>
<tr><td>Major Collector</td></tr>
<tr><td>Minor Collector</td></tr>
<tr><td>Local</td></tr>
<tr><td>Principal Arterial</td><td rowspan="5">Urbanized (200,000+)</td></tr>
<tr><td>Minor Arterial</td></tr>
<tr><td>Major Collector</td></tr>
<tr><td>Minor Collector</td></tr>
<tr><td>Local</td></tr>
</table>

The second step was the calculation of the scenario-specific county-level analysis year summer Weekday MOVES road type VMT by hour and SUT/fuel type. The MOVES road type VMT proportions were applied to the scenario-specific county-level analysis year summer Weekday VMT control total to estimate the scenario-specific county-level analysis year summer

Weekday MOVES road type VMT. The TxDOT district-level hourly factors and the scenario-specific VMT mix were then applied to estimate the scenario-specific county-level analysis year summer Weekday MOVES road type VMT by hour and SUT/fuel type.

The final step was to calculate the scenario-specific county-level analysis year hourly Weekday SHO by SUT/fuel type. The assigned average speed distribution was applied to the county-level analysis year summer Weekday MOVES road type VMT by hour and SUT/fuel type to estimate the county-level analysis year summer Weekday MOVES road type VMT by hour, SUT/fuel type, and MOVES speed bin. This VMT by hour, SUT/fuel type, and MOVES speed bin was divided by the MOVES speed bin speeds to estimate the county-level analysis year Weekday MOVES road type SHO by hour, SUT/fuel type and MOVES speed bin, which was then aggregated to produce the scenario-specific county-level analysis year hourly Weekday SHO by SUT/fuel type.

Hourly SHP by SUT and Fuel Type Calculation

The scenario-specific county-level analysis year hourly Weekday SHP by SUT/fuel type was calculated using the scenario-specific county-level analysis year total available hours by SUT/fuel type and the scenario-specific county-level analysis year hourly Weekday SHO by SUT/fuel type. For each hour and SUT/fuel type, the initial SHP by hour and SUT/fuel type was calculated by taking the total available hours minus the SHO. If the initial SHP by hour and SUT/fuel type was less than 0 (i.e., the calculated SHO was greater than the total available hours), then the final scenario-specific county-level analysis year hourly Weekday SHP by SUT/fuel type was set to 0. Otherwise, the final scenario-specific county-level analysis year hourly Weekday SHP by SUT/fuel type was set to the initial SHP by hour and SUT/fuel type.

Estimation of Starts

The second activity measure needed to estimate the off-network emissions using the rate per activity emissions rates are scenario-specific county-level 24-hour summer weekday estimates of starts by SUT/fuel type for each analysis year. For each scenario and analysis year, the 24-hour Weekday default starts per vehicle by SUT/fuel type were multiplied by the scenario-specific analysis year county-level vehicle population by SUT/fuel type to estimate the scenario-specific analysis year county-level weekday starts by SUT/fuel type.

For the 24-hour default starts per vehicle, the MOVES defaults were used. The MOVES activity output was used to estimate the 24-hour starts per vehicle for a MOVES weekday run by dividing the MOVES starts output by the MOVES vehicle population output. These MOVES default starts per vehicle do not vary by year or geography (i.e., county).

Estimation of SHI

The third activity measure needed to estimate the off-network emissions using the rate per activity emissions rates are scenario-specific weekday county-level estimates of SHI by hour and SUT/fuel type for each analysis year. These SHI estimates were for source type 62, fuel type 2 (Combination Long-Haul Truck – Diesel vehicles) only. The SHI was based on information from a TCEQ Extended Idling Study, which produced 2004 summer weekday SHI estimates for each Texas county. A scenario-specific county-level analysis year SHI scaling factor was applied to the base county-level 2004 summer weekday SHI value from the study to estimate the scenario-specific county-level analysis year 24-hour weekday SHI. SHI hourly factors were then applied to allocate the scenario-specific county-level analysis year 24-hour weekday SHI to each hour of the day. To ensure valid hourly SHI values are used in the emissions estimation, the scenario-specific county-level analysis year weekday hourly SHI was compared to the scenario-specific Combination Long-Haul Truck – Diesel vehicles hourly SHP (i.e., hourly SHI values cannot exceed the hourly SHP values).

The scenario-specific county-level analysis year SHI scaling factor was calculated using the county-level Combination Long-Haul Truck – Diesel vehicle 24-hour base (2004) summer weekday VMT and the scenario-specific county-level Combination Long-Haul Truck – Diesel vehicle 24-hour analysis year Weekday VMT. The county-level Combination Long-Haul Truck – Diesel vehicle 24-hour 2004 summer weekday VMT was calculated using county-level 2004 summer weekday virtual link VMT and speeds and the TxDOT district-level base weekday SUT/fuel type VMT mix (by MOVES road type). The scenario-specific county-level Combination Long-Haul Truck – Diesel vehicle 24-hour analysis year Weekday VMT was calculated using the scenario-specific county-level analysis year Weekday VMT, an assigned RIFCREC data set, and an assigned scenario-specific SUT/fuel type Weekday VMT mix (by MOVES road type). The SUT/fuel type VMT mixes were all by TxDOT district (i.e., each county within a TxDOT district used the same VMT mix). For the base weekday SUT/fuel type VMT mix, the 2006 weekday SUT/fuel type VMT mix was used. The scenario-specific Weekday VMT mix was developed for 2008, and 2020, which was then spread across all analysis years. Table 17 summarizes the inputs to the estimation of SHI that vary by year.

Table 17. SHI Inputs Summary.

Analysis Year	RIFCREC Data Year	VMT Mix Year
2008 - 2011	2008	2008
2012 - 2014	2008	2008
2015	2008	2020
2016 - 2030	2008	2020

SHI Scaling Factors

To estimate the scenario-specific county-level analysis year 24-hour weekday Combination Long-Haul Truck – Diesel vehicle SHI, a scenario-specific county-level analysis year SHI scaling factor was used. This SHI scaling factor was calculated by dividing the county-level Combination Long-Haul Truck – Diesel vehicle 24-hour 2004 summer weekday VMT by the scenario-specific county-level Combination Long-Haul Truck – Diesel vehicle 24-hour analysis year Weekday VMT.

The county-level Combination Long-Haul Truck – Diesel vehicle 24-hour 2004 summer weekday VMT was calculated using county-level 2004 summer weekday virtual link VMT and speeds and the TxDOT district-level base weekday SUT/fuel type VMT mix (by MOVES road type). For each link in the 2004 summer weekday virtual link VMT and speeds, the link VMT was allocated to Combination Long-Haul Truck – Diesel vehicle using the base weekday SUT/fuel type VMT mix. This VMT allocation was performed for each link and hour in the 2004 summer weekday virtual link VMT and speeds, with the individual link VMT aggregated by hour to produce the Combination Long-Haul Truck – Diesel vehicle hourly and 24-hour 2004 summer weekday VMT.

The scenario-specific county-level Combination Long-Haul Truck – Diesel vehicle 24-hour analysis year Weekday VMT was calculated using the scenario-specific county-level analysis year Weekday VMT, an assigned RIFCREC data set, and an assigned scenario-specific SUT/fuel type Weekday VMT mix (by MOVES road type). The county-level VMT from the assigned RIFCREC data (by RIFCREC road type/area type) was aggregated by MOVES road type (see Table 16), which was then converted to the MOVES road type VMT proportions. These VMT proportions were then applied to the scenario-specific county-level analysis year Weekday VMT to estimate the county-level analysis year MOVES road type VMT. The scenario-specific VMT mix was then applied to estimate the scenario-specific county-level analysis year Weekday MOVES road type VMT by SUT/fuel type. This VMT was then aggregated to scenario-specific county-level analysis year Weekday VMT by SUT/fuel type, which includes the Combination Long-Haul Truck – Diesel vehicle VMT.

SHI Hourly Factors

To allocate the scenario-specific county-level analysis year 24-hour weekday Combination Long-Haul Truck – Diesel vehicle SHI to each hour of the day, SHI hourly factors were used. These SHI hourly factors were calculated as the inverse of the TxDOT district level hourly factors. The inverse of these hourly factors were calculated and the inverse for each hour was divided by the sum of the inverse hourly factors across all hours to calculate the county-level SHI hourly factors.

Hourly Combination Long-Haul Truck – Diesel Vehicle SHI Calculation

The scenario-specific initial county-level analysis year Weekday Combination Long-Haul Truck – Diesel vehicle hourly SHI was calculated by multiplying the 24-hour 2004 summer weekday SHI by the scenario-specific SHI scaling factor and by the SHI hourly factors. For each hour, the scenario-specific initial county-level analysis year Weekday Combination Long-Haul Truck – Diesel vehicle SHI was then compared to the scenario-specific county-level analysis year Weekday Combination Long-Haul Truck – Diesel vehicle SHP to estimate the final county-level analysis year Weekday Combination Long-Haul Truck – Diesel vehicle hourly SHI. If the initial county-level analysis year Weekday Combination Long-Haul Truck – Diesel vehicle SHI value was greater than the county-level analysis year Weekday Combination Long-Haul Truck – Diesel vehicle SHP value, then the scenario-specific final county-level analysis year Weekday Combination Long-Haul Truck – Diesel vehicle SHI for that hour was set to the scenario-specific county-level analysis year Weekday Combination Long-Haul Truck – Diesel vehicle SHP value. Otherwise, the scenario-specific final county-level analysis year Weekday Combination Long-Haul Truck – Diesel vehicle SHI for that hour was set to the scenario-specific initial county-level analysis year Weekday Combination Long-Haul Truck – Diesel vehicle SHI value.

ESTIMATION OF EMISSIONS FACTORS

The emissions factors were developed using MOVES2010a (software and database released in EPA's MOVES2010a Installation Suite, revised September 23, 2010, downloadable from http://www.epa.gov/otaq/models/moves/index.htm). MOVES runs were performed for up to 44 county groups (comprising all 254 Texas counties) using the model's emissions inventory calculation mode for each analysis year. The 24-hour output from these MOVES runs were post-processed to calculate the emissions factors in terms of rates per activity (emissions output divided by activity output) as Table 18 shows.

Table 18. Emissions Rates by Process and Activity Factor.

Emissions Process	Activity[1]	Emissions Rate Units
Running Exhaust	VMT	grams/mile (g/mi)
Brakewear	VMT	g/mi
Tirewear	VMT	g/mi
Evaporative Permeation	VMT; SHP	g/mi; g/shp
Evaporative Fuel Vapor Venting	VMT; SHP	g/mi; g/shp
Evaporative Fuel Leaks	VMT; SHP	g/mi; g/shp
Crankcase Running Exhaust	VMT	g/mi
Start Exhaust	Starts	g/start
Crankcase Start Exhaust	Starts	g/start
Crankcase Extended Idle Exhaust	SHI	g/shi
Extended Idle Exhaust	SHI	g/shi

[1] The amount of travel on roads (VMT), hours parked (SHP), vehicle starts, and SHI are the basic activity factors. SHI is for combination long-haul trucks only.

The current county grouping scheme was based on prior statewide on-road mobile source inventory modeling efforts. The county groupings are delineated from intersections of different geographic boundaries of input data aggregations (districts, fuel regulation jurisdictions, time zone, Inspection and Maintenance (I/M) program areas) used to develop the local area inputs to MOVES. A 42-county group scheme was used for 1990 through 2003. A 44-county group scheme was used for 2004 and later. The county FIPS code of the first county in each of the 44 county groups, in ascending alphabetical order by county name, was used as the countyID input value for the MOVES runs, and represents all of the counties in the group.

The summer weekday emissions rates were produced by dividing the MOVES 24-hour emissions by the 24-hour activity from the summer Weekday MOVES emissions runs. When necessary, the TxLED factors were applied. These emissions rates were used as input to the emissions calculations.

The annual emissions rates were developed as an annualiztion of the summer weekday rates. Three sets of annualization ratios (2005, 2006, and 2011) were developed for the reformulated gasoline (RFG) counties and two sets of annualization ratios (2005 and 2011) were developed for the conventional gasoline (CG) counties, which were used to convert all of the 33 years of summer weekday emissions rates to the annual emissions rates used as input to the emissions calculations. Annual MOVES emissions runs (using summer and winter season data) were performed, with the output post-processed to calculate the annual emissions rates (annual emissions divided annual activity). These annual emissions rates were divided by the appropriate set of summer weekday emissions rates to calculate the annualization ratios. For each analysis year, the annualization ratios were then used to convert the summer weekday emissions rates (for a range of analysis years) to annual emissions rates. For the El Paso ethanol annualization ratios, the analysis years 1999 through 2007 were treated separately due to the El Paso oxygenated fuels program. Table 19 shows the annualization ratios by analysis year.

Table 19. Annualization Ratios by Analysis Year.

<table>
<tr><th rowspan="2">Analysis Year</th><th colspan="2">Annualization Ratio Year</th></tr>
<tr><th>RFG Counties</th><th>CG Counties</th></tr>
<tr><td>1990</td><td rowspan="8">2005</td><td rowspan="9">2005</td></tr>
<tr><td>1999</td></tr>
<tr><td>2000</td></tr>
<tr><td>2001</td></tr>
<tr><td>2002</td></tr>
<tr><td>2003</td></tr>
<tr><td>2004</td></tr>
<tr><td>2005</td></tr>
<tr><td>2006</td><td>2006</td></tr>
<tr><td>2007</td><td rowspan="5">2011</td><td></td></tr>
<tr><td>2008</td><td rowspan="4">2011</td></tr>
<tr><td>2009</td></tr>
<tr><td>2010</td></tr>
<tr><td>2011 through 2030</td></tr>
</table>

Summary of Control Programs Modeled

The MOVES-based emissions factors include the combined effects of progressively more stringent federal and state motor vehicle emissions control programs, which require increasingly lower exhaust and evaporative emissions standards for new vehicles, use of low-volatility and low-emissions fuels, and regular checks and maintenance of vehicle emissions control systems.

Such programs may vary by vehicle type, by year (depending on the implementation schedule) and by county (depending on the classification in relation to NAAQS, or severity of the pollution problem). This section summarizes the control programs modeled in the development of emissions factors, to include the fuels and vehicle types and pollutants, implementation schedules, and geographic coverage. MOVES models the control program effects on emissions factors assuming the regulated implementation schedules either by default or as input by the modeler. In some cases (i.e., TxLED), control program effects are not available in MOVES and can be included by post-processing the MOVES-based emissions factors. Table 20 shows the modeling approaches used for the emissions control strategies.

Table 20. Emissions Control Strategies and Approaches.

Strategy	Approach
Federal Motor Vehicle Control Program Standards	MOVES defaults
Federal Low Emissions Heavy-Duty Diesel Engines Rebuild Program	MOVES defaults
Federal Heavy-Duty 2004 Pull-Ahead Program	MOVES defaults
Conventional Gasoline Properties	TTI applied fuel formulations in MOVES that meet the appropriate state and federal regulatory requirements by year (e.g., Reid Vapor Pressure (RVP) limits, sulfur content, benzene content), and expected ethanol volumes in the fuel supply consistent with the federal renewable fuel standard (RFS) mandate. Other fuel property inputs (e.g., aromatics, olefins, e200, e300, oxygenates) were based on a combination of MOVES defaults, available local fuel survey data, and other available information. Sulfur values were consistent with prior MOBILE6-based trends analysis (with applicable Tier 2 phase-in values and pre-Tier 2 historical value averages). For non-ethanol blends, RVP was consistent with summertime limits that may include a conservative compliance safety margin based on historical fuel survey data observations. The increasing supply of ethanol blends due to implementation of the RFS were modeled by including proportions of non-ethanol and E10 (i.e., gasoline with a nominal 10% by volume ethanol content) gasoline in the supply, with E10 appearing in Texas retail outlets beginning in 2008, and all of the conventional gasoline retail supply becoming saturated with E10 in 2012 (based on Department of Energy [DOE], Energy Information Administration's [EIA], Annual Energy Outlook 2011 [AEO2011] motor gasoline and ethanol volume projections showing national ethanol volumes in the gasoline supply reaching 10% in 2012. For E10 blends, RVP waivers of 1.0% were applied where applicable and no RVP safety margin will be applied.

Table 20. Emissions Control Strategies and Approaches (Continued).

Strategy	Approach
Reformulated Gasoline Properties	TTI reviewed the MOVES default fuel formulations for the Houston and Dallas areas, and compared them to RFG fuel property averages based on EPA RFG survey summaries by year for each area and local survey data made available by EPA. A combination of MOVES defaults and updated information from the EPA surveys were used. For future years, fuel formulations based on recent year surveys were used in combination with expected averages (e.g., 30 parts per million [ppm] average sulfur content).
Diesel Sulfur	TTI based diesel sulfur content for a pre-regulated period on expected values consistent with historical surveys (consistent with previous MOBILE6-based trends analysis), and for sulfur content-regulated periods will use values consistent with federal limits, e.g., as provided in EPA's MOVES2010 *Technical Guidance*, April 2010.
Texas Low-Emission Diesel (TxLED)	TTI post-processed diesel vehicle emissions factors for the 110 counties using evaluation year-specific NO_x reduction factors to be produced by TTI based on a method developed by TCEQ (using 4.8% and 6.2% reductions for 2002 and later, and 2001 and earlier model years, respectively).
I/M Program	TTI developed MOVES set-ups for I/M Program area counties (imcoverage records) using the available MOVES I/M parameters (in terms of MOVES I/M "teststandards" and associated "imfactors") pertaining to the domain of subject I/M vehicles, consistent with current program descriptions and latest I/M modeling protocols. The compliance factor was calculated per EPA's *Technical Guidance* (i.e., compliance factor = % compliance rate x (100 - % waiver rate) x regulatory class coverage adjustment = 96% x 97% x 1.0 = 93.12%). No regulatory class coverage adjustments were made.

Federal Motor Vehicle Control Programs

Each new federal motor vehicle control program (FMVCP) rule requires the implementation of progressively more stringent pollutant emissions standards for newly manufactured vehicles (for particular vehicle classes and pollutants, as defined by the rule). Thus, over time the portion of the on-road fleet consisting of cleaner emitting vehicles grows, as the earlier vehicles with less stringent emissions standards are phased out of the fleet (or retired from use), resulting in increasingly cleaner on-road vehicle fleets for each future year. For this analysis, the FMVCP rules were modeled using the MOVES defaults.

Table 21 lists eight FMVCP rules, with the regulated vehicle classes and pollutants, and implementation schedules during the trend analysis period. These eight national rules are referred to as the Tier 1 rule (EPA, 1991), National Low-Emissions Vehicle (NLEV) rule (EPA, 1997), heavy-duty 2004 rule (EPA, 1997), Tier 2 rule (EPA, 2000), heavy-duty 2005 rule (EPA, 2000), heavy-duty 2007 rule (EPA, 2001), highway motorcycle 2006 rule (EPA, 2004), and the 2010 cold weather vehicle operation exhaust NMHC standards (Control of HAPS Rule, EPA, February 2007). The Tier 2 and heavy-duty 2007 rules are the most comprehensive and stringent rules of EPA's FMVCP. All eight of the FMVCP rules listed in Table 21 were modeled in MOVES.

Table 21. FMVCP with Phase-In During 1990 through 2040 Trend Analysis Period.

Federal Rule	Vehicle and Engine Classes/Fuel	Standards For	Phase In
Tier 1 (exhaust)	1) LDV[1]/LLDT[2] 2) LLDT 3) HLDT[3]	1) NMHC,[4] CO, NO_x, (LDV PM) 2) PM 3) NMHC, CO, NO_x, PM	1) 1994-1996 2) 1995-1997 3) 1996-1997
NLEV (exhaust)	LDV, LLDT	NMOG,[5] NO_x, CO, PM (diesel only), formaldehyde	2001
Tier 2 (exhaust, evap.)	1) LDV/LLDT 2) HLDT 3) MDPV[6] 4) Low-sulfur gasoline	NMOG, NO_x, CO, PM, formaldehyde	1) 2004 - 2007 2) 2004 - 2009 3) 2008 - 2009 4) 2004 - 2006
Heavy-Duty 2004 (diesel exhaust)	Diesel HDE[7]	Combined NMHC+NO_x	2004
Heavy-Duty 2005 (gasoline exhaust)	1) Gasoline HDE 2) LHDV[8] (excludes Tier 2 MDPV)	1) Combined NMHC+NO_x 2) NMOG, NO_x, CO	2005
Heavy-Duty 2007 (gasoline exhaust and evap., diesel exhaust)	1, 2) Diesel HDE 3) Low sulfur diesel	1) NMHC, NO_x 2) PM	1) 2007 - 2010 2) 2007 3) 2006
	Gasoline HDE and LHDV (excludes Tier 2 MDPV)	NMHC, NO_x, PM, formaldehyde (LHDV only)	2008 - 2009
Highway Motorcycle 2006 (exhaust, permeation)	1) Class I and II exhaust[9] 2) Class III exhaust 3) All Classes, permeation	1) HC, CO, (HC+NO_x option) 2) HC+NO_x, CO 3) HC	1) 2006 2) 2006-2010 3) 2008
2010 Cold Weather Vehicle Operation NMHC standards (exhaust)	LDV, LLDT, MDPV	NMHC	2010 - 2015

[1] Light-duty vehicles (passenger cars).
[2] Light-duty trucks at or below 6,000 lbs. GVWR (GVWR – the curb weight of the vehicle plus its maximum recommended load of passengers and cargo).
[3] Light-duty trucks from 6,000 to 8,500 lbs. GVWR.
[4] Non-methane hydrocarbon.
[5] Non-methane organic gas, species of hydrocarbons.
[6] Medium-duty passenger vehicles, or any complete vehicles between 8,500 and 10,000 lbs. GVWR designed primarily for the transportation of persons (refer to rule for specific exclusions).
[7] Highway heavy-duty engines used in heavy-duty vehicles (vehicles with a GVWR over 8,500 lbs.).
[8] Light heavy-duty vehicles, or heavy-duty vehicles from 8.500 to 14,000 lbs. GVWR.
[9] Class I is < 170 cubic centimeters (cc) engine displacement, Class II is 170 to 280 cc, and Class III is 280 cc and greater.

Two sets of emissions standards were defined for light-duty vehicles in the federal Clean Air Act (CAA) of 1990, Tier 1, and Tier 2. The Tier 1 rule implemented more stringent exhaust tailpipe emissions standards than the then current light-duty standards (termed Tier 0 standards). The Tier 1 standards include NMHC, CO, NO_x, and PM exhaust emissions for LDV and LDTs, and were phased in beginning in 1994 to 100 percent coverage of the LDV and LDT fleet in 1997 and later years.

The National Low Emission Vehicle (NLEV) program provided more stringent emissions standards (for LDV and LLDT exhaust) beyond Tier 1, for the transitional period before the introduction of the Tier 2 regulations. Emissions standards are included for NMOG, NO_x, CO, PM (diesel vehicles only) as well as formaldehyde. The NLEV program does not introduce more stringent evaporative emissions standards. NLEV standards are fully phased-in for all vehicle classes in one step, for the 2001 model year and thereafter (non-northeastern state phase-in).

The Tier 2 rule (beginning in 2004, with full phase in for all subject vehicle classes by 2009 model year) requires yet much more stringent tailpipe emissions standards for all passenger vehicles including passenger cars, pick-up trucks, minivans, vans, and sport utility vehicles (LDV, LDT [LLDT and HLDT], and MDPV, a newly defined vehicle class for the heaviest passenger vehicles [e.g., large sport utility vehicles] in the rule). All passenger vehicles are subject to the same national exhaust standards as cars (a first), and more stringent evaporative emissions standards are required for the LDV and LDT classes. Additionally, for the first time vehicles and fuels are treated as a system. The program reduces average gasoline sulfur nationwide, fully phased-in for 2006, which will enable the new Tier 2 vehicles to meet the emissions standards by reducing the degradation of vehicle emissions control performance due to sulfur in gasoline. The low sulfur gasoline will also reduce emissions from NLEV and other vehicles already on the road. Tier 2 emissions standards include NMOG, NO_x, CO, PM, and formaldehyde.

The heavy-duty vehicle rules (2004, 2005, and 2007) introduced more stringent and new emissions standards for light heavy-duty vehicles (LHDV) and heavy-duty engines (HDE) in two phases. The heavy-duty 2004 rule (for diesel HDEs) and the heavy-duty 2005 rule (for gasoline LHDV/HDEs) comprised phase one, and the heavy-duty 2007 rule (includes both gasoline and diesel LHDV/HDEs) was phase two. The heavy-duty 2004 rule required a new combined NMHC plus NO_x exhaust standard for diesel engines manufactured for model years 2004 and later. The heavy-duty 2005 rule required a new combined NMHC plus NO_x exhaust standard for gasoline LHDVs (excluding MDPVs covered in the Tier 2 rule), and individual NMOG, NO_x, and CO exhaust standards for gasoline HDEs for model years 2005 and later. The 2005 rule did not require more stringent evaporative emissions standards.

The heavy-duty 2007 rule, the second phase of EPA’s two-phase heavy-duty vehicle emissions control initiative, substantially reduces emissions from both diesel HDEs and gasoline HDEs and LHDVs (excluding MDPVs, which are covered in the Tier 2 rule). This program regulates the heavy-duty vehicle (engine) and its fuel as a single system. The new emissions standards took effect in 2007, and new low-sulfur diesel fuel rule took effect in 2006. The low-sulfur diesel fuel enables the new vehicles and engines to meet the new emissions standards by reducing the degradation of vehicle emissions control performance due to diesel sulfur, as well as enable light-duty diesels to meet the Tier 2 standards. The diesel HDE PM standard is fully phased-in for 2007 and later model years, and the diesel HDE NMHC and NO_x standards began in 2007 with full phase-in for 2010 and later model years. The gasoline HDE and LHDV NMHC, NO_x, PM, and formaldehyde (for LHDV only) exhaust standards begin in 2008 with full phase-in for 2009 and later model years. New evaporative emissions standards are applied to all heavy-duty gasoline vehicle and engine categories (except MDPV) according to the gasoline vehicle exhaust phase-in schedule.

The highway motorcycle 2006 rule requires new motorcycles to meet more stringent exhaust emissions standards and adds permeation (evaporative HC) standards beginning in 2006 and 2008 respectively. The exhaust standards include HC, HC+NO_x (for larger motorcycles, and optionally for smaller classes), and CO.

In addition to the emissions reductions that will occur according to the specific standards as set forth in the FMVCP rules described, reductions will occur for additional exhaust pollutants as well. For example, reductions in SO_2 emissions will result from the reduced sulfur in gasoline and diesel fuels as required in the Tier 2 and heavy-duty 2007 rules.

Heavy-Duty Diesel NO_x Off-cycle Effects Mitigation Programs

In the late 1980s through the early 2000s, some heavy-duty diesel engines were manufactured with built in "defeat devices" causing in-use engine NO_x emissions to be higher than specified under federal test procedure conditions. MOVES includes estimates of these excess NO_x emissions from the four heaviest diesel weight classes (most significantly, the two heaviest weight classes), for model years during which defeat devices were installed. The excess NO_x affects calendar years 1989 through 2026 fleet emissions, beyond which the subject model year vehicles are assumed to have been retired from fleet.

MOVES also models the effects of two programs designed to offset the heavy-duty diesel NO_x off-cycle emissions – early pull-ahead of 2004 heavy-duty diesel emissions standards (to the 2002 and 2003 model years), and the low emissions rebuilds of existing engines (engine software upgrades designed to reduce the excess NO_x emissions). The MOVES defaults were used in this analysis for these two programs.

Fuels Programs

Emissions reductions are also achieved through the implementation of federal and state fuel programs, which include summertime gasoline volatility (RVP) limits, gasoline reformulations, winter season oxygenated gasoline, low-emissions diesel formulations, and reduced sulfur fuels. These programs may be modeled in MOVES, except for programs that require alternate diesel fuel properties (e.g., TxLED program), in which case the program effects were modeled by post-processing MOVES-based emissions factors. Table 22 summarizes the fuel programs affecting on-road mobile source emissions in Texas, as modeled in the emissions factors for the trend analysis.

Table 22. Federal and State Fuels Controls in Texas during Trend Analysis Period.

Program	Start Year	Control/Standard	Geographic Coverage
Federal Controls on Gasoline Volatility[1]	1990	Max summertime RVP, 9.0 pounds per square inch (psi)	All 254 counties.
Federal Controls on Gasoline Volatility[1]	1992	Max summertime RVP, 7.8 psi Max summertime RVP, 9.0 psi	1-hr ozone nonattainment counties[2] Remainder of state
El Paso Oxygenated Gasoline[3]	1992	Winter season control period minimum weight percent oxygen 2.7%	El Paso CO nonattainment county
Federal Reformulated Gasoline (RFG[4])	Phase I 1995	Performance standard reductions: VOC, Toxics	DFW and HGB 1-hr ozone nonattainment counties
El Paso Low RVP Gasoline[5]	1996	Max summertime RVP, 7.0 psi	El Paso County
Federal RFG	Phase II 2000	Performance standard reductions: VOC, NO_x, Toxics	DFW and HGB 1-hr ozone nonattainment counties
Regional Low RVP Gasoline[6]	2000	Max summertime RVP, 7.8 psi	95 central and eastern Texas counties[7]
Tier 2 Low Sulfur Gasoline[8]	2004-2006 phase in	Refinery average 30 ppm gasoline sulfur content, per gallon cap 80 ppm	National
Federal Low Sulfur Highway Diesel	1993 2006	500 ppm max sulfur content[9] 15 ppm max sulfur content, with provisions[10]	National
Texas Low Emission Diesel[11]	2005	Low aromatic HC and high cetane number to control NO_x	110 counties: 95 counties[7] and the 15 HGB, BPA, and DFW one-hour ozone nonattainment counties

[1] 40 CFR § 80.27. Controls and Prohibitions on Gasoline Volatility.
[2] BPA: Hardin, Jefferson, Orange; DFW: Collin, Denton, Dallas, Tarrant; HGB: Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller; and El Paso County.
[3] 30 Texas Administrative Code (TAC) § 114.100 Oxygenated Fuels.
[4] 40 CFR § 80.41 Standards and Requirements for Compliance (federal RFG).
[5] 30 TAC §§ 115.252. Control Requirements (for gasoline RVP).
[6] 30 TAC § 114.301. Control Requirements for RVP.
[7] Anderson, Angelina, Aransas, Atascosa, Austin, Bastrop, Bee, Bell, Bexar, Bosque, Bowie, Brazos, Burleson, Caldwell, Calhoun, Camp, Cass, Cherokee, Colorado, Comal, Cooke, Coryell, De Witt, Delta, Ellis, Falls, Fannin, Fayette, Franklin, Freestone, Goliad, Gonzales, Grayson, Gregg, Grimes, Guadalupe, Harrison, Hays, Henderson, Hill, Hood, Hopkins, Houston, Hunt, Jackson, Jasper, Johnson, Karnes, Kaufman, Lamar, Lavaca, Lee, Leon, Limestone, Live Oak, Madison, Marion, Matagorda, McLennan, Milam, Morris, Nacogdoches, Navarro, Newton, Nueces, Panola, Parker, Polk, Rains, Red River, Refugio, Robertson, Rockwall, Rusk, Sabine, San Jacinto, San Patricio, San Augustine, Shelby, Smith, Somervell, Titus, Travis, Trinity, Tyler, Upshur, Van Zandt, Victoria, Walker, Washington, Wharton, Williamson, Wilson, Wise, and Wood.
[8] Control of Air Pollution From New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements; Final Rule, EPA, February 10, 2000. Note that the typical pre-control average sulfur content is about 300 ppm.
[9] 40 CFR § 80.29. Controls and Prohibitions on Diesel Fuel Quality.
[10] 40 CFR § 80.500. What are the Implementation Dates for the Motor Vehicle Diesel Fuel Sulfur Control Program?; 40 CFR § 80.520. What are the Standards and Dye Requirements for Motor Vehicle Diesel Fuel?
[11] 30 TAC § 114.312-319. Low Emission Diesel (LED) Standards.

Gasoline. The federal and state gasoline regulations summarized previously mandate progressive fuel control programs for Texas counties. At the beginning of the trends analysis, all 254 counties were modeled with conventional gasoline under the summer season federal volatility rules that limited RVP to 9.0 psi, and the typical average sulfur content value 300 ppm (pre-regulation). With the implementation of Phase II of the federal gasoline volatility rules, the ozone nonattainment counties (16 Texas one-hour ozone nonattainment counties at the time) were limited to a summer season gasoline RVP of 7.8 psi. Beginning in the winter of season of 1992, El Paso County implemented oxygenated gasoline, with a 2.7 weight percent minimum oxygen content.

In 1995 the federal Phase I RFG was implemented in 12 RFG counties in Texas (DFW and HGB ozone nonattainment counties), to reduce VOC and toxics. The next year, El Paso County implemented low RVP gasoline with summertime RVP limit of 7.0 psi. In May of 2000, the Regional Low RVP Gasoline program took effect reducing the RVP limit for 95 counties (central and east Texas) from 9.0 to 7.8 psi. Additionally in 2000, the 12 Texas federal RFG counties transitioned to Phase II RFG, which changed the Phase I emissions performance standards by increasing the required VOC reductions, increasing the required Toxics reductions, and adding a NO_x reduction requirement.

For all counties, gasoline sulfur was reduced (Tier 2 rule) to a 30 ppm refinery average for 2005 and beyond, with a per gallon cap of 300 ppm in 2004 and 2005, reduced to an 80 ppm cap in 2006. More information on how the conventional gasoline and RFG were modeled for this analysis is shown in Table 20 and in a following section (see “Fuels Inputs to MOVES”).

These gasoline controls have the effect of reducing the VOC, CO, NO_x, PM, and SO_2 emissions factors modeled. The volatility controls (lower RVP limits) reduce evaporative VOC emissions. The sulfur content reductions help the Tier 2 standard vehicles meet the Tier 2 emissions standards by reducing the degradation of emissions control systems due to sulfur in gasoline, and also substantially reduce gaseous SO_2 emissions and the sulfate (SO_4) emissions component of PM, as well as make minor contributions to reductions in VOC, CO, and NO_x emissions. RFG contributes to VOC, CO, and NO_x emissions reductions.

Highway Diesel. The highway diesel fuel controls implemented during the trend analysis period are the initial and subsequent federal requirements limiting sulfur content and the TxLED program, which changes specifications of conventional diesel to reduce NO_x emissions. The typical pre-regulated diesel fuel used in motor vehicles was 3,000 ppm. In October 1993, federal highway diesel fuel sulfur content was limited to 500 ppm. This limit was in effect until 2006, when the limit on sulfur content of highway diesel was reduced to 15 ppm. The TxLED fuel was implemented in October 2005.

TxLED conforms to the sulfur levels of the federal diesel, but changes other properties of the conventional diesel (including increasing the cetane number and lowering aromatic HC content), to reduce TxLED-fueled vehicle NO_x emissions. The TxLED program includes 110 Texas counties. By June 1, 2006, diesel fuel (TxLED and federal) is limited to 15 ppm sulfur content (reduced from the prior limit of 500 ppm) for all Texas counties. These sulfur content reductions help the Tier 2 standard light-diesel vehicles meet the Tier 2 emissions standards and help the 2007 rule HDDVs meet the 2007 rule standards by reducing the degradation of emissions control systems due to diesel sulfur. The diesel sulfur reductions also decrease the SO_4 component of PM and gaseous SO_2 emissions.

For TxLED counties, the modeled NO_x reductions beginning in late 2005 are within the range of 4.8 to 6.2 percent, diminishing to a constant 4.8 percent for 2026 and later, based on EPA's best estimate of TxLED NO_x reductions (EPA, 2001. More information on how highway diesel was modeled for this analysis is shown in Table 20 and in a following section (see "Fuels Inputs to MOVES").

Vehicle Inspection and Maintenance

The Texas exhaust and evaporative, annual I/M program effects on the affected gasoline-fueled vehicle types and model years was modeled within MOVES. The vehicle emissions I/M program (administered by the Texas Department of Public Safety [DPS], in coordination with TCEQ) is an annual test. The modeling of these programs was based on program modeling descriptions from the 1990 base year or rate-of-progress emissions inventories for Houston Galveston (TCEQ, 2004), Dallas-Ft. Worth (NCTCOG, 1992), and El Paso (TACB, 1992); from the current I/M SIP (TCEQ, 2005); and from prior emissions modeling analyses and consultations with TCEQ staff. More information on how the I/M programs were modeled for this analysis is shown in Table 20 and in a following section (see "Local I/M Inputs to MOVES").

The I/M programs over the trend period include earlier, less stringent I/M programs which consisted first of the idle exhaust test, followed by the two-speed idle (TSI) exhaust test and the evaporative gas cap integrity (GC) test. A later (new) I/M program in the Dallas-Ft. Worth and Houston-Galveston areas includes a combination of acceleration simulated mode (ASM-2, dynamometer-based), TSI, and on-board diagnostics (OBD) exhaust tests, and includes a combination of the GC, and GC plus OBD evaporative tests. The new I/M program in the El Paso and Austin areas includes a combination of TSI and OBD exhaust test, and GC and GC plus OBD evaporative tests. For the new I/M programs, the combination of test types administered depends on vehicle class (weight category) and model year.

The I/M program began in El Paso in 1987, in Dallas and Tarrant counties in April of 1990, and in Harris County in January 1997. In May of 2002, the DFW area I/M program added the counties of Collin and Denton, and in May of 2003 the I/M program was expanded to the five counties of Ellis, Johnson, Kaufman, Parker, and Rockwall. Additionally, in May of 2003 the I/M program in the Houston area was expanded to include the four counties of Brazoria, Fort Bend, Galveston, and Montgomery. To complete the current scenario, which includes a total of 17 Texas I/M counties, Travis and Williamson counties of the Austin area were added in September of 2005.

MOVES Run Specifications

The MRS (XML file) defines the place, time, vehicle, road, fuel, emissions producing process, and pollutant parameters for the modeling scenario. TTI developed the analysis MRS files by first creating an MRS template for each year using the MOVES Graphical User Interface (GUI), then looping through the templates with a basic file-building utility to create the individual MRS files for the MOVES runs. Table 23 describes the MRS selections TTI used to produce the summer Weekday MOVES emissions and activity output for calculating the emissions rates.

Table 23. Summer Weekday Analysis – MOVES RunSpec Selections by GUI Panel.

Navigation Panel	Detail Panel	Selection
Scale	Domain/Scale; Calculation Type	County; Inventory
Time Spans[1]	Time Aggregation Level; Years – Months[1] – Days[1] – Hours	Hour; 1990 (1999, 2000… 2030) - July - Weekday – All
Geographic Bounds[1]	Region; Selections; Domain Input Database[1]	County; County (individual county to represent a county group); <County database name for given county group>
On-Road Vehicle Equipment	SUT/fuel combinations	**Diesel:** Combination Long-Haul Truck – Combination Short-Haul Truck – Intercity Bus – Light Commercial Truck – Motor Home – Passenger Car – Passenger Truck – Refuse Truck – School Bus – Single Unit Long-Haul Truck – Single Unit Short-Haul Truck – Transit Bus **Gasoline:** Combination Short-Haul Truck – Light Commercial Truck – Motor Home – Motorcycle – Passenger Car – Passenger Truck – Refuse Truck – School Bus – Single Unit Long-Haul Truck – Single Unit Short-Haul Truck
Road Type	Selected Road Types	Off-Network – Rural Restricted Access – Rural Unrestricted Access – Urban Restricted Access – Urban Unrestricted Access
Pollutants and Processes[2]	VOC; CO; NO_x; CO_2; SO_2; NH_3; PM_{10}: OC, EC, SO_4, Brakewear, Tirewear; $PM_{2.5}$: OC, EC, SO_4, Brakewear, Tirewear; benzene; ethanol; MTBE; Naphthalene; 1,3-Butadiene; Formaldehyde; Acetaldehyde; Acrolein	Will include all of the following, as available by pollutant: Running Exhaust, Start Exhaust, Brakewear, Tirewear, Crankcase Running Exhaust, Crankcase Start Exhaust, Crankcase Extended Idle Exhaust, Evap Permeation, Fuel Vapor Venting, Fuel Leaks
Manage Input Data Sets	Additional input database selections	None
Strategies – Alternate Vehicle Fuels Technologies (AVFT)[3]	"New" button is grayed out	Means an AVFT file (local fuel fractions) was imported to the Runspec (will import alternate fuel fractions based on local registrations data and MOVES default data)
General Output	Output Database; Units; Activity	<database name for county group scenario>; Pounds, KiloJoules, Miles; Distance Traveled, Source Hours, Source Hours Idling, Source Hours Operating, Source Hours Parked, Population, Starts
Output Emissions Detail[1]	Always;[1] For All Vehicles/Equipment On Road	24-Hour Day,[1] County, Pollutant; Fuel Type, Emissions Process; Road Type, Source Use Type

[1] For the Annual analysis, the "Time Spans," "Geographic Bounds," and "Output Emissions Detail" parameters will be different: Months – January and July, Days – Weekday and Weekend; input database will be specifically for Annual (e.g., with summer and winter fuels and meteorology); output aggregation level will be "Year."

[2] Chained pollutants require other pollutants not shown (e.g., CO_2 requires Total Energy Consumption…).

[3] For 2010 and later years TTI will import AVFT file based on latest available, mid-year (2010) local registration data and for 2002 and earlier based on 2002 local data, and for 2003 through 2009 analysis years, based on local mid-year data for those years. MOVES default fuel fractions will be used in combination with the local data as needed.

Scale, Time Spans, and Geographic Bounds

The MOVES "County Domain/Scale" was selected. The MOVES Calculation Type "Inventory" was selected for MOVES to produce the output needed for the post-processing of MOVES activity and emissions output to calculate the 24-hour emissions rate look-up table.

The Time Spans parameters were specified to provide the most detail available, which is the hourly aggregation level, for all hours of the day. MOVES allows only one "Years" selection for the County Domain Scale. For the summer Weekday MOVES runs, which is for a single day, one "Months" (e.g., July) and one "Days" (Weekdays) selection was made. For the annual MOVES runs, the months were set to January and July, the days were set to Weekday and Weekend.

Under Geographic Bounds for the County Domain Scale, only one county may be selected. The detailed county database containing the scenario-specific input data for the county was specified as the Domain Input Database, with the annual input database containing both summer and winter fuels and meteorology.

On-Road Vehicle Equipment and Road Type

All of the SUTs associated with gasoline and diesel fuels were specified. Note that for this analysis, the MOVES default fuel engine fractions were replaced with local inputs, which showed no compressed natural gas (CNG) vehicles in the fleet (the MOVES default database includes some CNG Transit Buses), and no gasoline Transit Buses. (The local SUT/fuel type VMT mixes developed for the study define the SUT/fuel type combinations included.) For emissions rate calculations, all five MOVES road type categories were selected.

Pollutants and Processes

In MOVES, VOC is a "chained" pollutant, meaning that it is calculated based on one or more other pollutants that must also be calculated. In addition to the pollutants called for in this analysis, the following pollutants were additionally required for MOVES to produce the VOC emissions rates: Total Gaseous Hydrocarbons (THC), NMHC, and Methane. Additionally, Total Energy Consumption (TEC) was required for MOVES to calculate CO_2 rates. All of the associated processes available by the selected pollutants were included, except for the two refueling emissions processes.

Manage Input Data Sets and Strategies

The Manage Input Datasets feature allows alternate inputs other than those included in the CDB. No additional inputs were included via Manage Input Datasets panel. Alternative Vehicle Fuels & Technologies was used under Strategies to import local fuel/engine fractions into the MOVES MRS. A year-specific fuel/engine fractions data set was imported to each year-specific MRS template prior to creating the individual scenario RunSpecs for each year.

Output

The output units were pounds (converted in a later step to grams), kilojoules, and miles. All of the activity categories were chosen for inclusion in the output database, since the activity is needed along with the emissions output to calculate the rates/activity emissions rates look-up tables via post-processing. For the summer weekday MOVES runs, the output detail level is by 24-hour day, county, pollutant, process road type, and SUT. For the annual MOVES runs, the output detail level was the same as the summer Weekday MOVES runs except year was used instead of 24-hour day.

MOVES County Input Databases

Most of the locality-specific input data for county scale runs are entered through the county database (CDB) (the exception is the alternate or local fuel/engine fractions which are input via the MRS). Additional user input data may be entered through separate databases via the Manage Input Datasets feature, although this feature was not used. The CDBs (as well as the MRSs and output databases) for the MOVES Inventory runs were labeled using a single county name (actually its five-digit FIPS code) to represent all of the counties in each group. Table 24 describes the CDBs, followed by discussion of the development of the local data and defaults used.

Table 24. CDB Input Tables.

MOVES Input Table[1]	Data Category	Notes
Year	Time	Designates analysis year as a base year (base year means that local activity inputs will be supplied rather than forecast by the model).
State	Geography	Identifies the state (Texas) for the analysis.
County	Geography/ Meteorology	Identifies county of analysis (representing a county group) with local altitude and barometric pressure. Altitude was "low" for all counties, and meteorological inputs were based on 2005 weather station data representative of "eight climate zones" from a prior statewide emissions analysis.
Zonemonthhour	Meteorology	Local, hourly meteorological data (temperature and relative humidity) for the county. TTI used meteorological inputs based on 2005 weather station data representative of "eight climate zones" from a prior statewide emissions analysis.
roadtype	Activity	Lists the MOVES road types and associated ramp activity fractions. TTI set the road type ramp fractions to 0.
Hourvmtfraction		TTI used district-level hourly summer weekday VMT fractions based on recent multi-year aggregate TxDOT ATR data. For annual analysis, MOVES default weekend day hourly VMT fractions were used for the weekend day portion of the annual MOVES runs.
Avgspeeddistribution		TTI used average speed distributions based on 2008 summer weekday statewide virtual link data set. The speed distributions were calculated at the district level for calculating the emissions rates by county group. This set of average speed distributions will be used for both weekday and weekend day portions of the annual MOVES runs.
Hpmsvtypeyear[2]	Activity	**TTI used MOVES 1999 base year defaults** – 1999 national annual VMT by HPMS vehicle category, except yearID was set to analysis year.
roadtypedistribution[2]		**TTI used MOVES default** road type VMT fractions.
monthvmtfraction[2]		**TTI used MOVES default** month VMT fractions for summer weekday analysis. For the annual analyses, TTI set monthvmtfractions to zero except for January and July, which will each be set to 0.50 (effectively splitting the VMT between summer and winter).
dayvmtfraction[2]		**TTI used MOVES default** day VMT fractions.
sourcetypeyear[2]	Fleet	**TTI used MOVES 1999 base year national default** SUT populations for summer weekday analyses. For the annual analysis,1999 national SUT populations increased by a factor of six was. YearID was set equal to the analysis year.

Table 24. CDB Input Tables (Continued).

MOVES Input Table[1]	Data Category	Notes
sourcetypeage-distribution	Fleet	TTI estimated SUT age fractions using TxDOT/TxDMV vehicle registration data and MOVES defaults, as needed. Historical mid-year registration data was used for the historical years and latest available mid-year registration data for future analysis years.
fuelengfraction (text file import)	Fleet	TTI estimated SUT fuel fractions using TxDOT/TxDMV vehicle registration data and defaults where needed. Historical mid-registration data was used for historical years and latest available registration data was used for future analysis years.
Zone	Activity	Start, idle, and SHP zone allocation factors. County = zone, and all factors were set to 1.0 (required for county scale analyses).
zoneroadtype	Activity	SHO zone/roadtype allocation factors. County = zone, and all factors were set to 1.0 (required for county scale analyses).
fuelsupply	Fuel	TTI used, in general, the market share values from the MOVES default fuel supply table. Revisions may be made based on comparison to available local retail outlet fuel survey data summaries, and/or other available data as needed. A significant change will be made in the treatment of E10. Fuel supplies were be modified such that E10 (i.e., gasoline with a nominal 10% by volume ethanol content) for conventional gasoline counties will be phased into the market beginning in 2008 (later in Texas than the MOVES defaults, as indicated by local survey sample data) with full saturation across the state in all counties in 2012 (based on EIA Annual Energy Outlook 2011 [AEO2011] Reference case motor gasoline, E85 and ethanol forecasts).
fuelformulation	Fuel	TTI applied fuel formulations in MOVES that meet state and federal regulatory requirements by year (e.g., RVP limits, sulfur content, benzene content), and expected ethanol volumes in the fuel supply consistent with the federal renewable fuel standard (RFS) mandate and local data. Other fuel property inputs (e.g., aromatics, olefins, e200, e300, oxygenates) were based on a combination of MOVES defaults, available local fuel survey data, and other information. Sulfur values weree consistent with applicable Tier 2 phase-in values and pre-Tier 2 historical value averages. For non-ethanol blends, RVP was consistent with summertime limits that may include a conservative compliance safety margin based on historical fuel survey data observations. For E10 blends, RVP waivers of 1.0% will be used where applicable and no RVP safety margin will be applied. For RFG counties in particular, formulations were based on MOVES defaults and local RFG survey data available from EPA, using recent data for future years, in combination with expected averages (e.g., 30 ppm average sulfur content). For the annual analysis, summer and winter data were applied. Sulfur content for pre-regulated diesel were consistent with historical data, and for sulfur content-regulated periods were consistent with federal limits, e.g., as provided in MOVES2010 *Technical Guidance* (April 2010).
imcoverage	I/M	TTI prepared locality-specific set ups to represent I/M program design/description for each county and analysis year based on current I/M rules, prior setups produced for MOBILE6 analyses, and the available MOVES I/M parameters (in terms of MOVES I/M “teststandards” and associated “imfactors”) pertaining to the domain of I/M vehicles. No regulatory class adjustments were be made.

[1] There are 18 CDB tables. All tables listed are CDB input tables except for the fuel engine fractions, which are imported to the MOVES RunSpecs via the MOVES AVFT feature.

[2] For more information on these inputs, see the following “Default Activity and Population CDB Inputs to MOVES” section.

Year, State, and County Inputs to MOVES

The year, state, and county tables are populated with data identifying the year, state and county of the run. The same tables were used for both the summer weekday and annual MOVES runs.

The MOVES year table data for the analysis year was inserted from the MOVES default database, and year was set as a base year (specifies that MOVES will not forecast activity data and fleet data, since these data are to be provided as inputs). Similarly, the MOVES state table data was selected on stateID “48” (Texas) and inserted in the state table. The county table identifies the county of analysis and contains barometric pressure and altitude information (discussed further with other meteorological inputs). The county data is selected from a prepared “meteorology” database that contains the tables of weather data records (i.e., county and zonemonthhour tables) for the analysis.

Roadtype Table Inputs to MOVES

Currently the MOVES model contains “ramp” emissions rates, but not a road type for ramps specifically. In the roadtype table, MOVES provides a field “rampFraction” for including a fraction of estimated ramp activity as a fraction of SHO on each of the MOVES road types. For this analysis, the MOVES default roadtype table data were used, but with the ramp fractions set to zero (i.e., 100% of activity on each MOVES road type was based on the road type drive cycles assigned to that road type by MOVES, exclusive of ramp activity). The same roadtype table was used for both the summer weekday and annual MOVES runs.

Hourvmtfraction Table Inputs to MOVES

For the summer Weekday MOVES runs, TxDOT district-level hourly summer weekday VMT fractions were used to develop the hourvmtfraction table inputs to MOVES. These hourly VMT fractions were based on multi-year TxDOT ATR data (i.e., 2000 through 2008). Using the district summer day-type-specific ATR volumes, the hourly travel factors were calculated as the ratio of hourly volume to 24-hour volume.

Since the annual MOVES runs consist of weekday and weekend days, two sets of hourly VMT fractions were needed as input to MOVES. For weekday portion of the annual MOVES runs, the TxDOT district-level hourly summer weekday VMT fractions (same as used with the summer Weekday MOVES runs) were used. The MOVES default weekdend day hourly VMT fractions were used for the weekend portion of the annual MOVES runs.

Avgspeeddistribution Table Inputs to MOVES

The average speed distribution data used to build the avgspeeddistribution table inputs to MOVES were based on a 2008 summer Weekday statewide virtual link VMT and speeds data set. The speed distributions were calculated at the TxDOT district level. The same average speed distribution data were used for both the weekday and weekend day portions of the annual MOVES runs.

Default Activity and Population CDB Inputs to MOVES

The “grayed” MOVES CDB input table descriptions (see Table 24) are activity and vehicle population inputs that use the MOVES defaults (except for yearID where included the tables).

Since the MOVES activity output is divided into the MOVES emissions output to produce the "rates per activity" emissions rates in the emissions rates calculation post-processing procedure, the use of these defaults has no significant affect on the MOVES-based emissions rates and allows for an improved process efficiency that allows for simultaneous development of the emissions rates and the activity parameters (i.e., VMT, SHP, etc.) that are used in the emissions calculations. Data for all of these tables were selected and inserted from the MOVES default database. For those tables that include the yearID field (i.e., hpmsvtypeyear and sourcetypeyear), the yearID value was updated by setting it to the analysis year value. These tables include: hpmsvtypeyear, roadtpyedistribution, monthvmtfaction, dayvmtfraction, and sourcetypeyear.

- For the hpmsvtypeyear table, the MOVES 1999 base year defaults (1999 national annual VMT by HPMS vehicle category) were used for both the summer weekday and annual MOVES runs, with the yearID updated to represent the analysis year.
- For the roadtypedistribution table, the MOVES default roadtype VMT fractions were used for both the summer weekday and annual MOVES runs.
- For the monthvmtfraction table, the MOVES default month VMT fractions were used for the summer weekday MOVES runs. For the annual MOVES runs, the month VMT fractions were set to 0.5 for January and July, with all other months set to 0; thus effectively splitting the VMT between summer and winter.
- For the dayvmtfraction table, the MOVES default day VMT fractions were used for both the summer weekday and annual MOVES runs.
- For the sourcetypeyear table, the MOVES 1999 base year national default SUT populations were used for the summer weekday MOVES runs. For the annual MOVES runs, the 1999 national default SUT populations were multiplied by a factor of six. Since the MOVES "year" post-aggregation calculations requires 12 months to be selected (for the year, vehicles exist in all 12 months) and only two months (January and July) were selected in the MRS, this factor is required to maintain the balance between the default annual VMT (split between the two months) and the national default SUT populations. For both the summer weekday and annual MOVES runs, the year ID was set to the analysis year.

Local SUT Age Distributions and Fuel Engine Fractions Input to MOVES

The locality-specific fleet inputs to MOVES consist of the SUT age distributions (sourcetypeage table) and fuel engine fractions (fuelegfraction text file imported into MOVES). These fleet inputs were based on TxDOT mid-year county registrations data and MOVES defaults, as needed. For the analysis years where registration data was available, the historical mid-year registration data was used. For the remaining years (i.e., future years), the latest available (or historical year closest to the analysis year) registration data was used. This registration data consists of the following data sets: composite fuel light-duty and aggregate heavy duty registrations, heavy-duty gas registrations by eight weight categories, and heavy-duty diesel registrations by eight weight categories. The MOVESfleetInputBuild utility was used to produce these fleet inputs to MOVES in the required formats (see the utility description later in this appendix).

The fuel engine fractions were developed consistent with the SUT/fuel types in the VMT mix (e.g., if no CNG vehicles are in the SUT/fuel type VMT mix, then the fuel/engine fractions for CNG would be zero). One statewide level fuel fractions data set was developed for each year.

The locality-specific SUT age distributions were produced based on the TxDOT county vehicle registration category aggregations consistent with the vehicle registration category aggregations used in estimating the SUT/fuel type VMT mix. The SUT age distribution inputs were developed at the TxDOT district level (i.e., 25 distributions) for each year. Table 25 summarizes the data sources and aggregation levels used to estimate the SUT age distributions and the fuel engine fractions.

Table 25. Data Sources and Aggregations for SUT Age Distributions and Fuel/Engine Fractions.

SUT Name	SUT ID	TxDOT Category[1] Aggregations for Age Distributions and FEFs	Geographic Aggregation for Age Distributions	Geographic Aggregation for Fuel/Engine Fractions[2]
Motorcycle	11	Motorcycles	TxDOT District	NA – 100 percent gas, no FEFs
Passenger Car	21	Passenger	TxDOT District	MOVES default
Passenger Truck[2]	31	Total Trucks<=8500	TxDOT District	MOVES default
Light Commercial Truck[2]	32	Total Trucks<=8500	TxDOT District	MOVES default
Single-Unit Short-Haul Truck[2]	52	>8500+ >10000+ >14000+>16000	TxDOT District	Texas Statewide
Single-Unit Long-Haul Truck[2]	53	>8500+ >10000+ >14000+>16000	Texas Statewide	Texas Statewide
Refuse Truck	51	MOVES default		
Motor Home	54			
Intercity Bus	41			
Transit Bus[3]	42			
School Bus	43			
Combination Short-Haul Truck[2]	61	>19500+ >26000+ >33000+ >60000	TxDOT District	Texas Statewide
Combination Long-Haul Truck[2]	62	>19500+ >26000+ >33000+ >60000	Texas statewide	NA – 100 percent diesel, no FEFs

[1] TTI updated (based on current MOVES model and database) the MOVES default age distributions from EPA's MOVES tools webpage (http://www.epa.gov/otaq/models/moves/tools.htm (which were based on the previous MOVES version) and used them in this analysis.
[2] TxDOT category aggregations are listed as GVWR in units of lbs.
[3] MOVES default fuel-engine fractions for transit buses were revised to exclude the CNG and gasoline-fueled components, consistent with the local SUT/fuel type VMT mixes.

Local Meteorological (County and Zonemonthhour Table) Inputs to MOVES

The local meteorological data was input to MOVES via the county and zonemonthhour tables. The method used to build the meteorological data for these tables was consistent with the meteorological data from the most recent (2008) Trends analysis developed by TTI, *Development of On-Road Mobile Source, 1990 through 2040 Emissions Trends for All 254 Texas Counties*, TTI, August 2008. This method divided the 254 Texas counties into eight climate zones: Amarillo, Corpus Christi, Dallas, El Paso, Houston, Lubbock, Midland, and San Antonio. The meteorological data was developed using National Weather Service (NWS) validated 2005 hourly observation data by month from a site in each of the eight named cities.

To produce the summer Weekday meteorological inputs to MOVES, the June through August data within each climate zone were averaged to produce the hourly average temperature, hourly average relative humidity, and daily average barometric pressure. These meteorological inputs were also used for the summer portion of the annual MOVES runs. For the winter portion of the annual MOVES runs, the averages were calculated using the January through December data.

Fuels Inputs to MOVES

The local fuels inputs to MOVES are input via the CDB in the fuelsupply and fuelformulation tables. A combination of data sources were used to produce the MOVES inputs for fuels, including (but not limited to) the MOVES defaults, MOVES technical and various survey data.

For the fuelsupply table, the market share values used were generally from the MOVES default fuel supply table. For the conventional gasoline counties, fuel supplies were modified so that E10 (i.e., gasoline with a nominal 10% by volume ethanol content) was phased into the market beginning in 2008 with a full saturation across the entire state in 2012.

For the fuelformulation table, fuel formulations were applied in MOVES that meet the state and federal regulatory yearly requirements (e.g., RVP limits, sulfur content, benzene content). The expected ethanol volumes in the fuel supply were consistent with the federal RFS mandate and local data. Other fuel property inputs (e.g., aromatics, olefins, e200, e300, and oxygenates) were based on a combination of MOVES defaults and available local fuel survey data. Sulfur values were consistent with the applicable Tier 2 phase-in values and pre-Tier 2 historical averages. RVP was consistent with the summer limits, including a conservative compliance safety margin based on historical fuel survey data observations for non-ethanol blends. For E10 blends, RVP waivers of 1.0% were used (when applicable) and no RVP safety margin was applied. For the RFG counties, fuel formulations were based on MOVES defaults and local RFG survey data (available from EPA), using recent data for the future years in combination with expected averages (e.g., 30 ppm average sulfur content). Sulfur content values for pre-regulated diesel were consistent with historical data and consistent with the federal limits for the sulfur content-regulated periods. Summer and winter data were applied for the annual MOVES runs.

Local I/M Inputs to MOVES

In general, MOVES calculates emissions rates that reflect the emissions-reducing benefits of an I/M program (i.e., selected or target I/M program) using the following parameters:

- Non-I/M reference rate (mean base rates for all non-I/M areas); and
- I/M reference rate (mean base rates for the reference I/M program area at 100 percent effectiveness).

Other parameters include an I/M factor (emissions rate ratio for target, or local, I/M program to reference I/M program, derived from MOBILE6 rates) and the target I/M program compliance factor.

The I/M factor reflects the target I/M program's effectiveness relative to the reference I/M program, and is an adjustment to the standard I/M difference (non I/M reference rate minus I/M reference rate). The compliance rate is a measure of the target program's effectiveness relative to the design goals (100 percent is a perfect program, and 0 percent is a complete failure). MOVES calculates an I/M Adjustment Fraction as the product or these two factors and applies it using an algorithm to weight the MOVES non-I/M and I/M reference mean base rates into a mean base rate reflecting the effects of the target I/M program.

EPA has calculated the MOBILE6-based I/M Factors for various combinations of I/M program design parameters, which are included in the MOVES imfactor table. The MOVES imcoverage table contains I/M program parameters (populated using data from the EPA's 2005 National EI) including compliance factors, which may be updated or replaced using local data.

TTI reviewed the MOVES default imcoverage table input data for Texas and decided that it would be better to produce a completely new data set. TTI developed an updated set of Texas imcoverage inputs for all MOVES analysis years and stored them in a database for use in building CDBs for emissions rates modeling. For this Trends analysis, the following steps were followed to populate CDB imcoverage tables:

- Select and insert all MOVES default imcoverage records for the scenario's countyID and yearID into the CDB imcoverage table, and flag for non-use (set useIMyn = N) in the modeling run; and
- From the updated Texas MOVES imcoverage database, select and insert the imcoverage records for the scenario's yearID and countyID in the CDB imcoverage table.

These I/M inputs were built to best represent Texas I/M program designs as specified in the Texas I/M SIP and Texas rules (with compliance and waiver rates from the latest MOBILE6 analyses), using the currently available and I/M coverage modeling parameters in MOVES. For full I/M program details, please see the current I/M SIP, *Revision to the State Implementation Plan Mobile Source Strategies, Texas Inspection and Maintenance State Implementation Plan*, TCEQ, November 18, 2010.

Following is the general approach used to build the current Texas imcoverage tables.

- Identify/list the MOVES I/M test standards applicable to Texas (listed in column 5 of Table 26).
- Query the MOVES default imfactor table on Texas I/M test frequency and fuel type (i.e., annual and gasoline) and on the six imteststandards applicable to Texas – from this query

list the SUTs, test standards, pollutant, and emissions process combinations with imfactors (effects) available in MOVES (see Table 26, note 4).

- Categorize counties and years in groups under the same MOVES test standards.
- Assign MOVES improgramIDs such that: 1) all MOVES default improgramIDs are excluded, and 2) per MOVES User's Guide, for each yearID, each IMprogramID represents a unique combination of test standard, test frequency, begin model year, and end model year.

Development of the complete the set of MOVES imcoverage records for all Texas counties and analysis years in MOVES resulted in a total of 33,342 Texas MOVES imcoverage records. Table 26 describes the full set of records, from which the records for this analysis were used. Note that a review of the MOVES data showed that in the current MOVES model there are no I/M effects modeled for heavy-duty vehicle categories (i.e., vehicles with gross vehicle weight ratings > 8,500 pounds).

Table 26. Texas MOVES IMCoverage Input Descriptions – All Counties/Years.

I/M Area Abbr. IMprogamID[1]	YearID (records/county/year)[2]	begModel YearID[3]	endModel YearID[3]	testStandardsID	Sourcetypeid[4]
DT/EL					
90	1990 (18)	1975	1990	11 (Unloaded Idle)	LD (21, 31, 32)
HA/DT/EL					
20	1999 thru 2001 (33)	X	X	12 (2500 RPM/Idle)	LD, HD (52, 54)
50		X	X	41 (Evp Cap)	LD
EL					
20	2002 thru 2006 (33)	X	X	12 (2500 RPM/Idle)	LD, HD
50		X	X	41 (Evp Cap)	LD
HA/DT/CD					
30	2002 thru 2019 (54)	X	1995	23 (A2525/5015 Phase)	LD
51		X	1995	41 (Evp Cap)	LD
40		1996	X	51 (Exh OBD)	LD
60		1996	X	45 (Evp Cap, OBD)	LD
20		X	X	12 (2500 RPM/Idle)	HD
HU/XD					
30	2003 thru 2019 (54)	X	1995	23 (A2525/5015 Phase)	LD
51		X	1995	41 (Evp Cap)	LD
40		1996	X	51 (Exh OBD)	LD
60		1996	X	45 (Evp Cap, OBD)	LD
20		X	X	12 (2500 RPM/Idle)	HD
TW/EL					
21	2006/2007 thru 2019 (54)	X	1995	12 (2500 RPM/Idle)	LD
51		X	1995	41 (Evp Cap)	LD
40		1996	X	51 (Exh OBD)	LD
60		1996	X	45 (Evp Cap, OBD)	LD
20		X	X	12 (2500 RPM/Idle)	HD

Table 26. Texas MOVES IMCoverage Input Descriptions – All Counties/Years (Continued).

I/M Area Abbr. IMprogamID[1]	YearID (records/county/year)[2]	begModel YearID[3]	endModel YearID[3]	testStandardsID	Sourcetypeid[4]
ALL					
41	2020 thru 2050 (33)	X	X	51 (Exh OBD)	LD
61		X	X	45 (Evp Cap, OBD)	LD
20		X	X	12 (2500 RPM/Idle)	HD

[1] County labels and I/M implementation dates: EL (1/1/1987) El Paso; DT (4/1/1990) Dallas, Tarrant; CD (5/1/2002) Collin, Denton; XD (5/1/2003) Ellis, Johnson, Kaufman, Parker, Rockwall; HA (1/1/1997) Harris; HU (5/1/2003) Brazoria, Fort Bend, Galveston, Montgomery; TW (9/1/2005) Travis, Williamson.

[2] Common parameters for Texas imcoverage records include: annual test cycle, gasoline fuel type, useIMyn = Y. The compliancefactor for Texas programs is also common (i.e., based on current Texas I/M program compliance and waiver rates [96%/3%], i.e., 96% X (100-3%) = 93.12%), except for 1990 (where historical compliance and waiver rates from 1990 inventory documents were used, i.e., EL 73%/0%; DT 62%/0.6%), and for year/county combinations with a partially completed initial I/M test cycle as of July 1 of the analysis year (the imcompliancefactor is adjusted proportional to the amount of the test cycle completed, e.g., for May 1 of the analysis year implementation, the compliance factor adjustment would be 2/12). Based on start year/month, the partial I/M cycles (and adjustments) are: DT – 3/12; CD – 2/12; HU, XD – 2/12; and TW – 10/12.

[3] begmodelyearid and endmodelyearid, which define the range of vehicles covered, where represented by “x” are calculated as YearID – 24, and YearID – 2, respectively.

[4] Gasoline vehicles in MOVES: LD – passenger car (21), passenger truck (31), light commercial truck (32); HD – motor homes (54), single unit short-haul truck (52). For LD, MOVES includes both exhaust and evaporative I/M factors and mean base rates with I/M effects. For HD >8,500 lbs. GVWR, MOVES cuttently does not include I/M factors and mean base rate combinations that yield and I/M effects. The processes/pollutants included are exhaust running and exhaust start THC, CO, NO_x, and tank vapor venting THC.

Post-Processing of MOVES Output

Since the both the summer weekday and annual MOVES runs were performed using the model’s emissions estimation/inventory calculation mode, post-processing of the MOVES output was required to estimate the emissions factors used as input in the emissions calculation. These post-processing steps include: Rates per activity calculation, emissions rate adjustments, and annual emissions rates estimation.

Step 1 – Rates per Activity Calculation

For the summer Weekday MOVES runs, the rates per activity were calculated for each county group and analysis year by dividing the 24-hour MOVES emissions output (movesoutput table) by the MOVES activity output (movesactivity output table). This post-processing step resulted in one emissions rate table containing 24-hour emissions rates in terms of gram/mile, grams/SHP, grams/SHI, and grams/start for each county group and analysis year. The same rates per activity post-processing step was performed on the annual MOVES runs, resulting in one emissions rate table containing annual emissions rates in in terms of gram/mile, grams/SHP, grams/SHI, and grams/start for each county group and annual MOVES run.

Step 2 – Emissions Rate Adjustments

For the summer Weekday MOVES-based emissions rates developed in Step 1, the calculated emissions rates were extracted for only those pollutants needed in the emissions calculations and TxLED adjustments were applied to the TxLED-affected county group diesel vehicle NO_x emissions rates to estimate the adjusted summer Weekday emissions rates that were used to estimate the summer Weekday emissions. For the annual MOVES-based emissions rates developed in Step 1, the calculated emissions rates were extracted for only those pollutants needed in the emissions calculations and no emissions rate adjustments were applied.

Step 3 – Annual Emissions Rates Estimation

The annual emissions rates estimation has two key components: annualization ratios and the adjusted summer weekday emissions rates (from step 2). The annualization ratios were calculated for each county group and annual year (2005, 2006, and 2011) by dividing the annual emissions rates (from Step 2) by the ratio year unadjusted summer Weekday emissions rates (from Step 1). The adjusted summer Weekday emissions rates (from Step 2) were multiplied by the appropriate year and county group annualization ratios (see Table 19) to estimate the annual emissions rates that were used to estimate the annual emissions.

EMISSIONS CALCULATIONS

TTI calculated the summer Weekday emissions by county for each scenario and analysis year using the MOVEStrendsEmscalc (see utility descriptions in following section). Whereas typical emissions inventories use a link based method, the summer Weekday and annual emissions were calculated using an aggregate, MOVES "rates-per-activity" emissions modeling approach. The aggregate emissions calculations fall into two categories: VMT-based emissions calculations and off-network emissions calculations. The VMT-based emissions calculations use the scenario-specific county VMT control totals, an assigned RIFCREC data set, and an assigned scenario-specific VMT mix to estimate emissions at the MOVES road type and SUT/fuel type level. The off-network emissions calculations use the scenario-specific off-network activity (SHP, starts, and SHI by SUT/fuel type) to estimate emissions at the county level by SUT/fuel type.

Three output files were produced by the MOVEStrendsEmscalc utility: a listing file (summarizing all pertinent information regarding the emissions calculations), a tab-delimited emissions output file (lists activity by county, year, MOVES road type, and SUT/fuel type and emissions by county, year, MOVES road type, pollutant, pollutant process, and SUT/fuel type), and a tab-delimited emissions summary output file (lists activity by county, year, and SUT/fuel type and emissions by county, year, pollutant, and SUT/fuel type). To condense the amount of output generated by the emissions calculations, all of the analysis years for a county were written to the same output file. For the statewide scenario, the counties were grouped into eight groups based on the county name; thus producing three output files per county group (a total of 24 output files). For the areas scenario, the counties were grouped by the 12 areas (a total of 36 output files).

Aggregate Emissions Calculations

The summer Weekday emissions by county for each scenario and analysis year were calculated using the following major inputs:

- Scenario-specific summer Weekday county-level VMT control totals;
- 2008 RIFCREC data sets;
- RIFCREC road type/area type to MOVES road types designations;
- Scenario-specific TxDOT-level SUT/fuel type VMT mix by MOVES roadway type (2008, or 2020, assigned by analysis year);
- Scenario-specific county-level hourly SUT/fuel type summer Weekday and annual off-network activity estimates (SHP, starts, and SHI); and
- Summer Weekday MOVES-based aggregate emissions factors by pollutant, process, SUT, fuel type, MOVES road type, and activity type, which includes both the VMT-based ("on-network") and off-network emissions factors.

The 2008 RIFCREC data sets were used to develop the MOVES road type VMT fractions that were used to distribute the scenario-specific VMT control totals to each of the MOVES road types. The scenario-specific 2008 and 2020 VMT mix was used to distribute the MOVES road type VMT to each SUT/fuel type. The VMT mix was assigned to each emissions calculation based on the analysis year. Table 27 shows the RIFCREC data sets and VMT mixes by analysis year used to estimate the summer Weekday and annual emissions by county.

Table 27. RIFCREC and VMT Mix Inputs For Emissions Estimation.

Analysis Year	RIFCREC Data Year	VMT Mix Year
2008 - 2014	2008	2008
2015 - 2030	2008	2020

The scenario-specific VMT-based county-level summer Weekday emissions were calculated using the scenario-specific county-level summer Weekday VMT control totals, the assigned RIFCREC data set, the assigned scenario-specific VMT mix, and the summer Weekday MOVES-based aggregate emissions factors. The county-level VMT from the assigned RIFCREC data (by RIFCREC road type and area type) was aggregated by MOVES road type (see Table 16), which was then converted to the MOVES road type VMT proportions. These VMT proportions were then applied to the scenario-specific county-level analysis year summer Weekday VMT control total to estimate the scenario-specific county-level analysis year summer Weekday MOVES road type VMT.

The scenario-specific VMT mix was then applied to the scenario-specific summer Weekday MOVES road type VMT to estimate the scenario-specific county-level analysis year summer Weekday MOVES road type VMT by SUT/fuel type. The VMT-based emissions factors by pollutant, process, SUT/fuel type, and MOVES road type were selected from the appropriate county group summer Weekday MOVES-based aggregate emissions factors. These emissions factors were then multiplied by the scenario-specific county-level analysis year summer Weekday MOVES road type VMT by SUT/fuel type to estimate the scenario-specific VMT-based county-level summer Weekday emissions by pollutant, process, SUT/fuel type, and MOVES road type.

The scenario-specific off-network county-level summer Weekday emissions were calculated using the county-level hourly SUT/fuel type summer Weekday off-network activity estimates (SHP, starts, and SHI) and the summer Weekday MOVES-based aggregate emissions factors. The off-network emissions factors by pollutant, process, and SUT/fuel type, were selected from the appropriate county group summer Weekday MOVES-based aggregate emissions factors. These emissions factors were multiplied by the appropriate scenario-specific county-level hourly SUT/fuel type summer Weekday off-network activity estimates as determined by the pollutant process (see Table 28) to estimate the scenario-specific off-network county-level summer Weekday emissions by pollutant, process, and SUT/fuel type.

Table 28. Emissions Rates by Process and Activity Factor.

Emissions Process	Activity[1]	Emissions Rate Units
Running Exhaust	VMT	grams/mile (g/mi)
Brakewear	VMT	g/mi
Tirewear	VMT	g/mi
Evaporative Permeation	VMT; SHP	g/mi; g/shp
Evaporative Fuel Vapor Venting	VMT; SHP	g/mi; g/shp
Evaporative Fuel Leaks	VMT; SHP	g/mi; g/shp
Crankcase Running Exhaust	VMT	g/mi
Start Exhaust	starts	g/start
Crankcase Start Exhaust	starts	g/start
Crankcase Extended Idle Exhaust	SHI	g/shi
Extended Idle Exhaust	SHI	g/shi

[1] The amount of travel on roads (VMT), hours parked (SHP), vehicle starts, and SHI are the basic activity factors. SHI is for combination long-haul trucks only.

TTI EMISSIONS ESTIMATION UTILITIES

The following is a summary of utilities developed by TTI that may be used to produce on-road mobile source MOVES-based, aggregate method, county and SUT/fuel type emissions estimates, for various applications, such as for emissions trends analyses. These utilities perform the following functions for the MOVES-based, aggregate method: the MOVES activity input builder (MOVEStrendsActivityInputBuild) builds the sourcetypeagedistribution database table and fuel engine fraction inputs to MOVES (MOVESfleetInputBuild), calculates the MOVES-based emissions rates (MOVEStrendsRates and MOVEStrendsRatesAnn), adjusts the MOVES-based emissions rates (MOVEStrendsRatesAdj and MOVEStrendsRatesAnnAdj), calculates the emissions rate annualization factors (MOVEStrendsRatesAnnFact), estimates the county-level vehicle population (MOVESpopulationBuild), estimates the hourly SHP by county (MOVEStrendsSHPcalc), estimates the hourly starts by county (MOVEStrendsStartscalc), estimates the hourly SHI by county (MOVEStrendsExtIdleHrsCalc), and estimates the emissions by county and SUT/fuel type (MOVEStrendsEmscalc).

MOVEStrendsActivityInputBuild

The MOVEStrendsActivityInputBuild builds the hourvmtfraction and avgspeeddistribution MOVES input database tables for the aggregate method using virtual link VMT and speed, a user-specified VMT mix, and the MOVES defaults. This utility is specifically designed for the aggregate method and produces the MOVES input database tables based on aggregate data for multiple counties (i.e., the hourvmtfraction and avgspeeddistribution are for a region consisting of the user specified counties). The primary inputs to this utility are:

- County-level sets of virtual link hourly VMT and speeds;
- Link/MOVES roadway type designations, which lists associations of the link roadway types/area type combination to the MOVES roadway types (same designations used for each county-level set of virtual link hourly VMT and speeds);
- VMT mix by MOVES roadway type, MOVES source type, and MOVES fuel type (same as used with the MOVESemscalc utility);
- Day ID, which specifies the MOVES day ID for calculating the output, and
- MOVES default database.

For each link in the virtual link hourly VMT, the link VMT is saved in a VMT summary array based on hour, link functional class, and link area type. The link vehicle hours traveled (VHT) (link VMT/link speed) is saved in a VHT summary array based on hour, link functional class, link area type, and MOVES average speed bin ID (determined using the MOVES average speed bins and the link speed). This process is repeated for each hour and county in the county-level sets of virtual link hourly VMT and speeds; thus creating a VMT summary array and VHT summary array for the region.

After all of the county-level sets of virtual link hourly VMT and speeds have been processed, a MOVES roadway type array (by MOVES roadway type) is formed using the data in the VMT summary array and the link/MOVES roadway type designations. An hourly VMT array (by MOVES SUT, MOVES roadway type, and hour) is formed using the data in the VMT summary array, the link/MOVES roadway type designations, and the VMT mix. An average speed distribution array (by MOVES SUT, MOVES roadway type, hour, and MOVES speed bin) is created using the VHT summary array and the VMT mix. Using the appropriate MySQL code, the MOVES hourvmtfraction and avgspeeddistribution default values are extracted and saved for later use.

The VMT in the hourly VMT array is added to the hourly VMT fraction array (by SUT, MOVES roadway type, and hour) and for those roadway types where the VMT for all hours is greater than 0, this VMT is converted to an hourly distribution. For those roadway types where the VMT is equal to 0, a value of 1 is placed in the first hour, followed by 0 in the remaining hours. Using the appropriate MySQL code, the hourvmtfraction database table is written. For those SUTs where the VMT mix is greater than 0, the hourly VMT fraction array is used. Otherwise, the MOVES hourvmtfraction default values are used. A tab-delimited version is also written (optional).

The VHT in the average speed distribution array is converted to a distribution by SUT, MOVES roadway type, hour/day (combination of hour and the day ID specified by the user), and MOVES average speed bin. Using the appropriate MySQL code, the avgspeeddistribution database table is written. For those SUTs where the VMT mix is greater than 0, the average speed distribution array is used. Otherwise, the MOVES avgspeeddistribution default values are used. A tab-delimited version is also written (optional).

The utility also produces two tab-delimited summary output files. A tab-delimited VMT summary is output by hour, link road type, and link area type for the user-specified county. A tab-delimited VHT summary is output by hour, link road type, link area type, and MOVES average speed bin for the user-specified county.

MOVESfleetInputBuild

The MOVESfleetInputBuild utility builds the sourcetypeagedistribution database table and fuel engine fraction inputs to MOVES using the TxDOT registration data sets and the MOVES default database tables. The TxDOT registration data sets are three sets of registration data (an age registration data file, a gas trucks registration data file, and a diesel trucks registration data file) that lists 31 years of registration data. The primary inputs to this utility are:

- Age registration data file, which lists 31 years of registration data for the Passenger Vehicles, Motorcycles, Trucks <=6000, Trucks >6000 <=8500, Total Trucks <=8500, Gas Trucks >8500, Diesel Trucks >8500, Total Trucks >8500, and Total All Trucks vehicle categories;
- Gas trucks registration data file, which lists 31 years of registration data for the Gas > 8500, Gas > 10000, Gas > 14000, Gas > 16000, Gas > 19500, Gas > 26000, Gas > 33000, Gas > 60000, and Gas Totals gas truck categories;
- Diesel trucks registration data file, which lists 31 years of registration data for the Diesel > 8500, Diesel > 10000, Diesel > 14000, Diesel > 16000, Diesel > 19500, Diesel > 26000, Diesel > 33000, Diesel > 60000, and Diesel Totals diesel truck categories;
- SUT data sources input, which specifies the data source for each SUT to use when building the souretypeagedistribution database table;
- Fuel engine fractions data sources input, which specifies the data source for each SUT to use when building the fuel engine fractions;
- Default sourcetypeage distribution input;
- MOVES default database; and
- Year ID file (optional, only if year is not the registration data year as in a future year analysis), which specifies the year for calculating the output.

The SUT data sources input lists the data source for each SUT, either a single county, multiple counties, state, or MOVES default. As this input is processed, the utility keeps a list of the input sources. The same applies to the fuel engine fractions, except data source inputs are only valid for source types 52, 53, and 61 (others are not valid due to data limitations and source type 62 are all considered diesel).

For each county (or state total) in the list of the input sources, the age registration data (for the Passenger Vehicle, Motorcycles, Trucks <=6000, Trucks >6000 <=8500, and Total Trucks <=8500 vehicle categories) are saved in an age registration data array. The gas truck registration data (for the Gas > 8500, Gas > 10000, Gas > 14000, Gas > 16000, Gas > 19500, Gas > 26000, Gas > 33000, and Gas > 60000 gas truck categories) are saved in the gas truck section of the diesel/gas registration data array. The diesel truck registration data (for the Diesel > 8500, Diesel > 10000, Diesel > 14000, Diesel > 16000, Diesel > 19500, Diesel > 26000, Diesel > 33000, and Diesel > 60000 diesel truck categories) are saved in the diesel truck section of the diesel/gas registration data array.

The age registration data array and the diesel/gas registration data array are combined to form the registration category data array (a total of seven categories for 31 years of data and the total) using the combinations in Table 32 (Registration Categories**)**. The county is compared to the data sources for each SUT in the SUT data sources input. If the county is found for a given source type, then the 31 years of registration data from the source type's corresponding category in the registration category data array are added to the SUT age distribution array. Table 29 shows the source types and their corresponding registration categories.

Table 29. SUTs/Registration Categories Correlation for SUT Age Distribution.

SUT	Registration Category
11	2
21	1
31, 32	3
52, 53	4
61, 62	5

A similar process is followed for the fuel engine fractions array. However, only SUTs 52, 53, 61, and 62 are processed due to data limitations. The registration data are saved in the fuel engine fractions array based on fuel type. Table 30 shows the SUTs and their corresponding registration categories.

Table 30. SUTs/Registration Categories Correlation for Fuel Engine Fractions.

SUT	Fuel Type	Registration Category
52, 53	Diesel	4
	Gas	6
61	Diesel	5
	Gas	7
62	Diesel	5 + 7
	Gas	None – all are assumed diesel

After processing all of the counties, the data from the default sourcetypeage distribution input are processed and the data for the registration data year are saved in the default age distribution array. For each source type in which the registration data are to be used for the age distribution, the 31 years of registration data in the SUT age distribution array are converted to a distribution by dividing the source type yearly registration data by the source type total registration data. For each source type in which the defaults are to be used, the defaults values from the default age distribution array are copied to the SUT age distribution array.

The MOVES default fuel engine fractions are extracted from the MOVES default database (using the appropriate code for MySQL) and saved in the default fuel engine fractions array. For source types 52, 53, and 61, the source type yearly registration data in the fuel engine fractions array are converted to fuel engine fractions by dividing the yearly source type diesel registration data by the sum of the yearly source type diesel registration data and the yearly source type gas registration data.

If the year ID input is used, then these fuel engine fractions are adjusted to match the year from the year ID input. If the year from the year ID input is greater than the registration data year, then the first fuel engine fraction is extended to match the year from the year ID input and the appropriate number of years is dropped from the end of the fuel engine fractions to maintain the appropriate distribution. If the year from the year ID input is less than the registration data year, then the last fuel engine fraction is extended to match the year from the year ID input and the appropriate number of years is dropped from the beginning of the fuel engine fractions to maintain the appropriate distribution. For source type 62, all of the fuel engine fractions in the fuel engine fractions array are set to a value of 1.

Using the appropriate MySQL code, a new sourcetypeagedistribution database table is created and the data from the SUT age distribution array, along with the year ID (either from the registration data or the year ID input), are used to fill the new database table. A text format of this database table may be written as well. Using the appropriate MySQL code, a new AVFTfuelengfraction database table is created and the data from the fuel engine fractions array are used to fill the new database table for SUTs 52, 53, 61, and 62. For all other SUTs, the default fuel engine fraction array data for the appropriate year (either the registration data year or the year ID input) are used to fill the new database table. A text format of this database table may be written as well.

MOVEStrendsRates and MOVEStrendsRatesAnn

The MOVEStrendsRates and MOVEStrendsRateAnn utilities calculated the MOVES-based emissions rates from a 24-hour (MOVEStrendsRates) or from an annual (MOVEStrendsRatesAnn) MOVES emissions estimation/inventory run using the data in the movesoutput (emissions output) and movesactivityoutput (activity output) database tables. Although these utilities use different type of MOVES runs (i.e., 24-hour or annual), the function and calculation process for these utilities are the same. If not specified, emissions rates are calculated for each pollutant and process combination (excluding total energy) in the movesoutput database table. The utility also uses the movesrun database table to determine the units of the emissions in the movesoutput table, which will then be converted to grams per activity during the emissions rate calculations; thus allowing the user to specify any of the units available in MOVES for the MOVES emissions rate run. The emissions rates can be calculated in the same manner as MOVES calculates emissions rates (i.e., rate per distance and rate per vehicle emissions rates) or as rate per activity emissions rates (based on the emissions process, see Table 31).

Table 31. MOVES2010a Emissions Process and Corresponding Activity for Grams per Activity Emissions Rates.

MOVES2010a Emissions Process	Activity	Emissions Rate Units
Running Exhaust	Miles Traveled	Grams/Mile
Crankcase Running Exhaust	Miles Traveled	Grams/Mile
Start Exhaust	Starts	Grams/Start
Crankcase Start Exhaust	Starts	Grams/Start
Extended Idle Exhaust	Extended Idle Hours	Grams/Extended Idle Hour
Crankcase Extended Idle Exhaust	Extended Idle Hours	Grams/Extended Idle Hour
Evaporative Permeation	Miles Traveled Source Hours Parked	Grams/Mile Grams/ Source Hour Parked
Evaporative Fuel Vapor Venting	Miles Traveled Source Hours Parked	Grams/Mile Grams/ Source Hour Parked
Evaporative Fuel Leaks	Miles Traveled Source Hours Parked	Grams/Mile Grams/ Source Hour Parked
Brake Wear	Miles Traveled	Grams/Mile
Tire Wear	Miles Traveled	Grams/Mile

Since multiple activity types are used to calculate the emissions rates, the utility forms the activity output array. Using the appropriate MySQL code, the utility extracts all of the activity output (from the movesactivityoutput database table) and saves this activity in the activity output array by SUT, fuel type, MOVES roadway type, and activity type ID.

Using the appropriate MySQL code, the utility then extracts the emissions data (pollutant, process, SUT, fuel type, MOVES roadway type, and emissions quantity) for the each record in the movesoutput database table with the appropriate pollutant code (either all pollutants or only the specified pollutants). For each extracted record, the utility calculates the emissions rate based on the record's MOVES roadway type and process, applies the appropriate units conversion, and saves the emissions rate in the emissions rate array (by pollutant, process, SUT, fuel type, and MOVES roadway type). If the MOVES roadway type is 2, 3, 4, or 5 for the extracted record, the emissions quantity is divided by the appropriate miles traveled activity in the activity output array. If the MOVES roadway type is 1 (i.e., off-network) for the extracted record, then the emissions rate is calculated as either rate per vehicle or rate per activity. If the off-network emissions rates are to be calculated as rate per vehicle (as in MOVES), the emissions quantity is divided by the appropriate vehicle population activity in the activity output array. If the off-network emissions rates are to be calculated as rate per activity, the emissions quantity is divided by the appropriate activity (SHP, starts or extended idle hours as determined by the process, see Table B3) from the activity output array.

The utility has the option of creating two forms of emissions rate output: database table and a tab-delimited version. Using the appropriate MySQL code, the utility writes the emissions rate data from the emissions rate array (along with the activity type ID used to calculate the emissions rate) to the database table. The tab-delimited version of the emissions rate output contains the same data as the database table (emissions rate data from the emissions rate array and the activity type ID used to calculate the emissions rate).

MOVEStrendsRatesAdj and MOVEStrendsRatesAnnAdj

The MOVEStrendsRatesAdj and MOVEStrendsRatesAnnAdj utilities apply emissions rate adjustments to an emissions rate database table produced by the MOVEStrendsRates or MOVEStrendsRatesAnn utilities or by this utility to produce a new emissions rate database table in the same format as the input emissions rate database table. The emissions rate adjustments can be linear adjustments that are applied to all emissions rates or can be applied by SUT, fuel type, pollutant, and process (adjustments may also include roadway type). The user has the option of selecting which pollutants will be in the new emissions rate database table. Otherwise, all of the pollutants in the input emissions rate database table will be in the new emissions rate database table.

For the first input emissions rate database table, the utility extracts the emissions rates for the specified pollutants (or all the pollutants if not specified) from the input database emissions rate table, applies the emissions rate adjustments (if necessary), and saves these adjusted emissions rates. If more than one emissions rate database table is input, then the utility performs a similar calculation process to the first input emissions rate database table for each input emissions rate database table. If pollutants are found in more than one input emissions rate database table, the adjusted emissions rates are summed to produce one emissions rate.

After processing all of the input emissions rate database tables, the utility creates a new emissions rate database table in the same format as the first input emissions rate database table and writes the adjusted emissions rates to this new emissions rate database table. The tab-delimited version of the emissions rate output contains the same data as the new emissions rate database table with the adjusted emissions rates.

MOVEStrendsRatesAnnFact

The MOVEStrendsRatesAnnFact utility calculates emissions rate annualization factors (or ratios) using 24-hour emissions rates (output from either the MOVEStrendsRates or MOVEStrendsRatesAdj utility) and annual emissions rates (output from either the MOVEStrendsRatesAnn or MOVEStrendsRatesAnnAdj utility). The annualization factor output from this utility is in the proper format for use with the MOVEStrendsRatesAdj utility, which can then be used to create annual emissions rates from a set of 24-hour emissions rates.

The utility extracts the emissions data from the 24-hour emissions rates and saves this data in the 24-hour portion of the emissions rates array by pollutant, process, SUT, fuel type, and MOVES roadway type. The utility then extracts the emissions data from the annual emissions rates based on the 24-hour portion of the emissions rates array and saves this emissions data in the annual portion of the emissions rates array. The annualization factors are then calculated by dividing the annual portion of the emissions rates array by the 24-hour portion of the emissions rates array (by pollutant, process, SUT, fuel type, and MOVES roadway type).

MOVESpopulationBuild

The MOVESpopulationBuild utility builds the sourcetypeyear MOVES input database table and the source type/fuel type population input file used with the MOVESemscalc utility to estimate emissions using the VMT mix and the TxDOT registration data sets. The TxDOT registration data sets are three sets of registration data (an age registration data file, a gas trucks registration data file, and a diesel trucks registration data file) that list 31 years of registration data. The primary inputs to this utility are:

- County ID file, which specifies the county for which the output will be calculated;
- Age registration data file, which lists 31 years of registration data for the Passenger Vehicle, Motorcycles, Trucks <=6000, Trucks >6000 <=8500, Total Trucks <=8500, Gas Trucks >8500, Diesel Trucks >8500, Total Trucks >8500, and Total All Trucks vehicle categories;
- Gas trucks registration data file, which lists 31 years of registration data for the Gas > 8500, Gas > 10000, Gas > 14000, Gas > 16000, Gas > 19500, Gas > 26000, Gas > 33000, Gas > 60000, and Gas Totals gas truck categories;
- Diesel trucks registration data file, which lists 31 years of registration data for the Diesel > 8500, Diesel > 10000, Diesel > 14000, Diesel > 16000, Diesel > 19500, Diesel > 26000, Diesel > 33000, Diesel > 60000, and Diesel Totals diesel truck categories;
- VMT mix by TxDOT district, MOVES source type, and MOVES fuel type;
- TxDOT district name file, which specifies the VMT mix TxDOT district;
- MOVES default database;
- Population factor file (optional); and
- Year ID file (optional, only used if population factors are used), which specifies the year for calculating the output.

For the desired county (from the county ID file), the age registration data (for the Passenger Vehicle, Motorcycles, Trucks <=6000, Trucks >6000 <=8500, and Total Trucks <=8500 vehicle categories) are saved in an age registration data array. The gas truck registration data (for the Gas > 8500, Gas > 10000, Gas > 14000, Gas > 16000, Gas > 19500, Gas > 26000, Gas > 33000, and Gas > 60000 gas truck categories) are saved in the gas truck section of the diesel/gas registration data array. The diesel truck registration data (for the Diesel > 8500, Diesel > 10000, Diesel > 14000, Diesel > 16000, Diesel > 19500, Diesel > 26000, Diesel > 33000, and Diesel > 60000 diesel truck categories) are saved in the diesel truck section of the diesel/gas registration data array. The age registration data array and the diesel/gas registration data array are combined to form the registration category data array (a total of seven categories for 31 years of data and the total) using the combinations in Table 32.

Table 32. Registration Categories.

Registration Category	Vehicle Category	Data Location
1	Passenger Vehicle	Age registration data array
2	Motorcycles	
3	Total Trucks <=8500	
4	Diesel > 8500, Diesel > 10000, Diesel > 14000, Diesel > 16000	Diesel/gas registration data array
5	Diesel > 19500, Diesel > 26000, Diesel > 33000, Diesel > 60000	
6	Gas > 8500, Gas > 10000, Gas > 14000, Gas > 16000	
7	Gas > 19500, Gas > 26000, Gas > 33000, Gas > 60000	

The registration category data array is used to fill the SUT population array (by SUT and fuel type) for everything except the long-haul trucks. Each SUT/fuel type combination is assigned the total registrations from one or more of the registration categories in the registration category data array. Table 33 shows the SUTs and their associated registration category in the registration category data array.

Table 33. SUT/Registration Category Correlation.

SUT	Registration Category
11	2
21	1
31, 32	3
41, 42, 43, 51, 52, 54	4 + 6
61	5 + 7

SUT population factors are calculated by SUT/fuel type using the data from the VMT mix input for all SUTs except motorcycles (SUT 11) and the long-haul trucks (SUTs 53 and 62) and are saved in the SUT population factors array. For SUT 21, the fuel type VMT mix is divided by the total VMT mix for SUT 21. For SUT 31, the fuel type VMT mix is divided by the total VMT mix for SUTs 31 and 32. The same calculation process used for SUT 31 applies to SUT 32. For SUT 41, the fuel type VMT mix is divided by the total VMT mix for SUTs 41, 42, 43, 51, 52, and 54. The same process applies to SUTs 42, 43, 51, 52, and 54. For SUT 61, the fuel type VMT mix is divided by the total VMT mix for SUT 61.

For SUT 11, the source type population factor for fuel type 1 (gasoline) is set at 1 with all other factors set to 0. For SUT 53, the SUT population factors by fuel type are calculated by dividing the fuel type VMT mix for SUT 53 by the fuel type VMT mix for SUT 52. For SUT 62, the SUT population factors by fuel type are calculated by dividing the fuel type VMT mix for SUT 62 by the fuel type VMT mix for SUT 61, thus creating a ratio of long-haul and short-haul trucks.

The SUT population factors and the population factor (if desired) are applied to the SUT population array for all SUTs except SUT 53 and 62. For SUT 53, the SUT population factors for SUT 53 are applied to the SUT population array for SUT 52. For SUT 62, the SUT population factors for SUT 62 are applied to the SUT population array for SUT 61.

Using the appropriate MySQL code, a new sourcetypeyear database table is created. The data in the SUT population array is aggregated by fuel type and used to fill the sourcetypeyear database table, along with the yearID, salesGrowthFactor, and migrationrate. For the yearID, the year of the registration data is used, unless a population factor is used, in which case the year from the year ID input is used. The salesGrowthFactor and migrationrate for each SUT is set at 1. A text format of this database table is written by the utility as well. The source type/fuel type population input file used with the MOVESemscalc utility is written using the SUT population array.

MOVEStrendsSHPcalc

The MOVEStrendsSHPcalc utility calculates the daily and annual SHP activity by hour, SUT and fuel type used to estimate emissions using the MOVEStrendsEmscalc and MOVEStrendsEmscalcAnn utility. The SHP is calculated using the user supplied daily VMT control total, annual VMT control total, county-level RIFCREC data sets, the RIFCREC functional class/area type-to-MOVES roadway type designations, VMT mix (by MOVES roadway type), hourly factors, vehicle population and average speed distribution.

The utility first extracts the VMT for the desired county from the RIFCREC data sets and saves the VMT in the RIFCREC data array by RIFCREC functional class and area type. Using the RIFCREC data array and the RIFCREC functional class/area type-to-MOVES roadway type designations, the utility aggregates the data in the RIFCREC data array by MOVES roadway and converts this VMT to proportions to form the MOVES roadway type VMT fractions.

The MOVES roadway type VMT fractions are then applied to the daily VMT control total to calculate the daily VMT by MOVES roadway type. The hourly fractions are then applied to the daily VMT by MOVES roadway type to calculate the daily VMT by MOVES roadway type and hour. The utility then applies the VMT mix and the average speed distribution to the daily VMT by MOVES roadway type and hour to calculate the daily VMT by MOVES roadway type, hour, SUT/fuel type, and average speed bin.

The daily VMT by MOVES roadway type, hour SUT/fuel type, and average speed bin is then divided by the speed-bin speed (i.e., 2.5, 5, 10,…, 75) to calculate the daily VHT by MOVES roadway type, hour, SUT/fuel type, and average speed bin. This VHT is then aggregated by average speed bin and MOVES roadway type to produce the daily VHT (or SHO) by hour and SUT/fuel type.

The utility then calculates the daily SHP by hour and SUT/fuel type by taking the difference between the vehicle population (by SUT/fuel type) and the SHO by hour and SUT/fuel type. If the calculation results in a negative value (i.e., SHO is greater than the vehicle population), the SHP is set to 0. The utility then calculates the annual SHP by hour and SUT/fuel type by applying an annualization factor to the daily SHP by hour and SUT/fuel type. The annualization factor is calculated as the annual VMT control total divided by the daily VMT control total.

MOVEStrendsStartscalc

The MOVEStrendsStartscalc utility calculates the daily and annual starts activity by SUT and fuel type used to estimate emissions using the MOVEStrendsEmscalc and MOVEStrendsEmscalcAnn utility. The starts are calculated using the vehicle population by SUT/fuel type, a default daily starts per vehicle, and an annual starts per vehicle.

The daily starts by SUT and fuel type are calculated by multiplying the vehicle population (by SUT/fuel type) by the default daily starts per vehicle. The annual starts by SUT and fuel type are calculated by multiplying the vehicle population (by SUT/fuel type) by the annual daily starts per vehicle.

MOVEStrendsExtIdleHrsCalc

The MOVEStrendsExtIdleHrscalc utility calculates the daily and annual SHI activity by hour for SUT 62, fuel type 2 (Combination Long-Haul Truck – Diesel) used to estimate emissions using the MOVEStrendsEmscalc and MOVEStrendsEmscalcAnn utility. This hourly SHI is calculated using a 24-hour base SHI for a specific year and day type, base virtual link VMT and speeds, base VMT mix, virtual link road type/area type-to-MOVES roadway type designations, future daily and annual VMT control totals, county-level RIFCREC data sets, the RIFCREC functional class/area type-to-MOVES roadway type designations, future VMT mix, hourly VMT factors, and the future tab-delimited hourly SHP by SUT/fuel type. All of the base data should be from the same year and day type. Although the term future data is used, the future data can be a year prior to the base data (i.e., historical year) and should be from the same year and day type.

For each link in the first base VMT and speeds input with the desired county code, the utility applies the appropriate base VMT mix (based on the link's road type, area type, and the virtual link road type/area type-to-MOVES roadway type designations) for Combination Long-Haul Truck – Diesel vehicles to the link VMT to calculate the link Combination Long-Haul Truck – Diesel vehicle VMT, which is added to the hourly base Combination Long-Haul Truck – Diesel vehicle VMT. This calculation process is repeated for each base VMT and speeds input; thus producing 24-hourly values for the base Combination Long-Haul Truck – Diesel vehicle VMT.

The utility then extracts the VMT for the desired county from the RIFCREC data sets and saves the VMT in the RIFCREC data array by RIFCREC functional class and area type. Using the RIFCREC data array and the RIFCREC functional class/area type-to-MOVES roadway type designations, the utility aggregates the data in the RIFCREC data array by MOVES roadway type and converts this VMT to proportions to form the MOVES roadway type VMT fractions. The MOVES roadway type VMT fractions are then applied to the daily VMT control total to calculate the daily VMT by MOVES roadway type. The daily VMT by MOVES roadway type is then multiplied by the appropriate future VMT mix for Combination Long-Haul Truck – Diesel vehicles to calculate the daily VMT by MOVES roadway type, which is then aggregated by MOVES roadway type to calculate the future daily Combination Long-Haul Truck – Diesel vehicle VMT.

The 24-hour future SHI is calculated using the 24-hour base Combination Long-Haul Truck – Diesel vehicle VMT, the future daily Combination Long-Haul Truck – Diesel vehicle VMT, and the 24-hour base SHI. The scaling factor is calculated by the dividing the future daily Combination Long-Haul Truck – Diesel vehicle VMT by the 24-hour base Combination Long-Haul Truck – Diesel vehicle VMT. The scaling factor is multiplied by the 24-hour base SHI to estimate the 24-hour future SHI.

The 24-hour future SHI is distributed to each hour using SHI hourly factors. The SHI hourly factors are calculated using the hourly VMT factors. The SHI hourly factors are calculated by taking the inverse of the hourly VMT factors (i.e., more VMT implies less SHI). The SHI hourly factors are applied to the 24-hour future SHI to calculate the initial hourly future SHI, thus distributing the 24-hour future SHI to each hour of the day.

To form the final SHI activity by hour, the initial hourly future SHI is compared to the hourly Combination Long-Haul Truck – Diesel vehicle SHP. If the initial hourly future SHI is greater than the hourly Combination Long-Haul Truck – Diesel vehicle SHP, then the final SHI activity for that hour is set to the hourly Combination Long-Haul Truck – Diesel vehicle SHP. Otherwise, the final SHI activity for that hour is set to the initial hourly future SHI. This comparison is performed for each hour. The utility then calculates the annual SHI by hour and SUT/fuel type by applying an annualization factor to the daily SHP by hour and SUT/fuel type. The annualization factor is calculated as the annual VMT control total divided by the daily VMT control total.

MOVEStrendsEmscalc

The MOVEStrendsEmscalc utility calculates 24-hour or annual emissions by pollutant, process, MOVES roadway type, and SUT/fuel type. The emissions are calculated using a VMT control total, county-level RIFCREC data sets, the RIFCREC functional class/area type-to-MOVES roadway type designations, VMT mix (by MOVES roadway type), the off-network activity, and emissions rates. The emissions rates can be either the original MOVES form (i.e., including the rate per vehicle) or the rate per activity emissions rates from any of the emissions rate calculation or adjustment utilities listed in this appendix. If the original MOVES format emissions rates are used, the off-network activity is the vehicle population. If the rates per activity emissions rates are used, the off-network activity is the SHP by hour and SUT/fuel type, the starts by SUT and fuel type, and the SHI by hour for Combination Long-Haul Truck – Diesel vehicles.

The utility first extracts the VMT for the desired county from the RIFCREC data sets and saves the VMT in the RIFCREC data array by RIFCREC functional class and area type. Using the RIFCREC data array and the RIFCREC functional class/area type-to-MOVES roadway type designations, the utility aggregates the data in the RIFCREC data array by MOVES roadway type and converts this VMT to proportions to form the MOVES roadway type VMT fractions. The MOVES roadway type VMT fractions are then applied to the VMT control total to calculate the VMT by MOVES roadway type. The utility then applies the VMT mix VMT by MOVES roadway type to calculate the VMT by MOVES roadway type, and SUT/fuel type.

The utility then processes the off-network activity. If the emissions rates are in the original MOVES format, the utility processes the vehicle population and saves the vehicle population in the activity array by SUT/fuel type. If the emissions rates are in the rate per activity format, the utility processes the SHP by hour and SUT/fuel type, the starts by SUT and fuel type, and the SHI by hour for Combination Long-Haul Truck – Diesel vehicles, saving the 24-hour SHP by SUT/fuel type, the 24-hour starts by SUT/fuel type, and the 24-hour SHI for Combination Long-Haul Truck – Diesel vehicles in the activity array.

The utility then calculates the emissions. For each line in the tab-delimited emissions rates file, the utility multiplies the emissions rate by the appropriate activity and the desired units conversion factor, saving the emissions in the emissions array by pollutant, process, MOVES roadway type, and SUT/fuel type. The activity is determined by the MOVES roadway type and emissions process. If the MOVES roadway type is 2, 3, 4, or 5, the activity is the emissions rates respective MOVES roadway type VMT from the VMT by MOVES roadway type and SUT/fuel type. If the MOVES roadway type is 1 (i.e., off-network) and the emissions rates are in terms of rate per vehicle, then the activity is the vehicle population from the activity array. If the MOVES roadway type is 1 (i.e., off-network) and the emissions rates are in terms of rate per activity, then the activity is the activity (SHP, starts, or SHI) from the activity array as determined by the emissions process (see Table 31).

The utility has two optional outputs: the detailed tab-delimited output and the summary tab-delimited output. The detailed tab-delimited output lists the VMT, off-network activity, and emissions by county, year, pollutant, process (including the composite emissions), MOVES roadway type (including a total for all roadway types), and SUT/fuel type. The summary tab-delimited output lists the VMT, off-network activity, and emissions by county, year, pollutant (composite emissions only), and SUT/fuel type (combination of all MOVES roadway type emissions).

RESULTS

This project estimates the VMT proportions of pass-through HDDVs, or combination trucks (long-haul and short-haul), and other local HDDVs that would affect local control programs in Texas, along with the total summer weekday emissions produced by the HDDVs from the 2008 through 2030 analysis years in the current and potential nonattainment areas.

Emissions estimates are provided from 2008 through 2030 for pass-through and local HDDVs for current and future potential nonattainment areas, using VMT proportions and emissions rates based on the latest available trend analysis (developed under a separate work order). Emissions rates are based upon the latest available HPMS-based, 24-hour, average Monday through Friday weekday ozone season (aggregate June through August) data and the MOVES model.

One aspect of particular interest emanating from this study is the relative proportion of emissions attributable to local and pass-through diesel vehicles. While the actual estimates of the various pollutants are provided in tables, along with the total emissions, it is difficult to get an overview of the relative proportion of a given pollutant directly from tables of numbers. Consequently, graphics are provided illustrating these relationships by region for selected years, for VMT and the criteria pollutants.

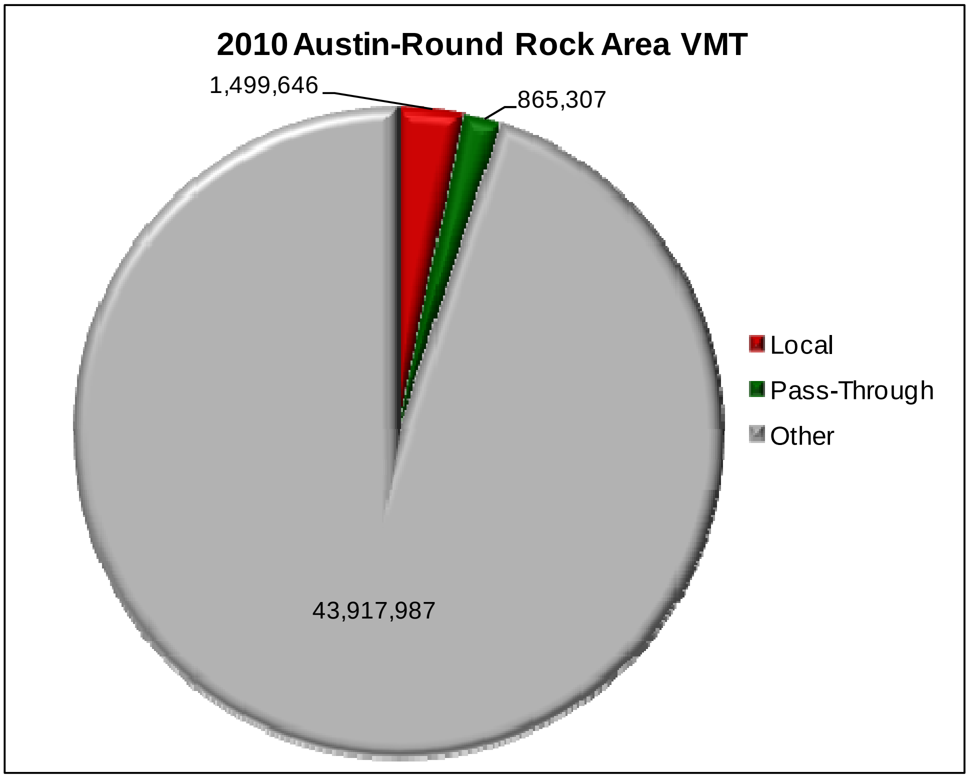
Specifically, local HDDV, pass-through HDDV and total VMT, VOC, CO, and NO_x are shown for 2010, 2015, and 2020 for each analysis region and for statewide. The actual values are provided on the graphics to help the reader maintain scale. The values for all years for each region are provided in tables following the graphics.

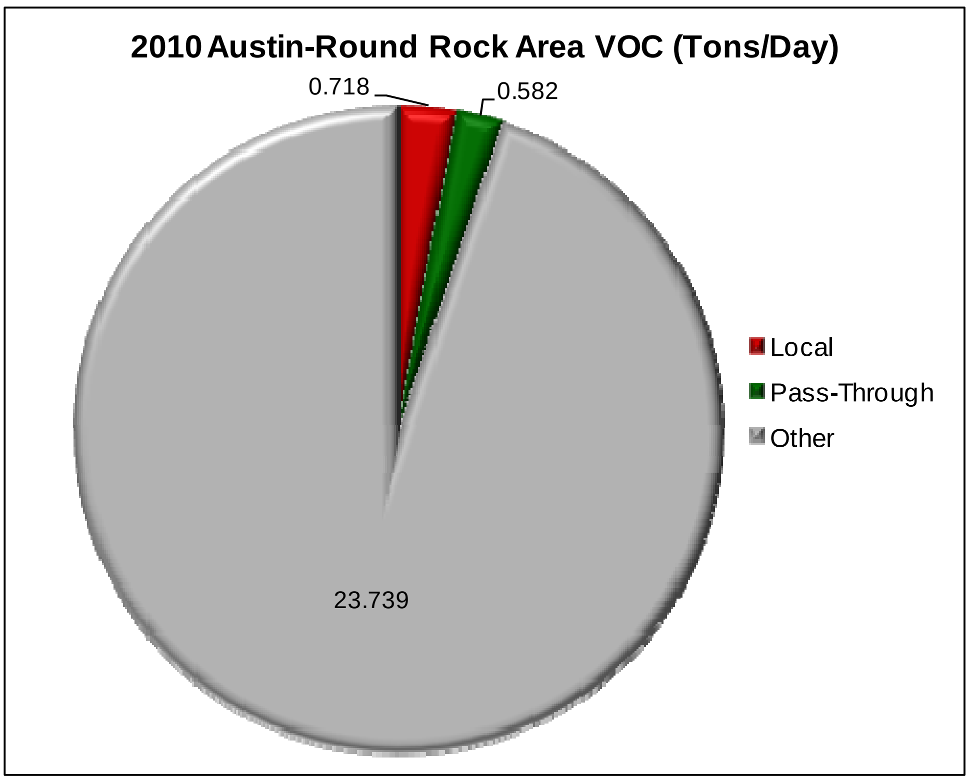
For the selected years, VMT proportions can be seen to vary across regions between approximately 3% and 12% for the local diesel category. For pass-through diesel vehicles, the range is slightly less than 2% to over 10%. The higher values in both cases are in smaller areas with less non-truck traffic. Within a given region, the proportions do not vary much between years.

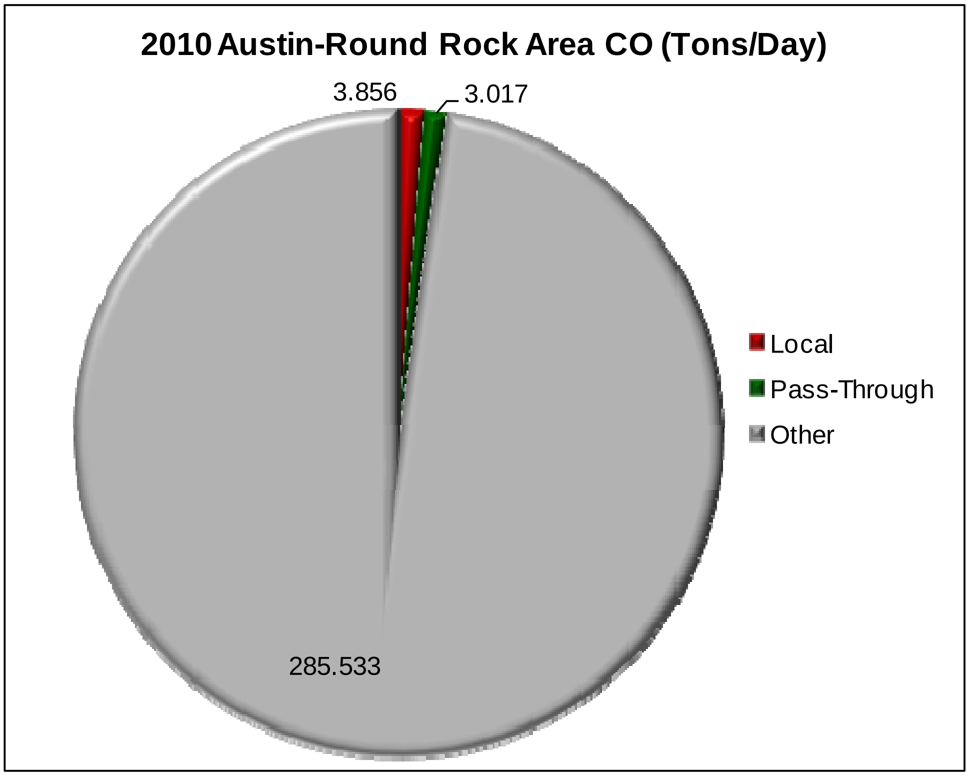
For VOC, the range of proportion attributable to local diesel vehicles is less than 2% to over 8%. For pass-through diesel vehicles, the range is less than 3% to almost 12%. Again, the higher values in both cases are in smaller areas with less non-truck traffic. Fleet age is also a factor in these areas where fleets tend to be older. There is slightly more variation across years for VOC than for VMT, since improvements in vehicle technology have an impact on emissions.

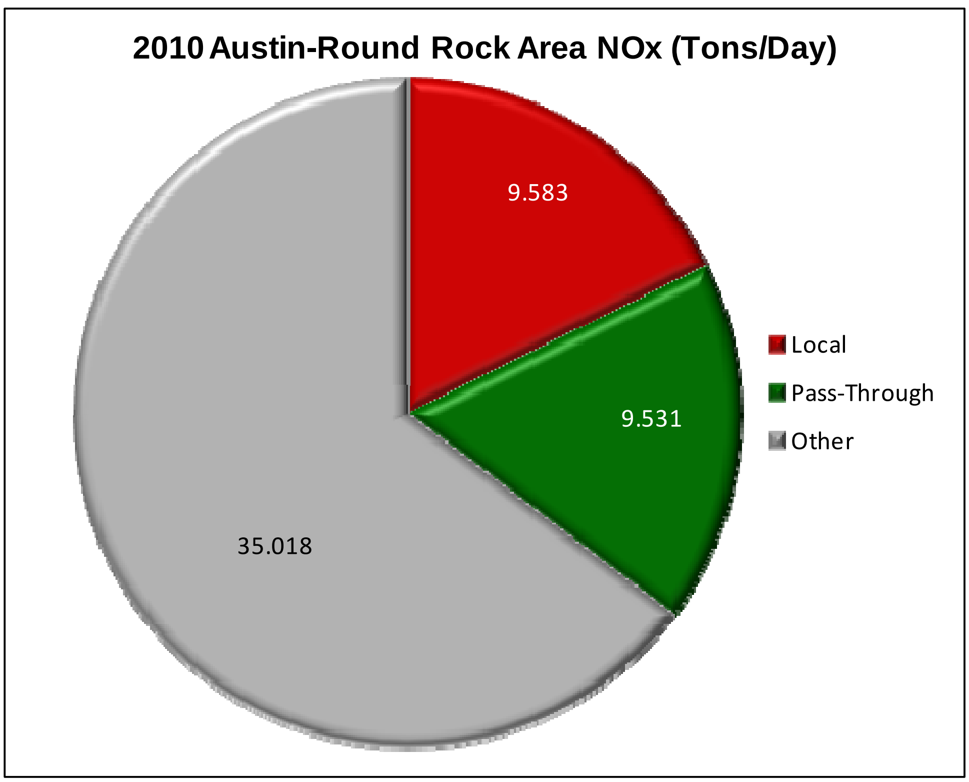
For CO, the range of proportion attributable to local diesel vehicles is less than 1% to slightly less than 4%. For pass-through diesel vehicles, the range is less than 1% to almost 5%. Again, variation across years for CO, though modest, is attributable to improvements in vehicle technology reducing emissions.

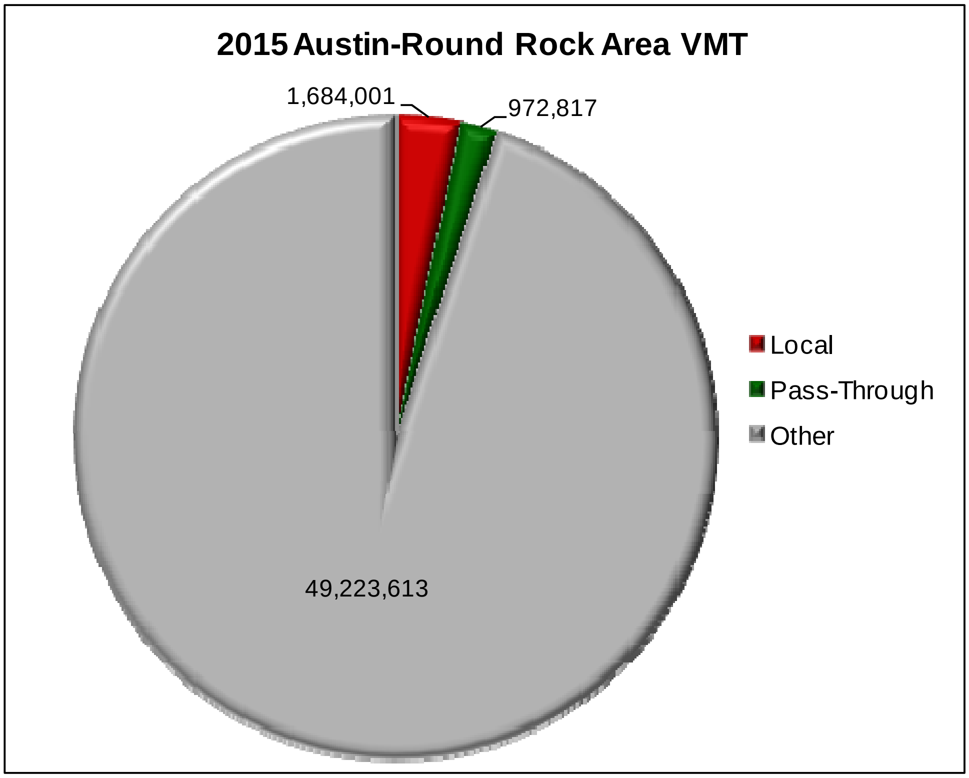
For NO_x, the range of proportion attributable to local diesel vehicles is over 12% to just over 32%. For pass-through diesel vehicles, the range is just over 15%percent to almost 40%. There is not much variation across years, and in some years the proportions actually increase since NO_x controls are fully incorporated into the fleet and VMT growth becomes the dominate factor. Note that the absolute proportions are much higher for NO_x than the other pollutants, consistent with the emissions characteristics of heavy-duty diesel vehicles. Difference across regions may be attributed to differences in the proportion of trucks, fleet age and/or operating characteristics (distribution of road type, speed, etc.).

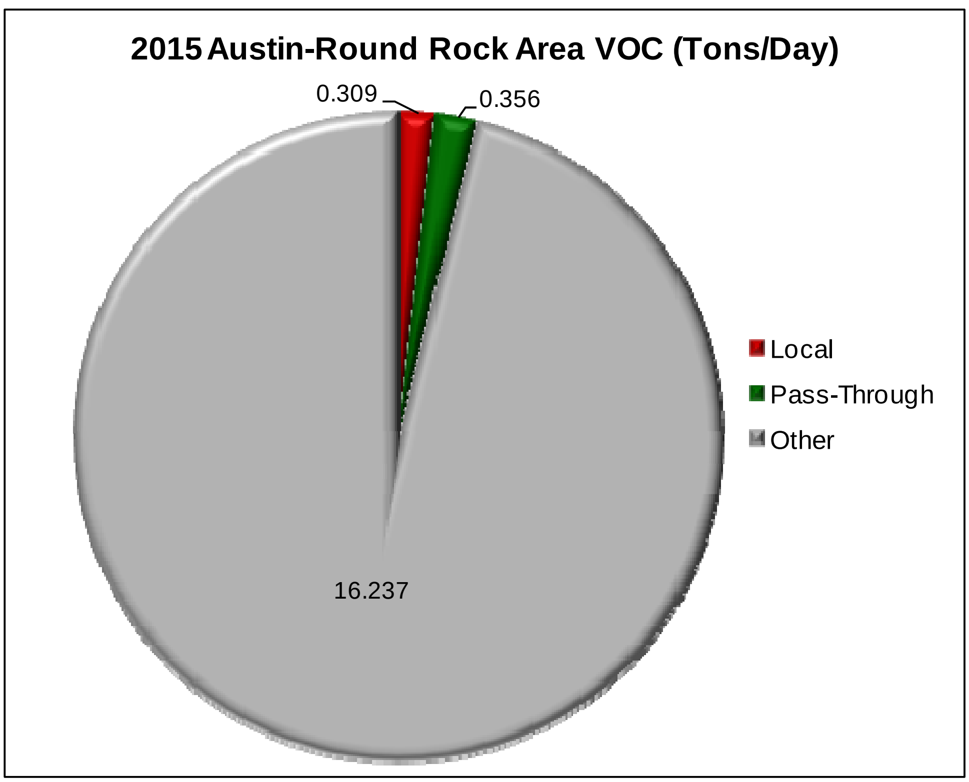

2010 Austin-Round Rock Area VMT
1,499,646
865,307
43,917,987
Local
Pass-Through
Other

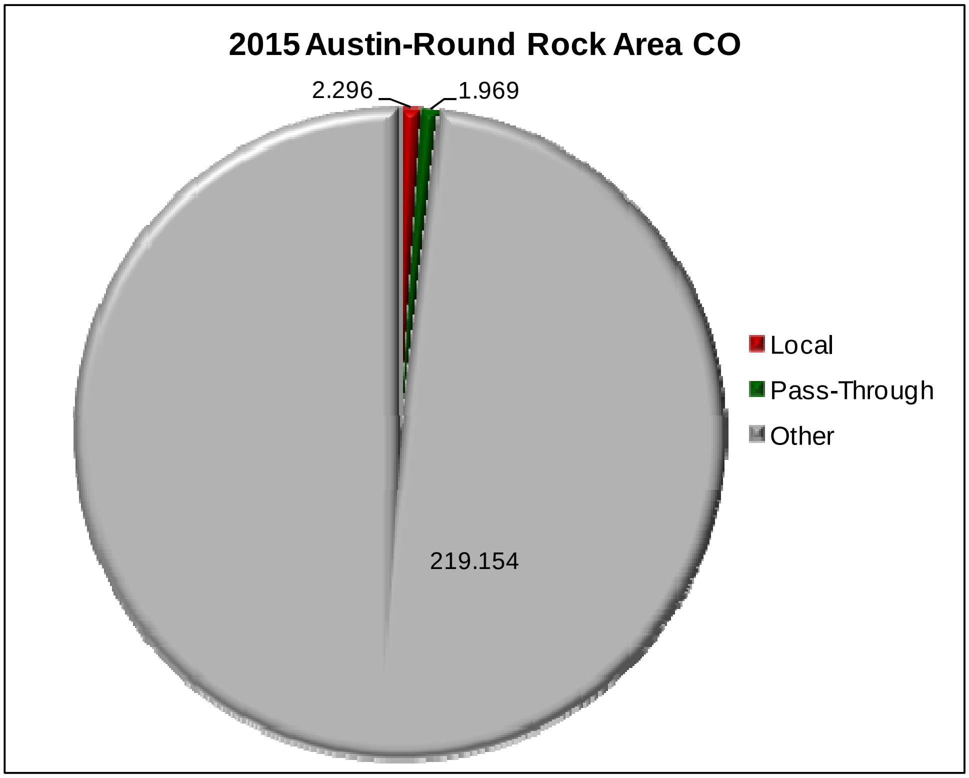

2010 Austin-Round Rock Area VOC (Tons/Day)
0.718
0.582
23.739
Local
Pass-Through
Other

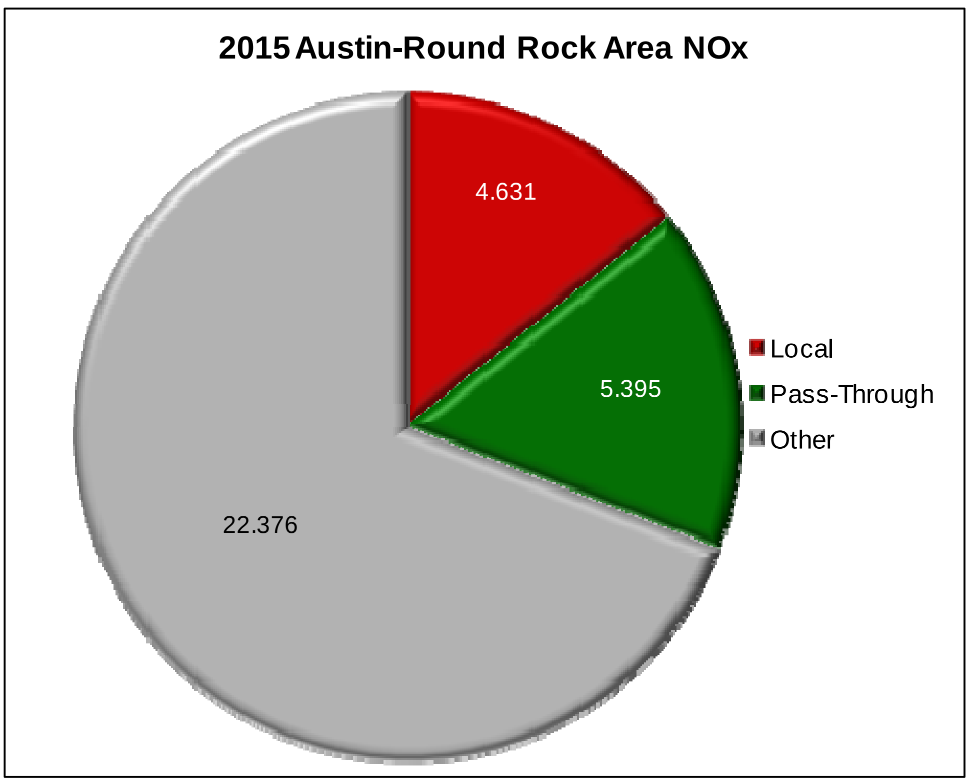

2010 Austin-Round Rock Area CO (Tons/Day)
3.856
3.017
285.533
Local
Pass-Through
Other

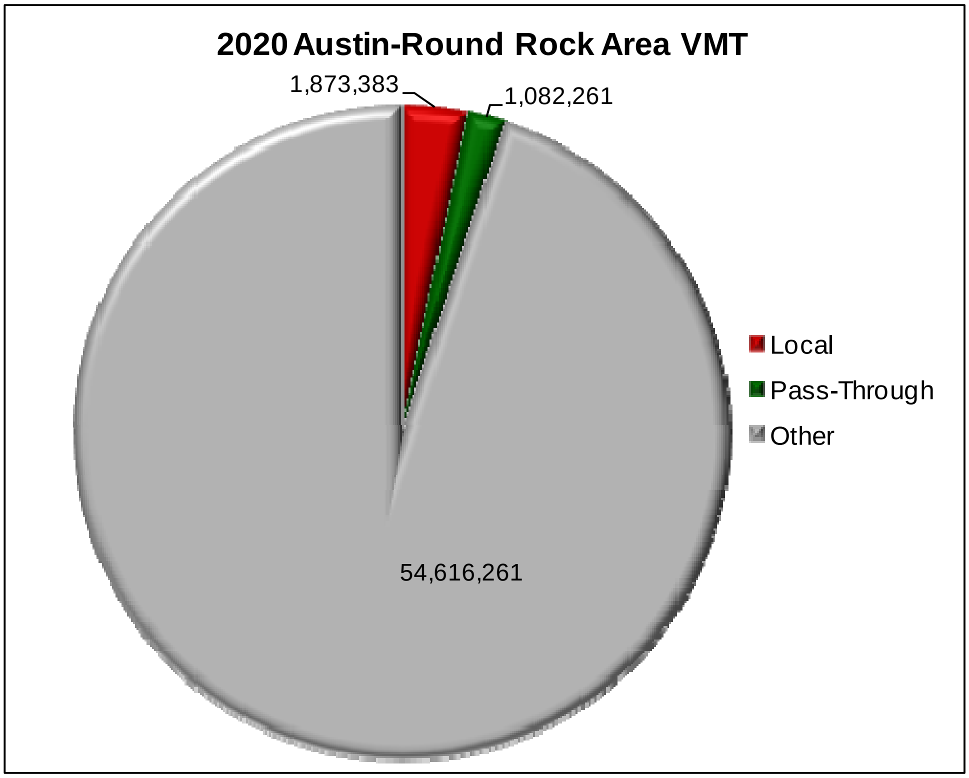

2010 Austin-Round Rock Area NOx (Tons/Day)
9.583
9.531
35.018
Local
Pass-Through
Other

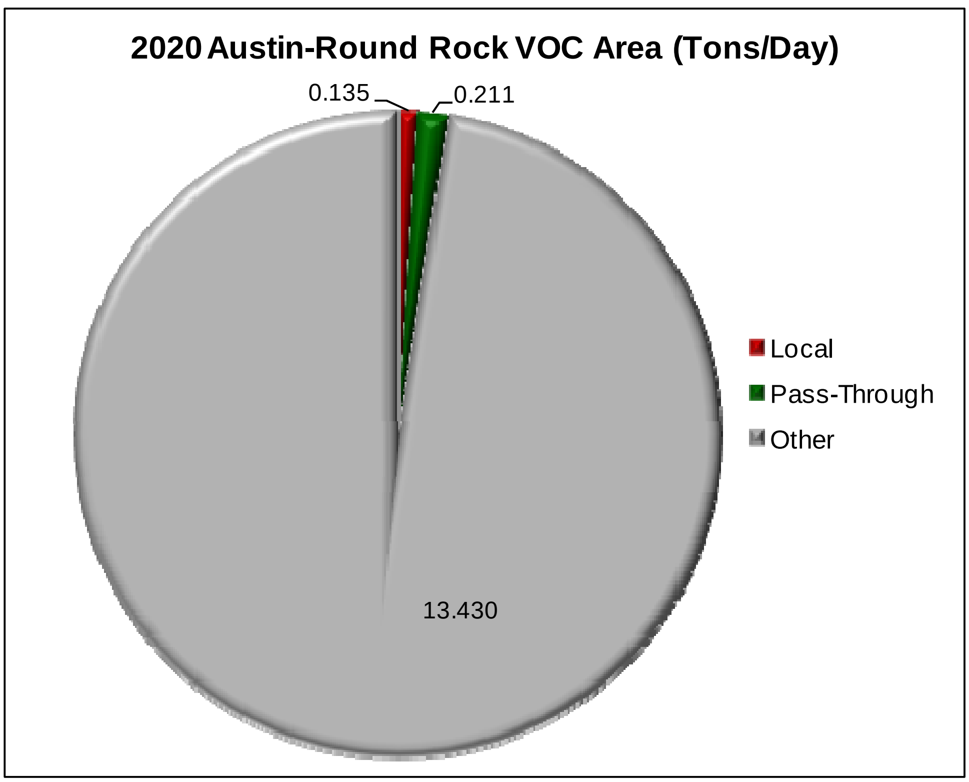

2015 Austin-Round Rock Area VMT
1,684,001
972,817
49,223,613
Local
Pass-Through
Other

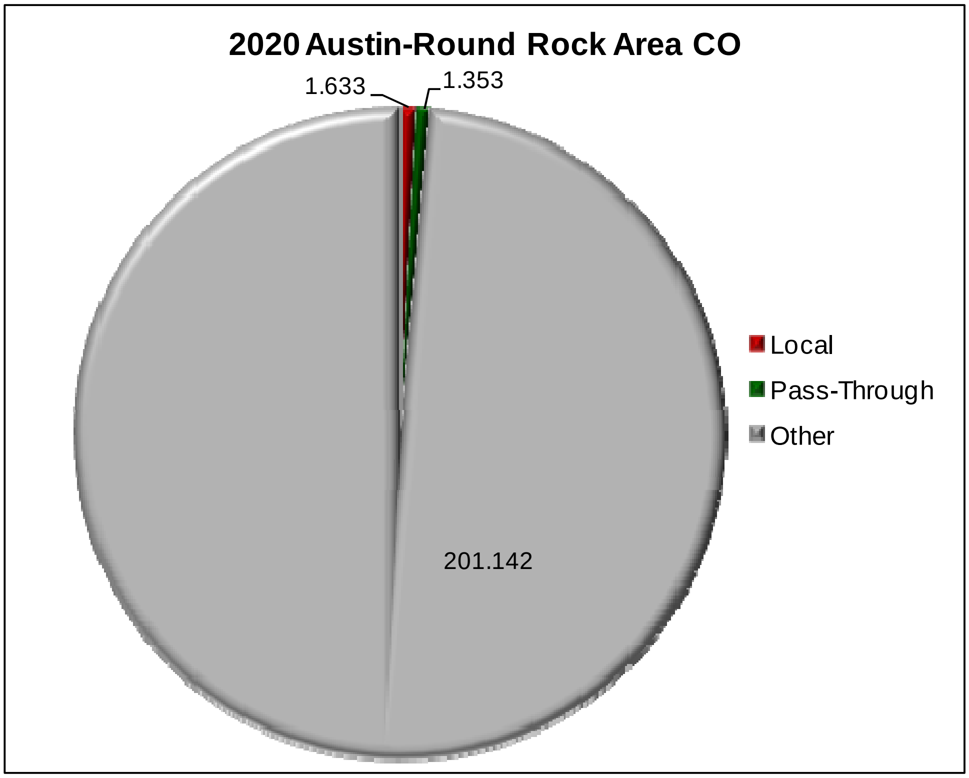

2015 Austin-Round Rock Area VOC (Tons/Day)
0.309
0.356
16.237
Local
Pass-Through
Other

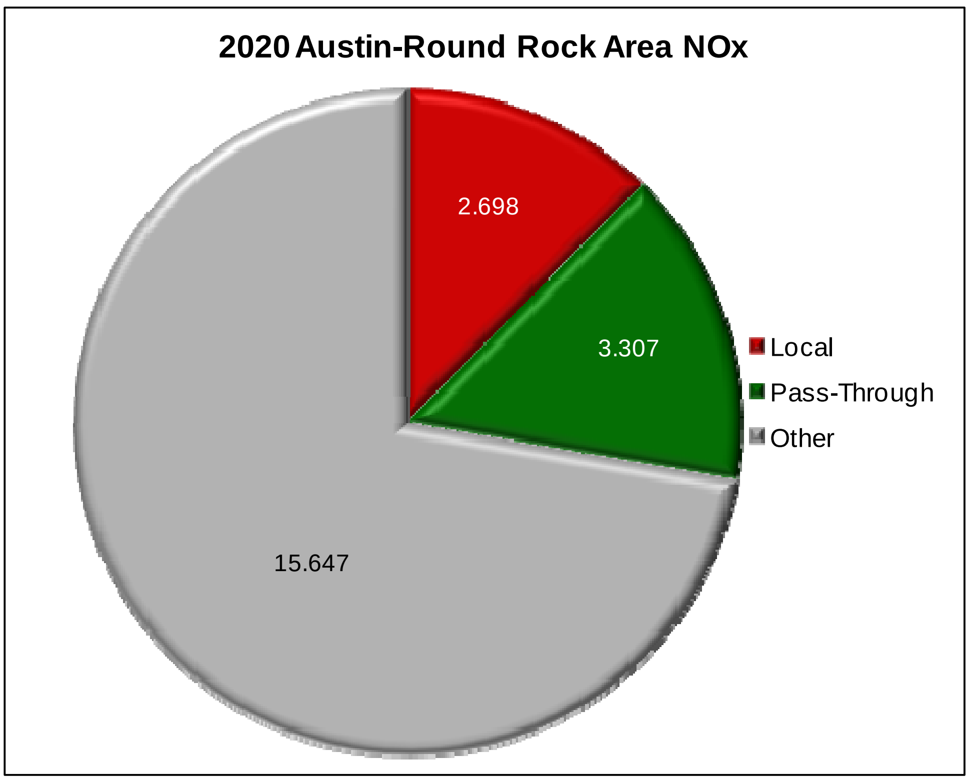

2015 Austin-Round Rock Area CO
2.296
1.969
219.154
Local
Pass-Through
Other

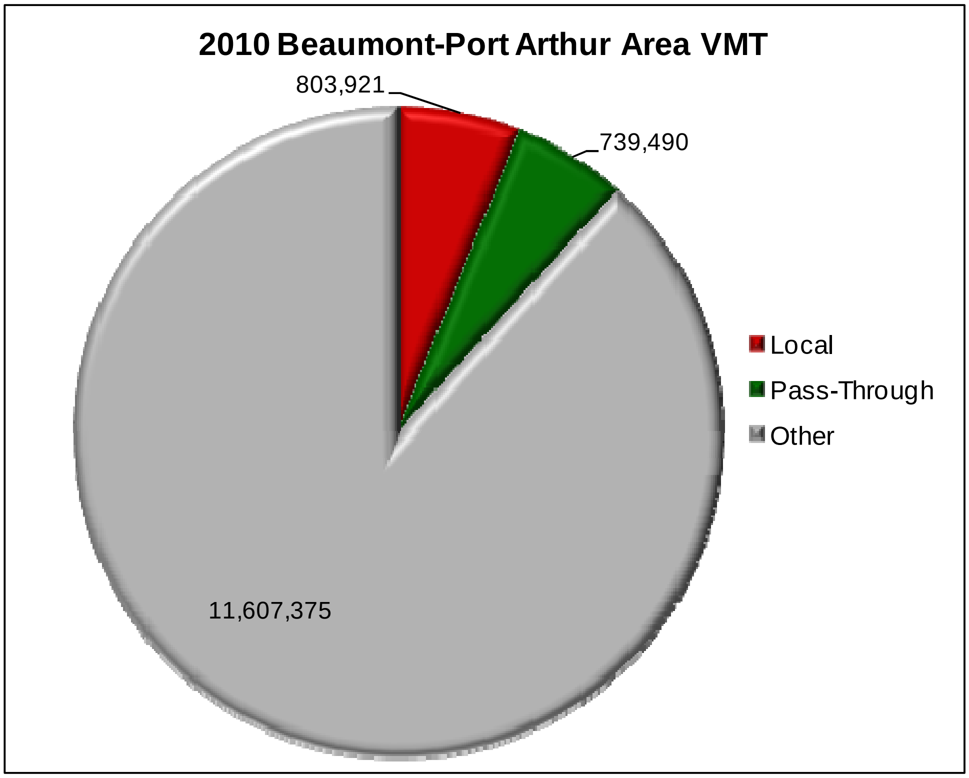

2015 Austin-Round Rock Area NOx
4.631
5.395
22.376
Local
Pass-Through
Other

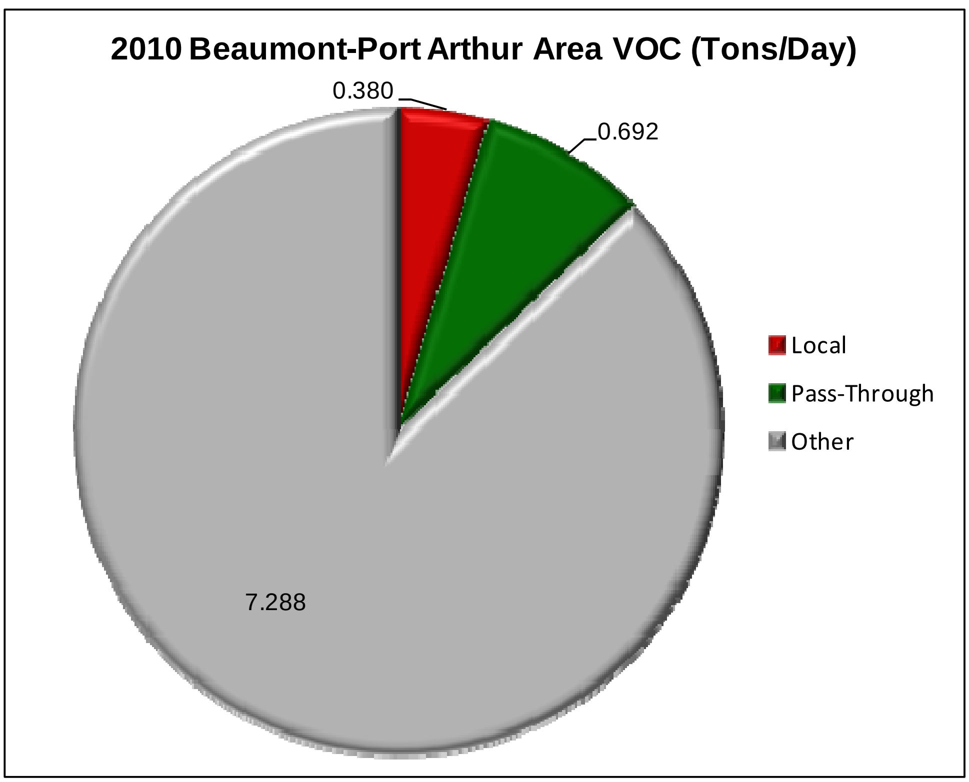

2020 Austin-Round Rock Area VMT
1,873,383
1,082,261
54,616,261
Local
Pass-Through
Other

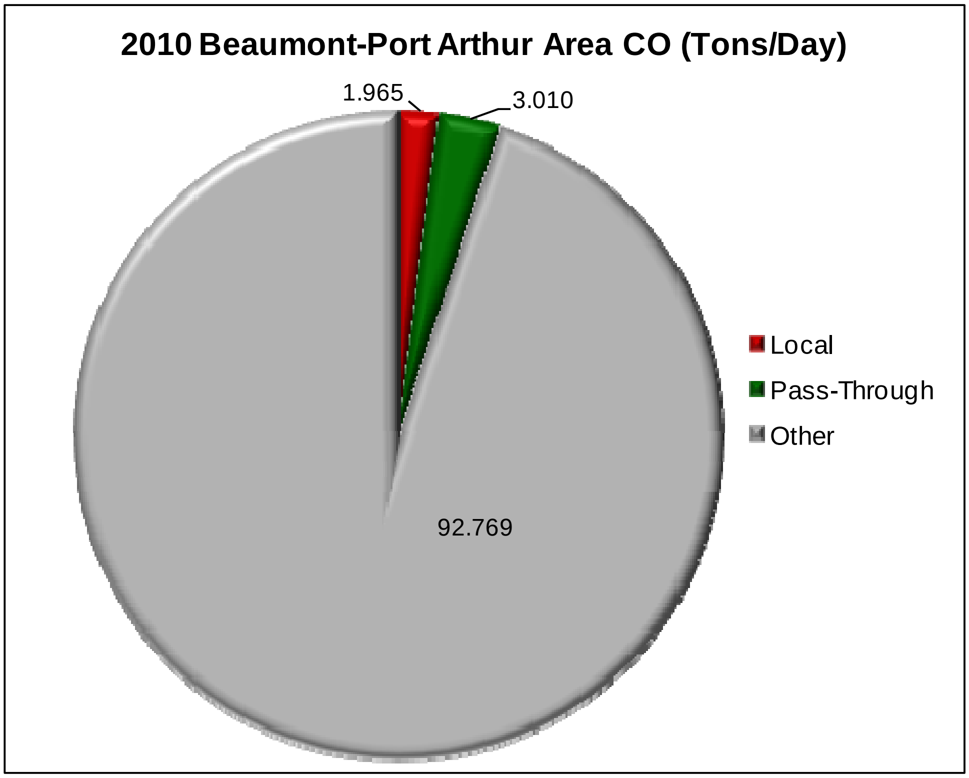

2020 Austin-Round Rock VOC Area (Tons/Day)
0.135
0.211
13.430
Local
Pass-Through
Other

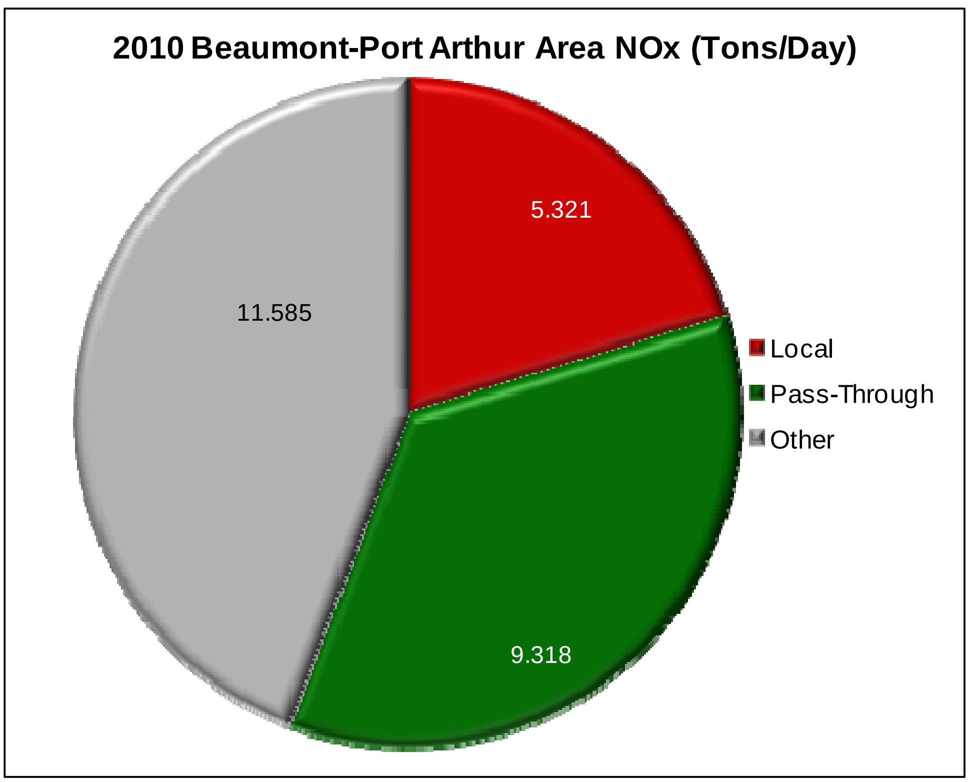

2020 Austin-Round Rock Area CO
1.633
1.353
201.142
Local
Pass-Through
Other

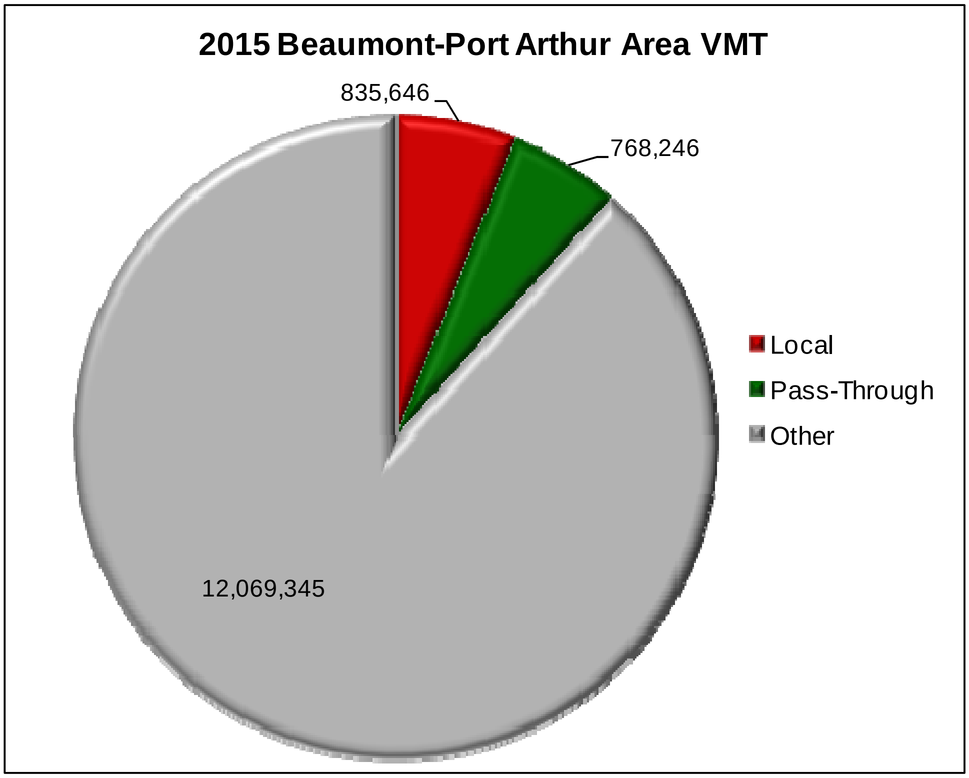

2020 Austin-Round Rock Area NOx
2.698
3.307
15.647
Local
Pass-Through
Other

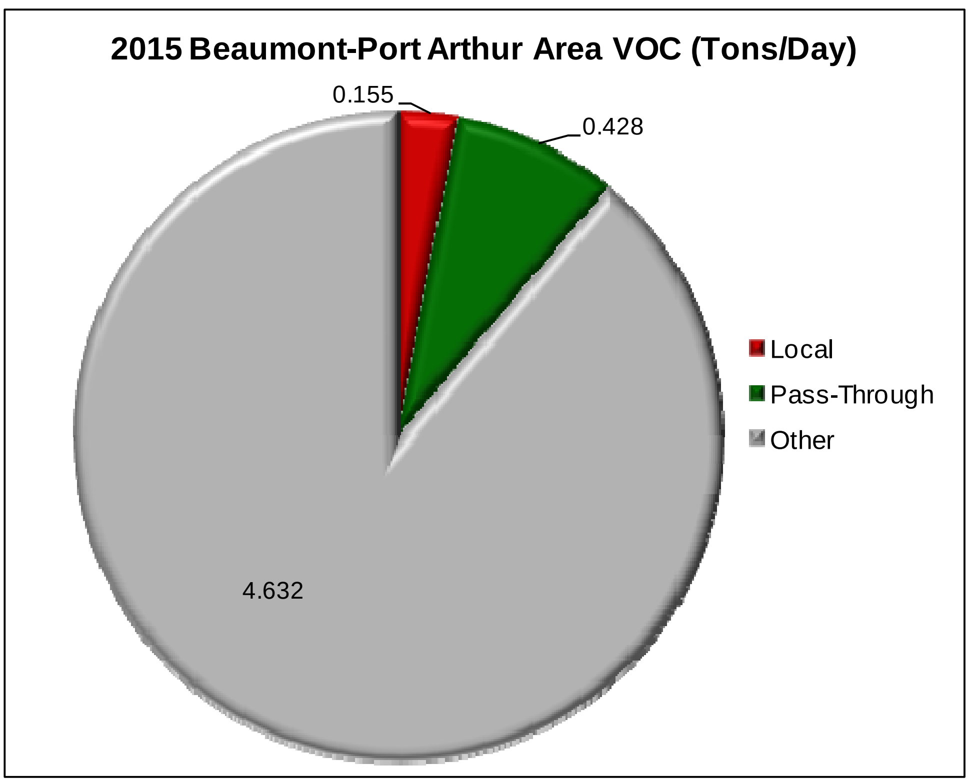

2010 Beaumont-Port Arthur Area VMT
803,921
739,490
11,607,375
Local
Pass-Through
Other

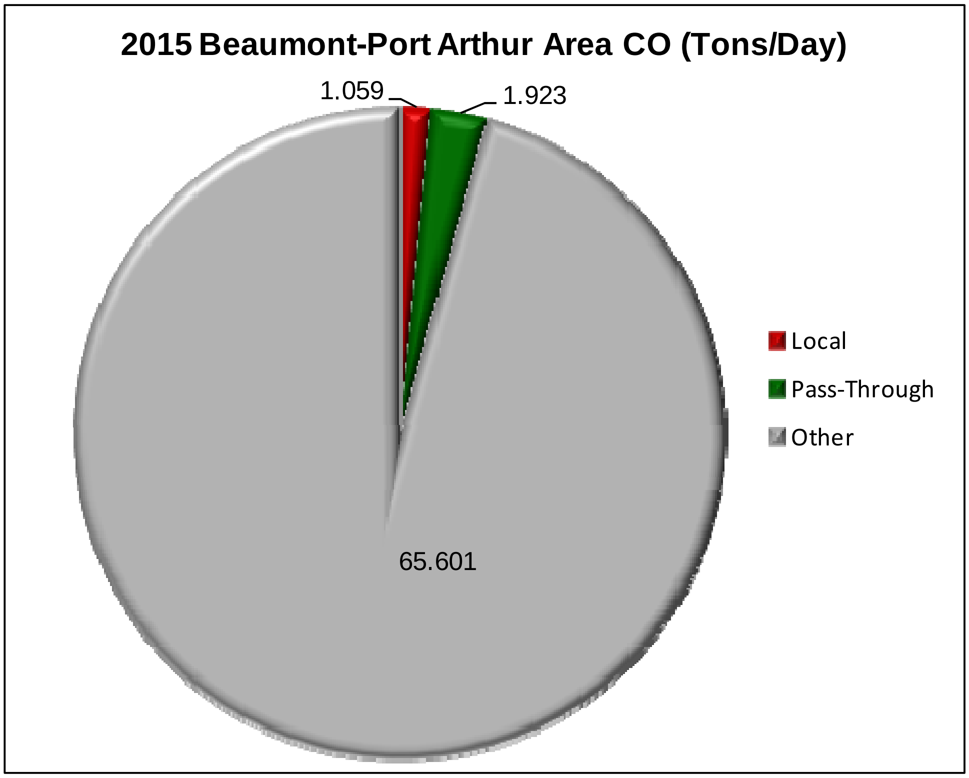

2010 Beaumont-Port Arthur Area VOC (Tons/Day)
0.380
0.692
7.288
Local
Pass-Through
Other

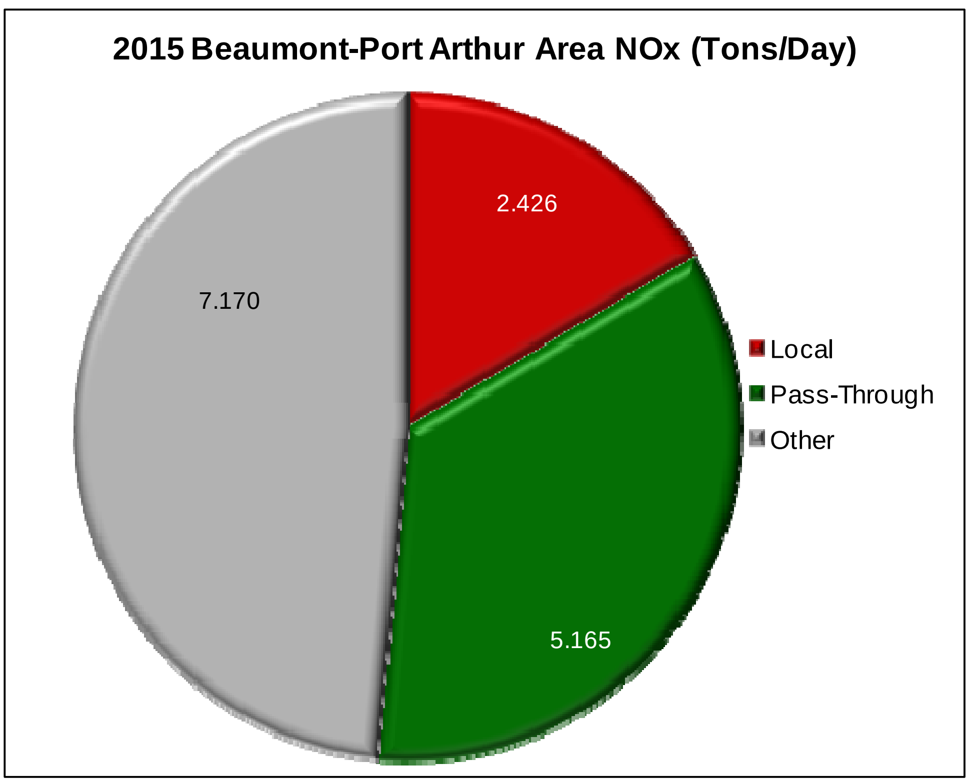

2010 Beaumont-Port Arthur Area CO (Tons/Day)
1.965
3.010
92.769
Local
Pass-Through
Other

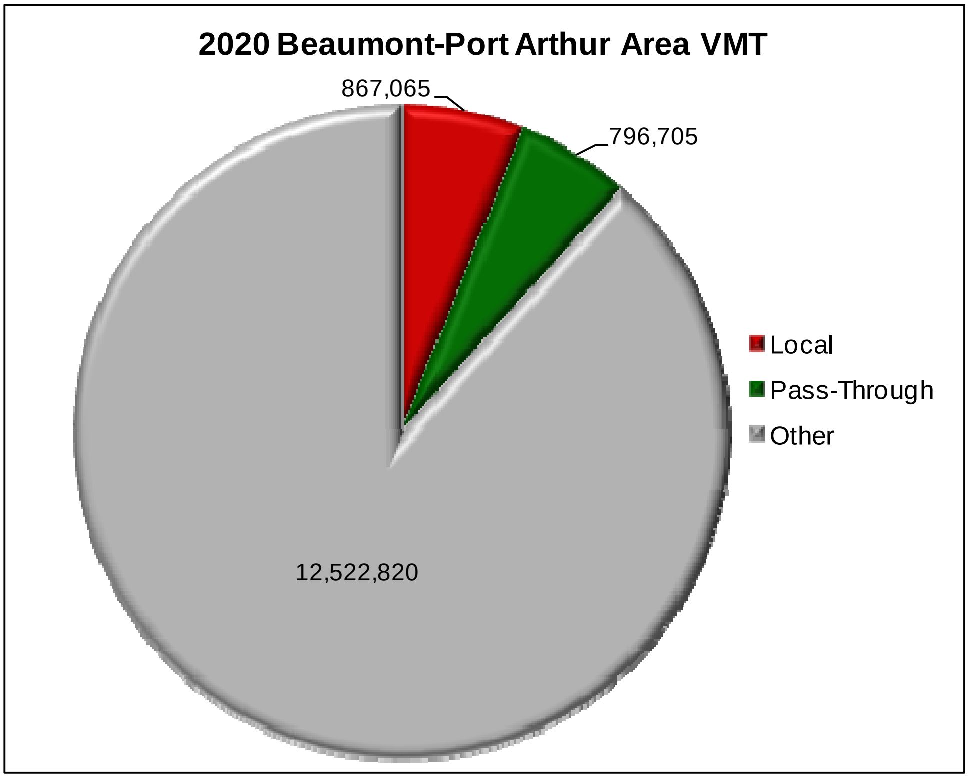

2010 Beaumont-Port Arthur Area NOx (Tons/Day)
5.321
11.585
9.318
Local
Pass-Through
Other

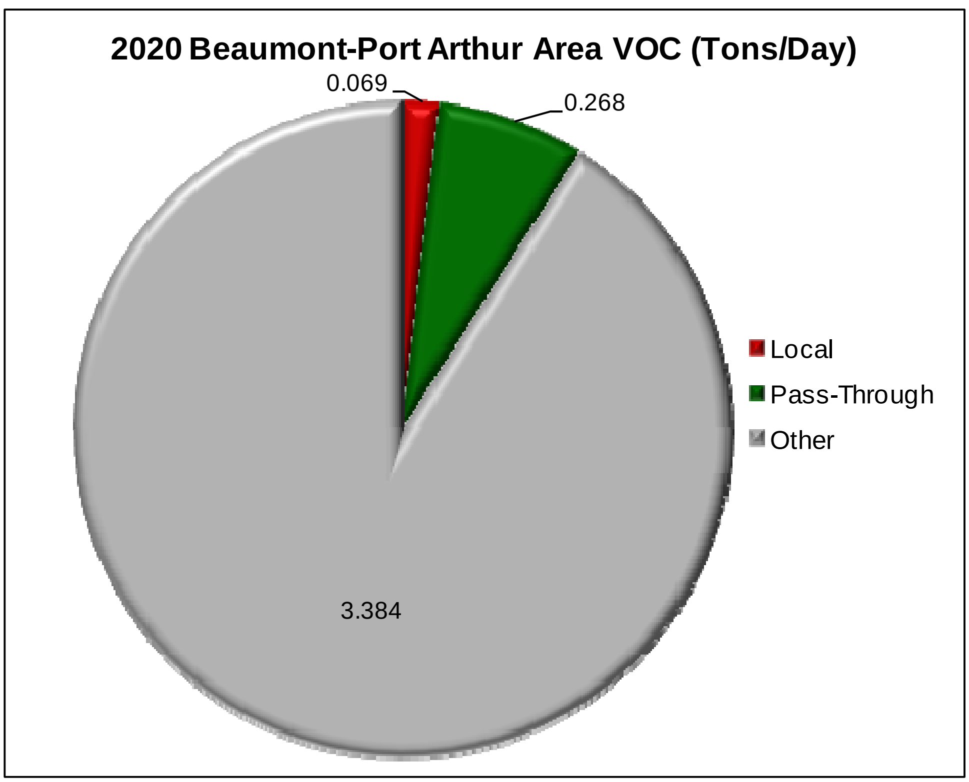

2015 Beaumont-Port Arthur Area VMT
835,646
768,246
12,069,345
Local
Pass-Through
Other

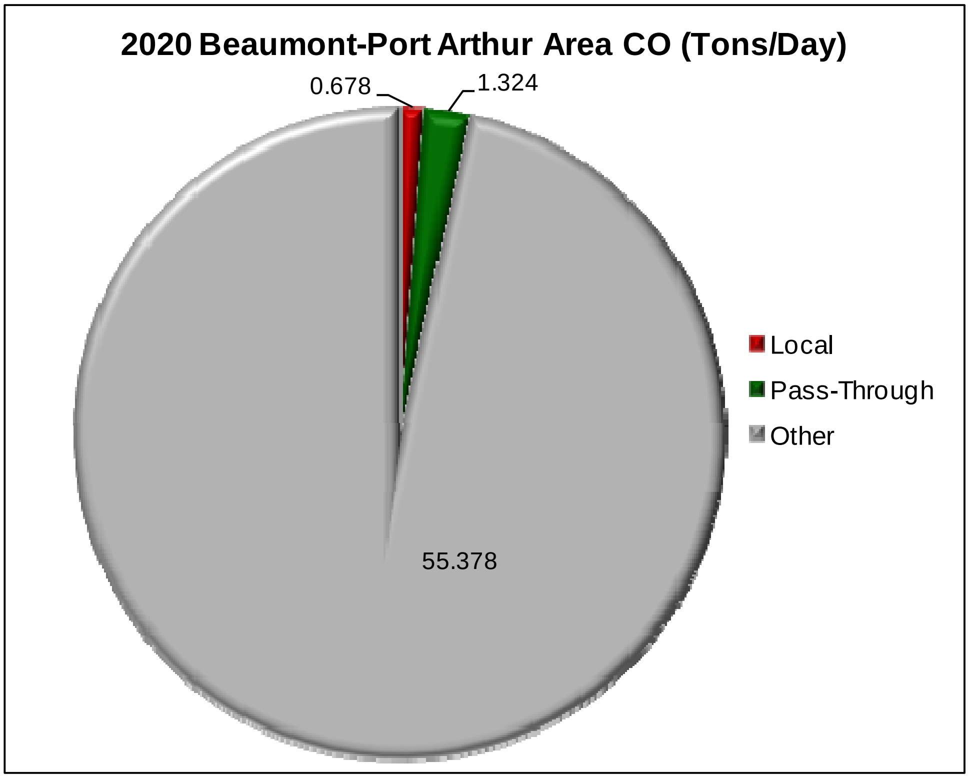

2015 Beaumont-Port Arthur Area VOC (Tons/Day)
0.155
0.428
4.632
Local
Pass-Through
Other

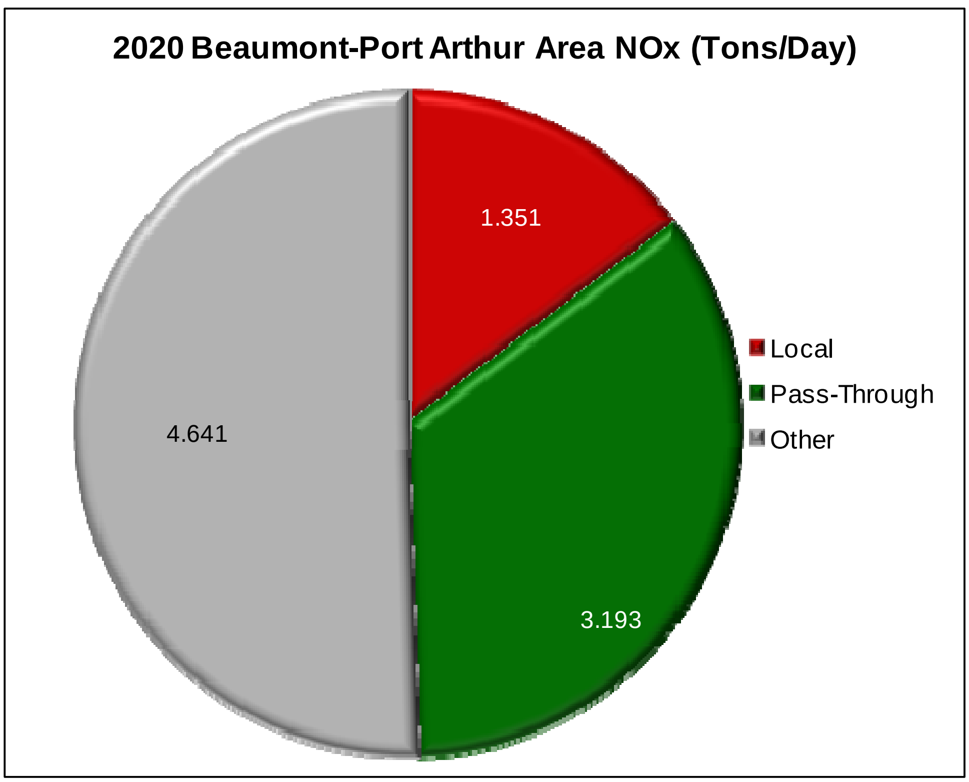

2015 Beaumont-Port Arthur Area CO (Tons/Day)
1.059
1.923
65.601
Local
Pass-Through
Other

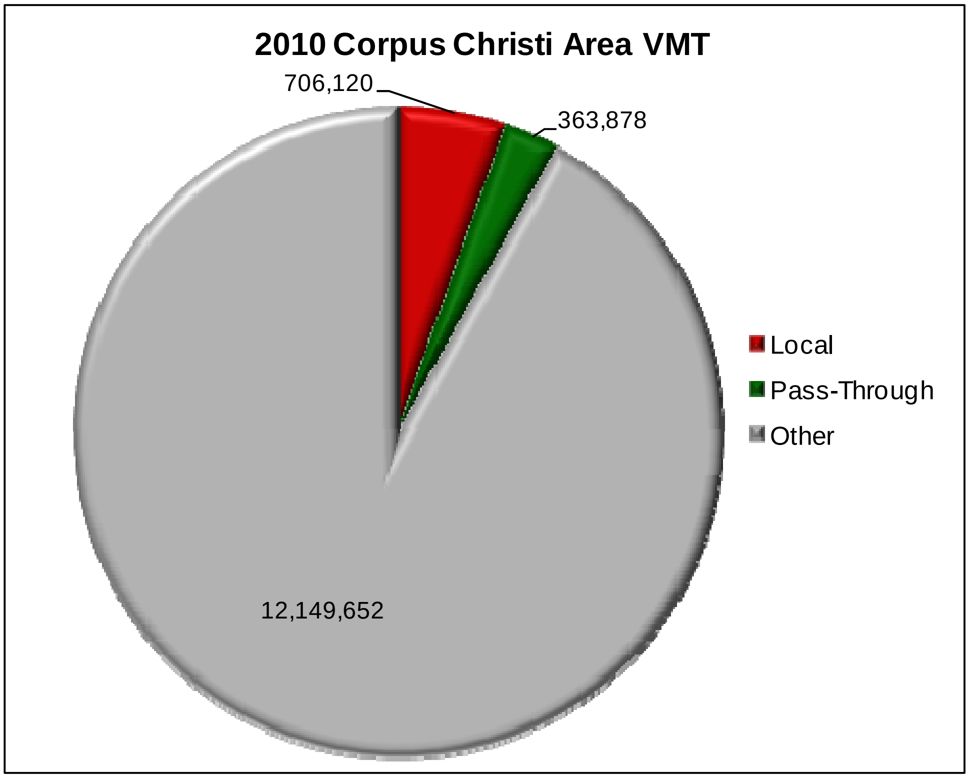

2015 Beaumont-Port Arthur Area NOx (Tons/Day)
2.426
7.170
5.165
Local
Pass-Through
Other

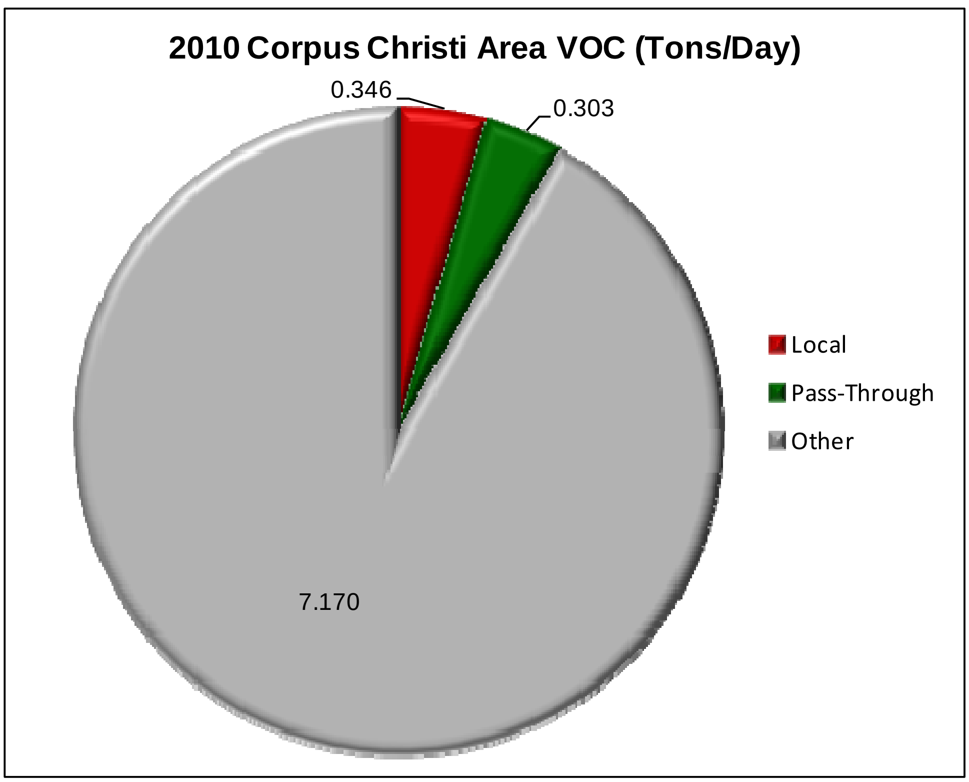

2020 Beaumont-Port Arthur Area VMT
867,065
796,705
12,522,820
Local
Pass-Through
Other

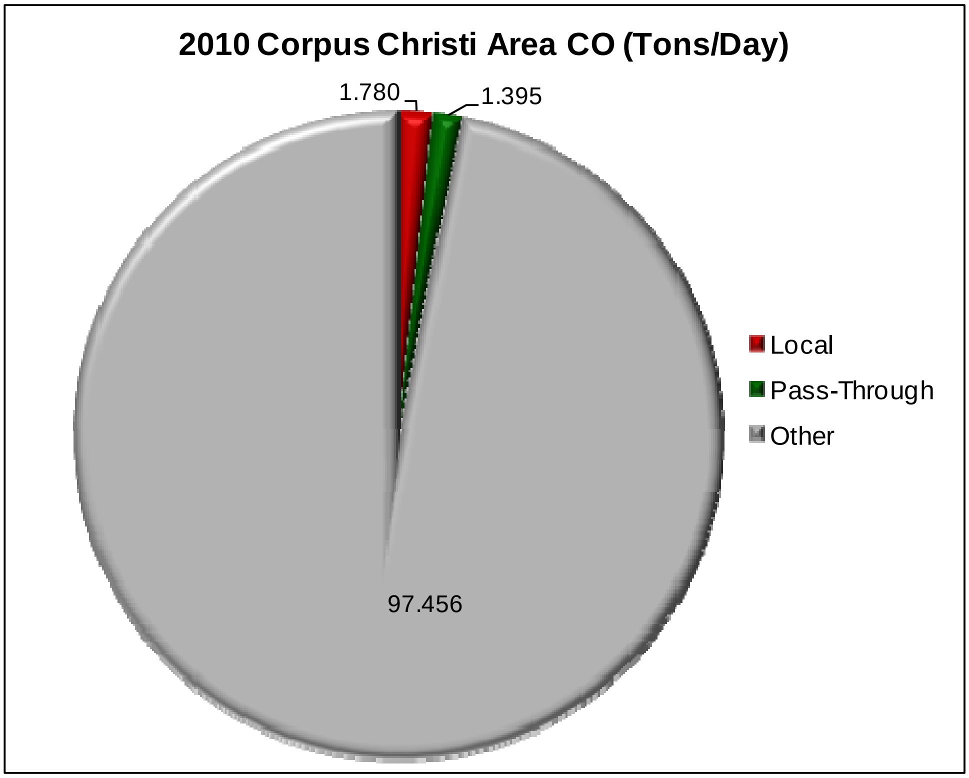

2020 Beaumont-Port Arthur Area VOC (Tons/Day)
0.069
0.268
3.384
Local
Pass-Through
Other

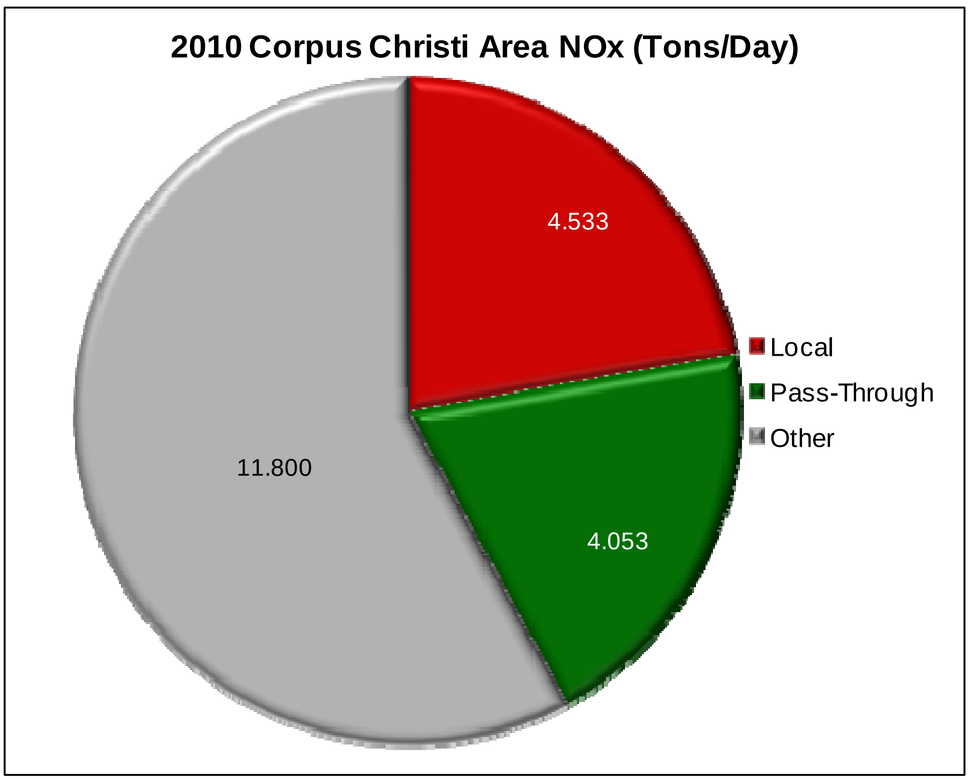

2020 Beaumont-Port Arthur Area CO (Tons/Day)
0.678
1.324
55.378
Local
Pass-Through
Other

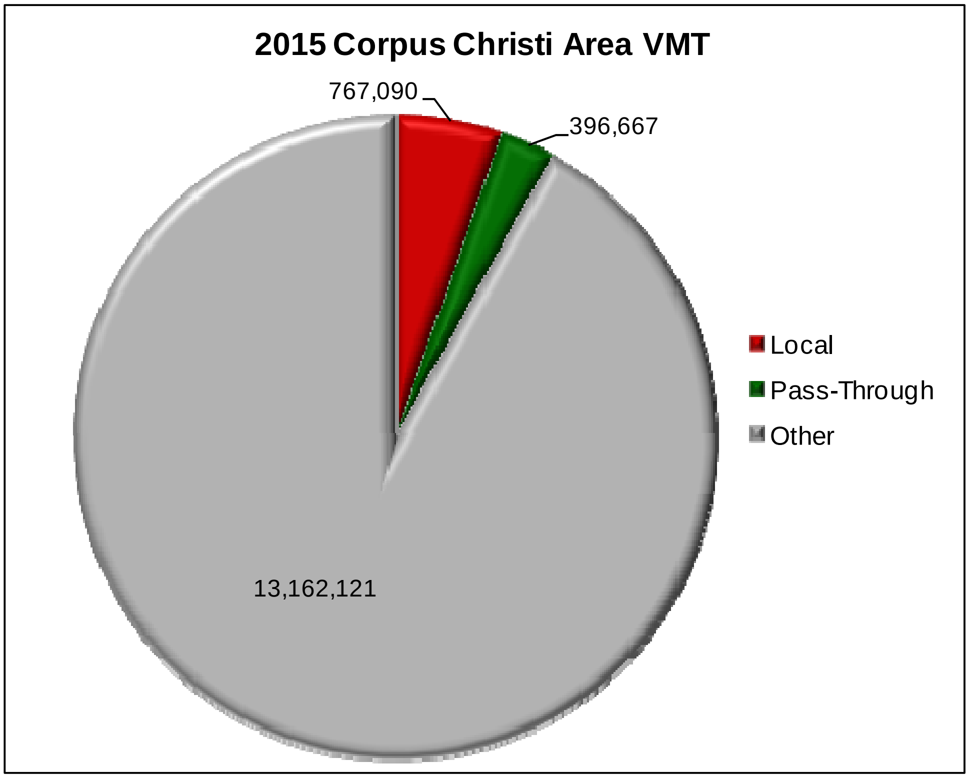

2020 Beaumont-Port Arthur Area NOx (Tons/Day)
1.351
4.641
3.193
Local
Pass-Through
Other

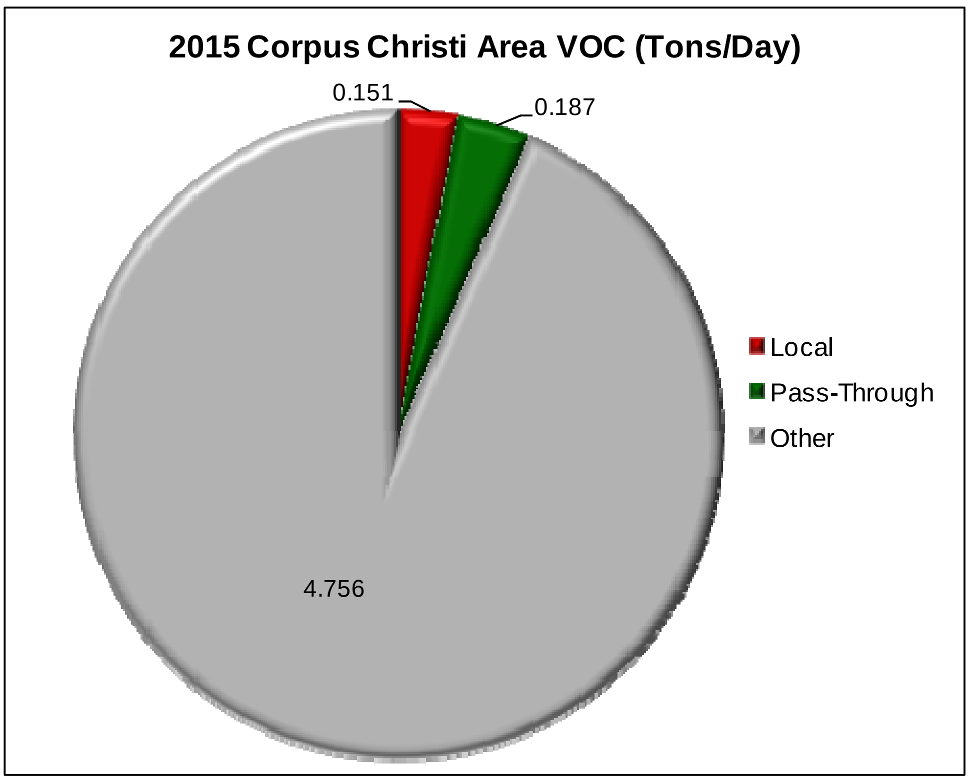

2010 Corpus Christi Area VMT
706,120
363,878
12,149,652
Local
Pass-Through
Other

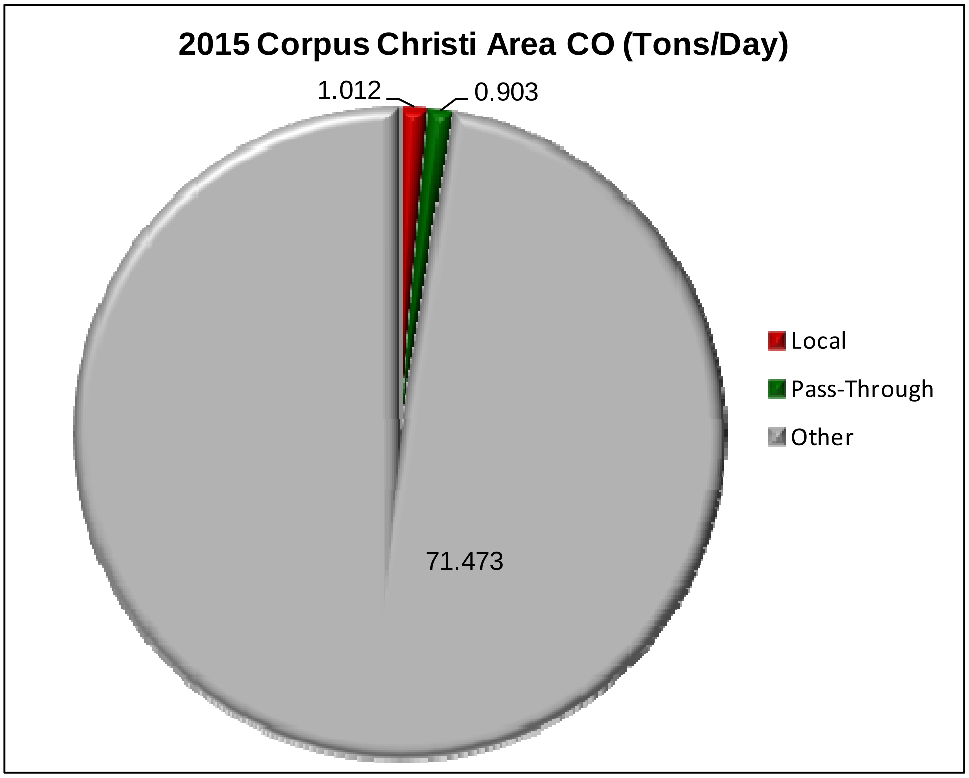

2010 Corpus Christi Area VOC (Tons/Day)
0.346
0.303
7.170
Local
Pass-Through
Other

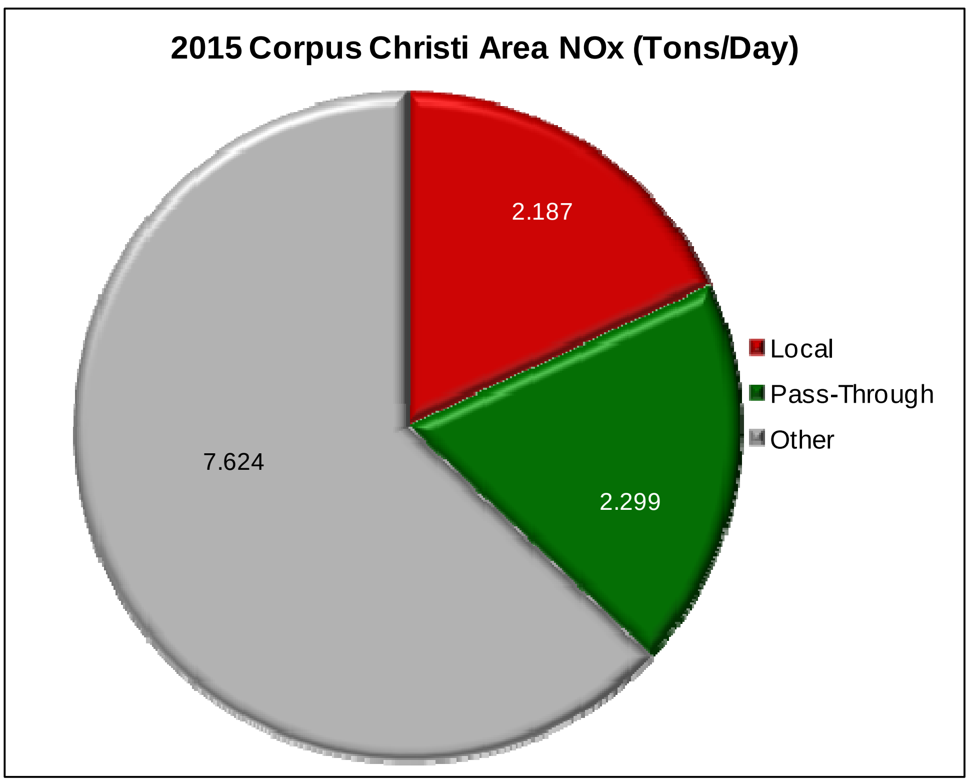

2010 Corpus Christi Area CO (Tons/Day)
1.780
1.395
97.456
Local
Pass-Through
Other

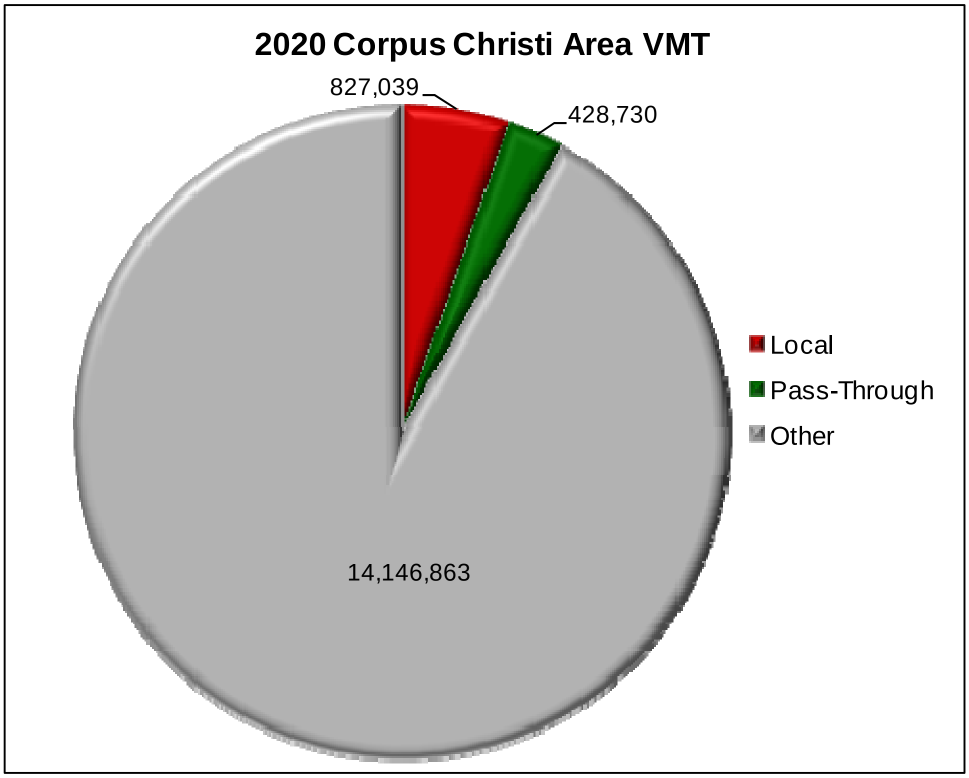

2010 Corpus Christi Area NOx (Tons/Day)
4.533
11.800
4.053
Local
Pass-Through
Other

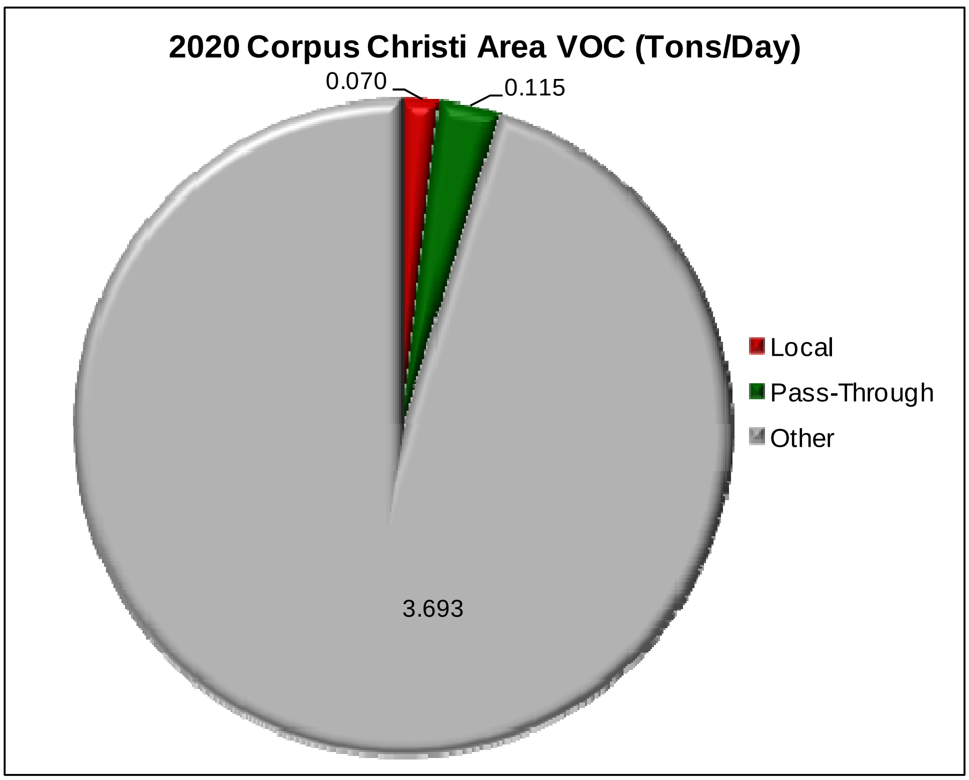

2015 Corpus Christi Area VMT
767,090
396,667
13,162,121
Local
Pass-Through
Other

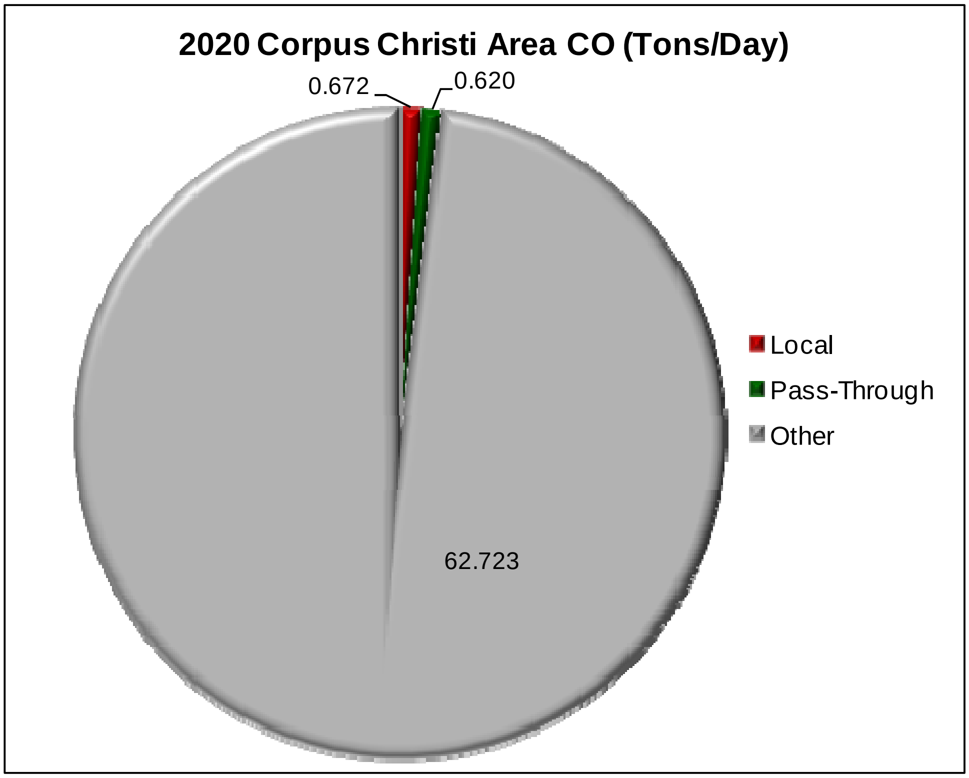

2015 Corpus Christi Area VOC (Tons/Day)
0.151
0.187
4.756
Local
Pass-Through
Other

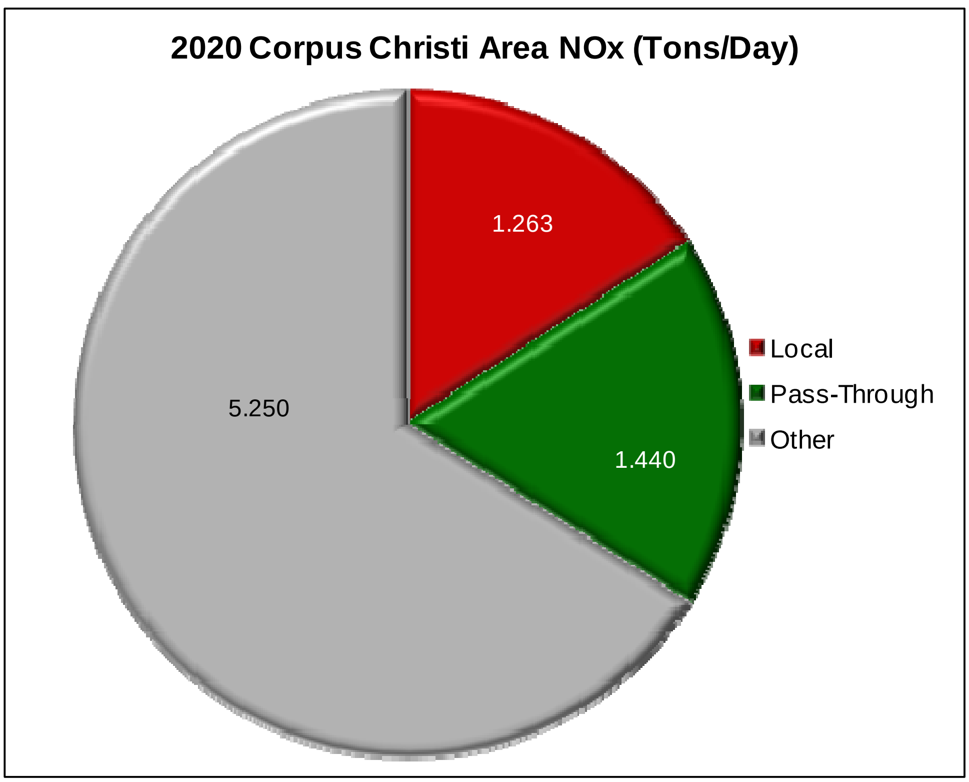

2015 Corpus Christi Area CO (Tons/Day)
1.012
0.903
71.473
Local
Pass-Through
Other

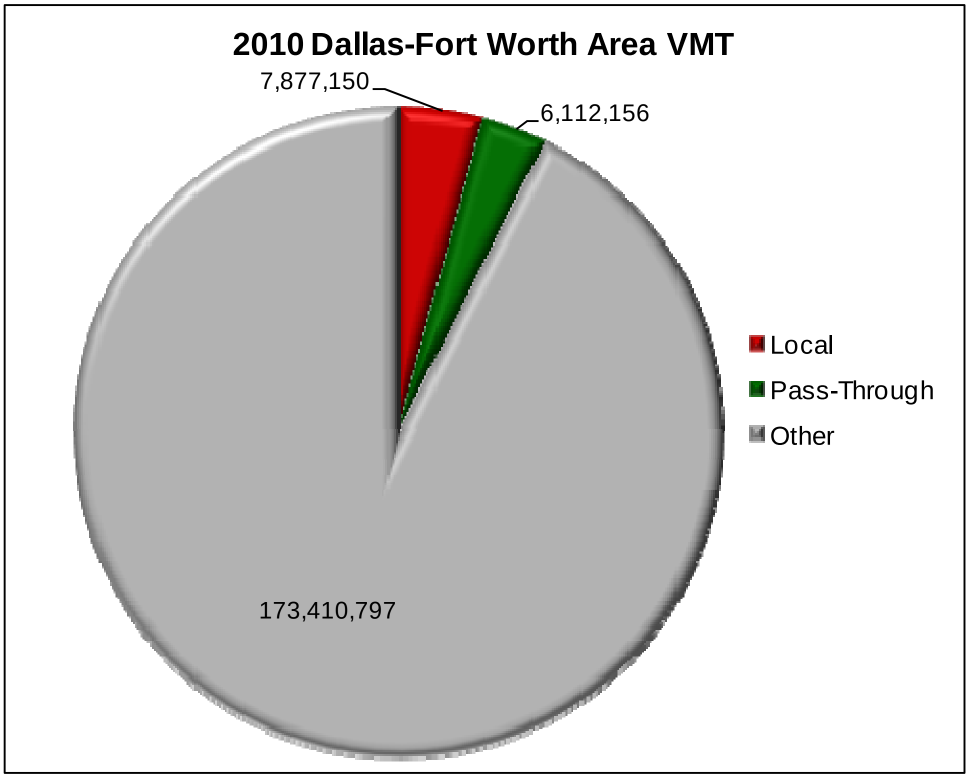

2015 Corpus Christi Area NOx (Tons/Day)
2.187
2.299
7.624
Local
Pass-Through
Other

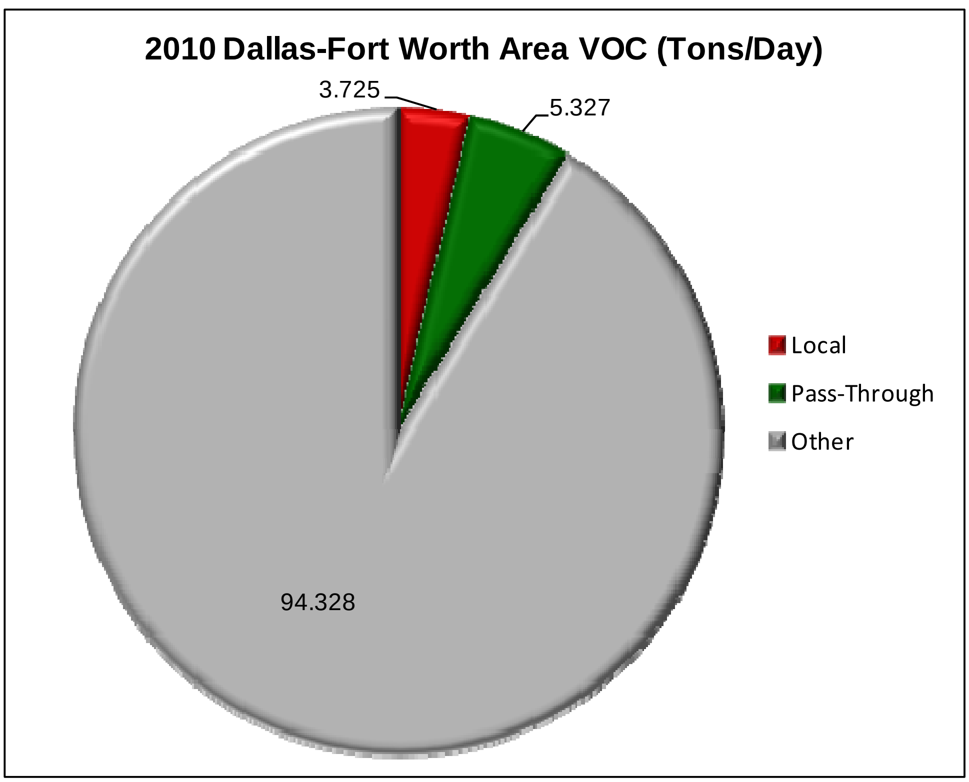

2020 Corpus Christi Area VMT
827,039
428,730
14,146,863
Local
Pass-Through
Other

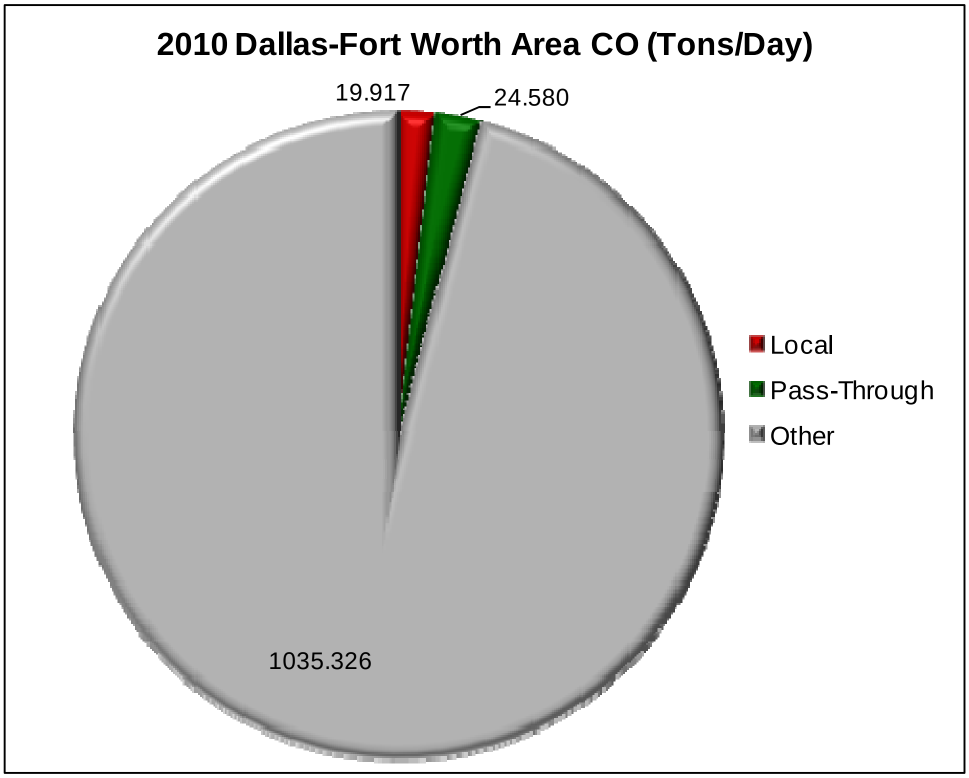

2020 Corpus Christi Area VOC (Tons/Day)
0.070
0.115
3.693
Local
Pass-Through
Other

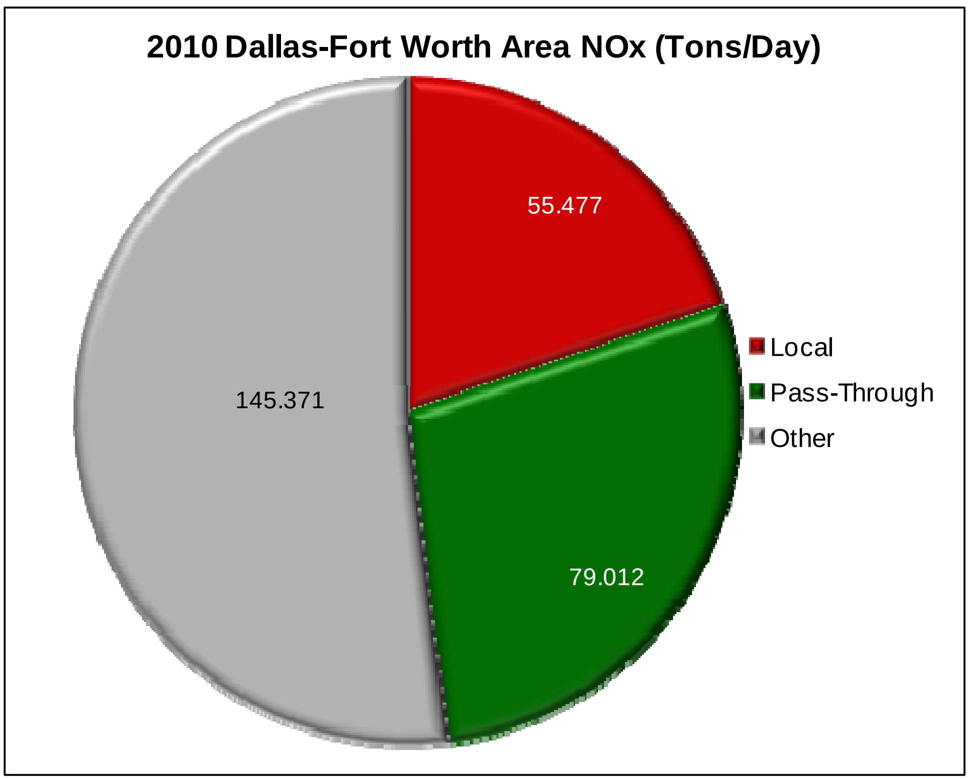

2020 Corpus Christi Area CO (Tons/Day)
0.672
0.620
62.723
Local
Pass-Through
Other

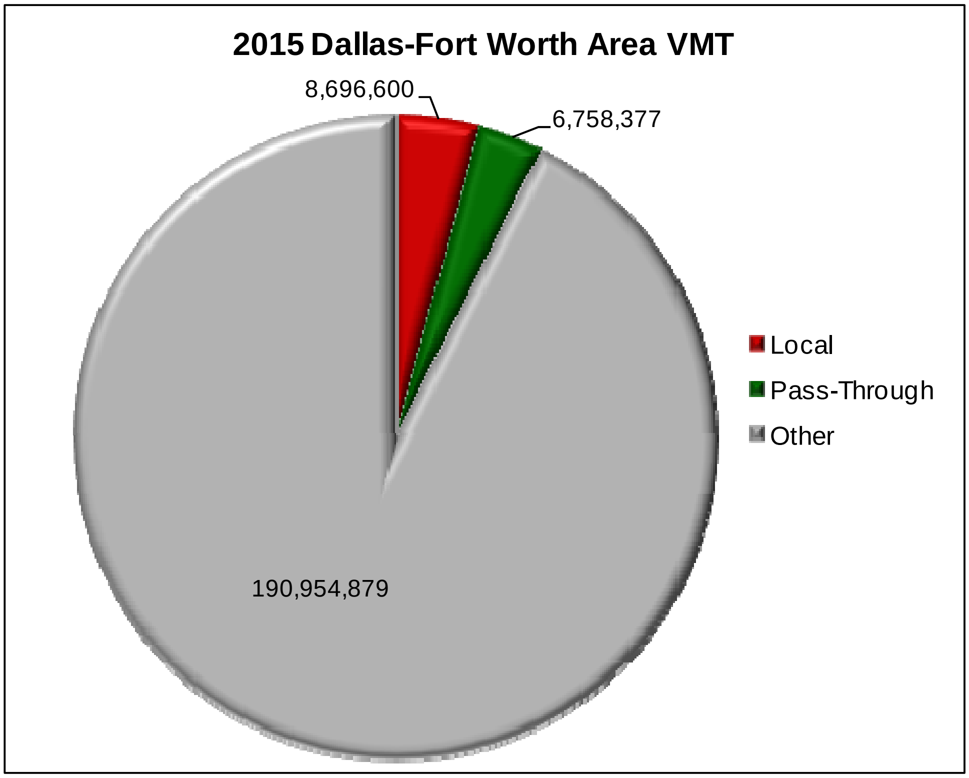

2020 Corpus Christi Area NOx (Tons/Day)
1.263
1.440
5.250
Local
Pass-Through
Other

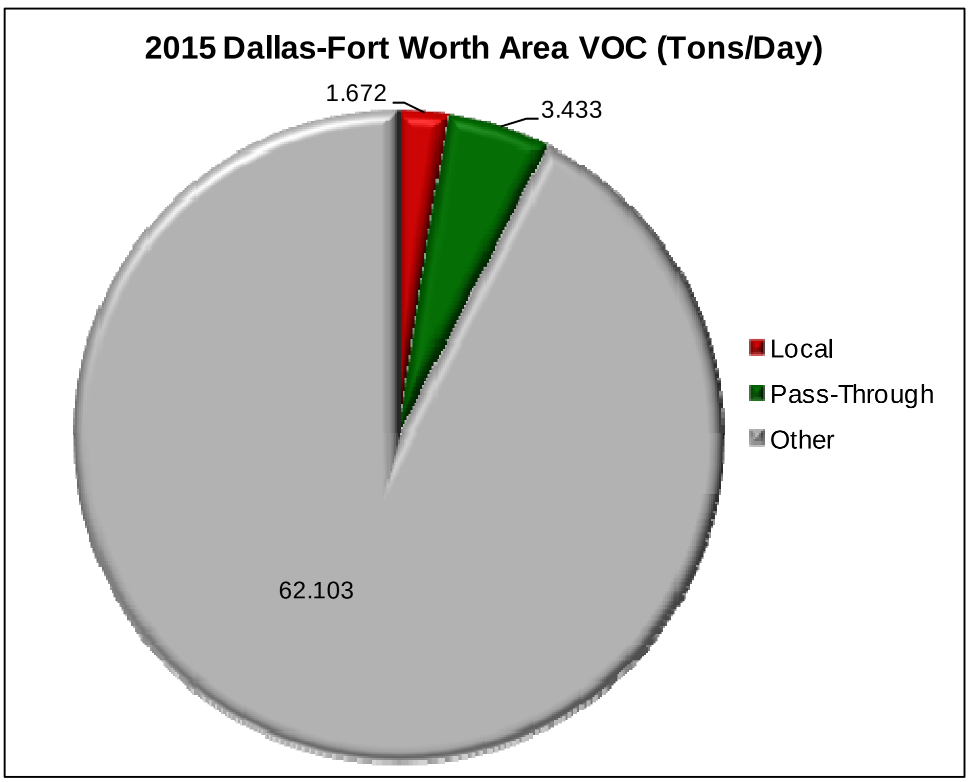

2010 Dallas-Fort Worth Area VMT
7,877,150
6,112,156
173,410,797
Local
Pass-Through
Other

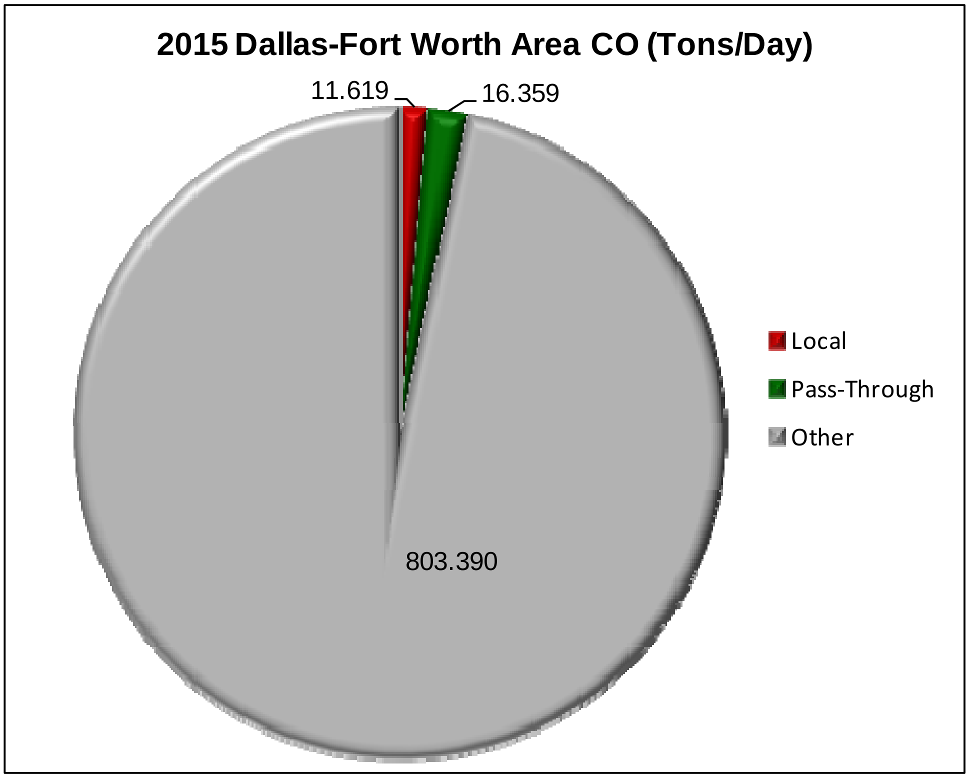

2010 Dallas-Fort Worth Area VOC (Tons/Day)
3.725
5.327
94.328
Local
Pass-Through
Other

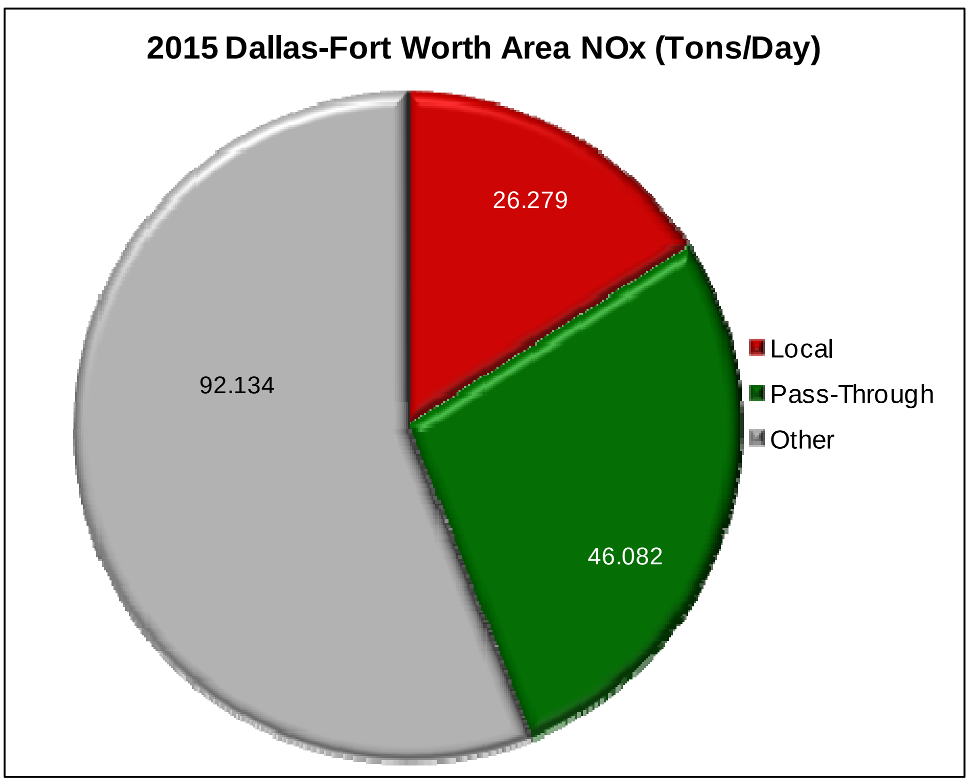

2010 Dallas-Fort Worth Area CO (Tons/Day)
19.917
24.580
1035.326
Local
Pass-Through
Other

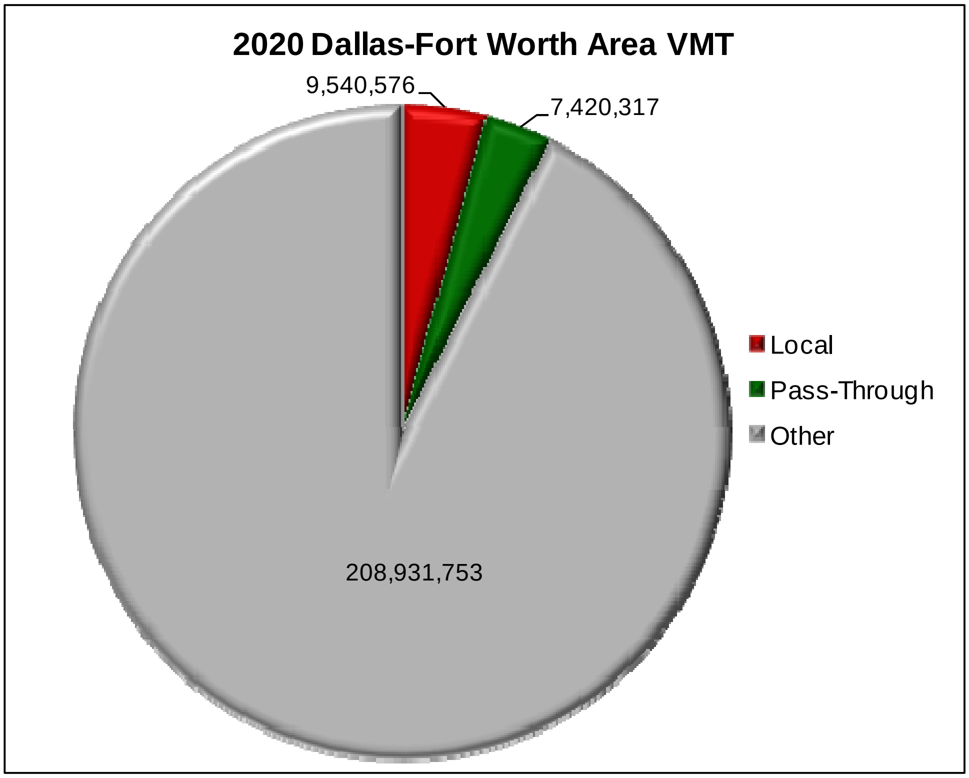

2010 Dallas-Fort Worth Area NOx (Tons/Day)
55.477
145.371
79.012
Local
Pass-Through
Other

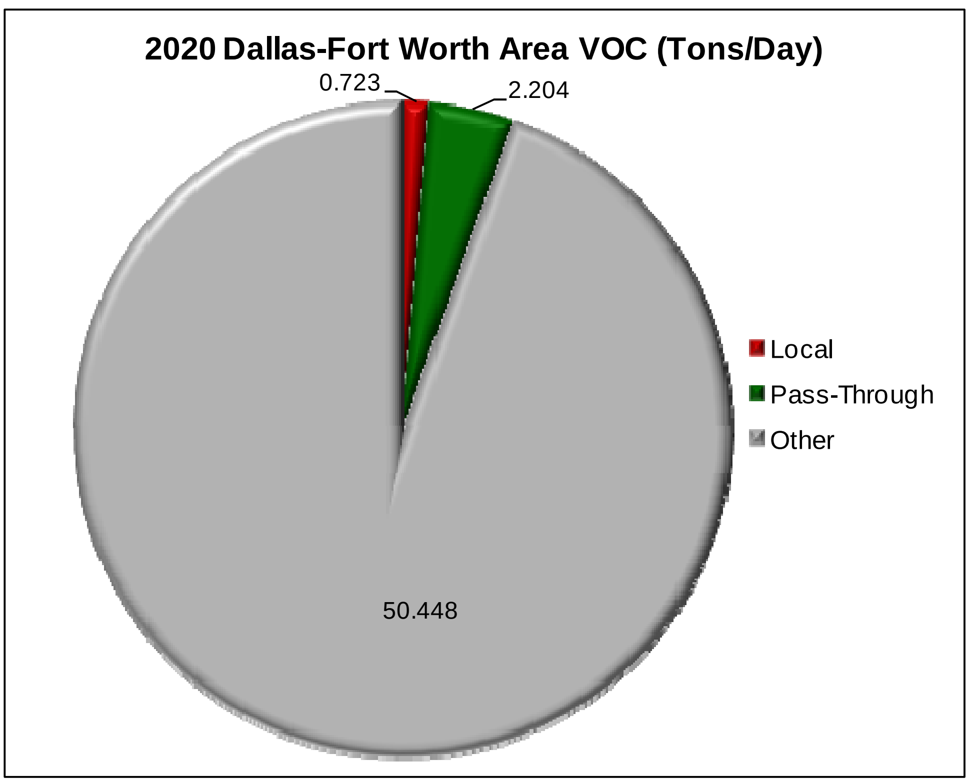

2015 Dallas-Fort Worth Area VMT
8,696,600
6,758,377
190,954,879
Local
Pass-Through
Other

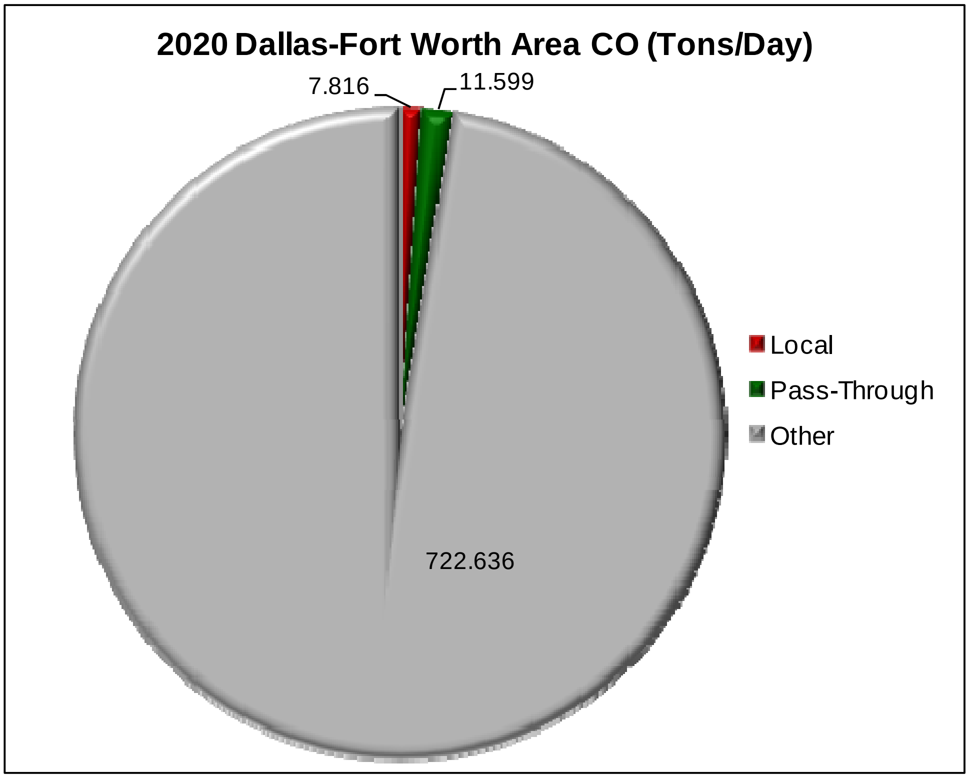

2015 Dallas-Fort Worth Area VOC (Tons/Day)
1.672
3.433
62.103
Local
Pass-Through
Other

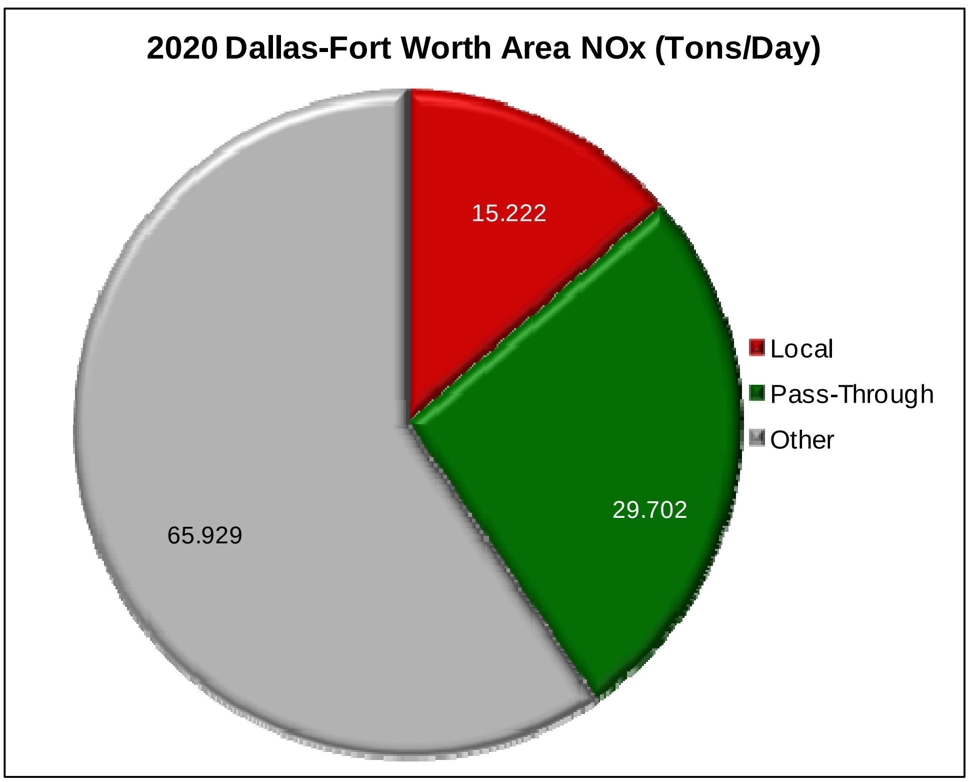

2015 Dallas-Fort Worth Area CO (Tons/Day)
11.619
16.359
803.390
Local
Pass-Through
Other

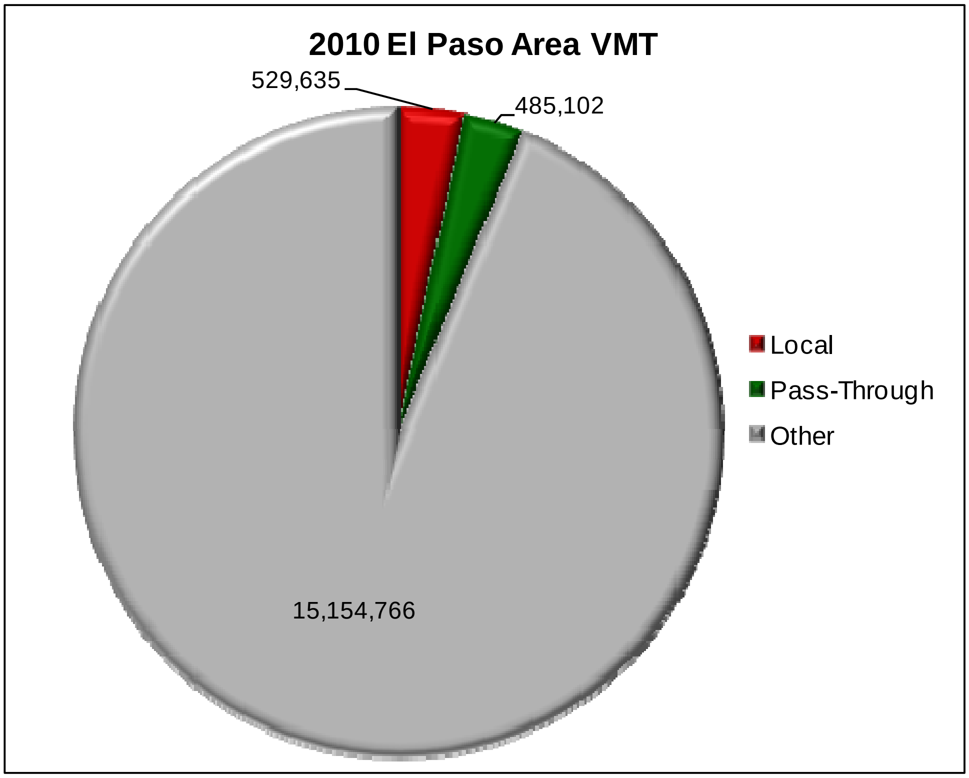

2015 Dallas-Fort Worth Area NOx (Tons/Day)
26.279
46.082
92.134
Local
Pass-Through
Other

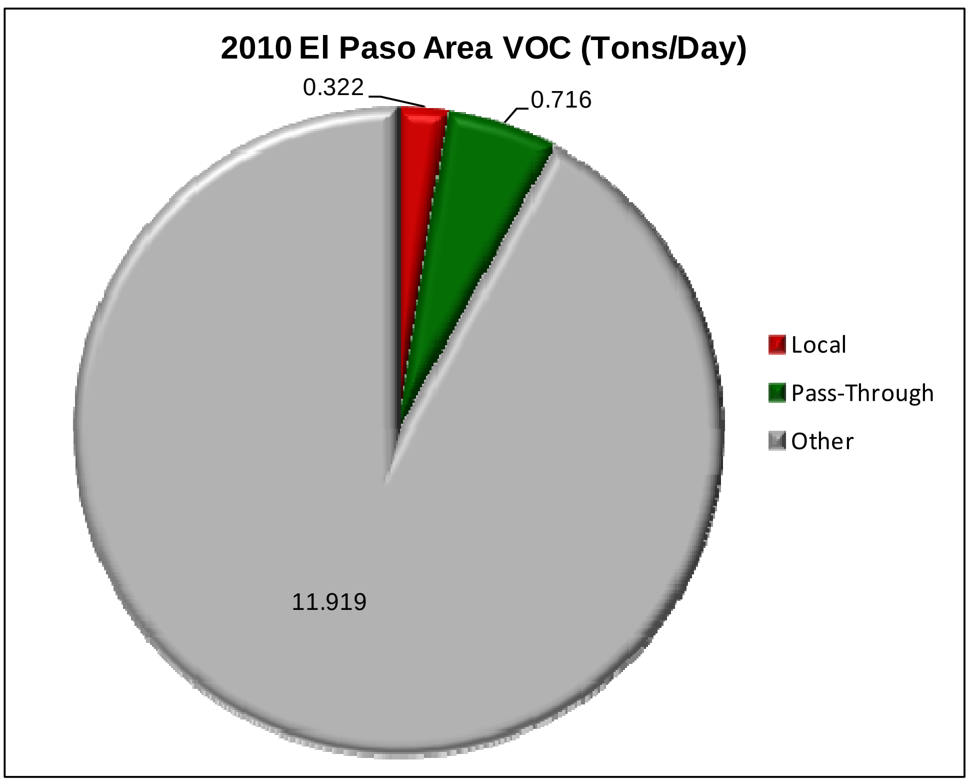

2020 Dallas-Fort Worth Area VMT
9,540,576
7,420,317
208,931,753
Local
Pass-Through
Other

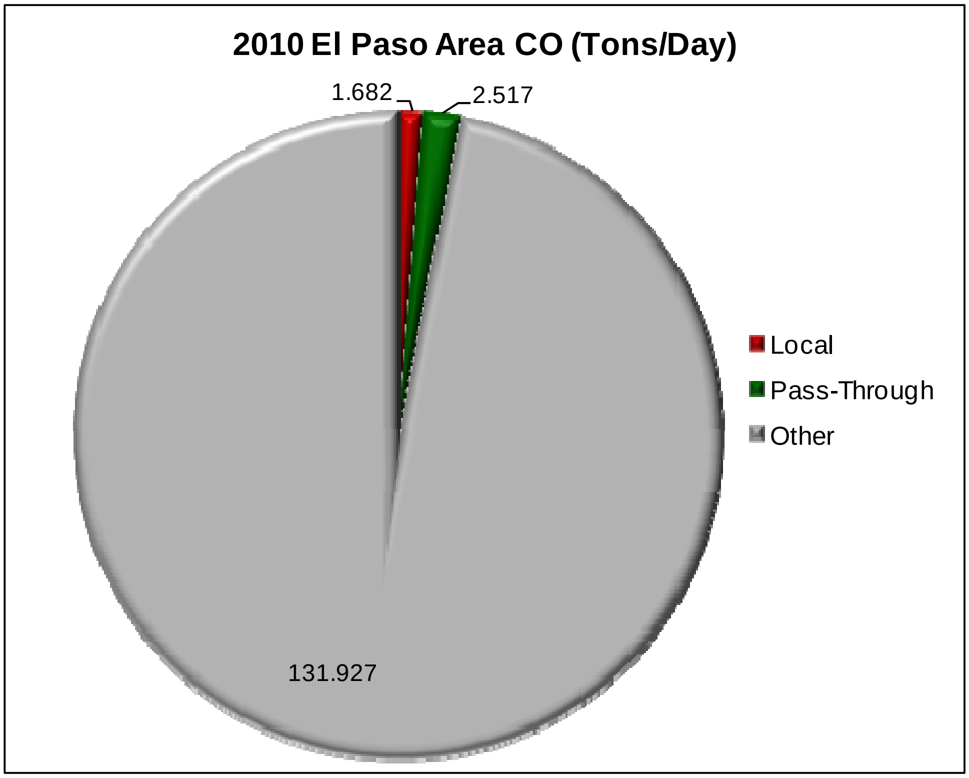

2020 Dallas-Fort Worth Area VOC (Tons/Day)
0.723
2.204
50.448
Local
Pass-Through
Other

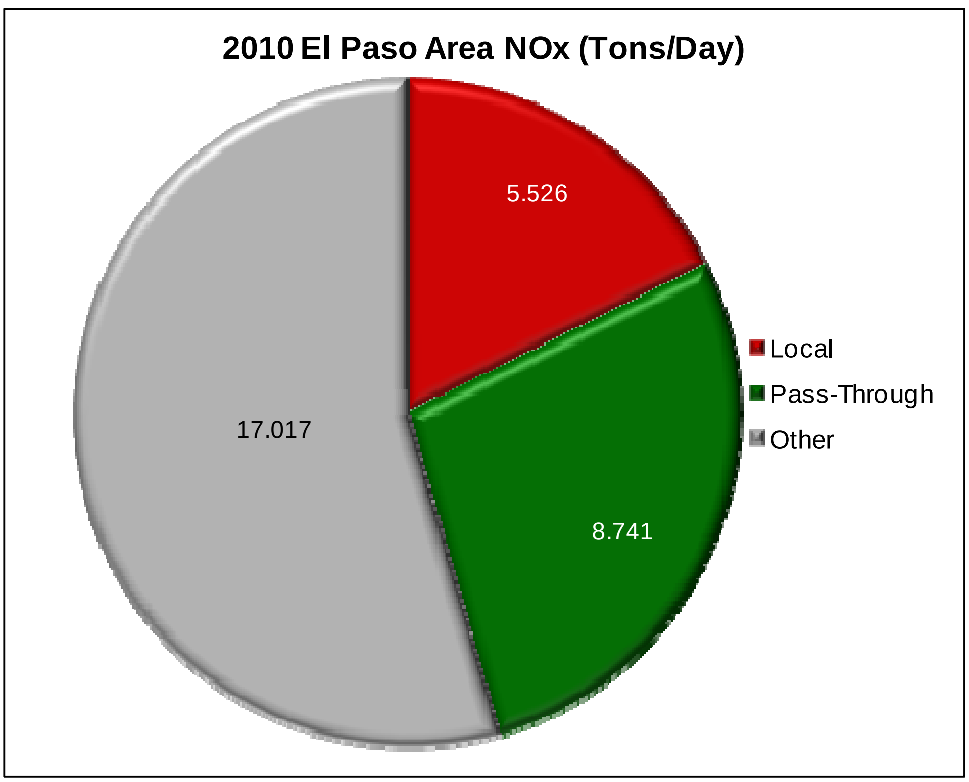

2020 Dallas-Fort Worth Area CO (Tons/Day)
7.816
11.599
722.636
Local
Pass-Through
Other

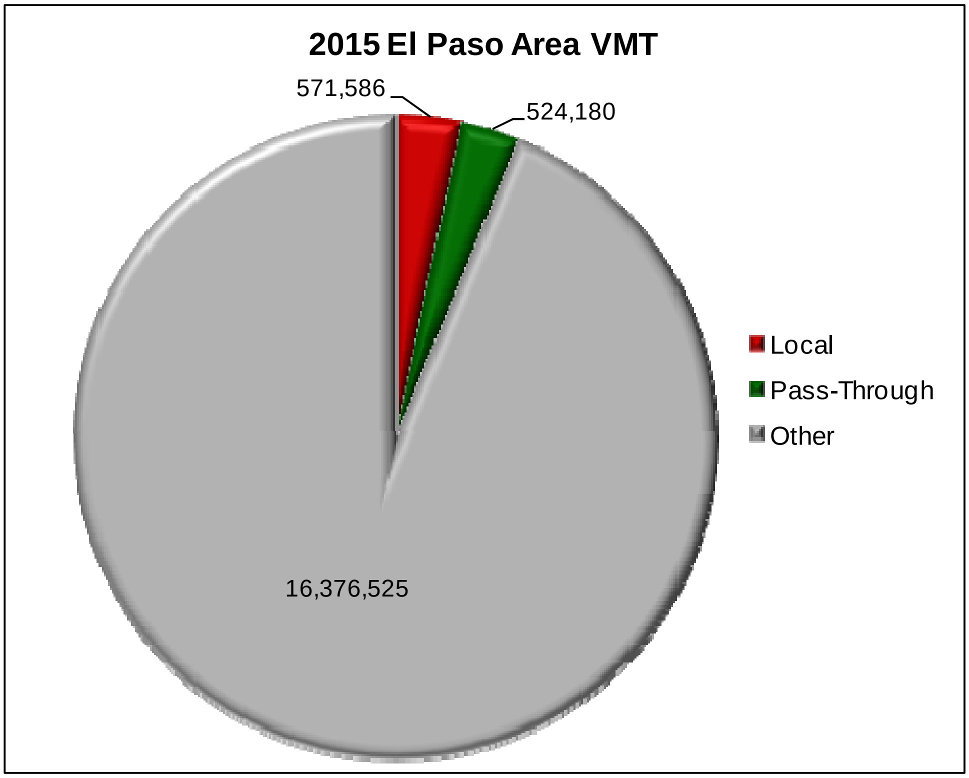

2020 Dallas-Fort Worth Area NOx (Tons/Day)
15.222
29.702
65.929
Local
Pass-Through
Other

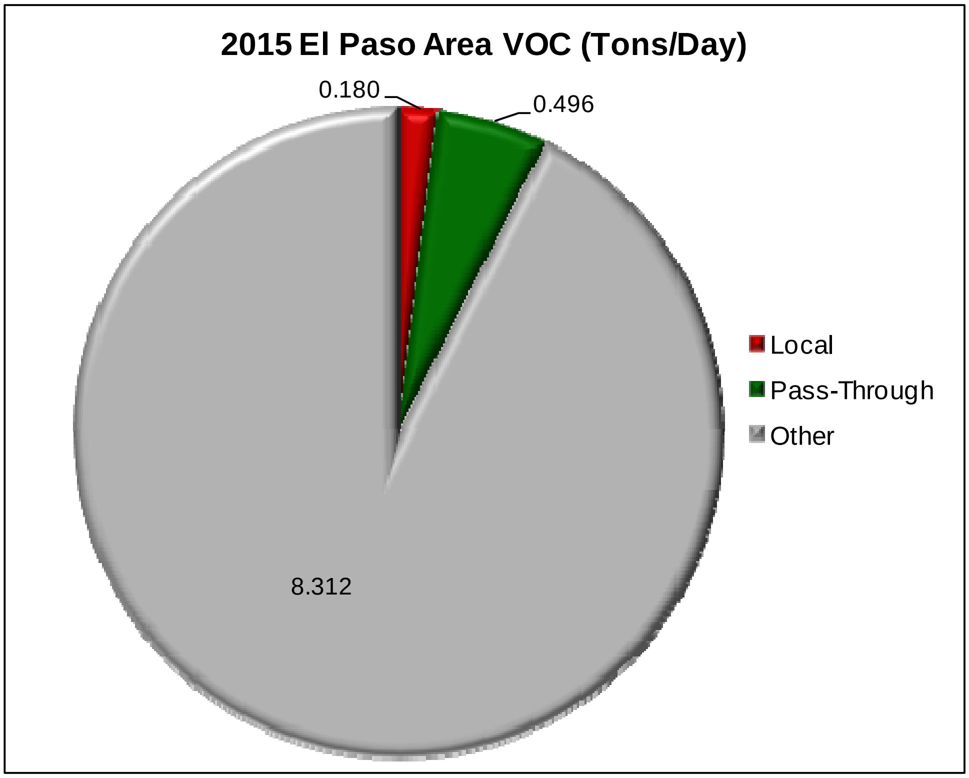

2010 El Paso Area VMT
529,635
485,102
15,154,766
Local
Pass-Through
Other

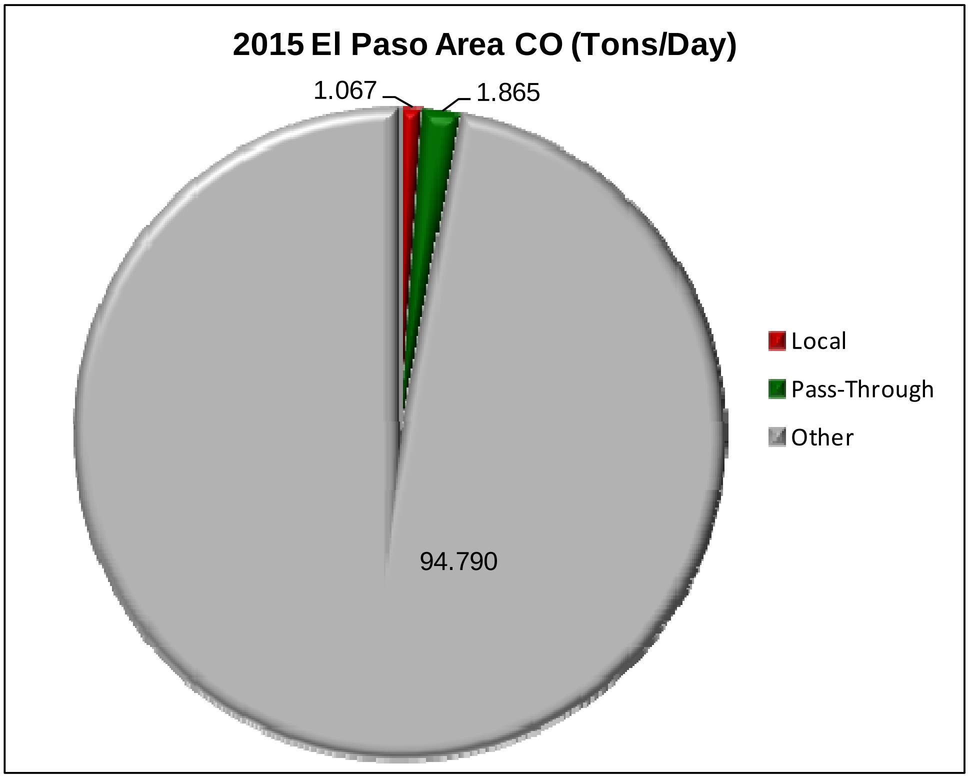

2010 El Paso Area VOC (Tons/Day)
0.322
0.716
11.919
Local
Pass-Through
Other

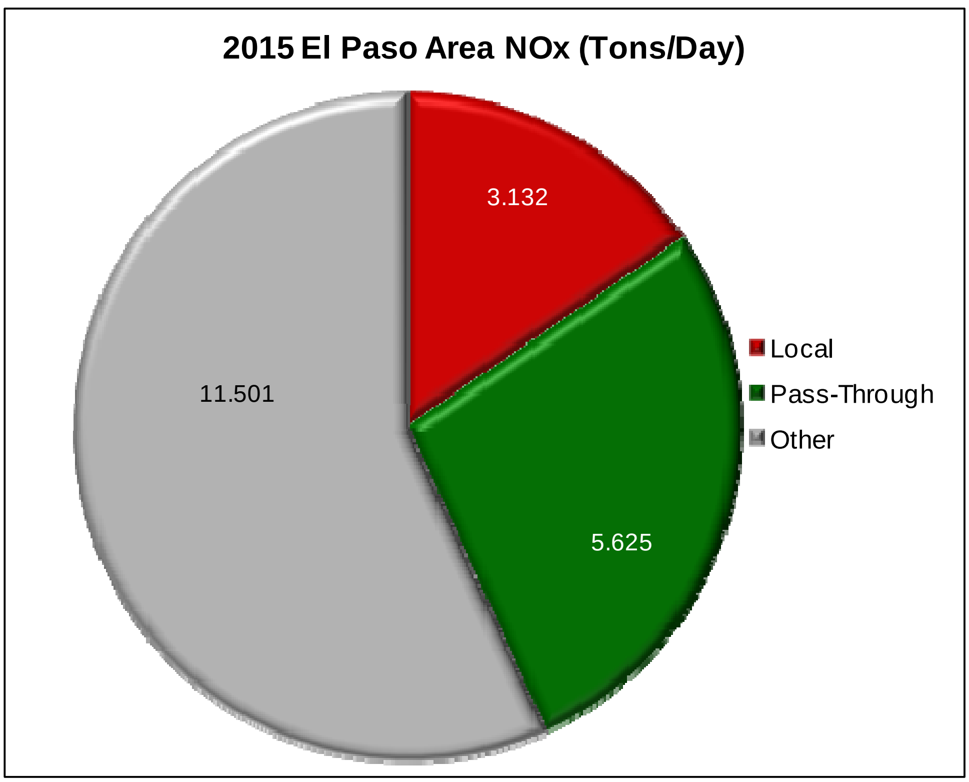

2010 El Paso Area CO (Tons/Day)
1.682
2.517
131.927
Local
Pass-Through
Other

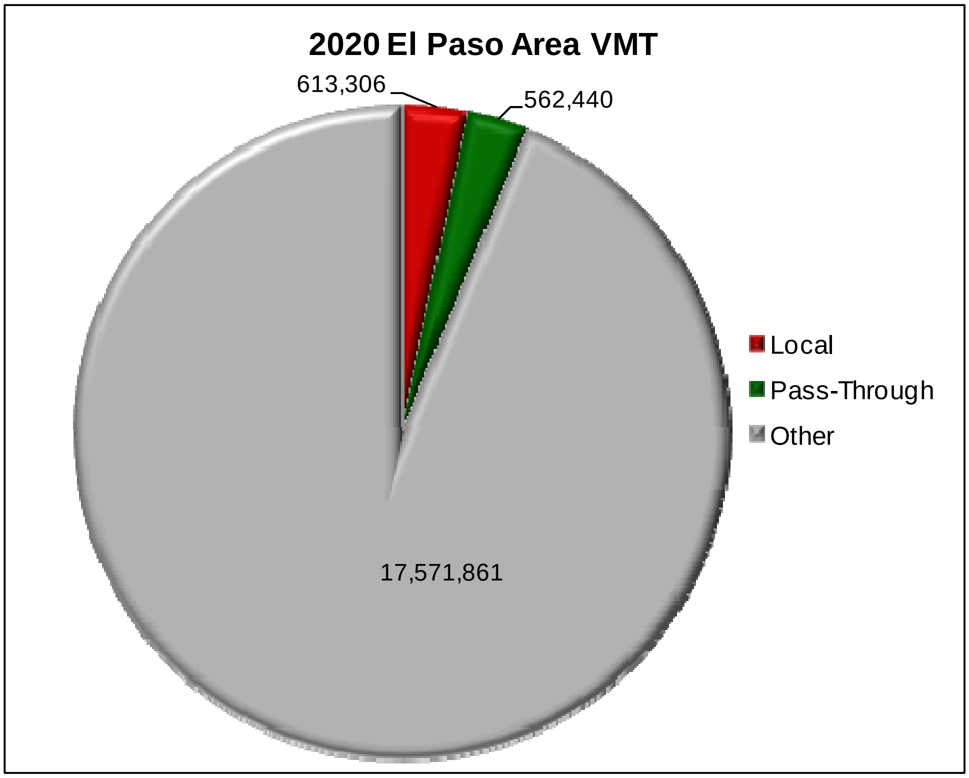

2010 El Paso Area NOx (Tons/Day)
5.526
17.017
8.741
Local
Pass-Through
Other

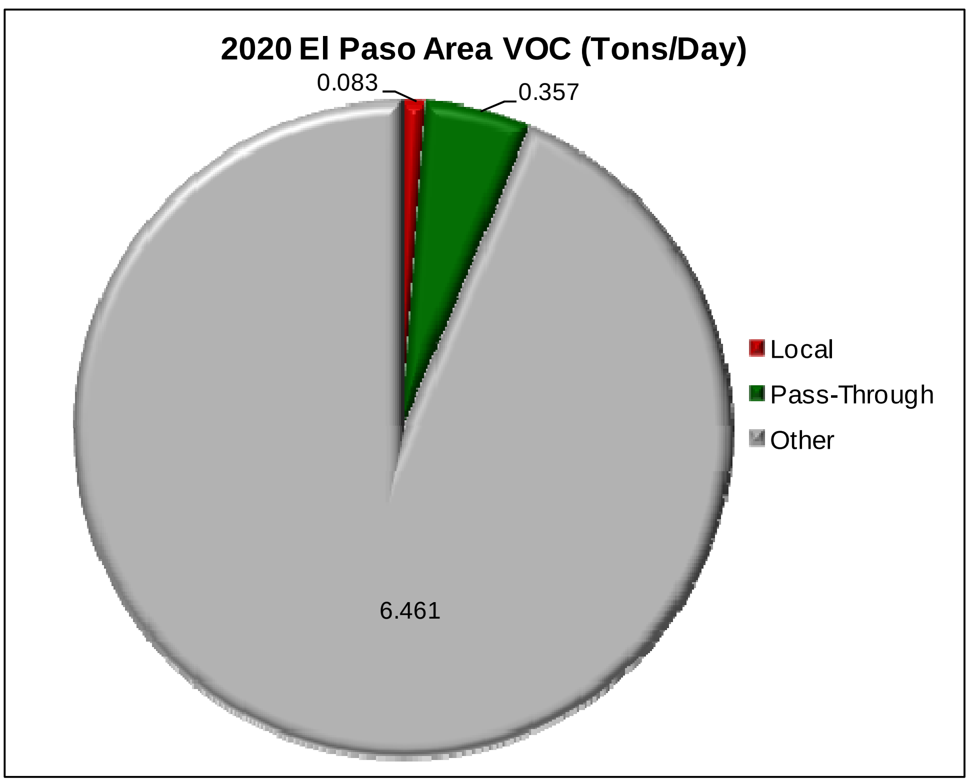

2015 El Paso Area VMT
571,586
524,180
16,376,525
Local
Pass-Through
Other

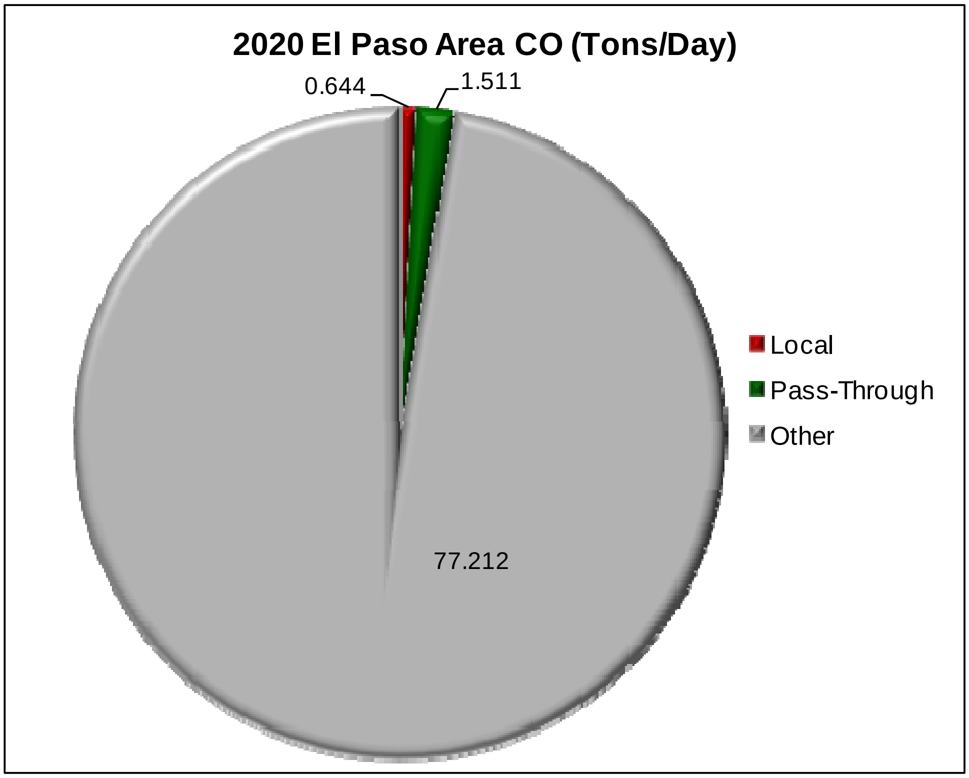

2015 El Paso Area VOC (Tons/Day)
0.180
0.496
8.312
Local
Pass-Through
Other

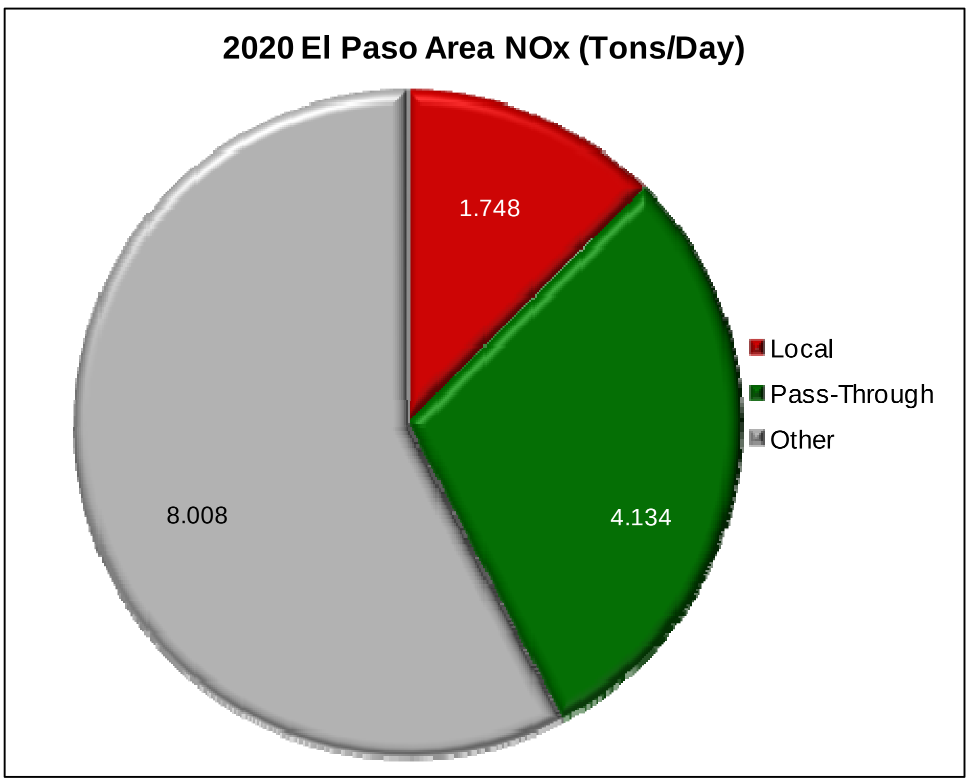

2015 El Paso Area CO (Tons/Day)
1.067
1.865
94.790
Local
Pass-Through
Other

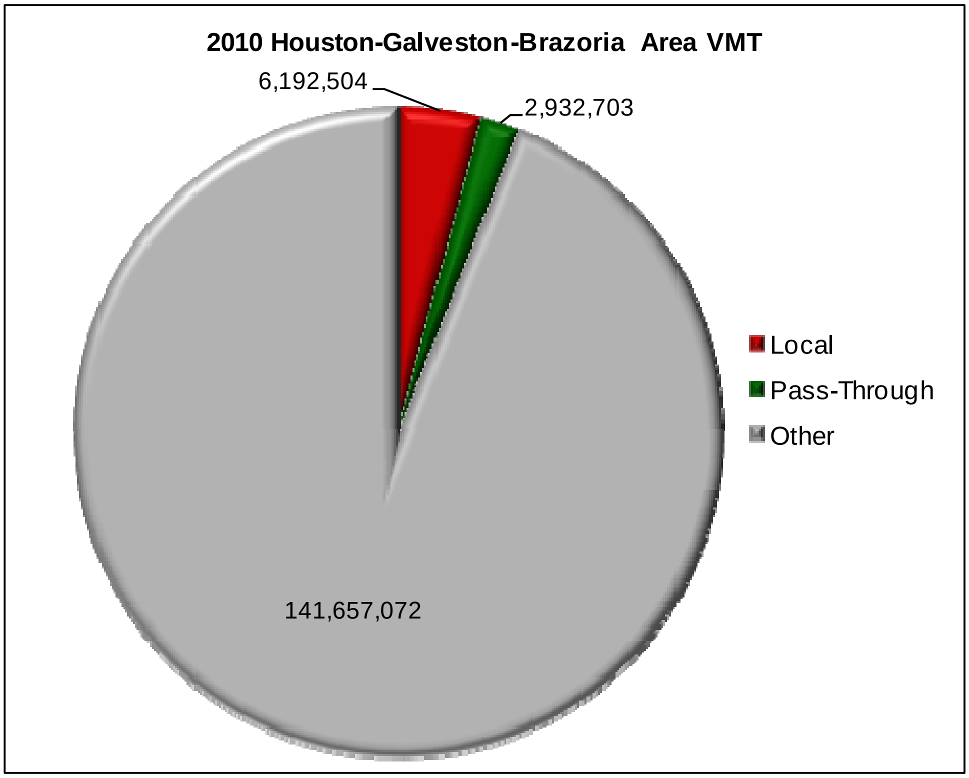

2015 El Paso Area NOx (Tons/Day)
3.132
11.501
5.625
Local
Pass-Through
Other

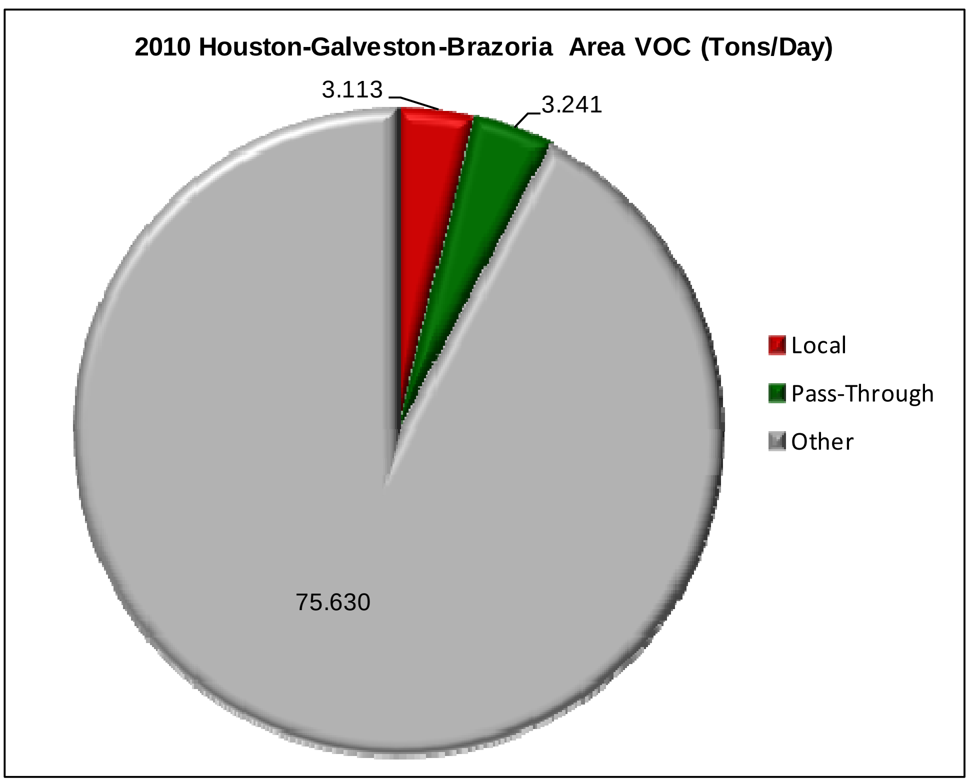

2020 El Paso Area VMT
613,306
562,440
17,571,861
Local
Pass-Through
Other

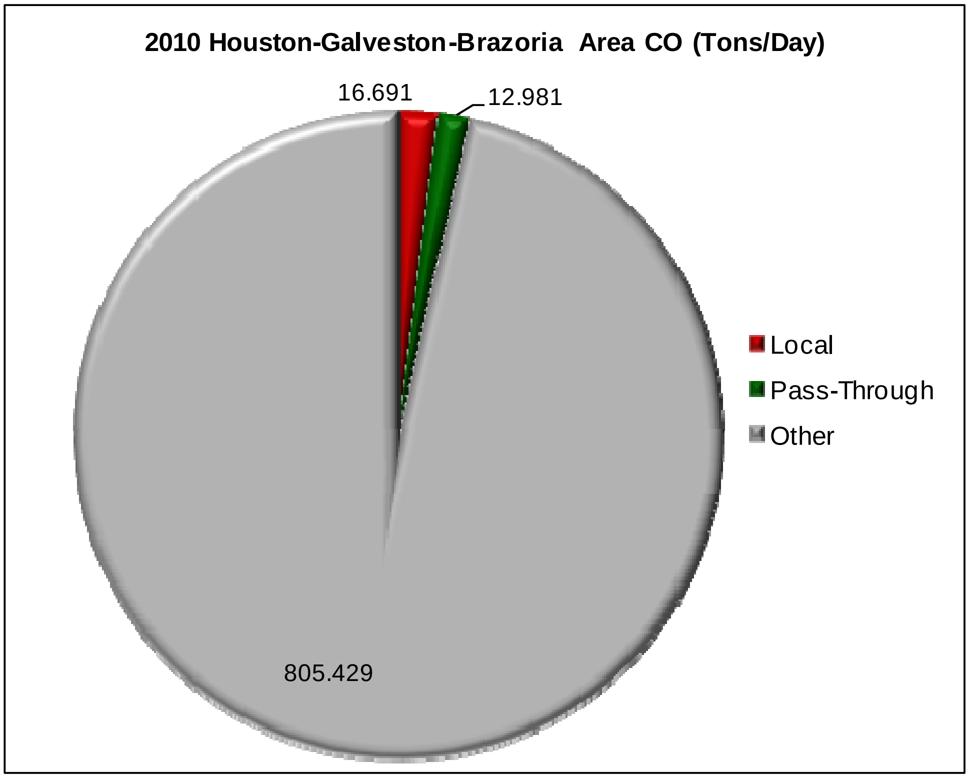

2020 El Paso Area VOC (Tons/Day)
0.083
0.357
6.461
Local
Pass-Through
Other

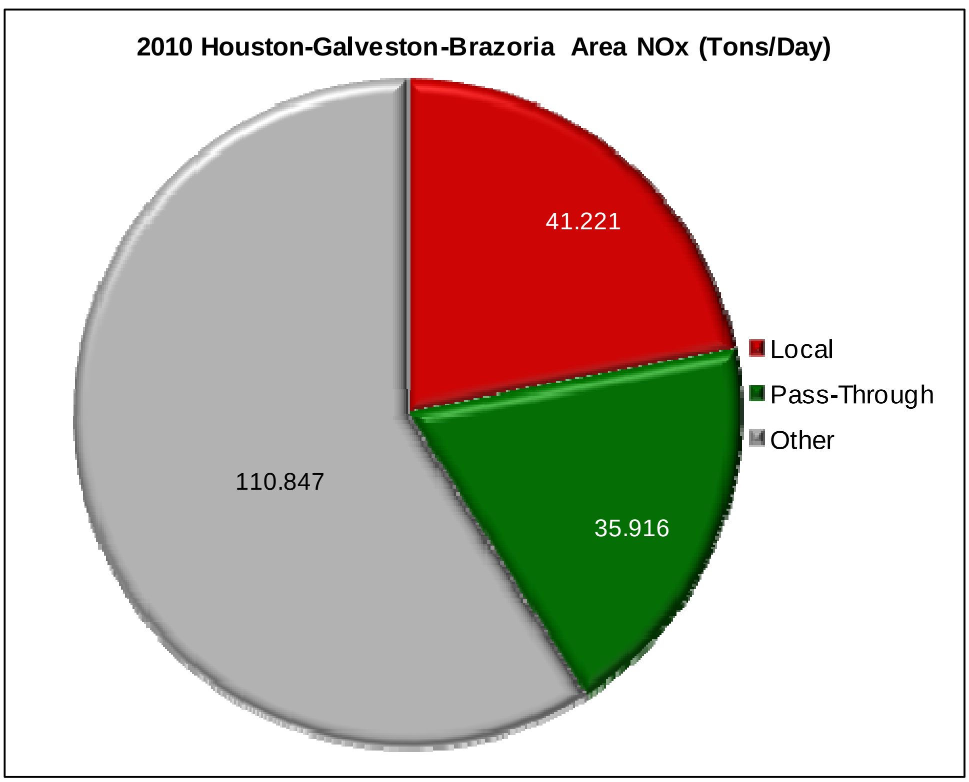

2020 El Paso Area CO (Tons/Day)
0.644
1.511
77.212
Local
Pass-Through
Other

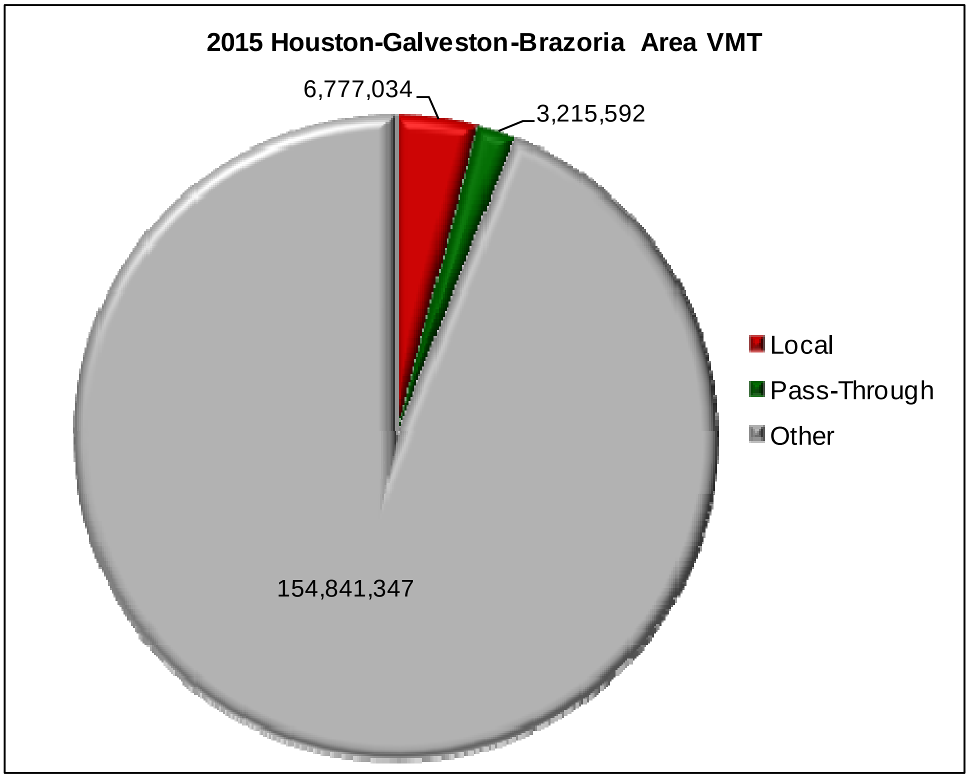

2020 El Paso Area NOx (Tons/Day)
1.748
4.134
8.008
Local
Pass-Through
Other

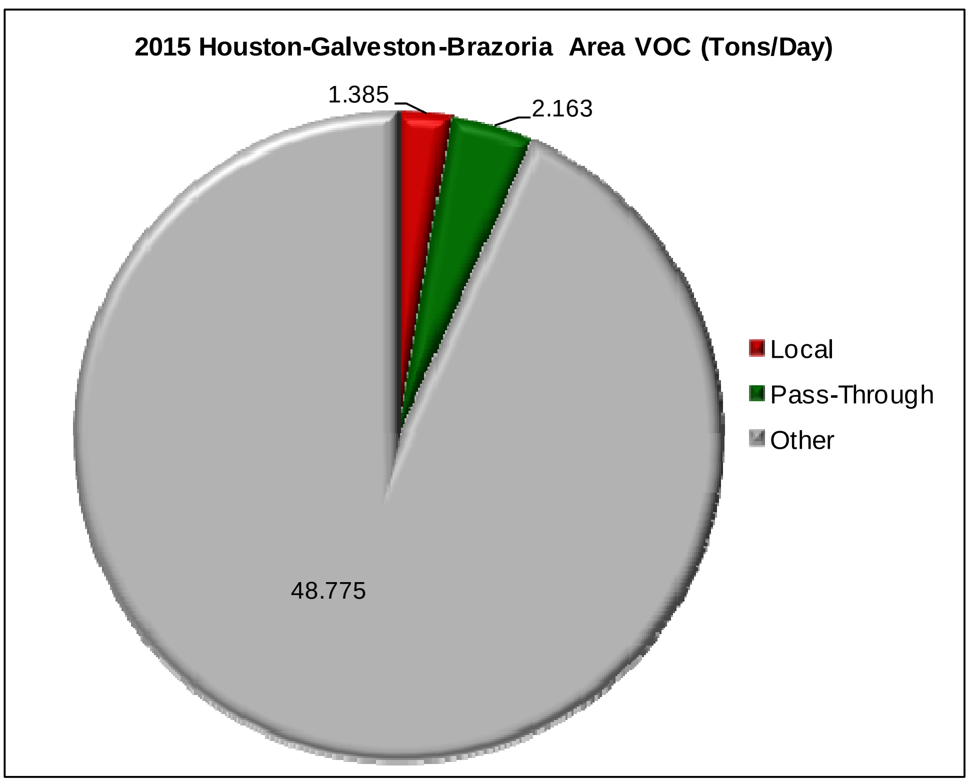

2010 Houston-Galveston-Brazoria Area VMT
6,192,504
2,932,703
141,657,072
Local
Pass-Through
Other

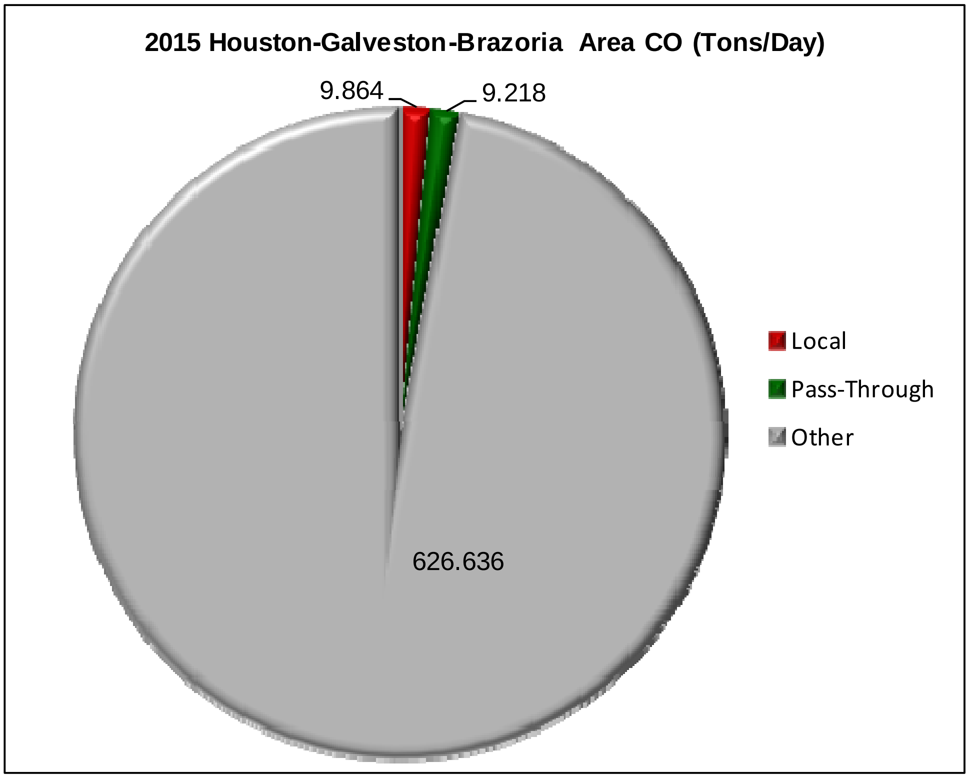

2010 Houston-Galveston-Brazoria Area VOC (Tons/Day)
3.113
3.241
75.630
Local
Pass-Through
Other

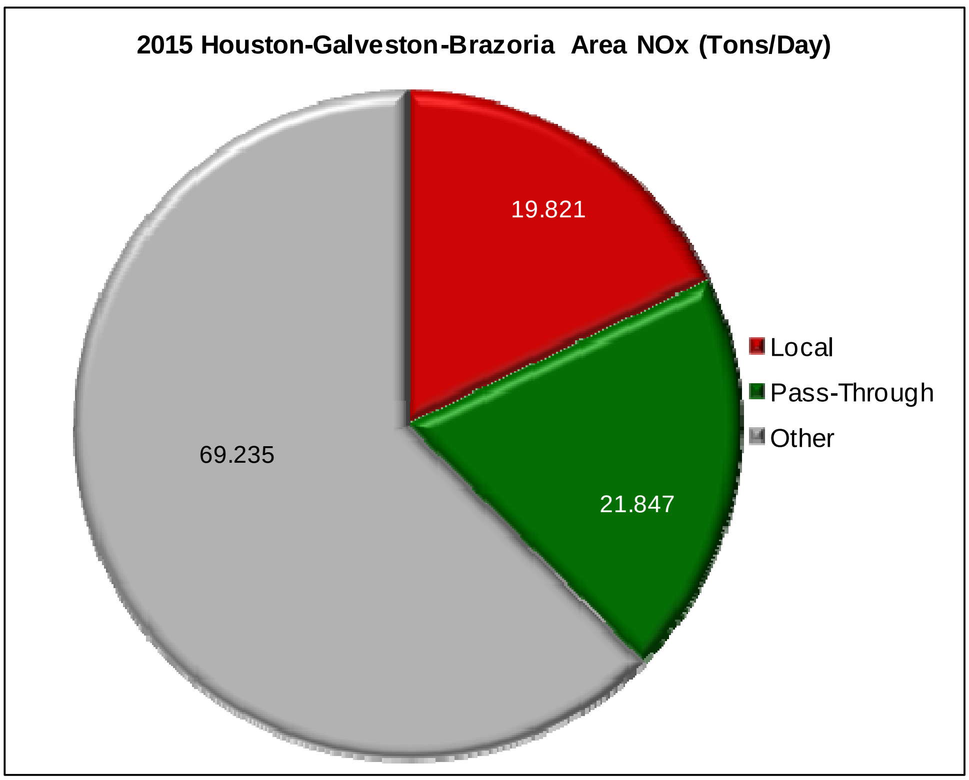

2010 Houston-Galveston-Brazoria Area CO (Tons/Day)
16.691
12.981
805.429
Local
Pass-Through
Other

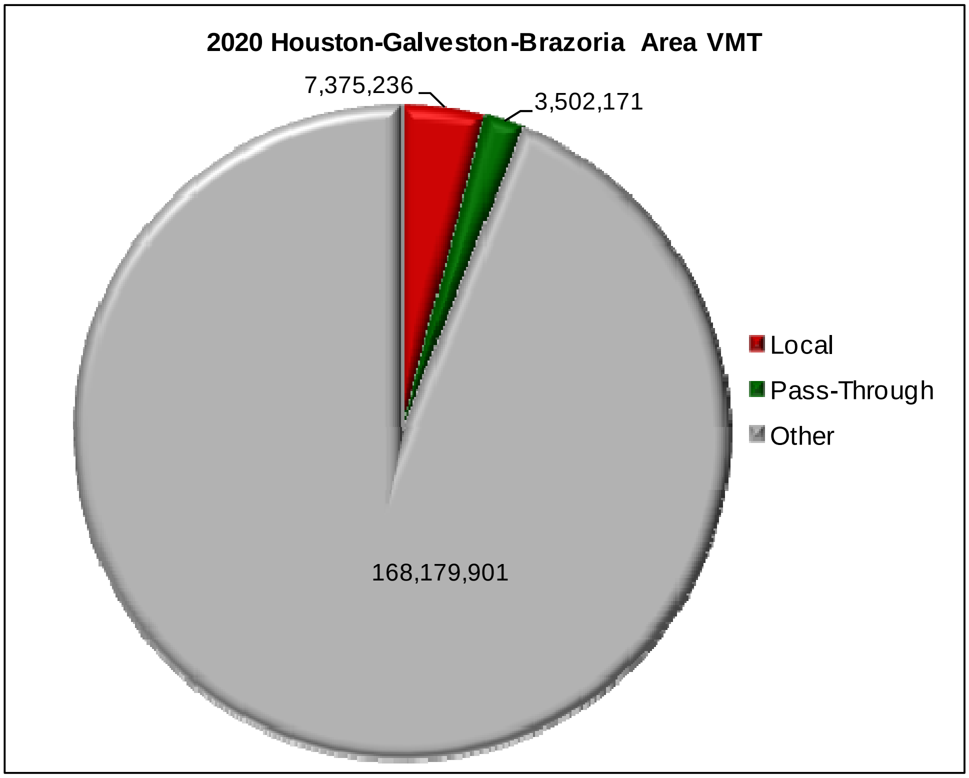

2010 Houston-Galveston-Brazoria Area NOx (Tons/Day)
41.221
35.916
110.847
Local
Pass-Through
Other

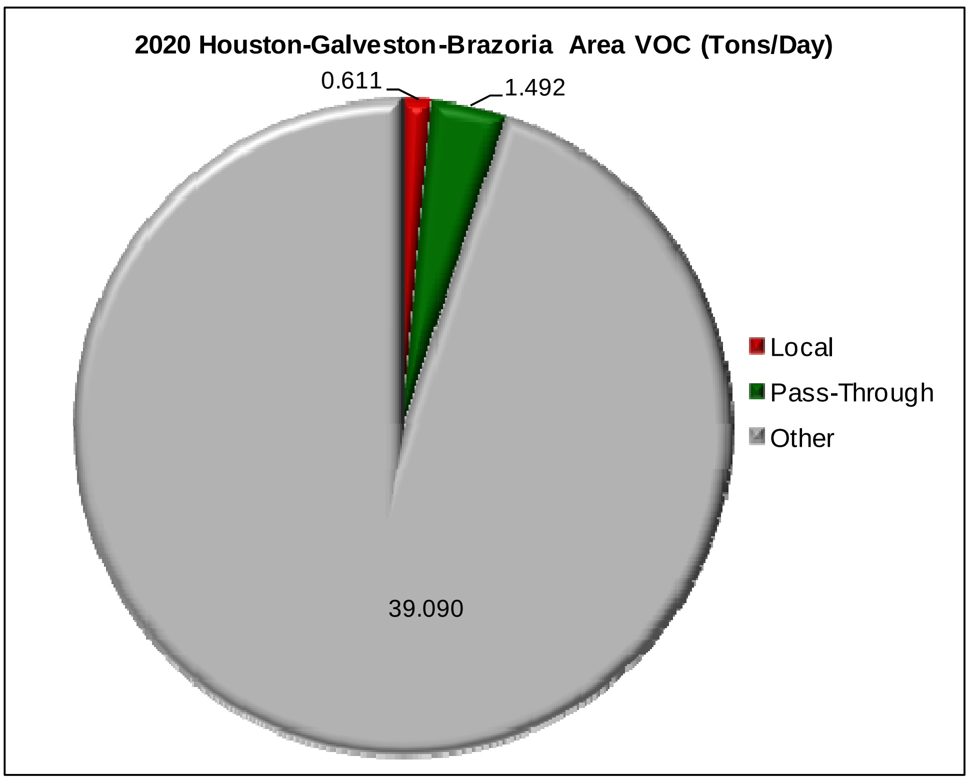

2015 Houston-Galveston-Brazoria Area VMT
6,777,034
3,215,592
154,841,347
Local
Pass-Through
Other

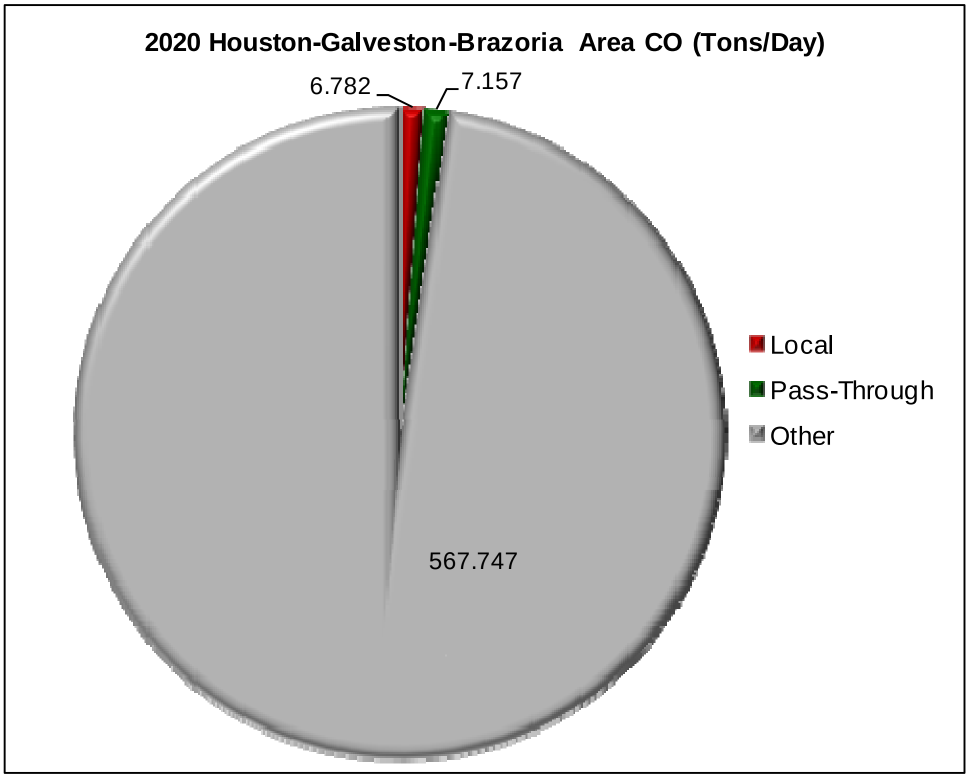

2015 Houston-Galveston-Brazoria Area VOC (Tons/Day)
1.385
2.163
48.775
Local
Pass-Through
Other

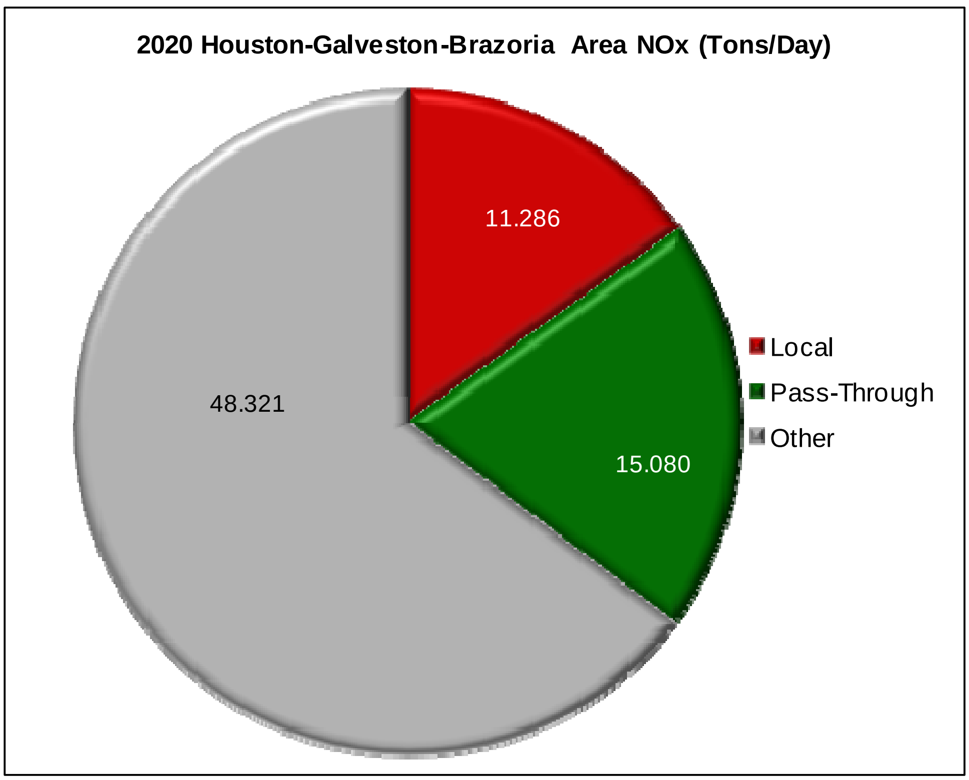

2015 Houston-Galveston-Brazoria Area CO (Tons/Day)
9.864
9.218
626.636
Local
Pass-Through
Other

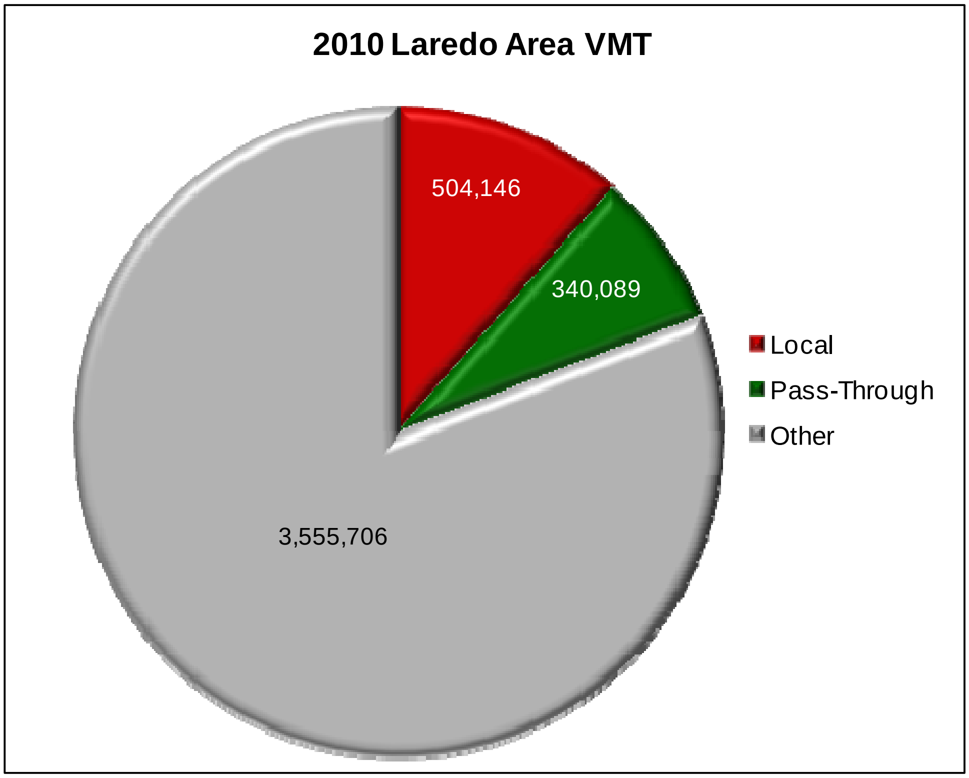

2015 Houston-Galveston-Brazoria Area NOx (Tons/Day)
19.821
21.847
69.235
Local
Pass-Through
Other

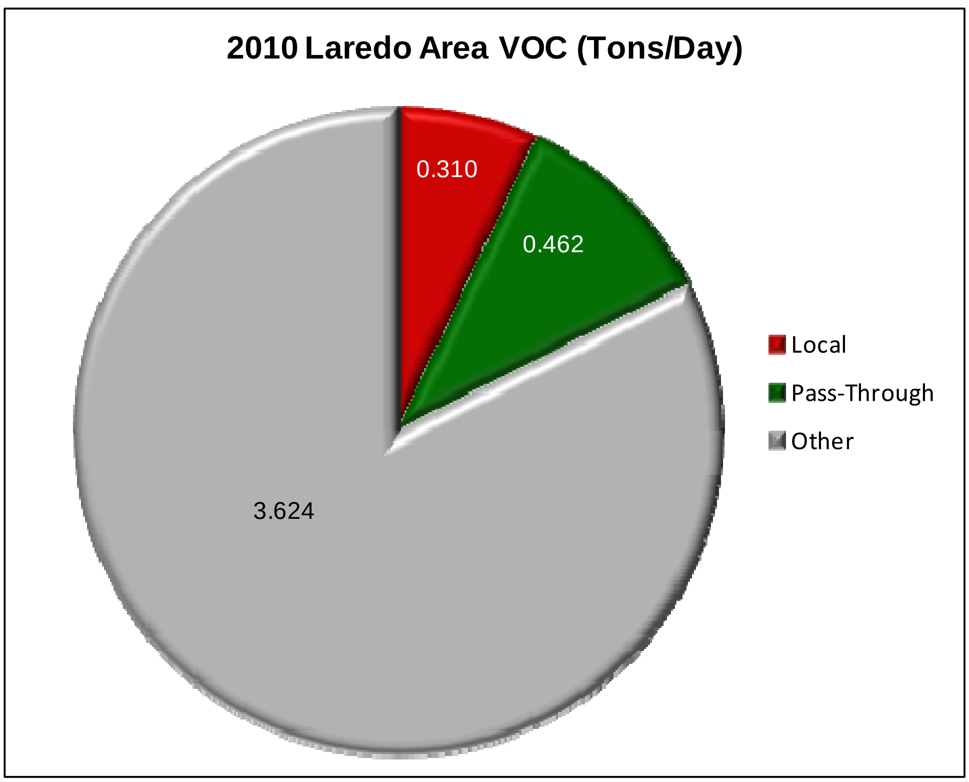

2020 Houston-Galveston-Brazoria Area VMT
7,375,236
3,502,171
168,179,901
Local
Pass-Through
Other

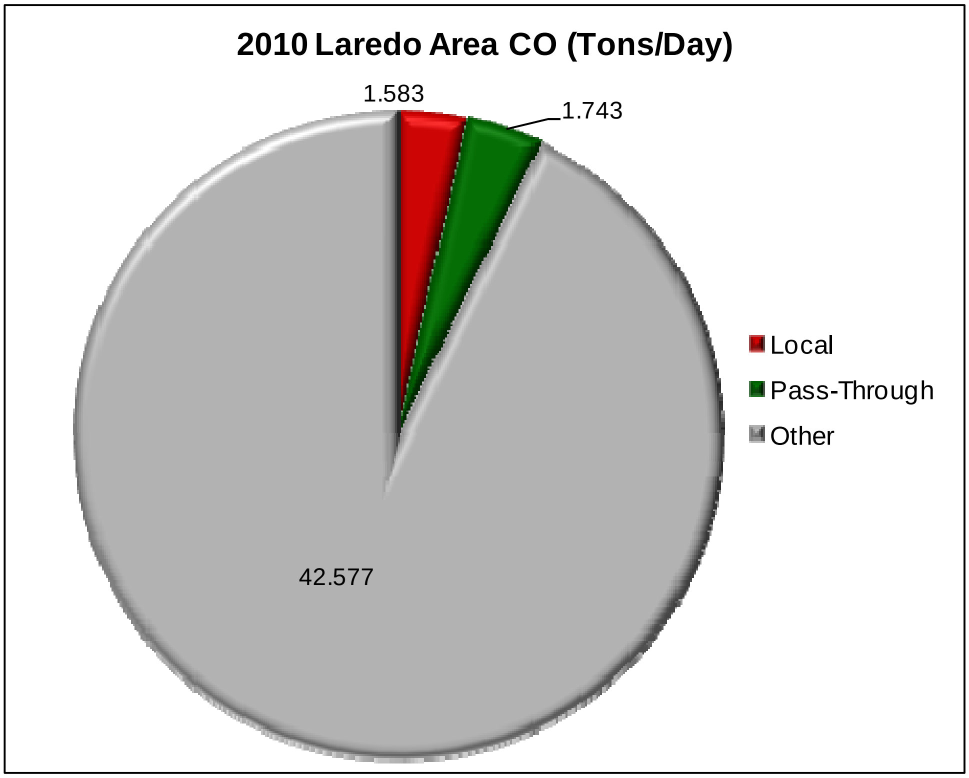

2020 Houston-Galveston-Brazoria Area VOC (Tons/Day)
0.611
1.492
39.090
Local
Pass-Through
Other

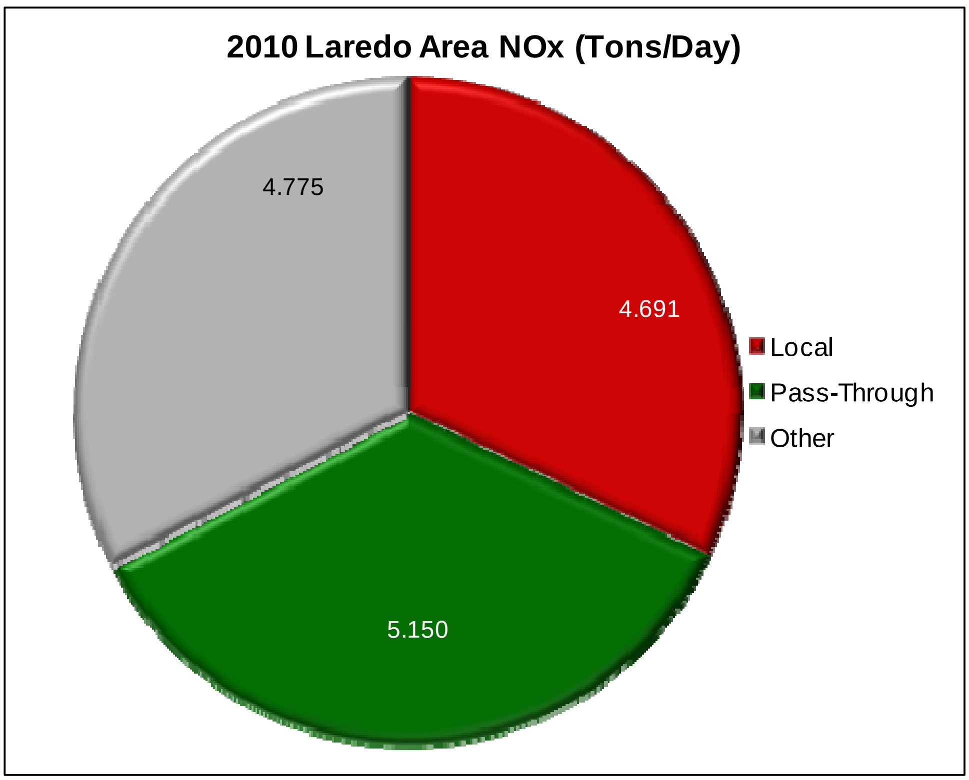

2020 Houston-Galveston-Brazoria Area CO (Tons/Day)
6.782
7.157
567.747
Local
Pass-Through
Other

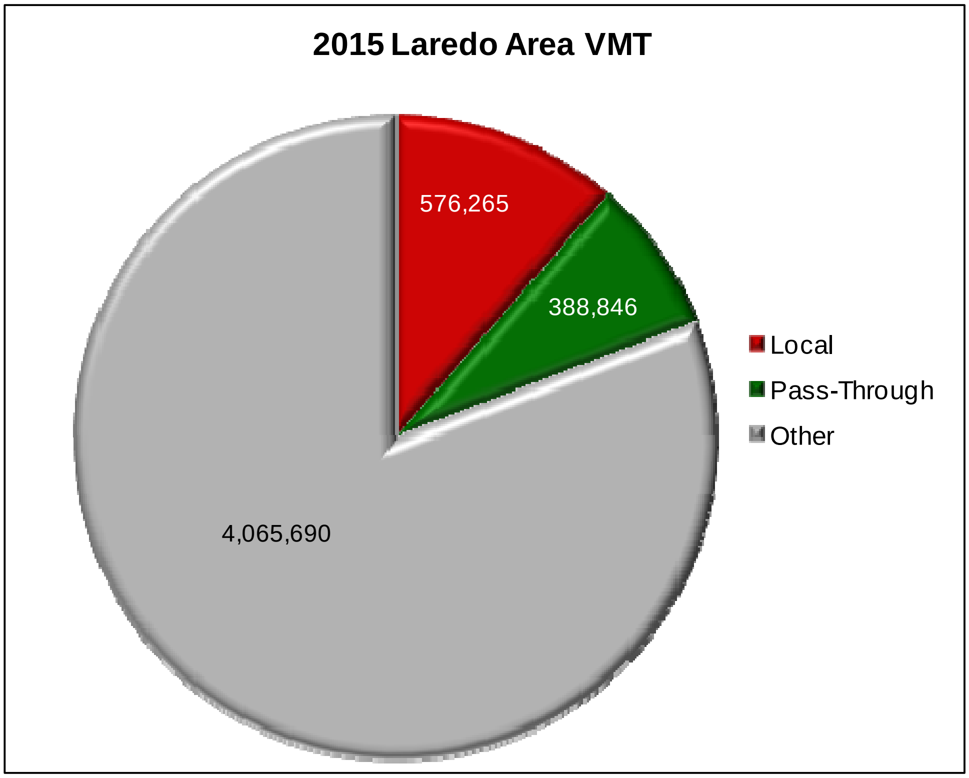

2020 Houston-Galveston-Brazoria Area NOx (Tons/Day)
11.286
15.080
48.321
Local
Pass-Through
Other

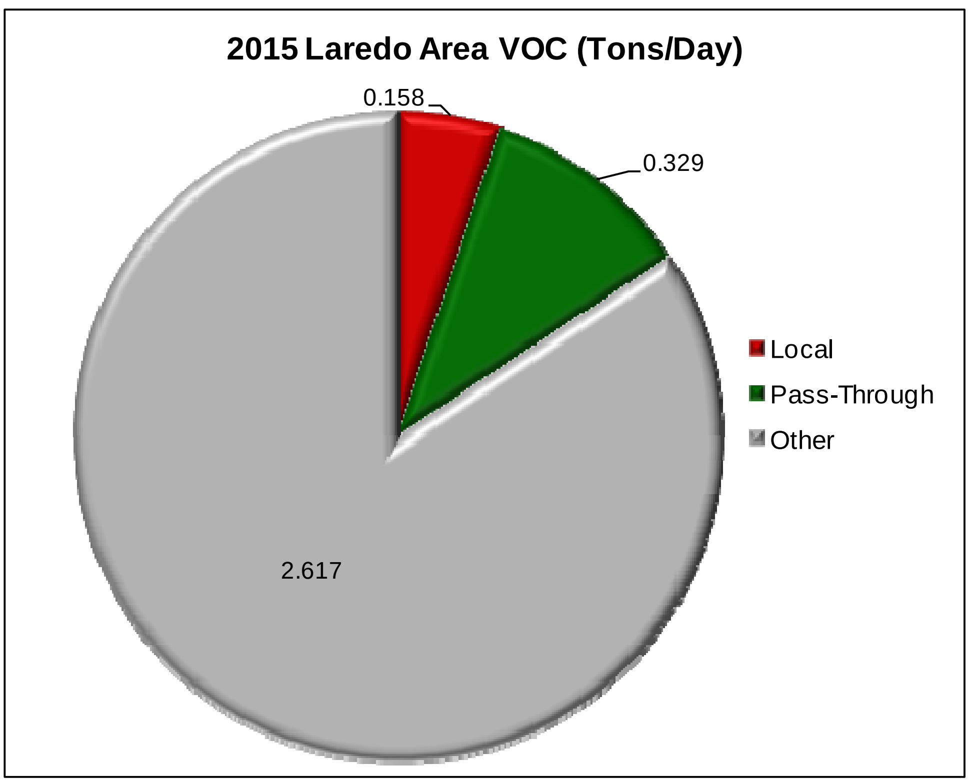

2010 Laredo Area VMT
504,146
340,089
3,555,706
Local
Pass-Through
Other

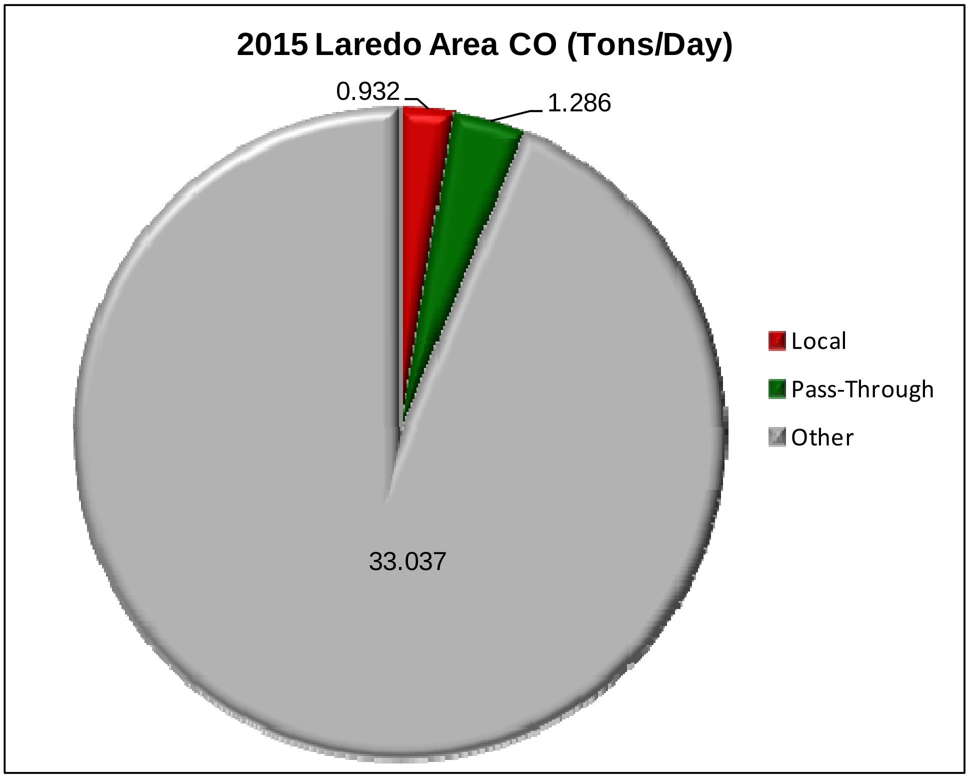

2010 Laredo Area VOC (Tons/Day)
0.310
0.462
3.624
Local
Pass-Through
Other

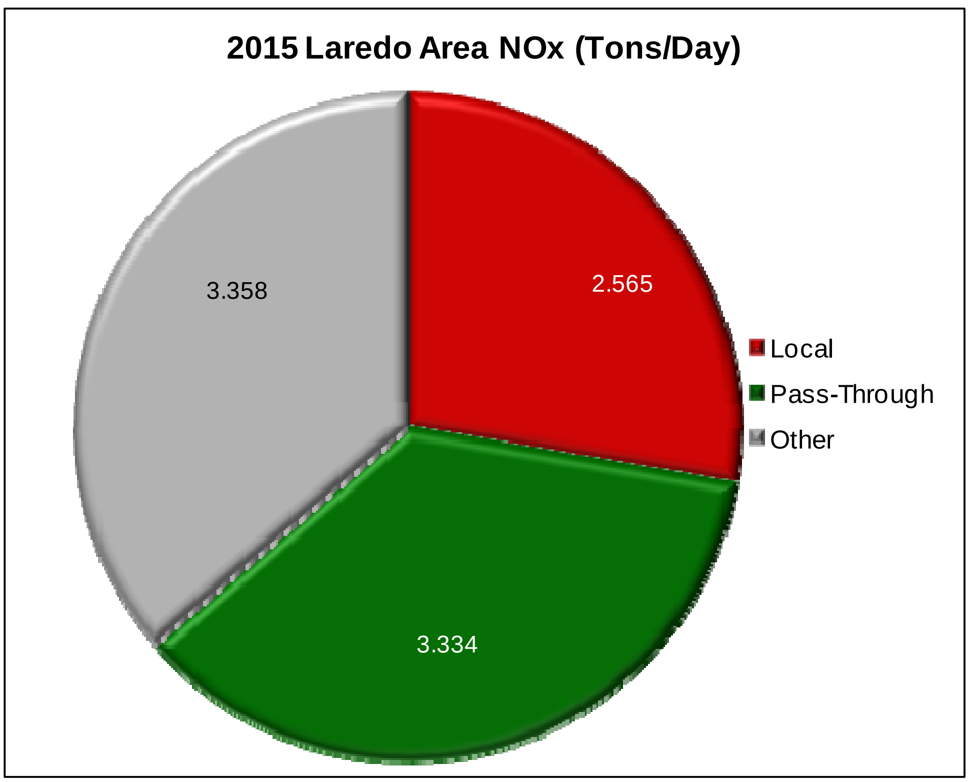

2010 Laredo Area CO (Tons/Day)
1.583
1.743
42.577
Local
Pass-Through
Other

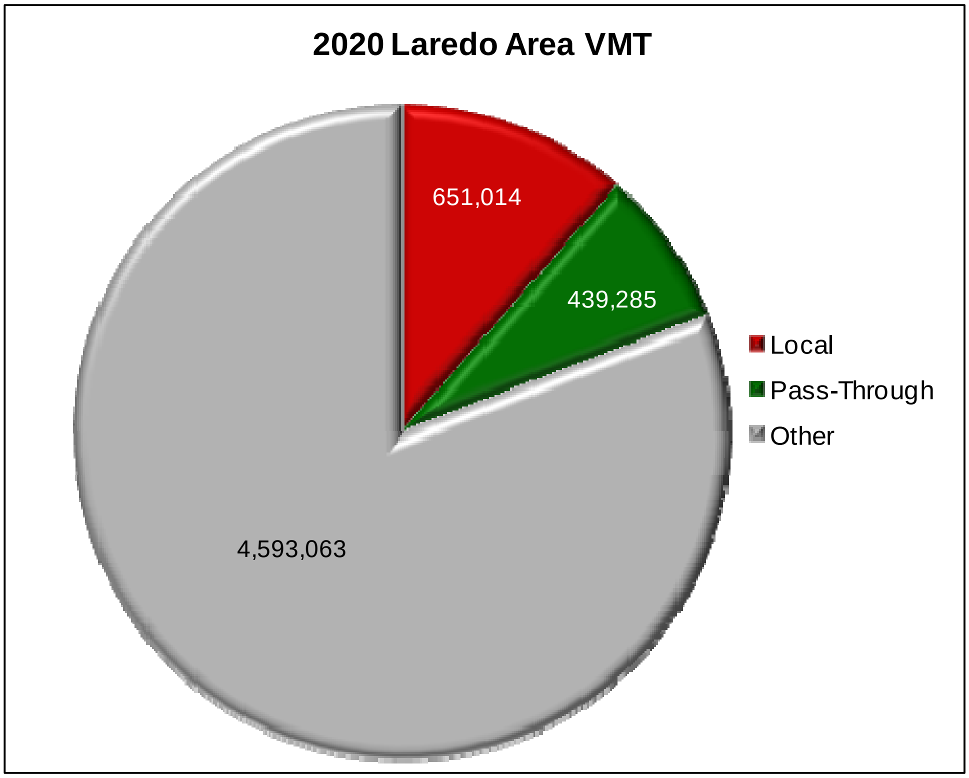

2010 Laredo Area NOx (Tons/Day)
4.775
4.691
5.150
Local
Pass-Through
Other

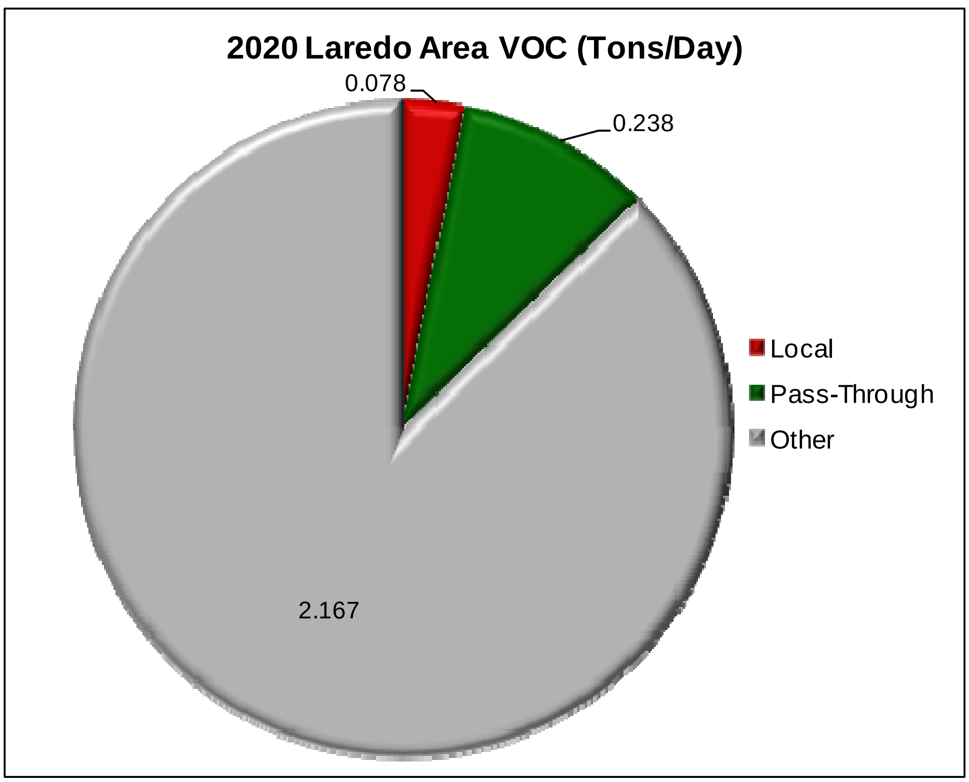

2015 Laredo Area VMT
576,265
388,846
4,065,690
Local
Pass-Through
Other

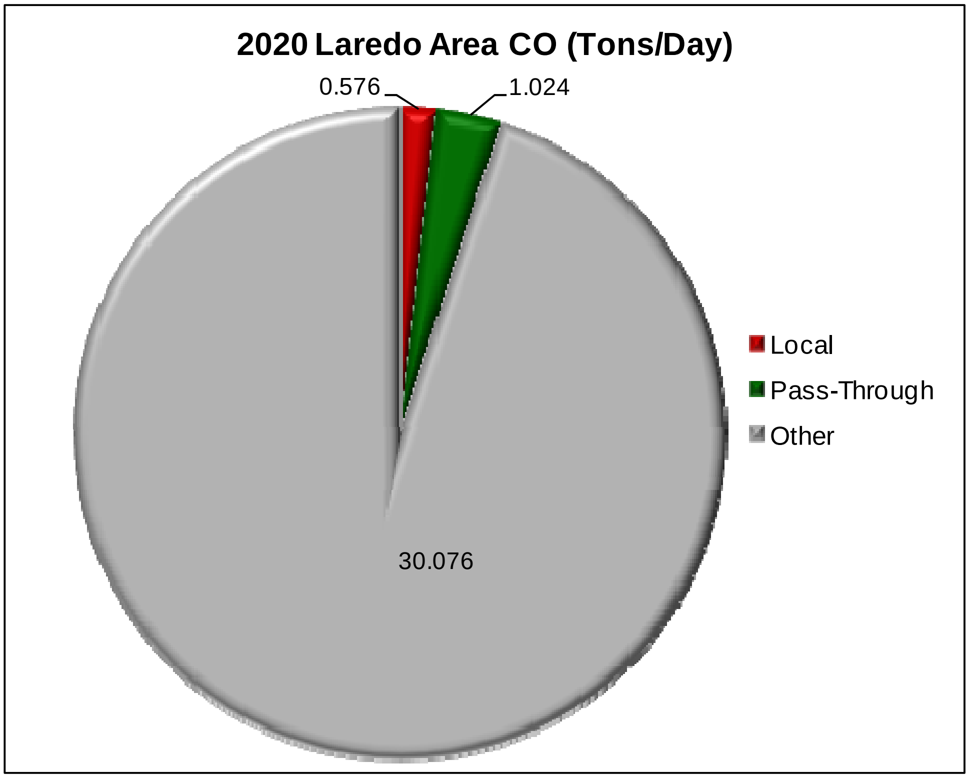

2015 Laredo Area VOC (Tons/Day)
0.158
0.329
2.617
Local
Pass-Through
Other


2015 Laredo Area CO (Tons/Day)
0.932
1.286
33.037
Local
Pass-Through
Other

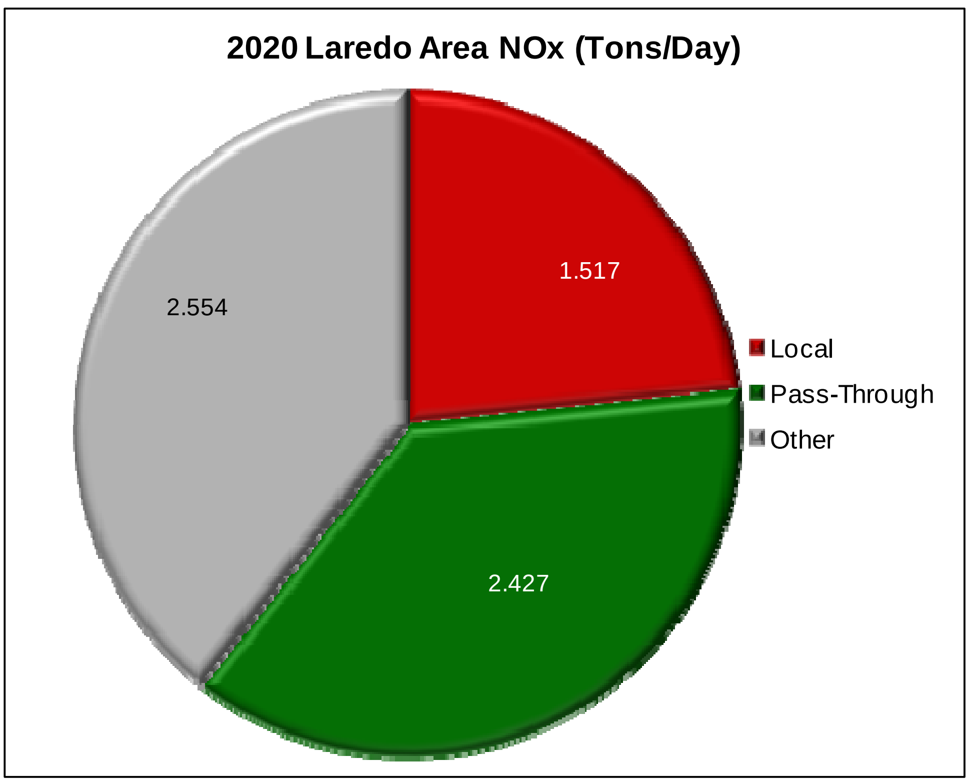

2015 Laredo Area NOx (Tons/Day)
3.358
2.565
3.334
Local
Pass-Through
Other


2020 Laredo Area VMT
651,014
439,285
4,593,063
Local
Pass-Through
Other

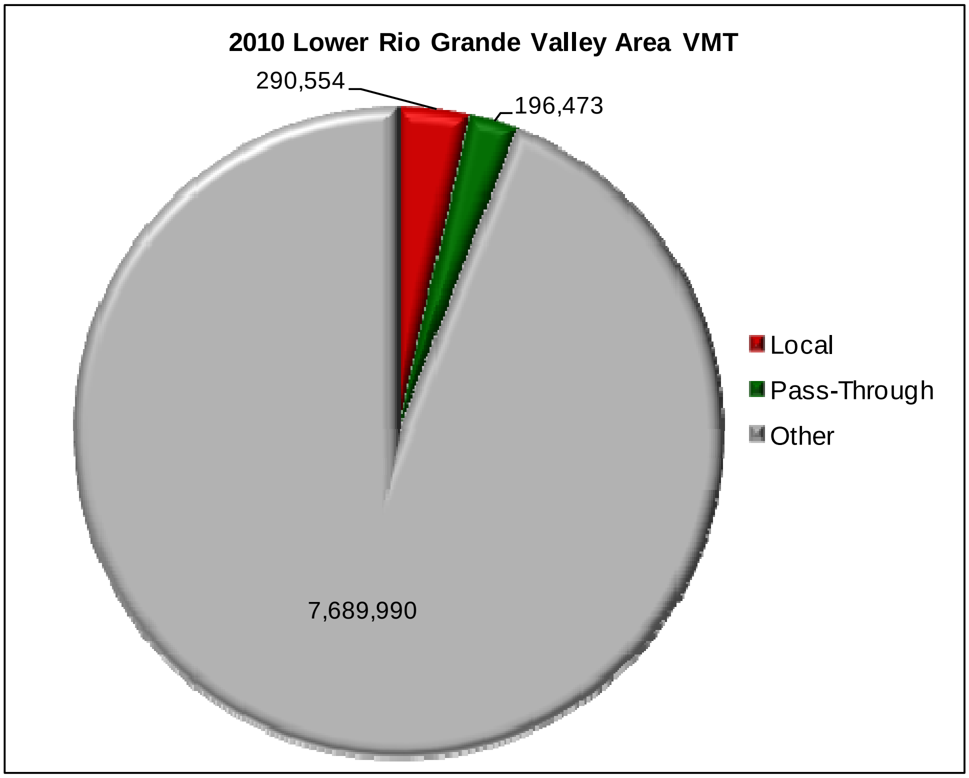

2020 Laredo Area VOC (Tons/Day)
0.078
0.238
2.167
Local
Pass-Through
Other

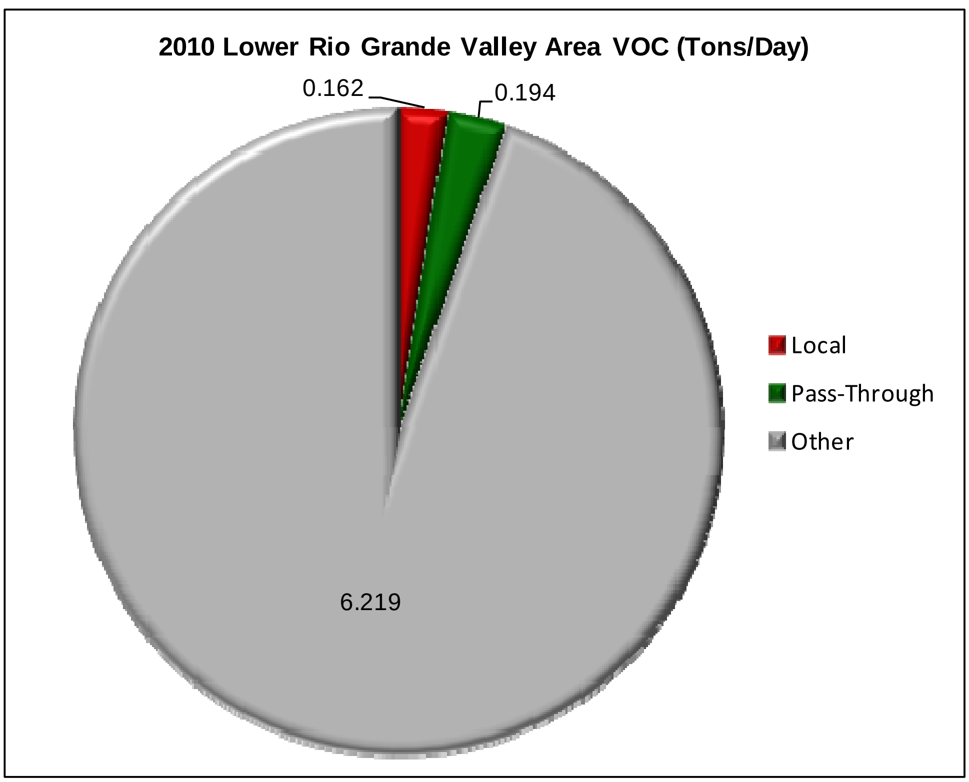


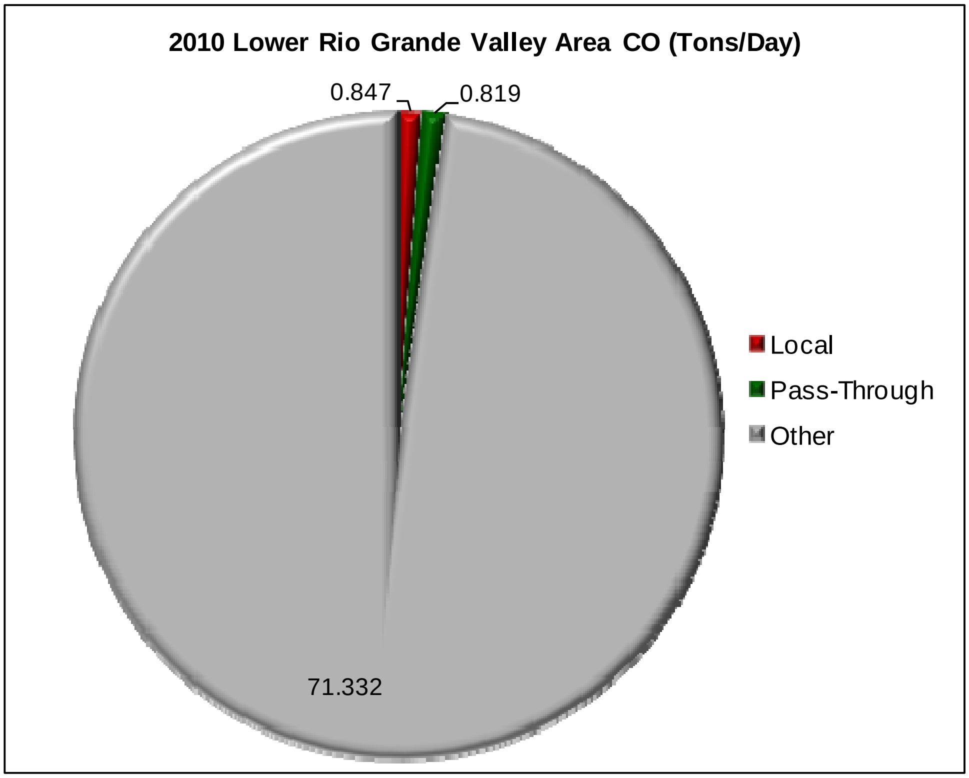
2020 Laredo Area CO (Tons/Day)
0.576
1.024
30.076
Local
Pass-Through
Other

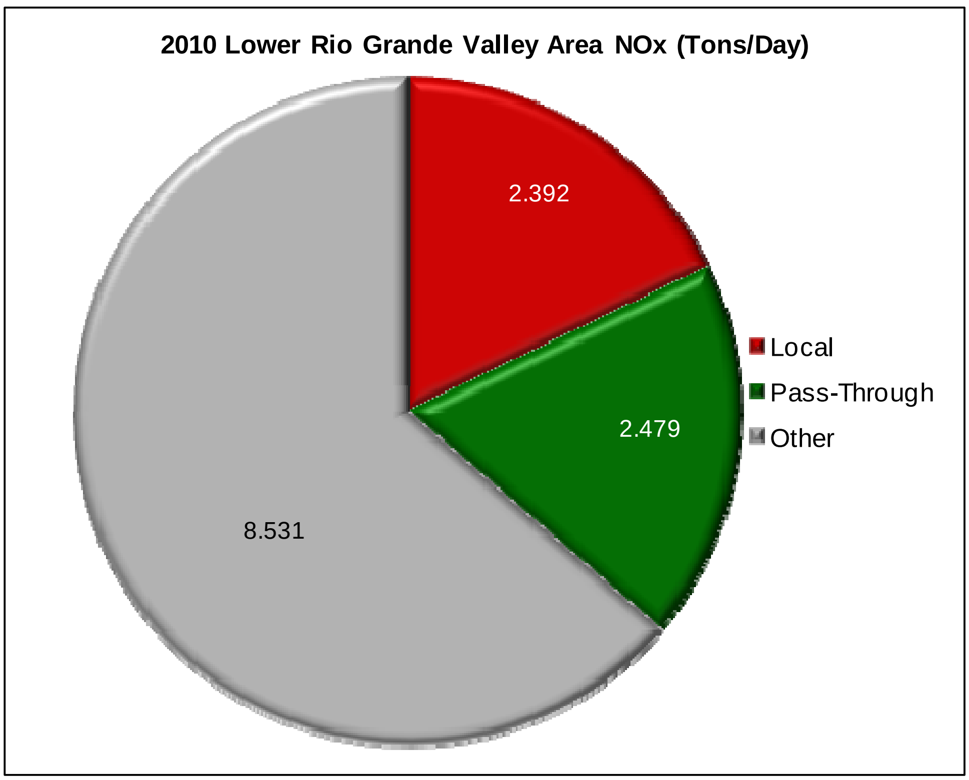


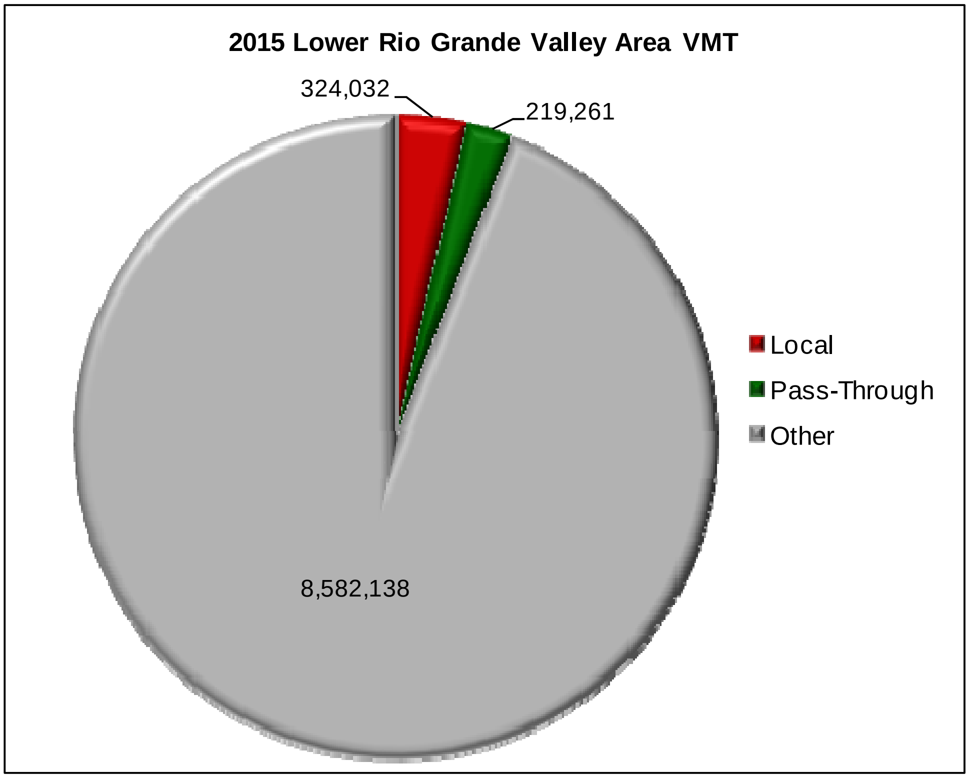
2020 Laredo Area NOx (Tons/Day)
1.517
2.554
2.427
Local
Pass-Through
Other

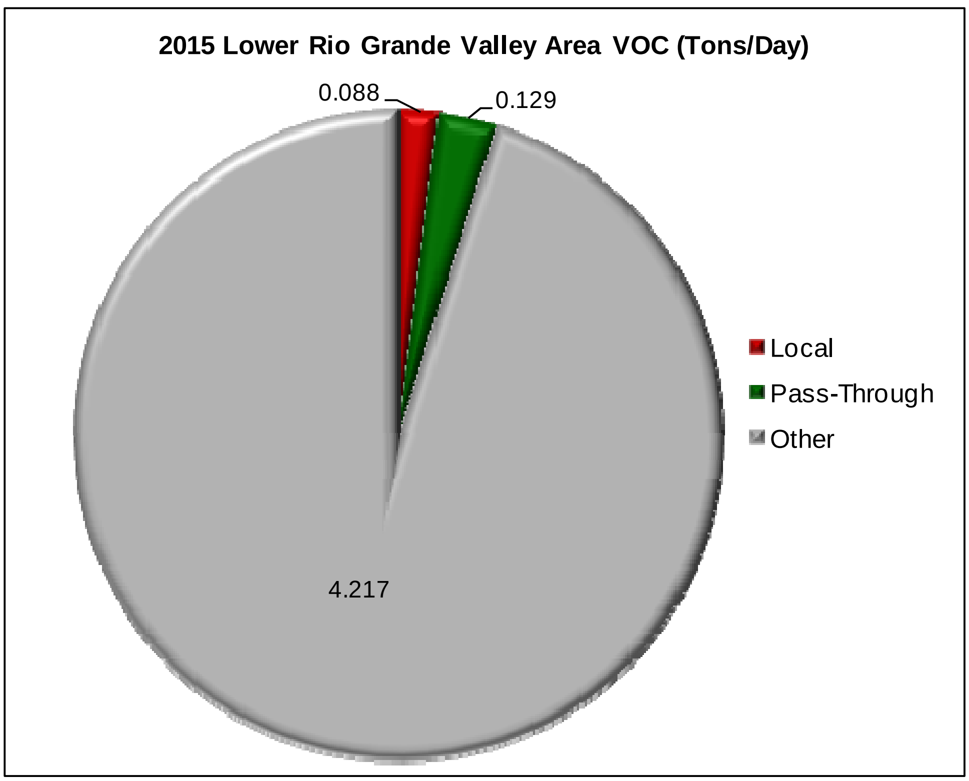

2010 Lower Rio Grande Valley Area VMT
290,554
196,473
7,689,990
Local
Pass-Through
Other

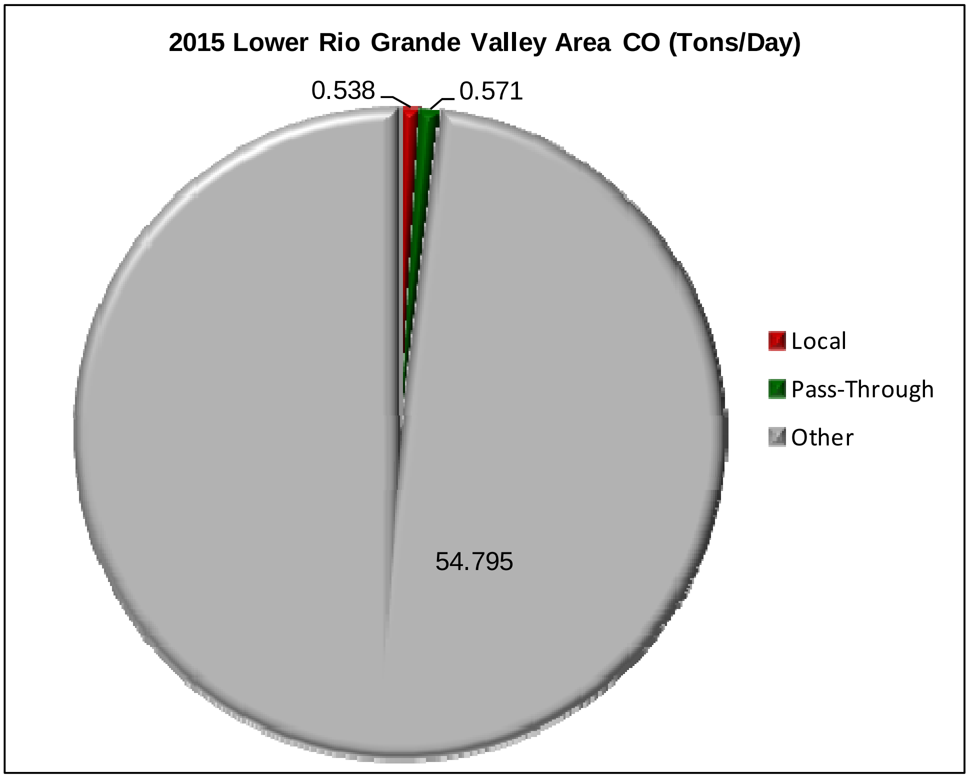

2010 Lower Rio Grande Valley Area VOC (Tons/Day)
0.162
0.194
6.219
Local
Pass-Through
Other

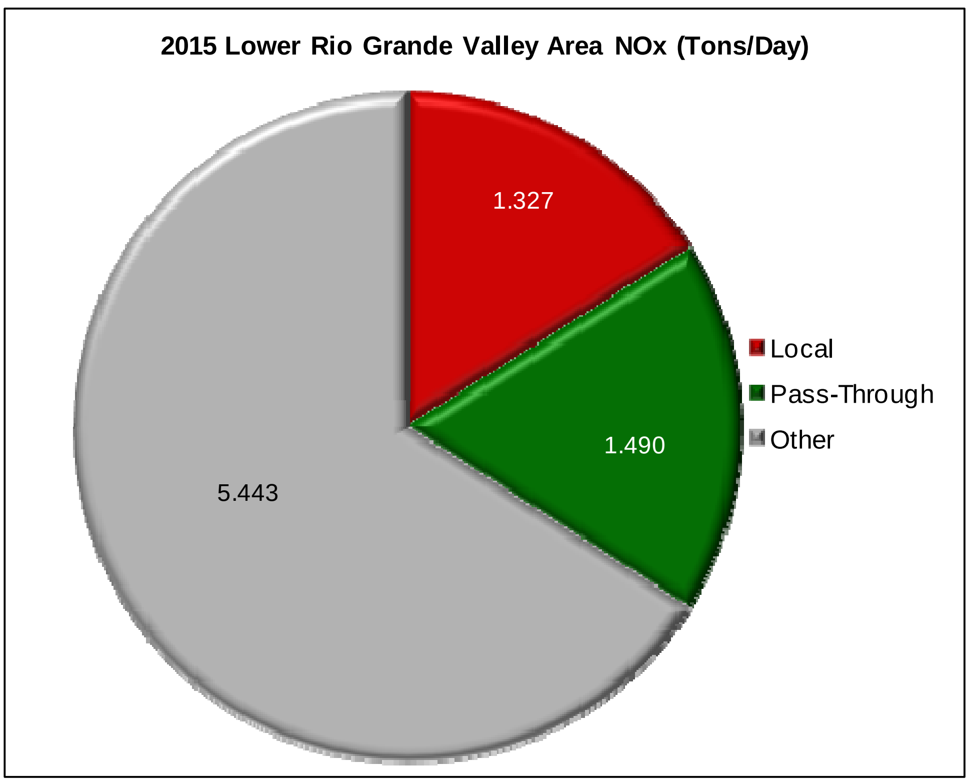

2010 Lower Rio Grande Valley Area CO (Tons/Day)
0.847
0.819
71.332
Local
Pass-Through
Other

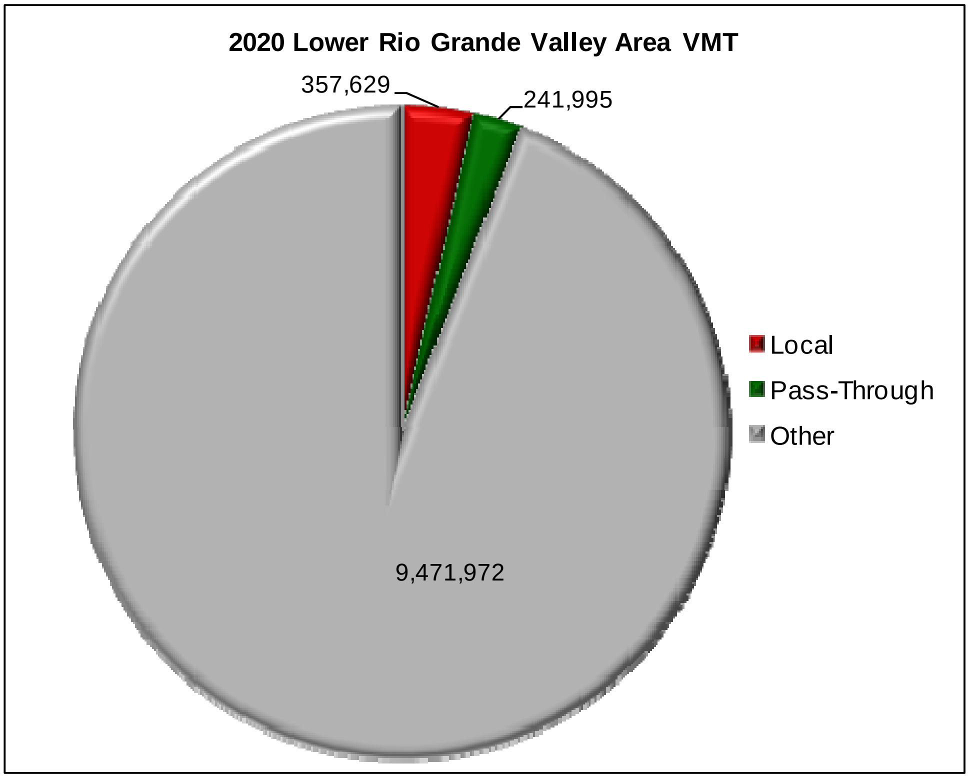

2010 Lower Rio Grande Valley Area NOx (Tons/Day)
2.392
2.479
8.531
Local
Pass-Through
Other

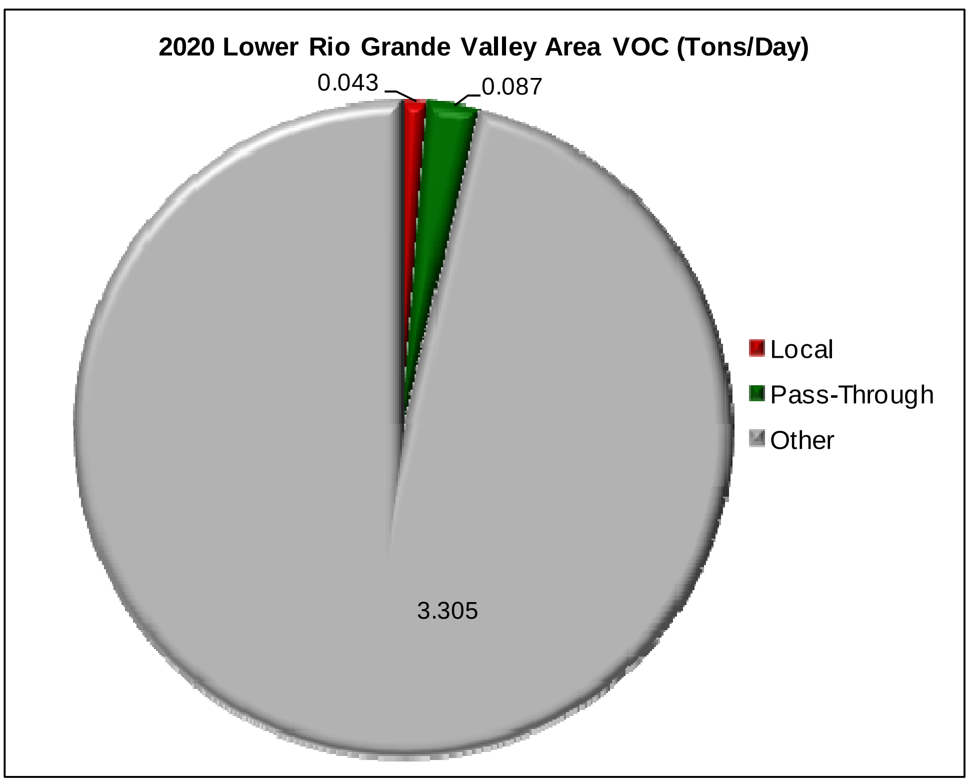

2015 Lower Rio Grande Valley Area VMT
324,032
219,261
8,582,138
Local
Pass-Through
Other

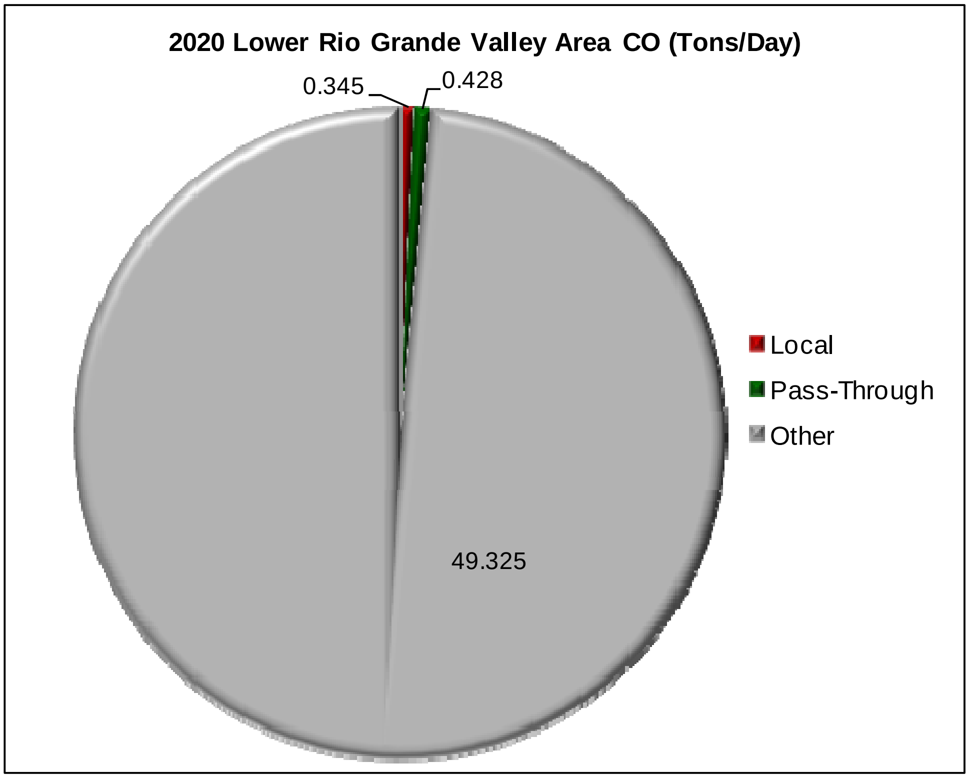

2015 Lower Rio Grande Valley Area VOC (Tons/Day)
0.088
0.129
4.217
Local
Pass-Through
Other

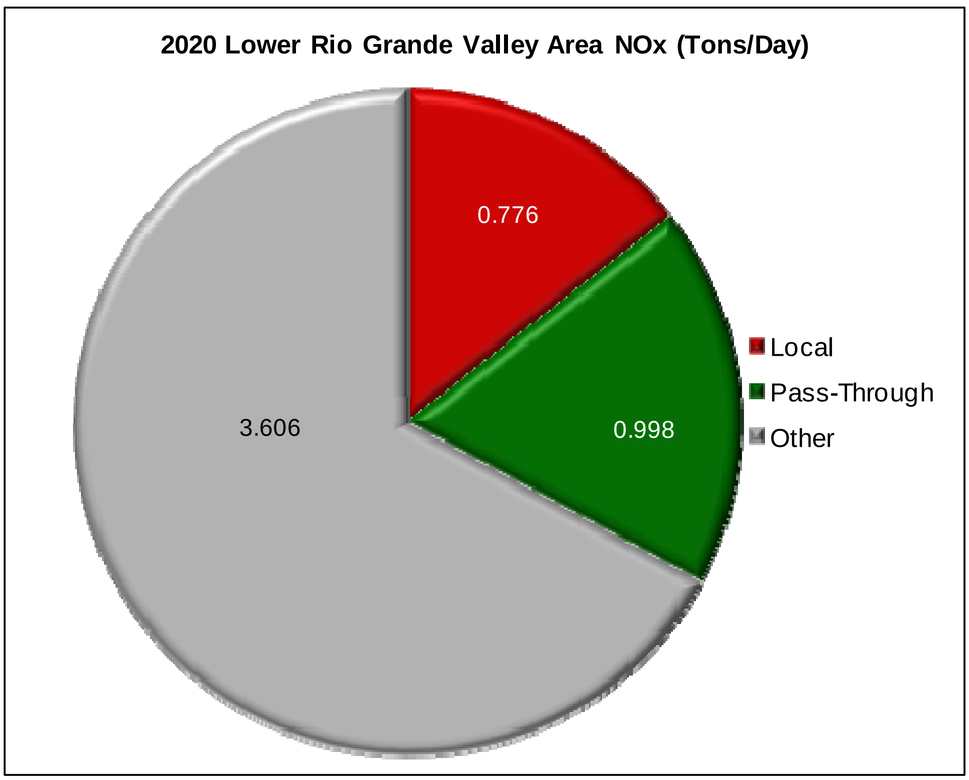

2015 Lower Rio Grande Valley Area CO (Tons/Day)
0.538
0.571
54.795
Local
Pass-Through
Other

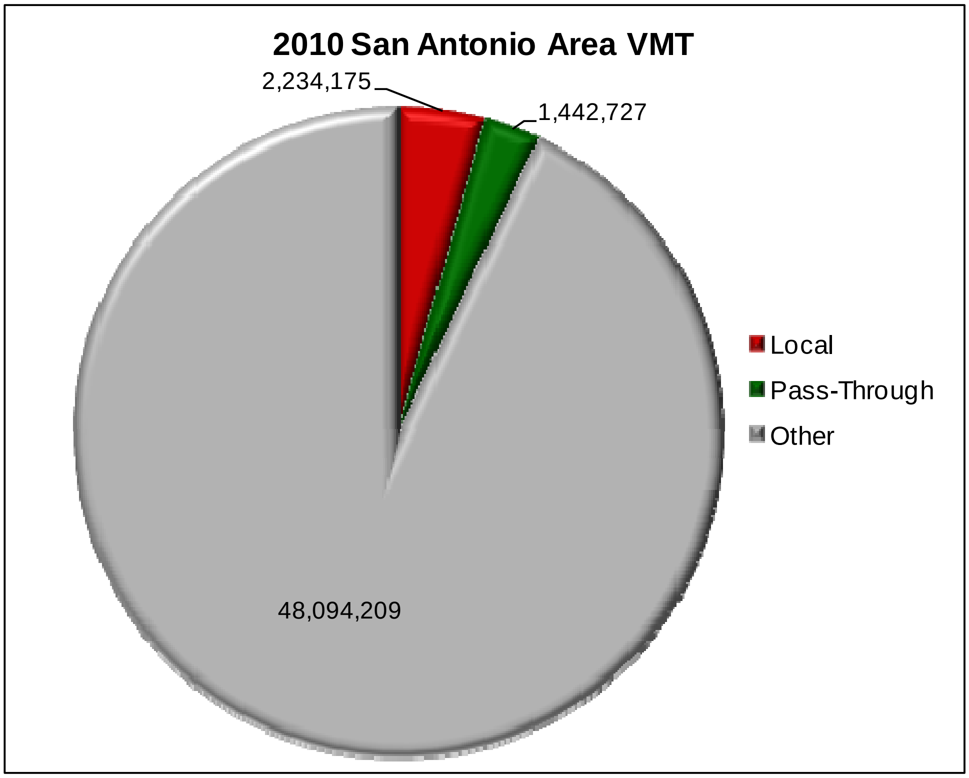

2015 Lower Rio Grande Valley Area NOx (Tons/Day)
1.327
1.490
5.443
Local
Pass-Through
Other

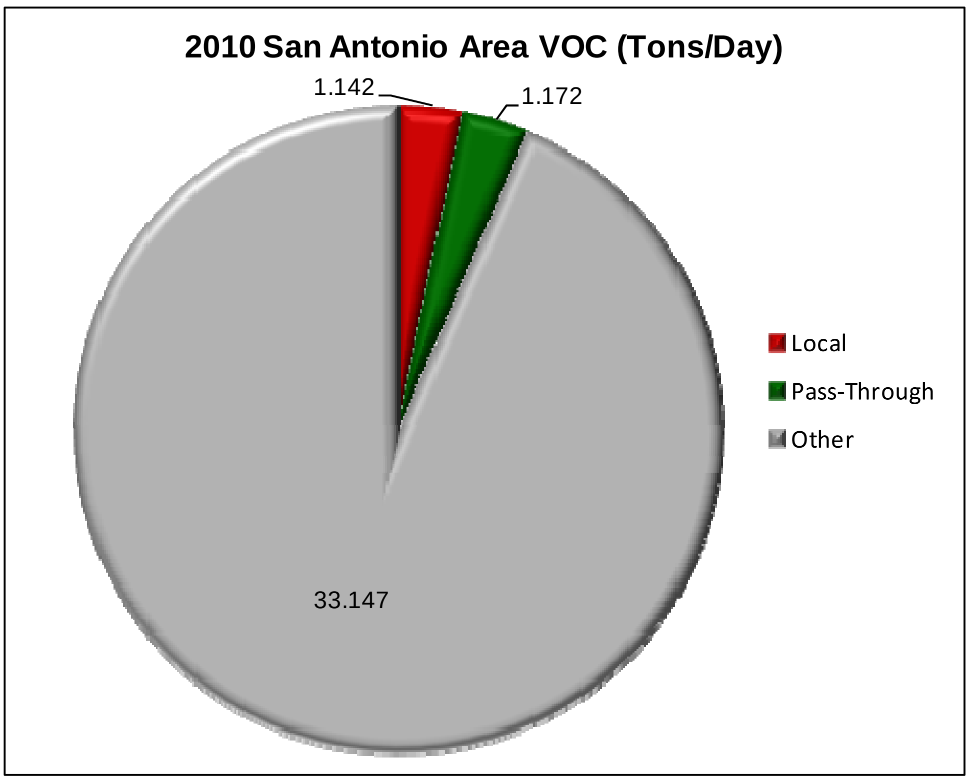

2020 Lower Rio Grande Valley Area VMT
357,629
241,995
9,471,972
Local
Pass-Through
Other

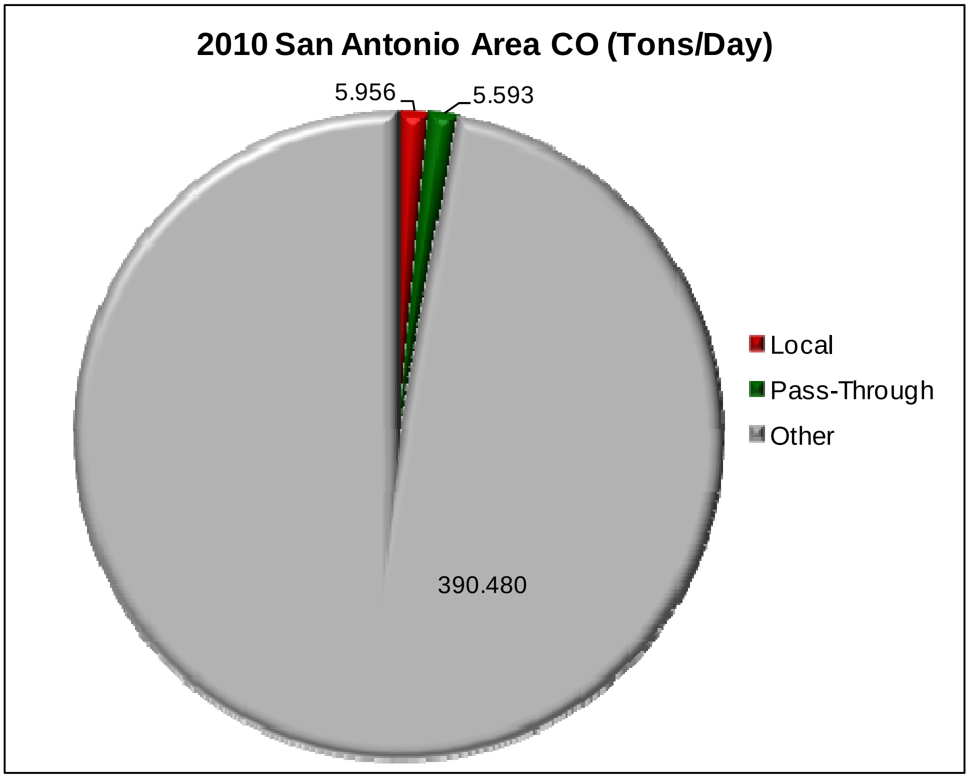

2020 Lower Rio Grande Valley Area VOC (Tons/Day)
0.043
0.087
3.305
Local
Pass-Through
Other

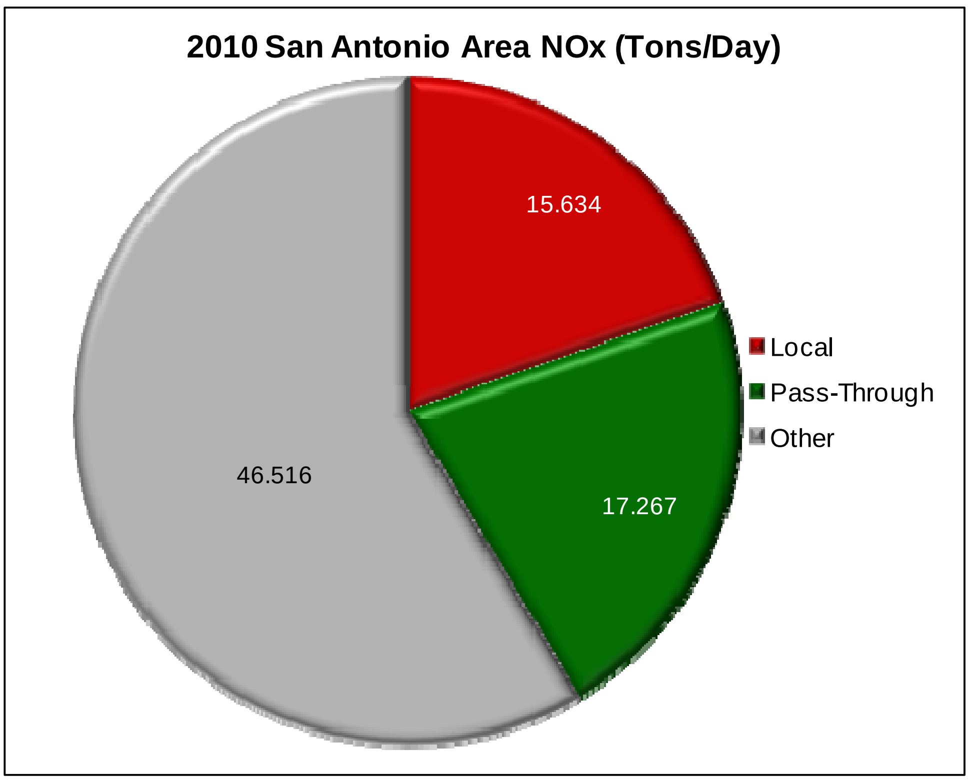

2020 Lower Rio Grande Valley Area CO (Tons/Day)
0.345
0.428
49.325
Local
Pass-Through
Other

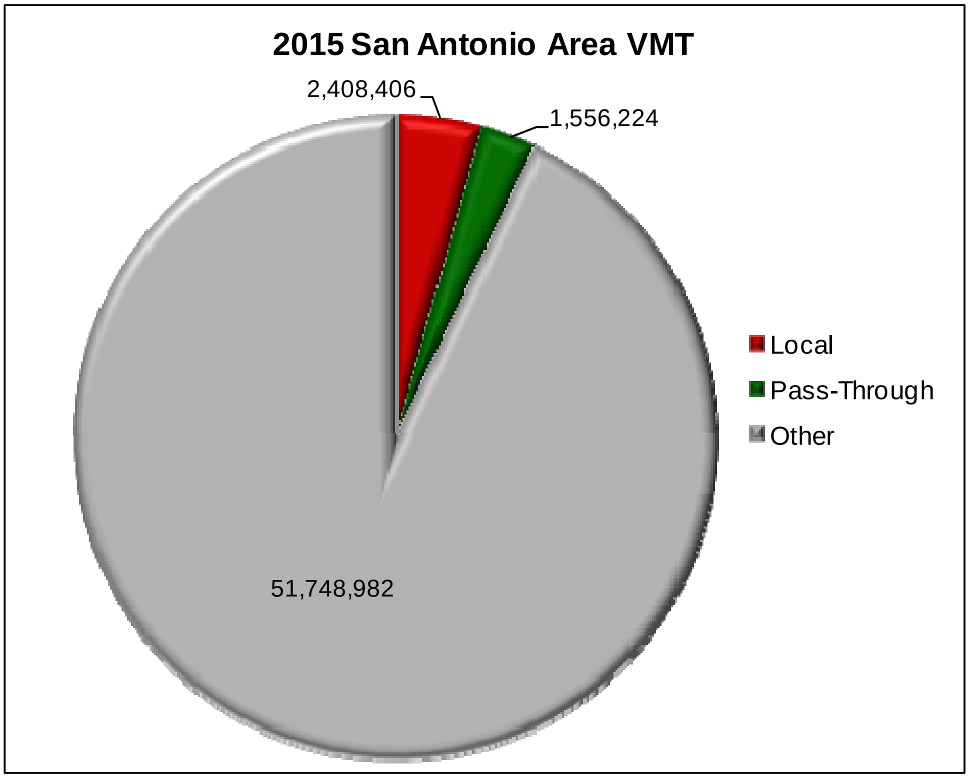

2020 Lower Rio Grande Valley Area NOx (Tons/Day)
0.776
0.998
3.606
Local
Pass-Through
Other

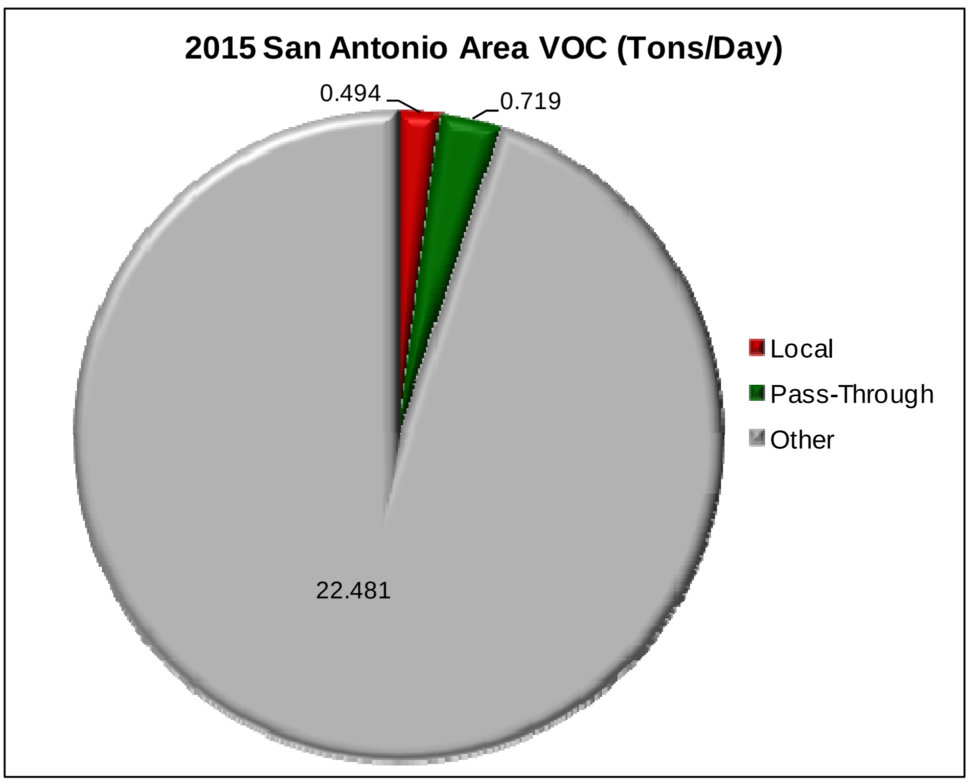

2010 San Antonio Area VMT
2,234,175
1,442,727
48,094,209
Local
Pass-Through
Other

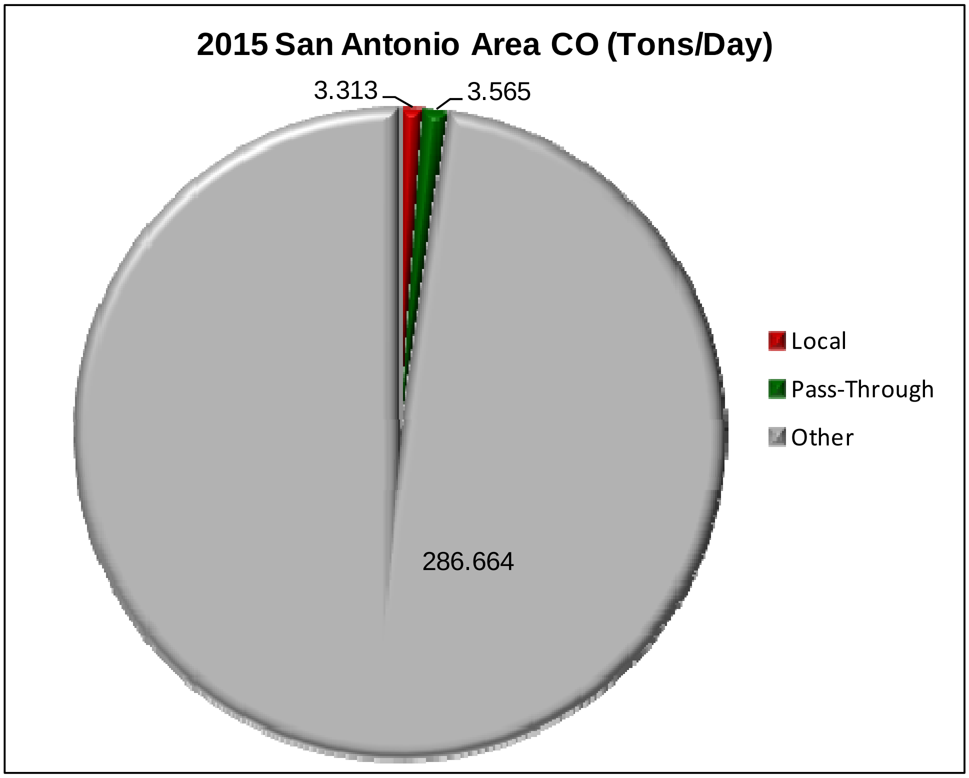

2010 San Antonio Area VOC (Tons/Day)
1.142
1.172
33.147
Local
Pass-Through
Other

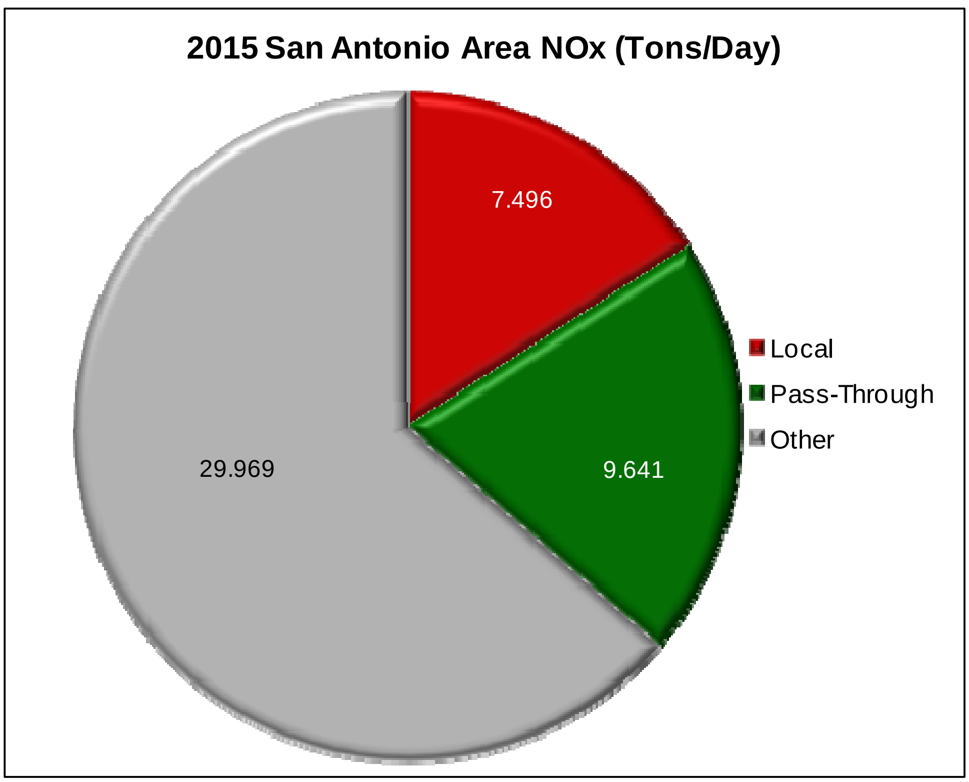

2010 San Antonio Area CO (Tons/Day)
5.956
5.593
390.480
Local
Pass-Through
Other

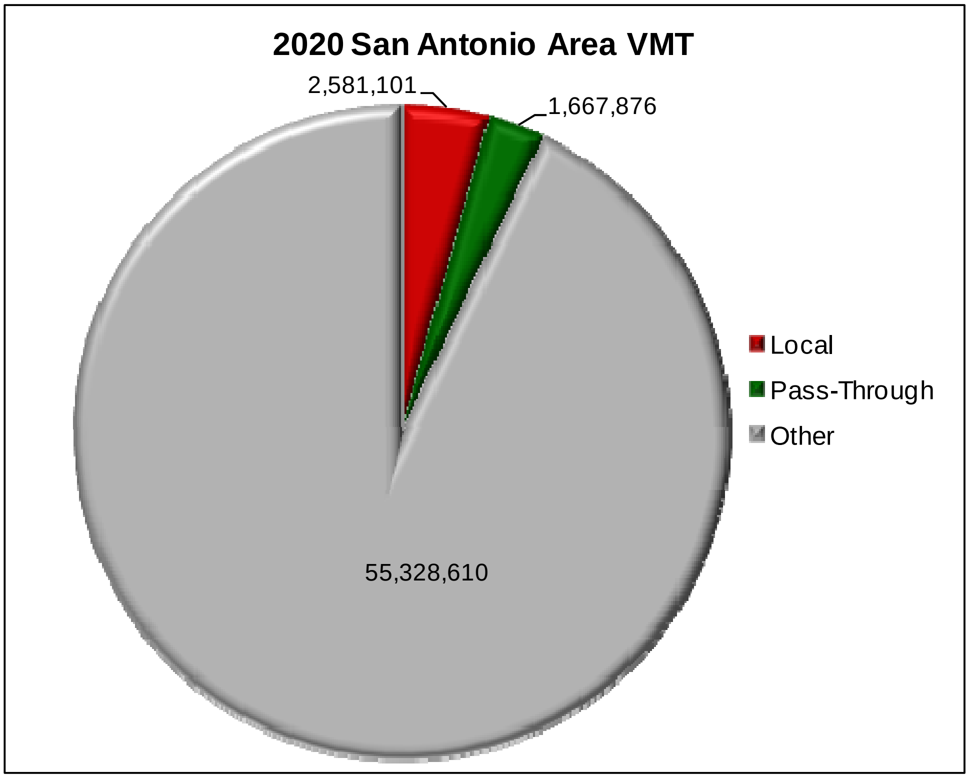

2010 San Antonio Area NOx (Tons/Day)
15.634
17.267
46.516
Local
Pass-Through
Other

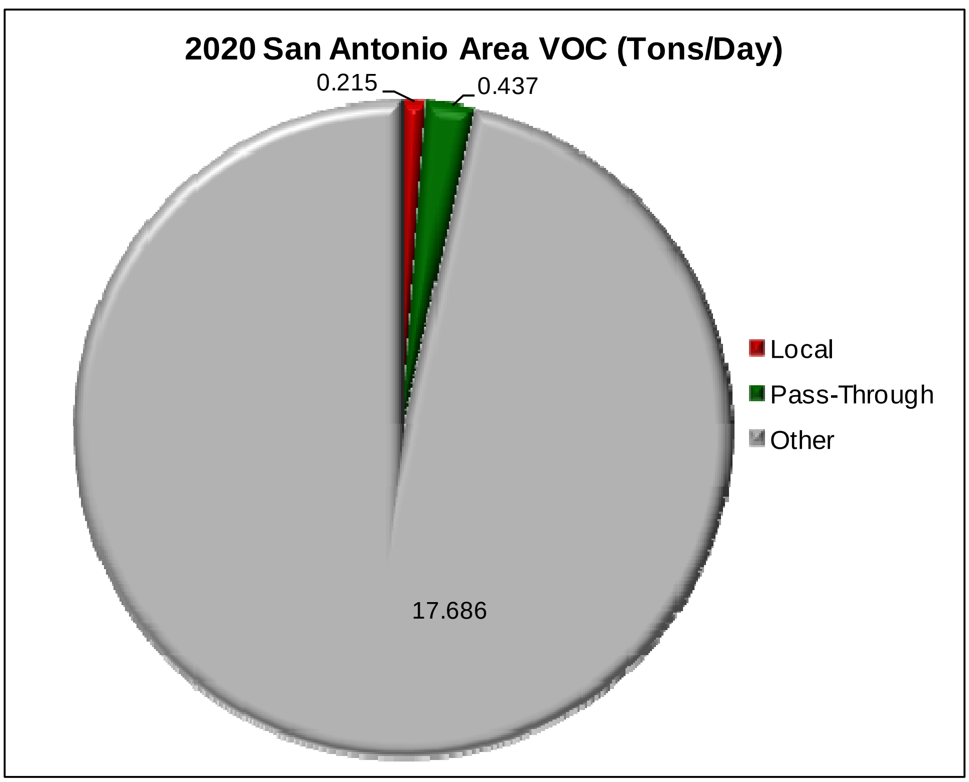

2015 San Antonio Area VMT
2,408,406
1,556,224
51,748,982
Local
Pass-Through
Other

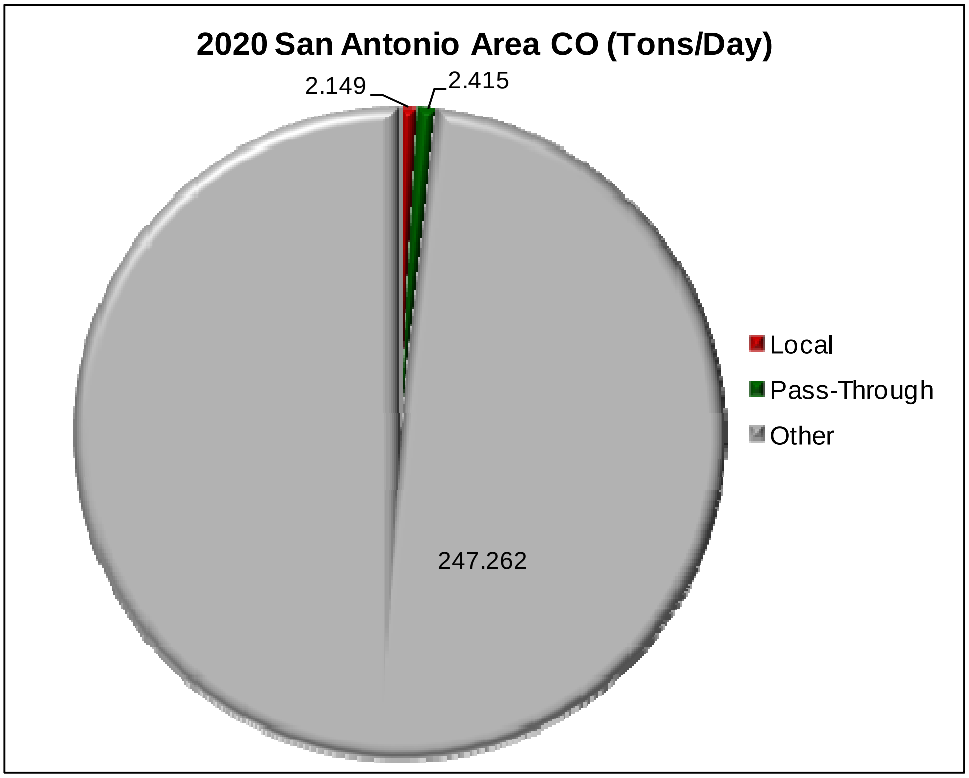

2015 San Antonio Area VOC (Tons/Day)
0.494
0.719
22.481
Local
Pass-Through
Other

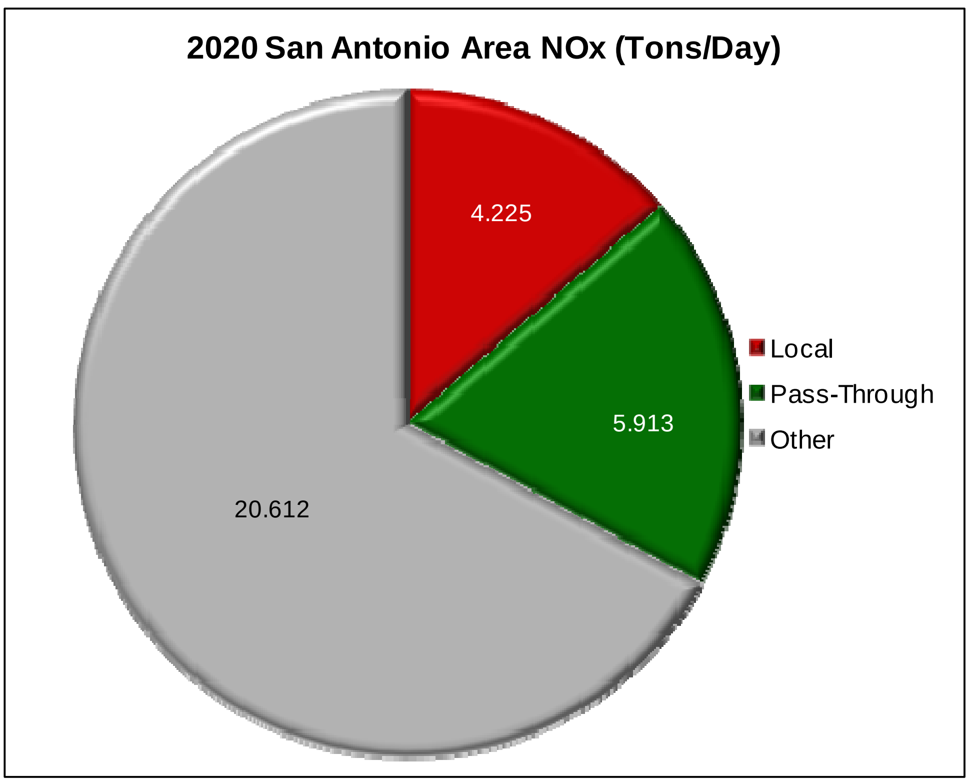

2015 San Antonio Area CO (Tons/Day)
3.313
3.565
286.664
Local
Pass-Through
Other

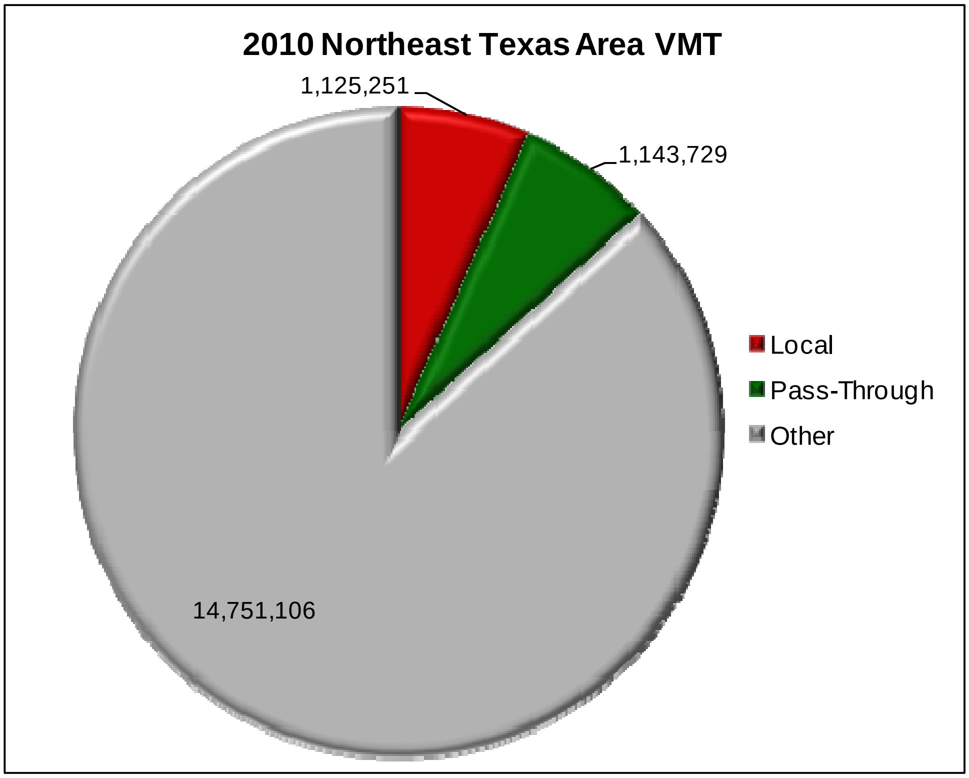

2015 San Antonio Area NOx (Tons/Day)
7.496
9.641
29.969
Local
Pass-Through
Other

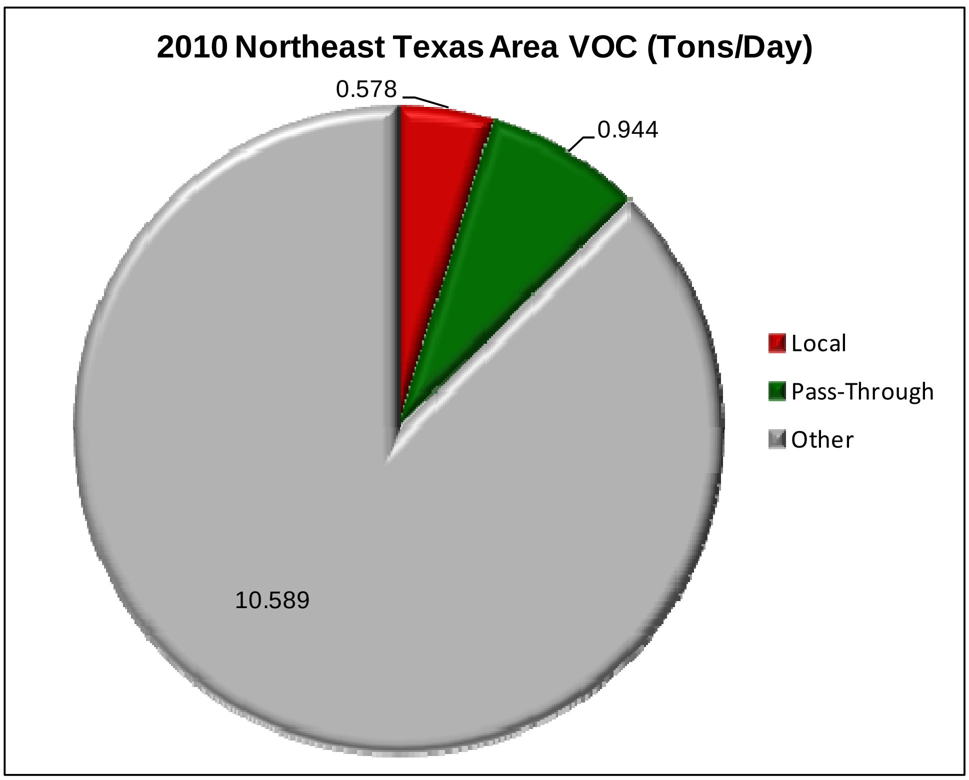

2020 San Antonio Area VMT
2,581,101
1,667,876
55,328,610
Local
Pass-Through
Other

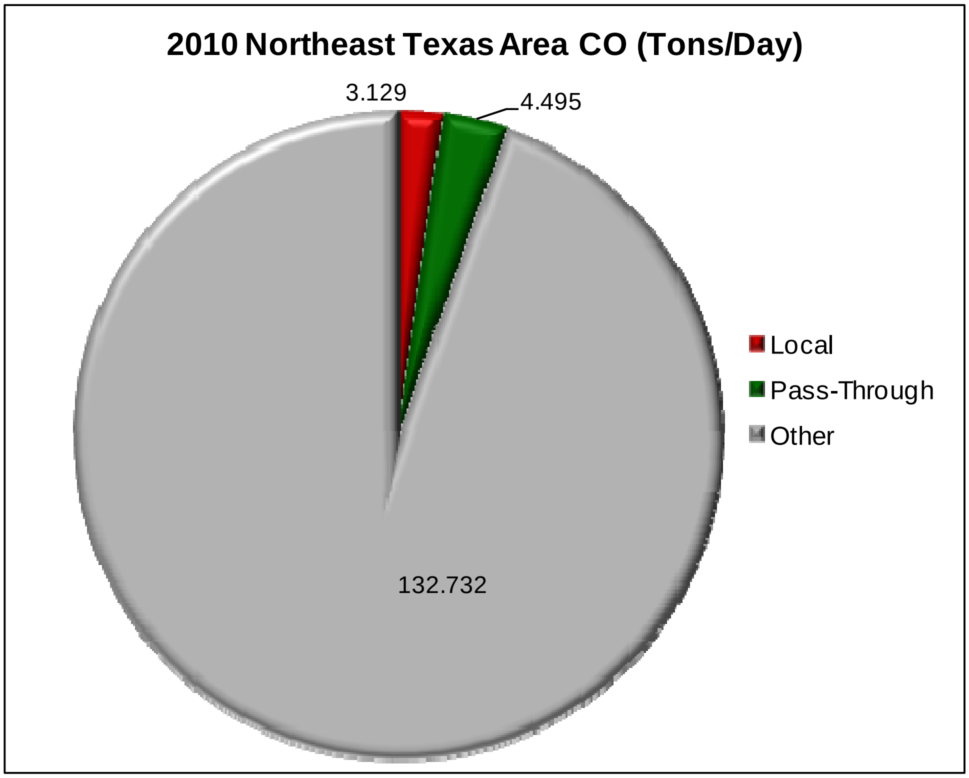

2020 San Antonio Area VOC (Tons/Day)
0.215
0.437
17.686
Local
Pass-Through
Other

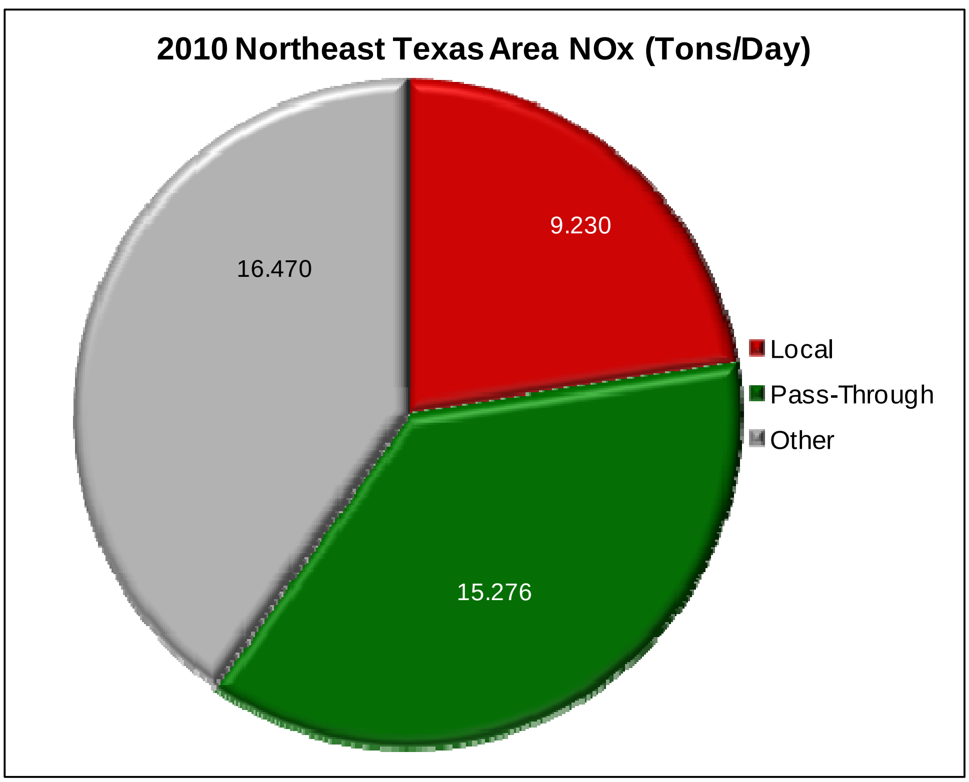

2020 San Antonio Area CO (Tons/Day)
2.149
2.415
247.262
Local
Pass-Through
Other

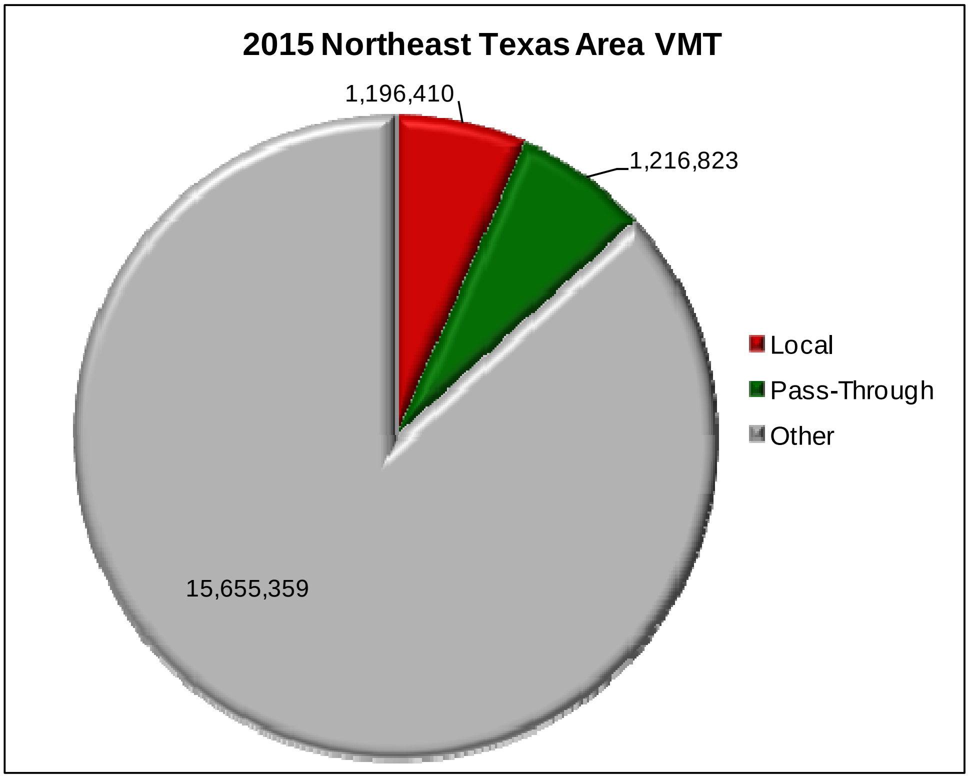

2020 San Antonio Area NOx (Tons/Day)
4.225
5.913
20.612
Local
Pass-Through
Other

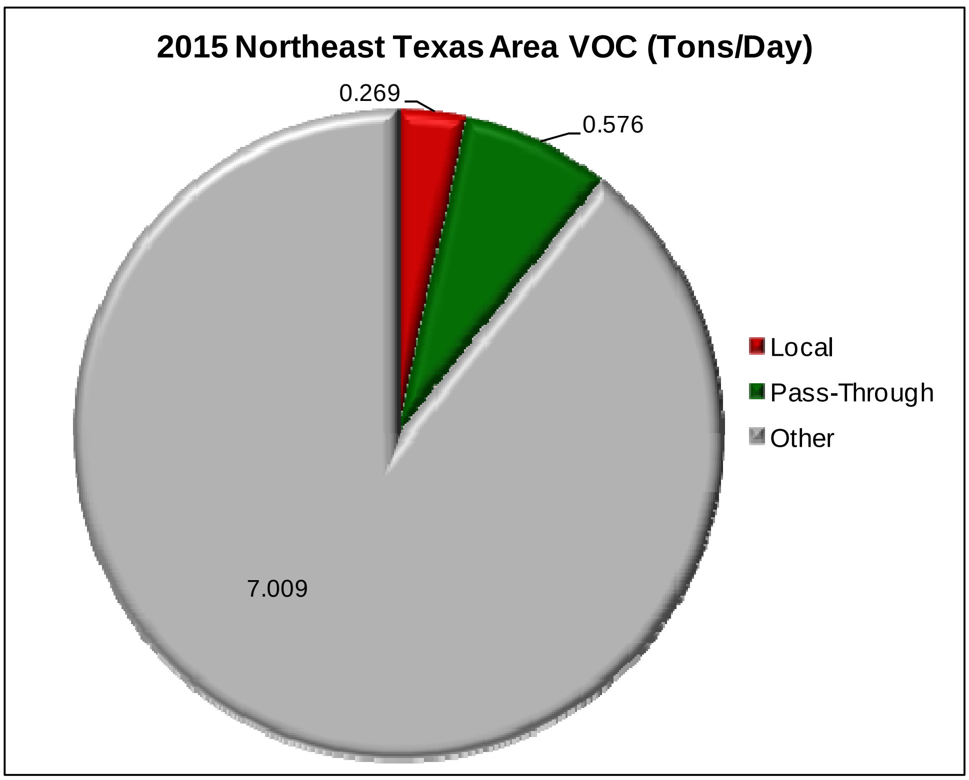

2010 Northeast Texas Area VMT
1,125,251
1,143,729
14,751,106
Local
Pass-Through
Other

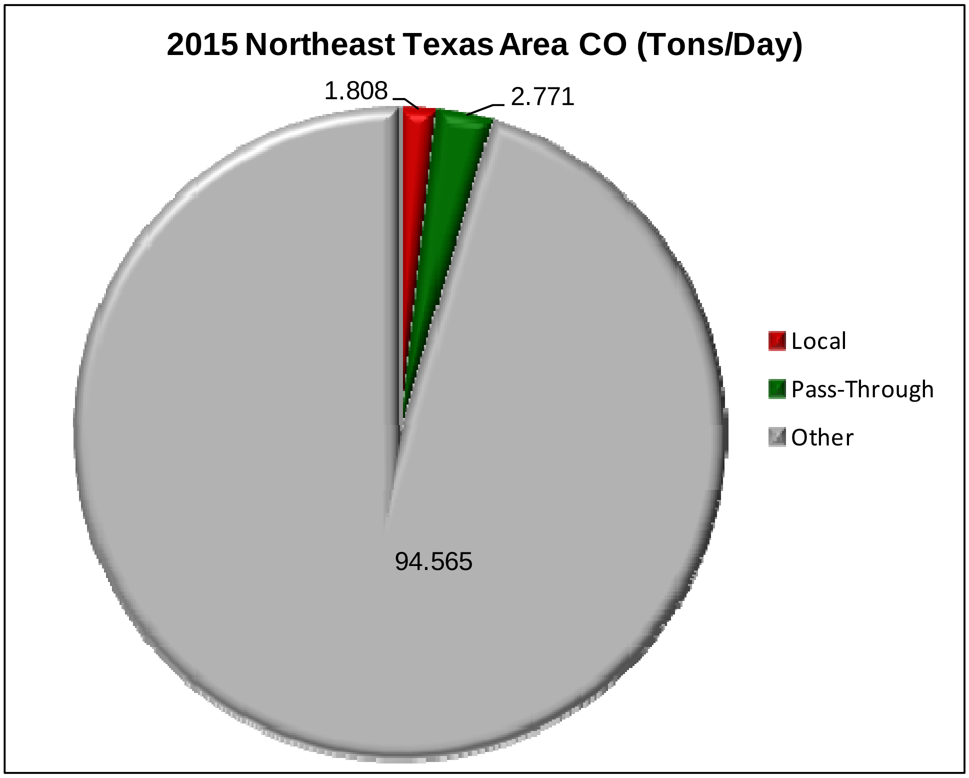

2010 Northeast Texas Area VOC (Tons/Day)
0.578
0.944
10.589
Local
Pass-Through
Other

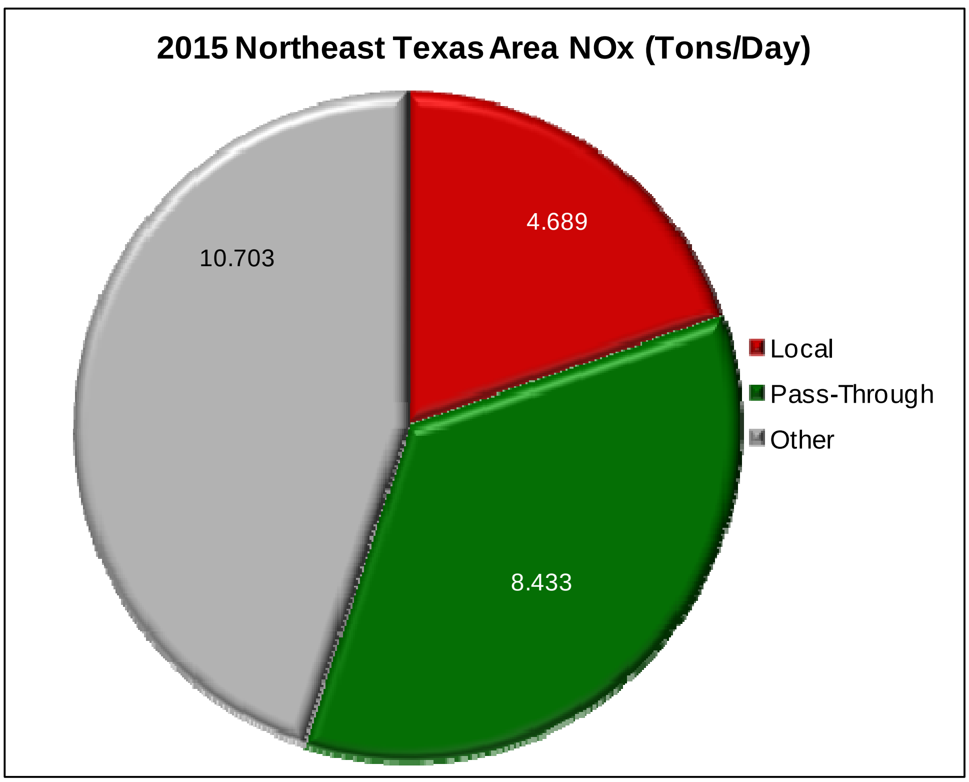

2010 Northeast Texas Area CO (Tons/Day)
3.129
4.495
132.732
Local
Pass-Through
Other

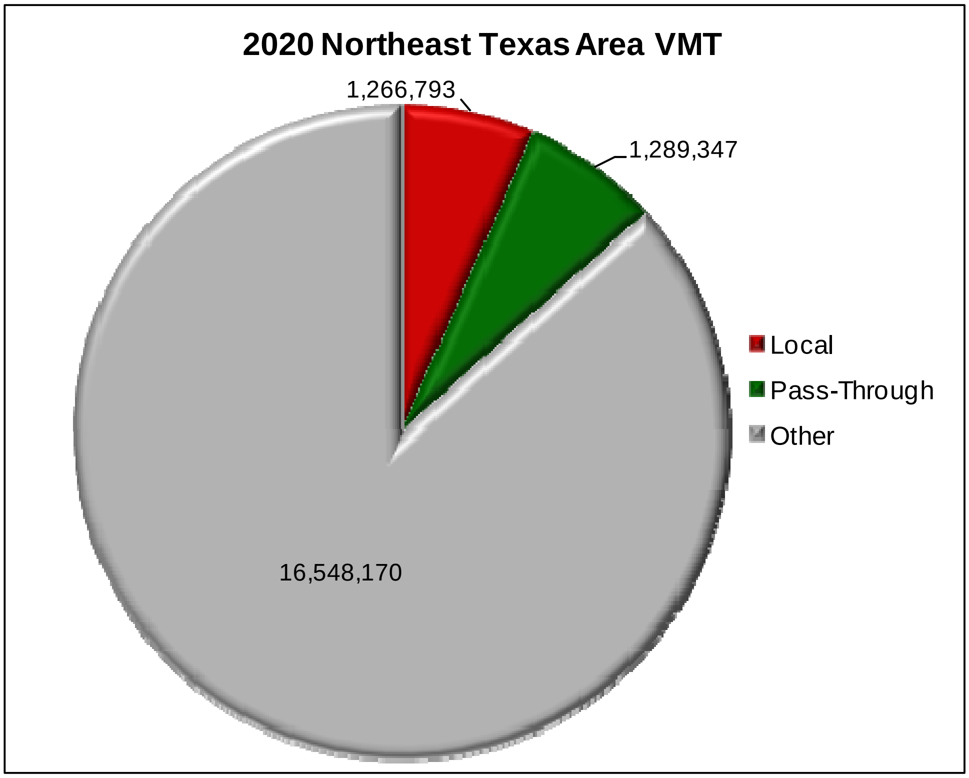

2010 Northeast Texas Area NOx (Tons/Day)
9.230
16.470
15.276
Local
Pass-Through
Other

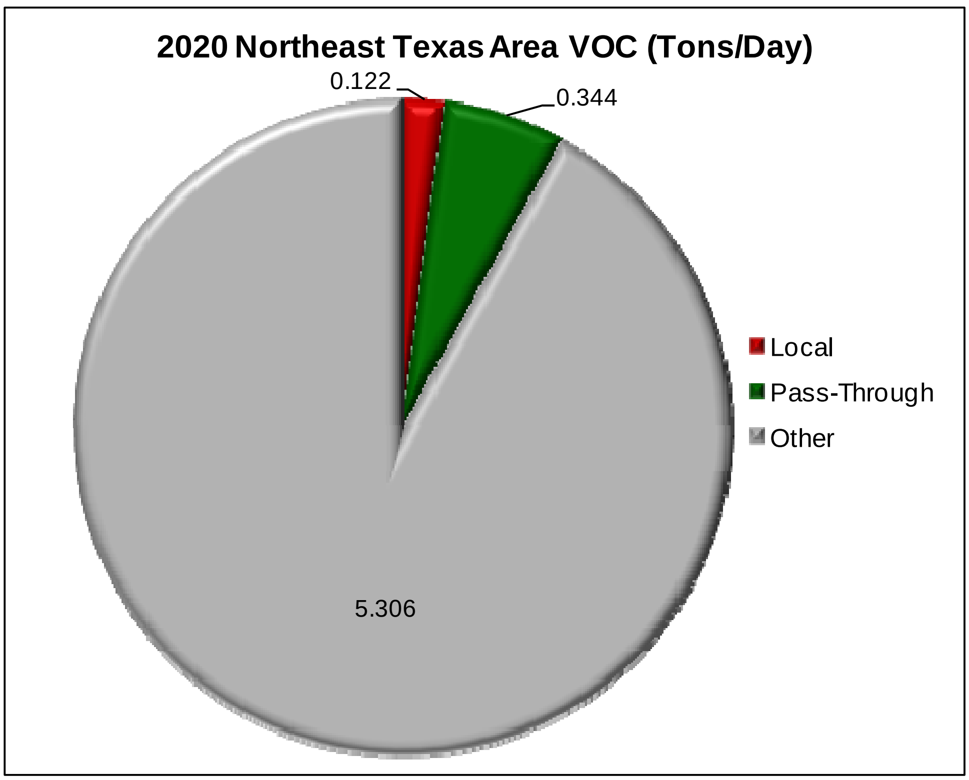

2015 Northeast Texas Area VMT
1,196,410
1,216,823
15,655,359
Local
Pass-Through
Other

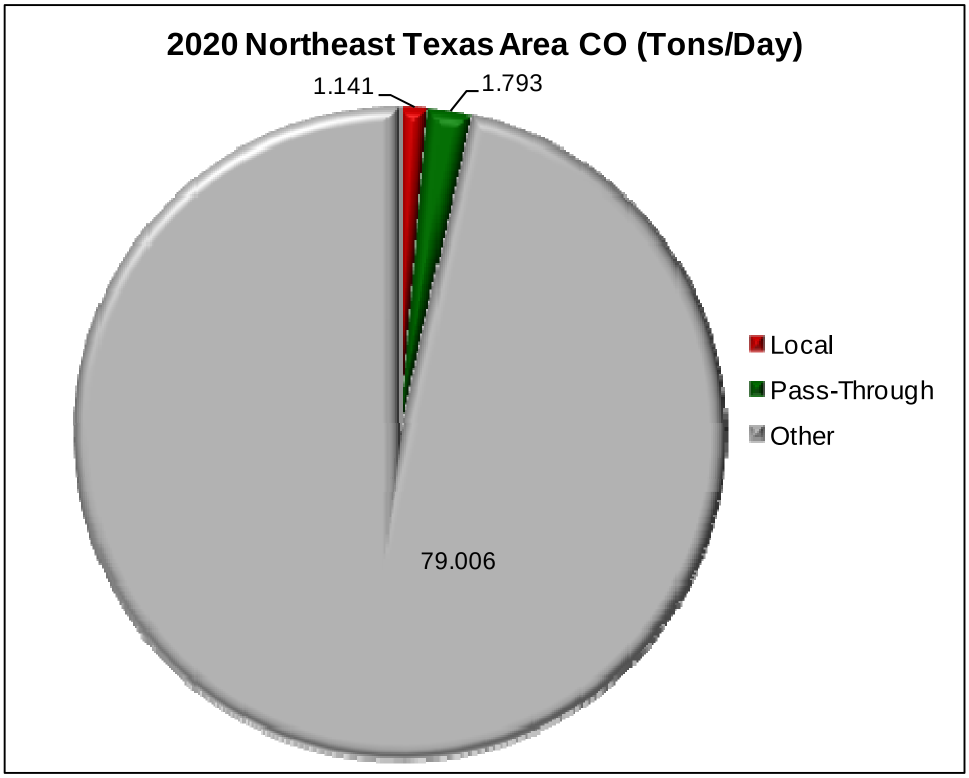

2015 Northeast Texas Area VOC (Tons/Day)
0.269
0.576
7.009
Local
Pass-Through
Other

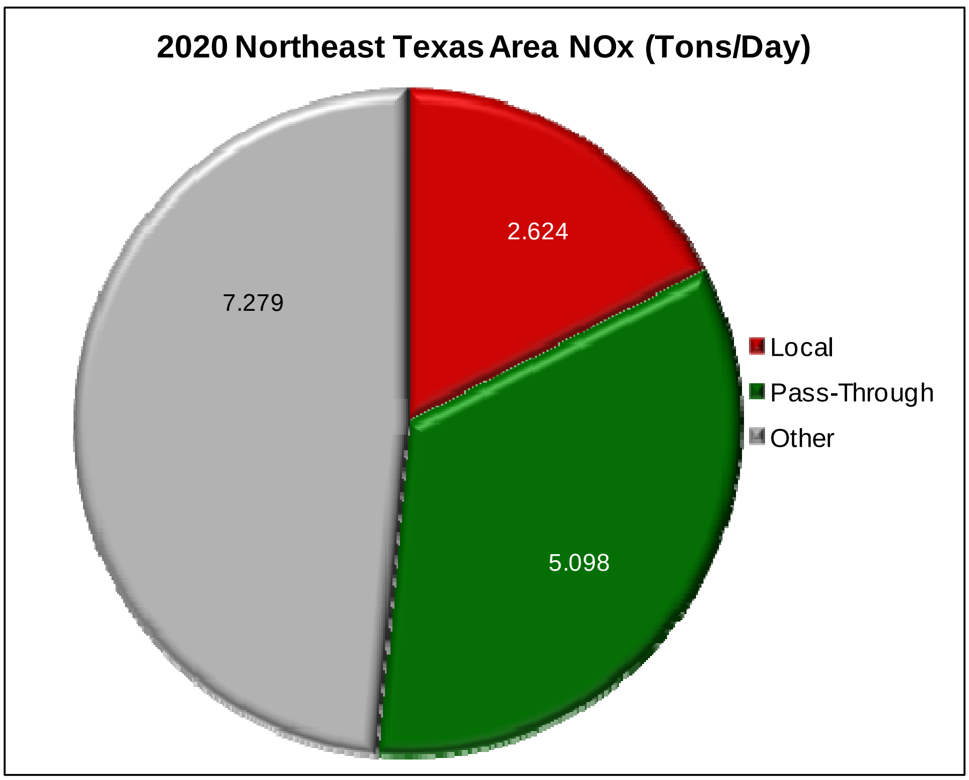

2015 Northeast Texas Area CO (Tons/Day)
1.808
2.771
94.565
Local
Pass-Through
Other

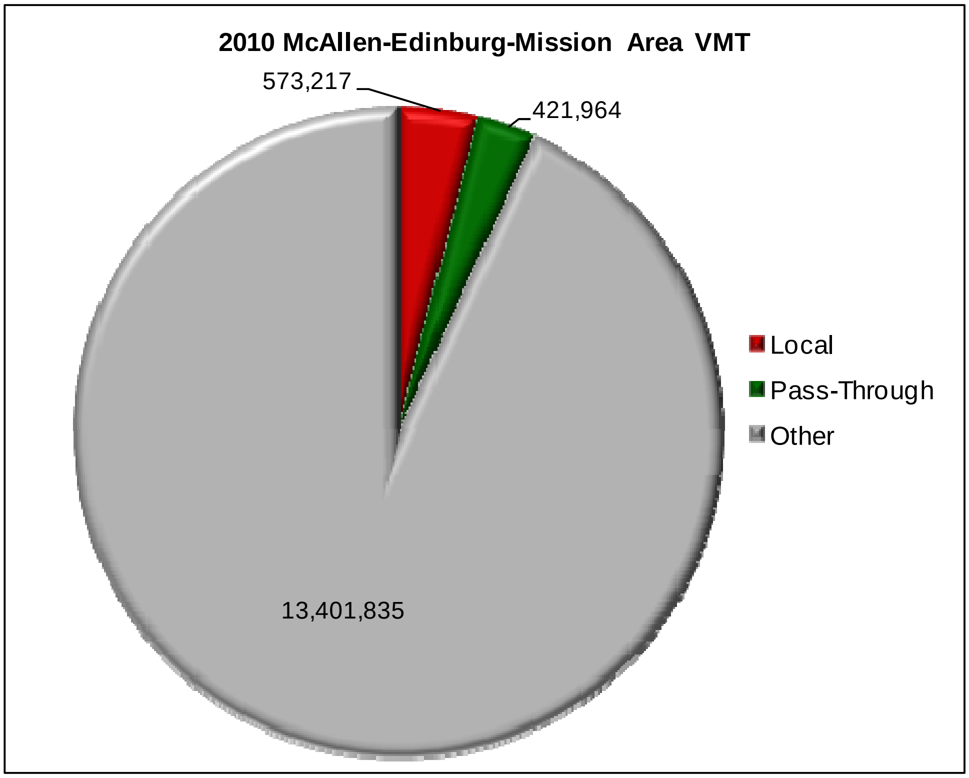

2015 Northeast Texas Area NOx (Tons/Day)
4.689
10.703
8.433
Local
Pass-Through
Other

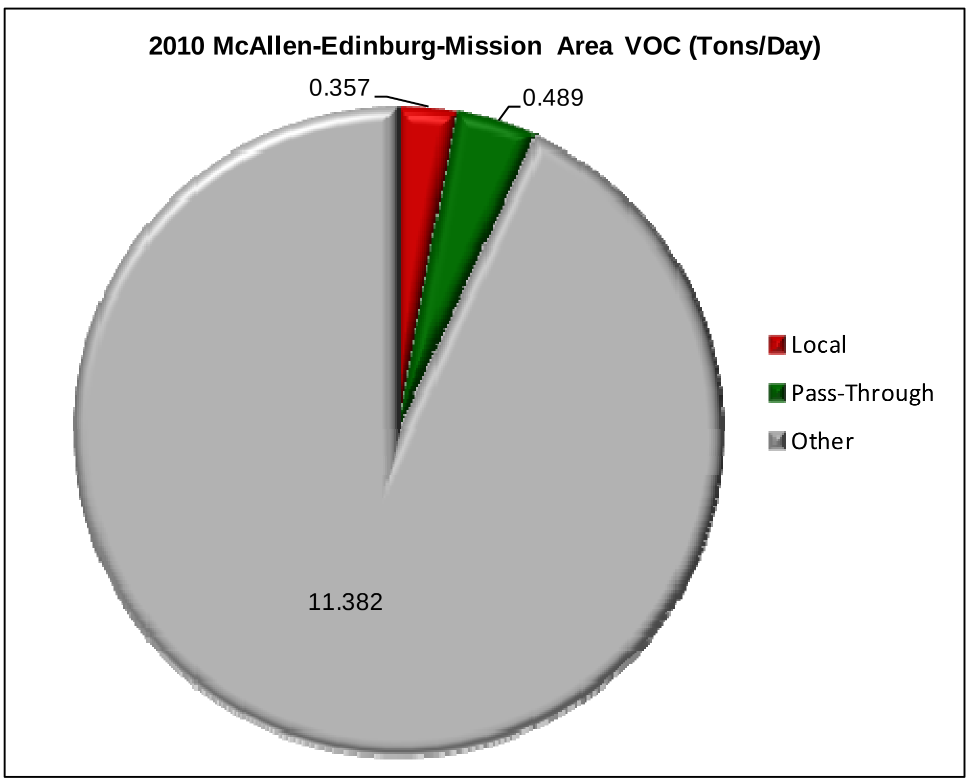

2020 Northeast Texas Area VMT
1,266,793
1,289,347
16,548,170
Local
Pass-Through
Other

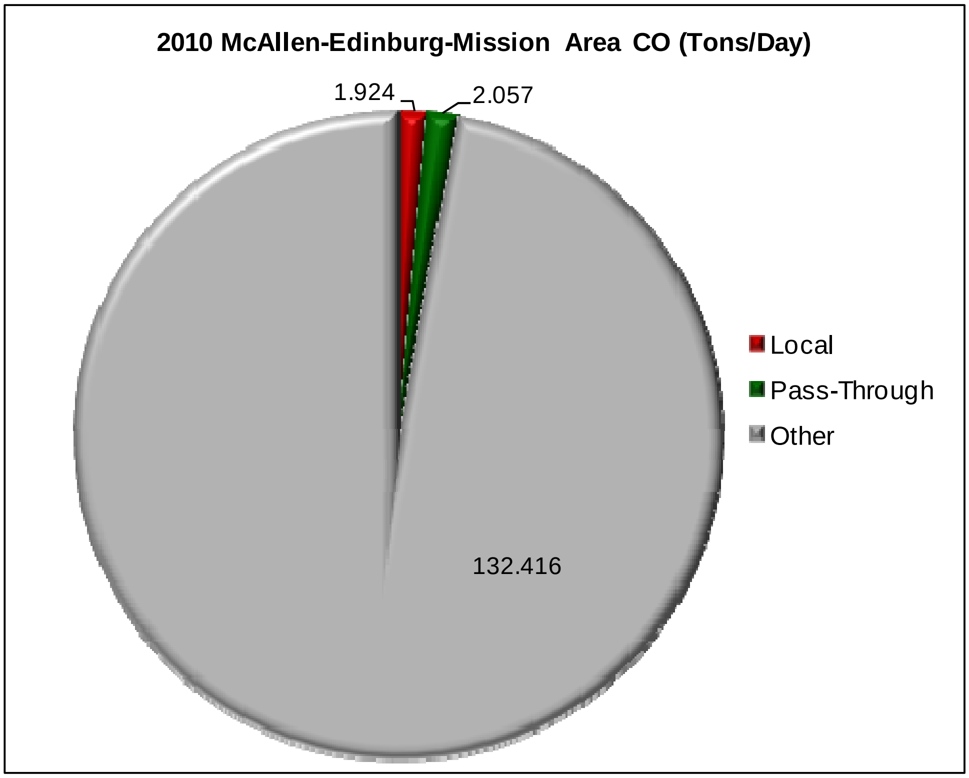

2020 Northeast Texas Area VOC (Tons/Day)
0.122
0.344
5.306
Local
Pass-Through
Other

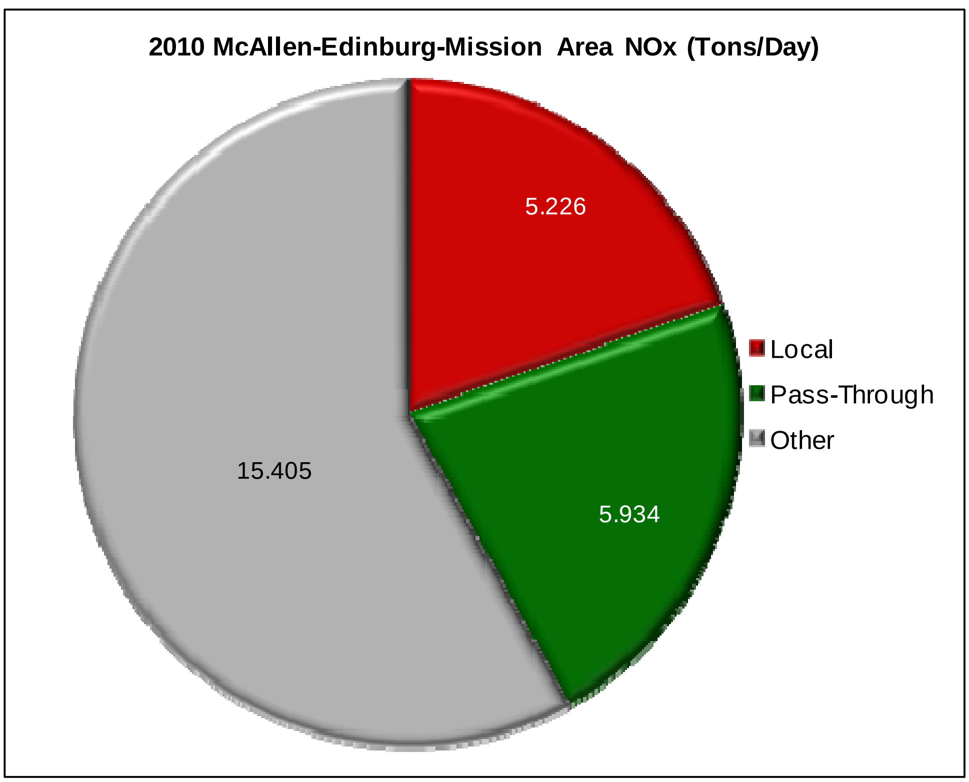

2020 Northeast Texas Area CO (Tons/Day)
1.141
1.793
79.006
Local
Pass-Through
Other

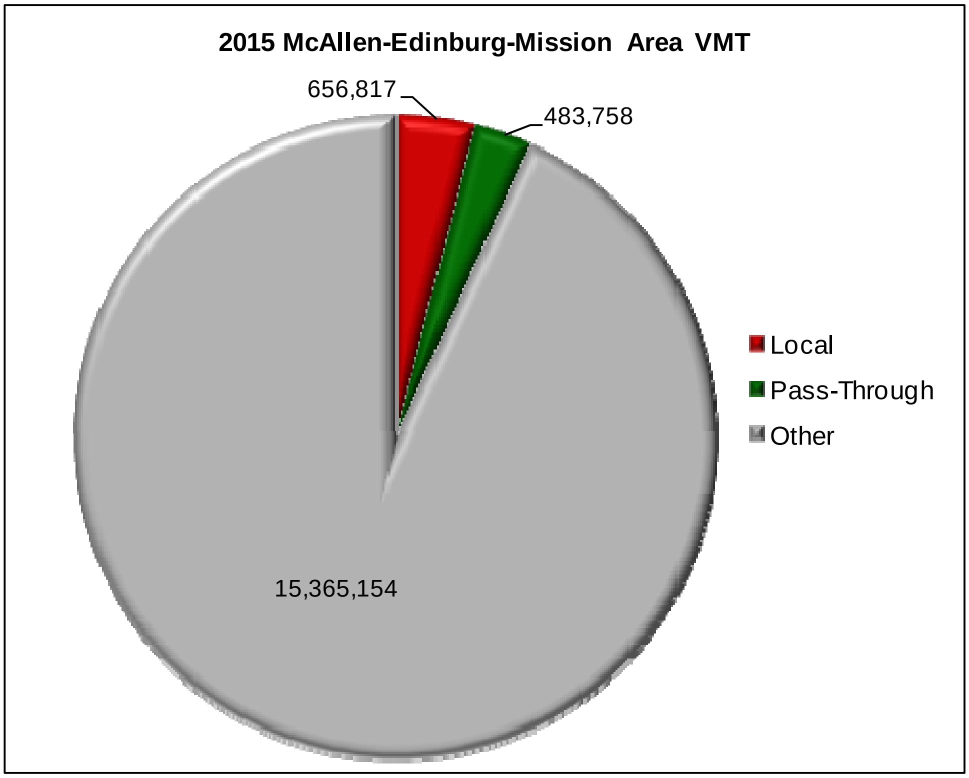

2020 Northeast Texas Area NOx (Tons/Day)
2.624
7.279
5.098
Local
Pass-Through
Other

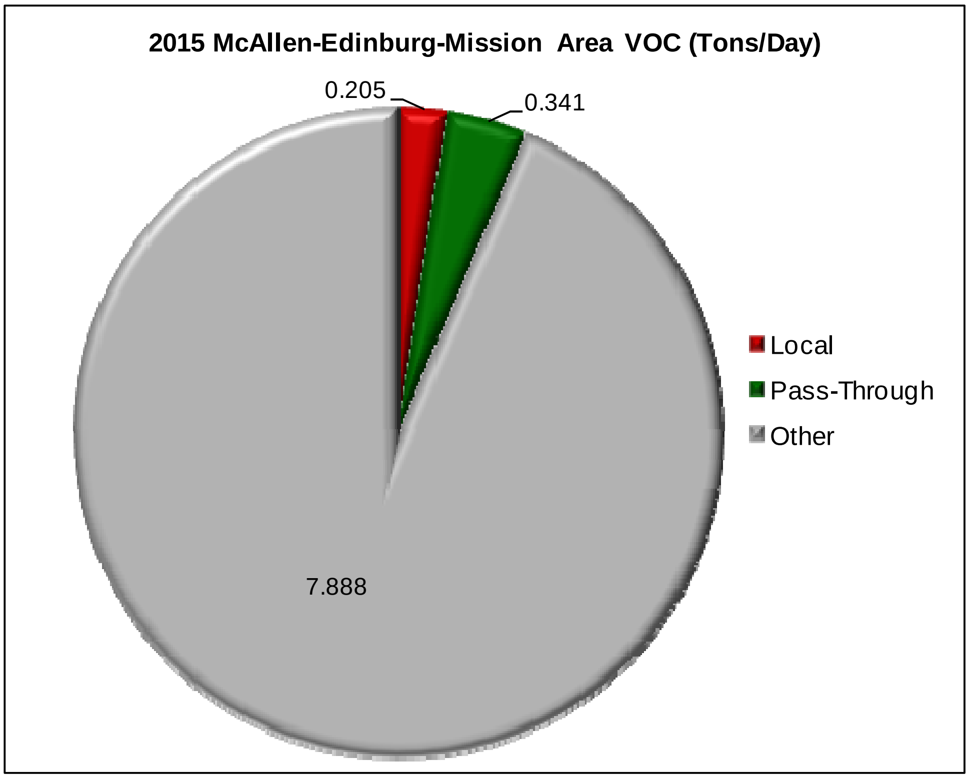

2010 McAllen-Edinburg-Mission Area VMT
573,217
421,964
13,401,835
Local
Pass-Through
Other

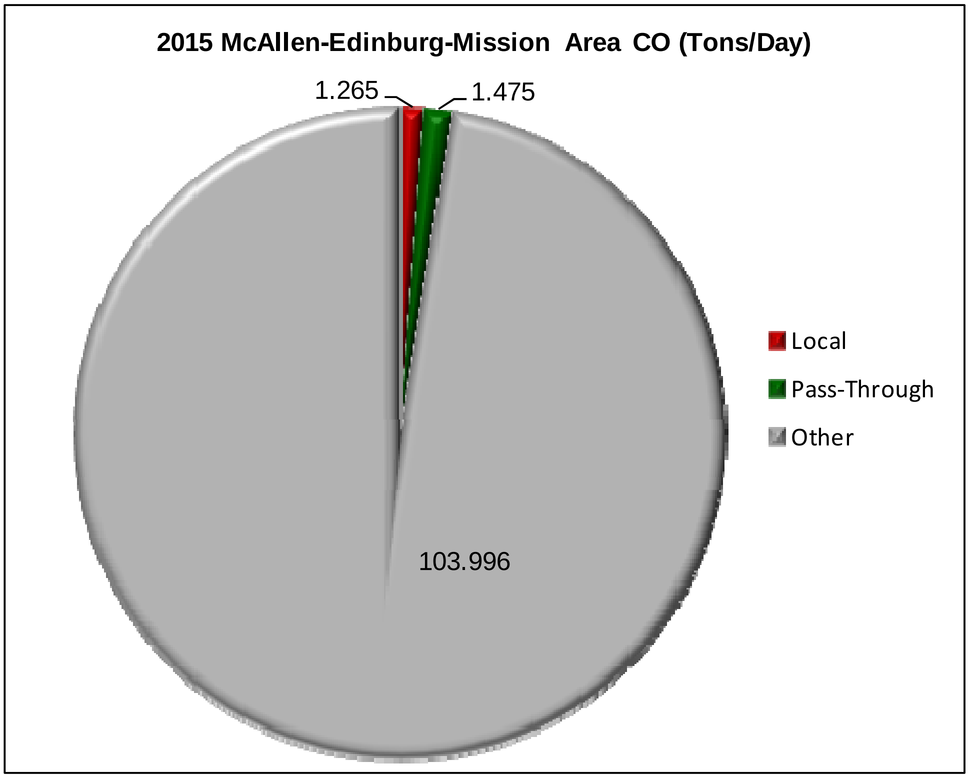

2010 McAllen-Edinburg-Mission Area VOC (Tons/Day)
0.357
0.489
11.382
Local
Pass-Through
Other

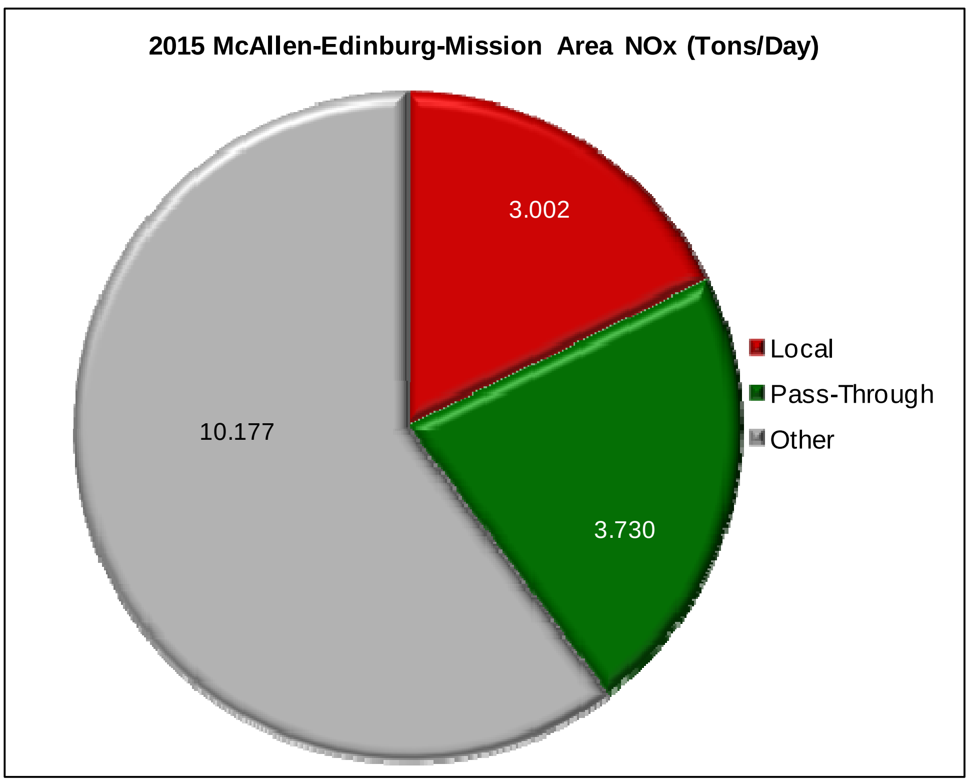

2010 McAllen-Edinburg-Mission Area CO (Tons/Day)
1.924
2.057
132.416
Local
Pass-Through
Other

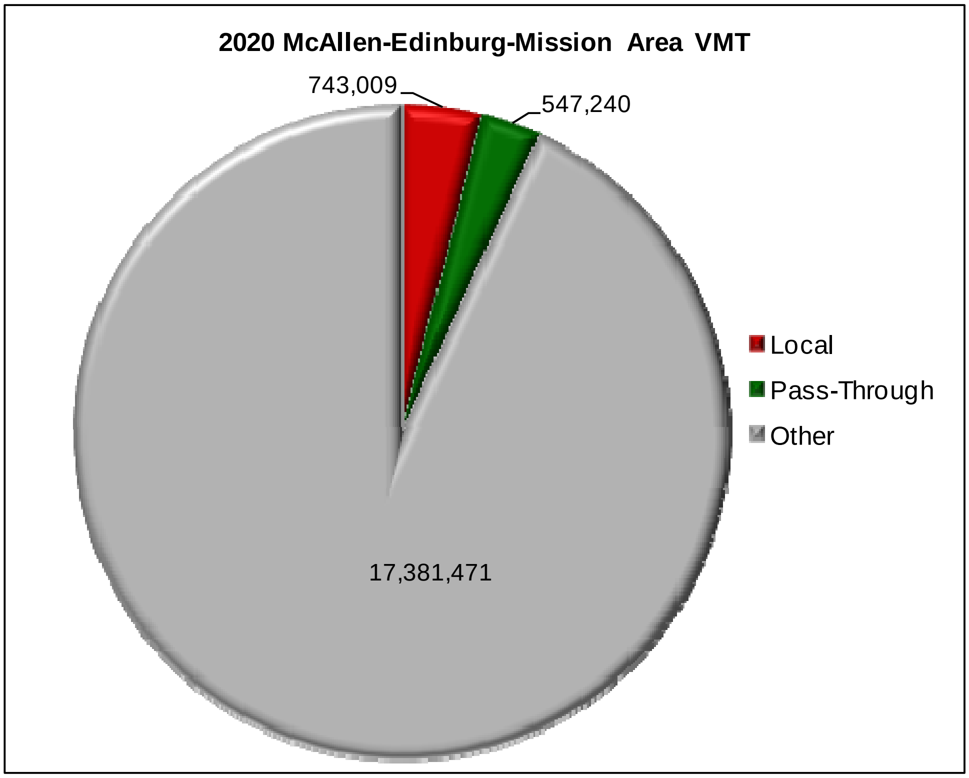

2010 McAllen-Edinburg-Mission Area NOx (Tons/Day)
5.226
5.934
15.405
Local
Pass-Through
Other

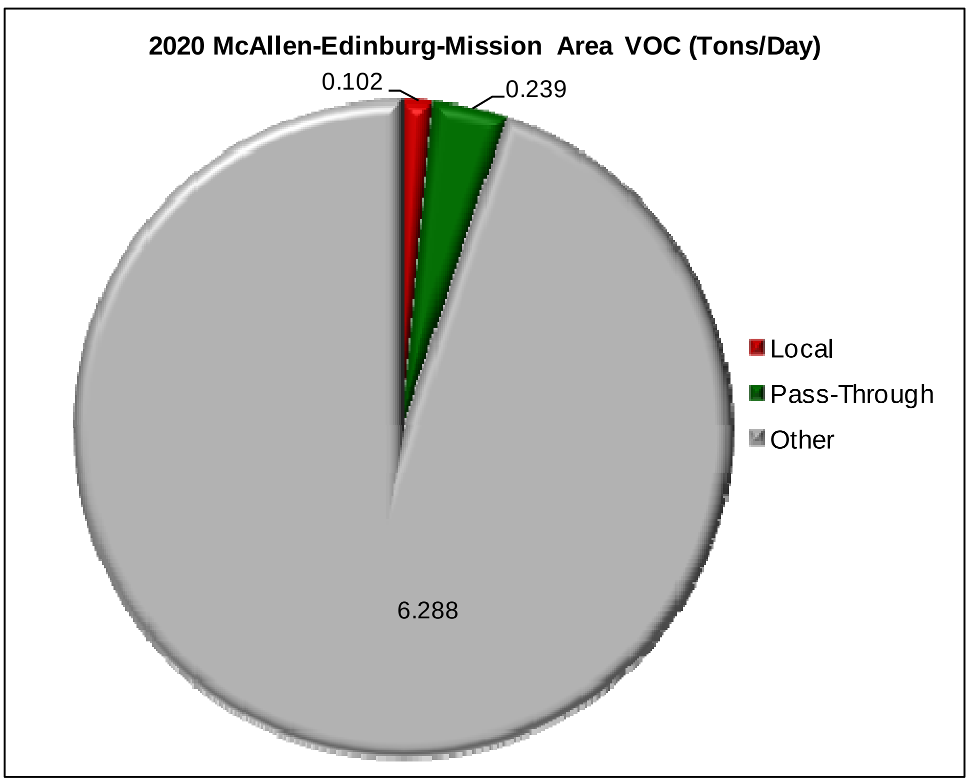

2015 McAllen-Edinburg-Mission Area VMT
656,817
483,758
15,365,154
Local
Pass-Through
Other

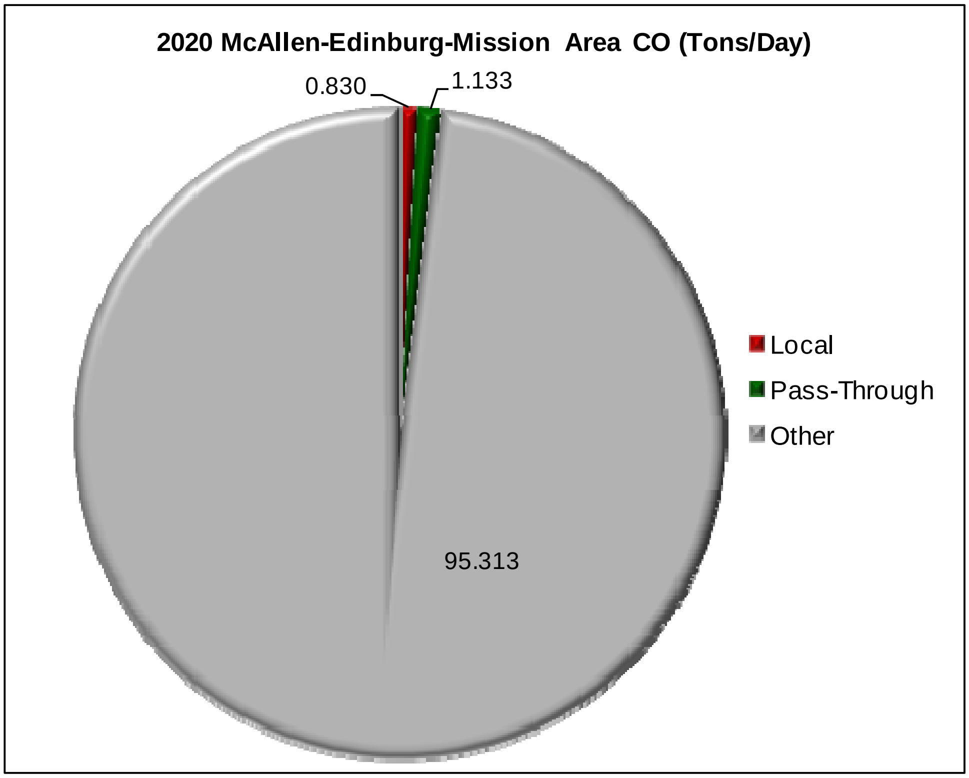

2015 McAllen-Edinburg-Mission Area VOC (Tons/Day)
0.205
0.341
7.888
Local
Pass-Through
Other

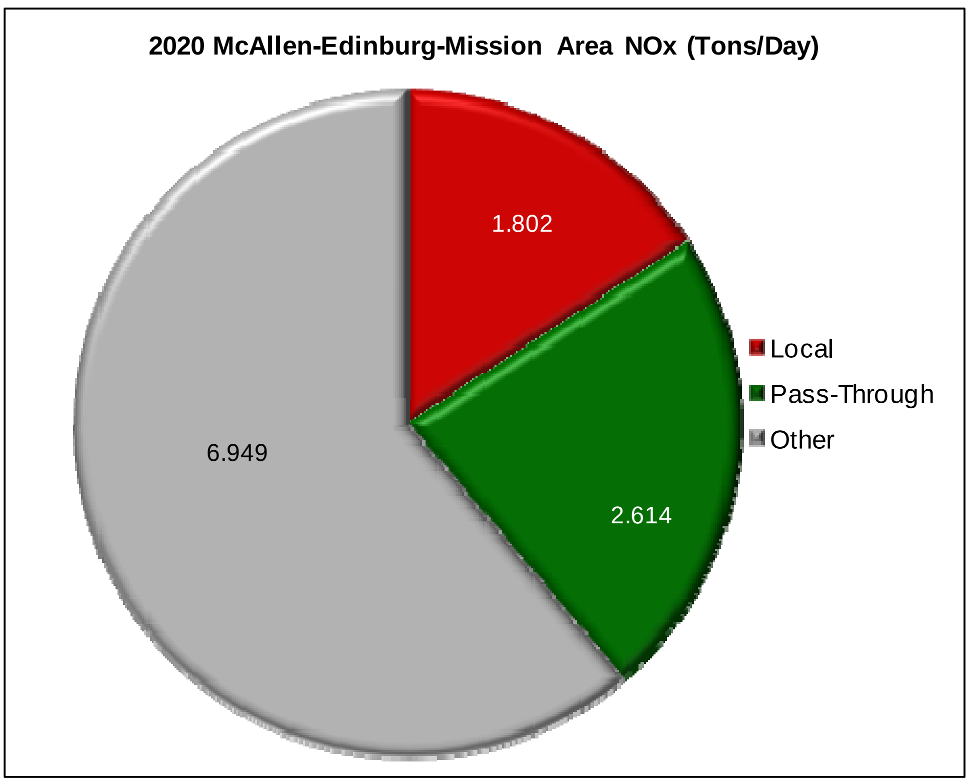

2015 McAllen-Edinburg-Mission Area CO (Tons/Day)
1.265
1.475
103.996
Local
Pass-Through
Other

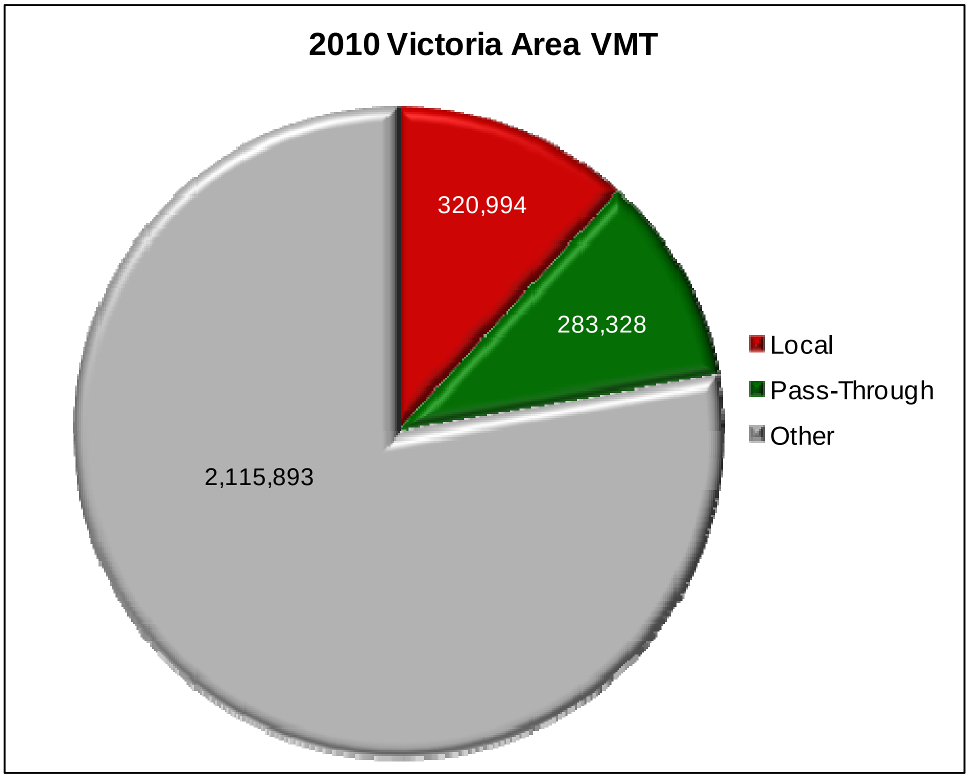

2015 McAllen-Edinburg-Mission Area NOx (Tons/Day)
3.002
3.730
10.177
Local
Pass-Through
Other

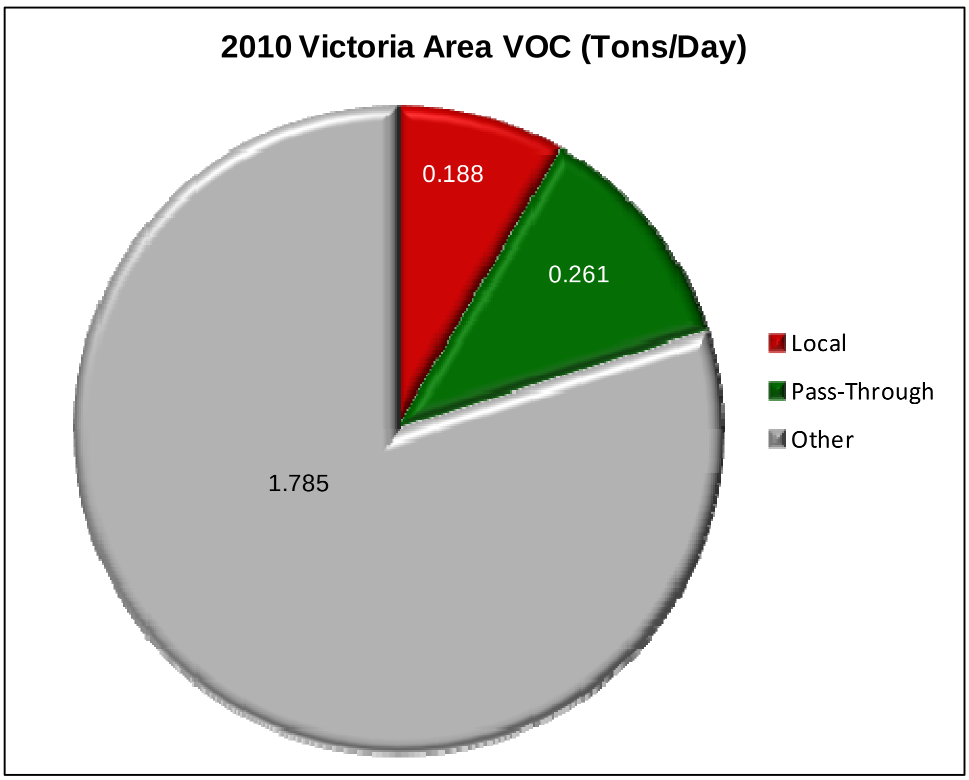

2020 McAllen-Edinburg-Mission Area VMT
743,009
547,240
17,381,471
Local
Pass-Through
Other

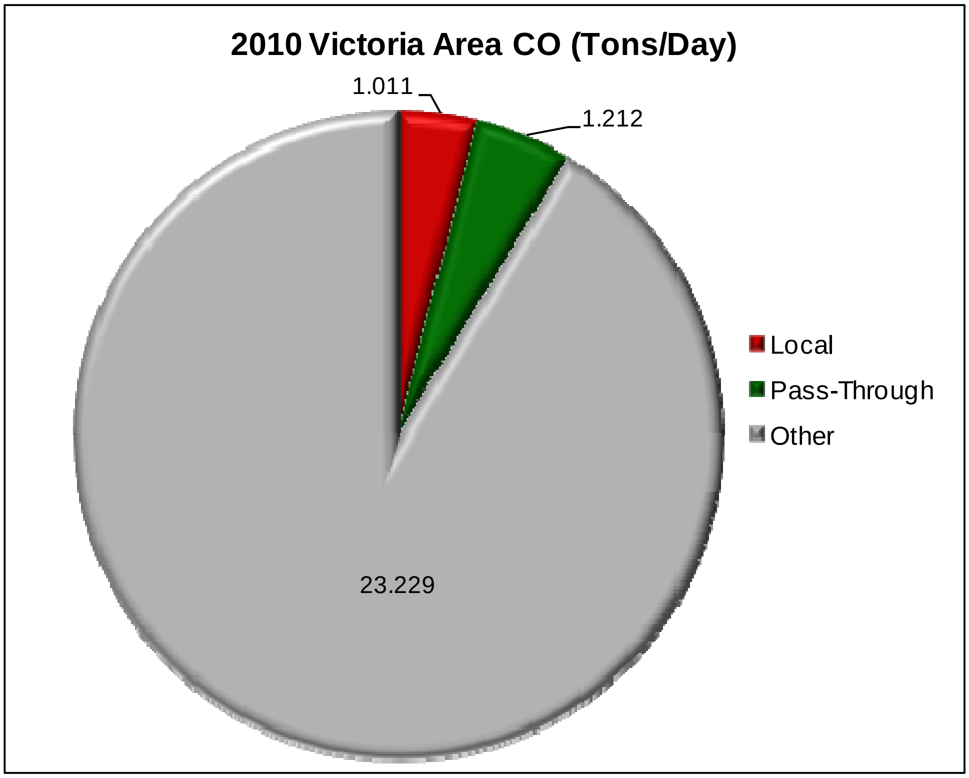

2020 McAllen-Edinburg-Mission Area VOC (Tons/Day)
0.102
0.239
6.288
Local
Pass-Through
Other

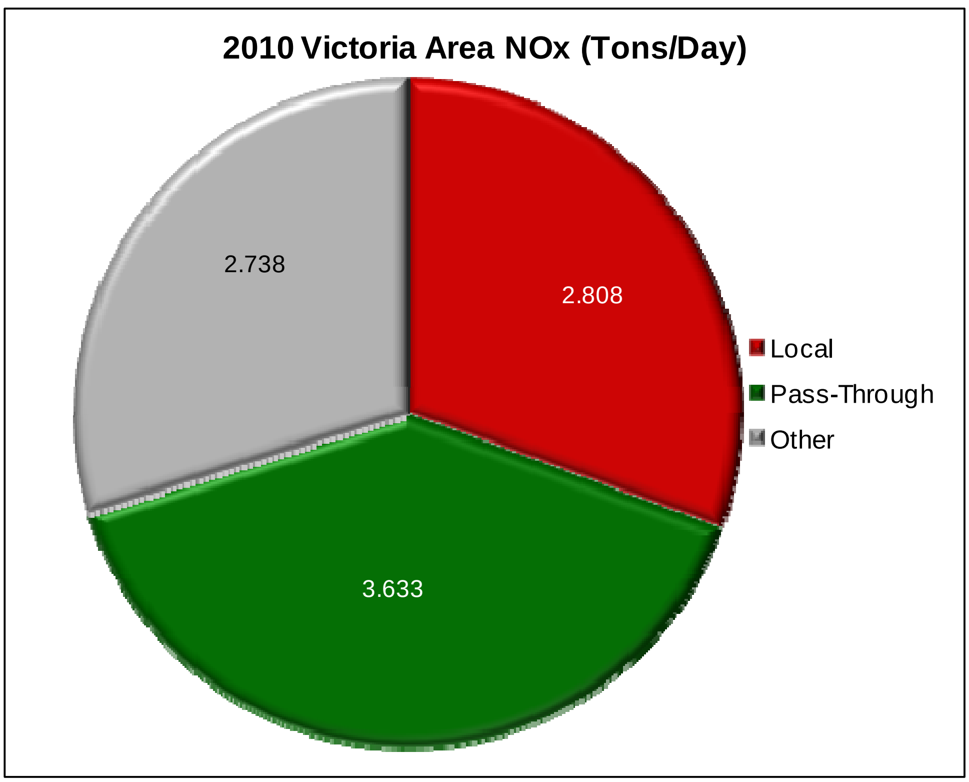

2020 McAllen-Edinburg-Mission Area CO (Tons/Day)
0.830
1.133
95.313
Local
Pass-Through
Other

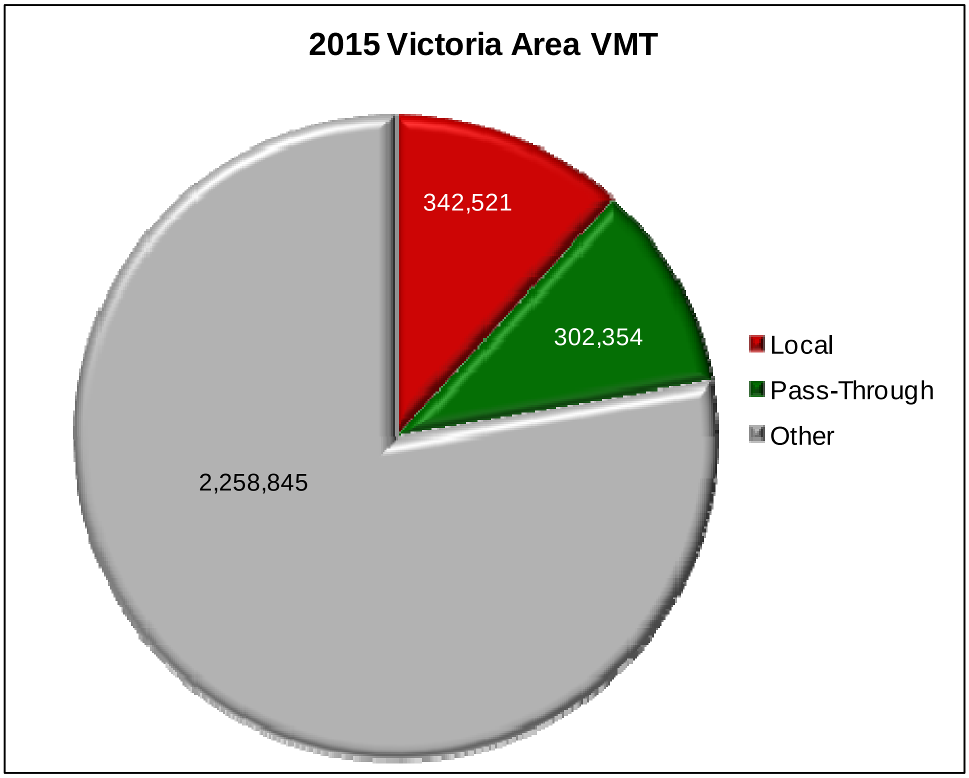

2020 McAllen-Edinburg-Mission Area NOx (Tons/Day)
1.802
2.614
6.949
Local
Pass-Through
Other

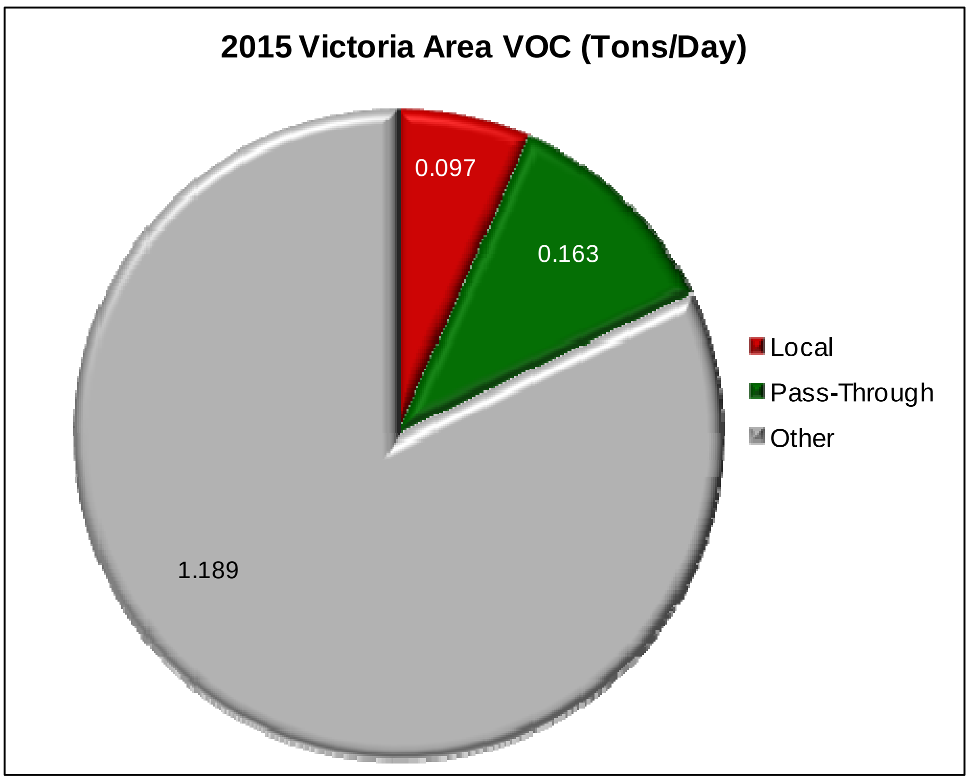

2010 Victoria Area VMT
320,994
283,328
2,115,893
Local
Pass-Through
Other

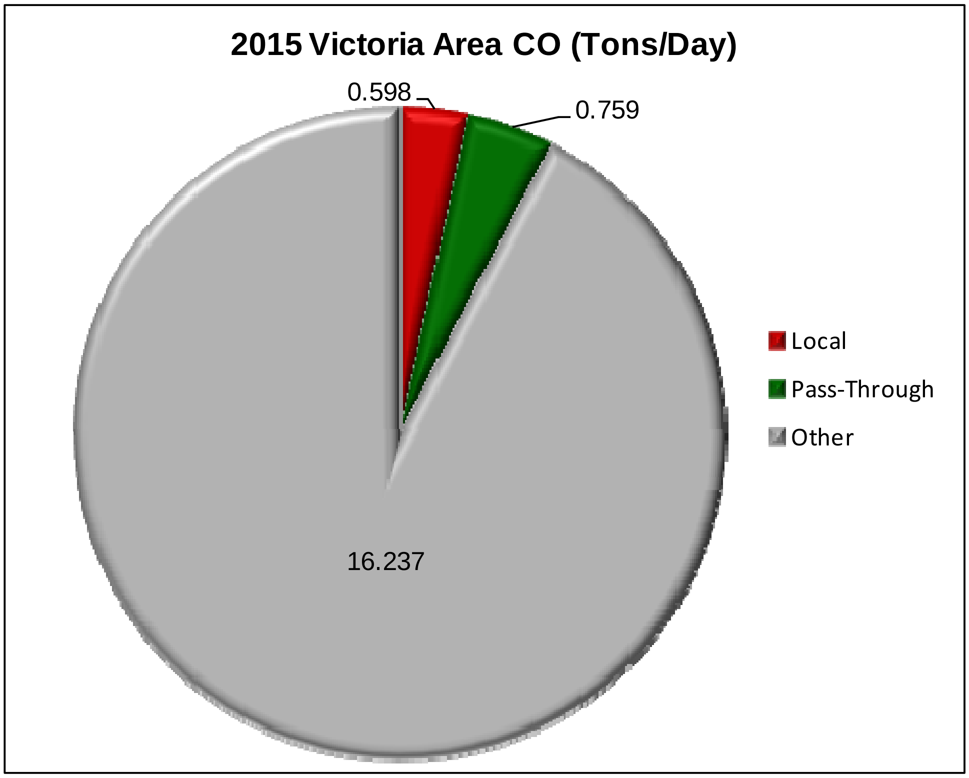

2010 Victoria Area VOC (Tons/Day)
0.188
0.261
1.785
Local
Pass-Through
Other

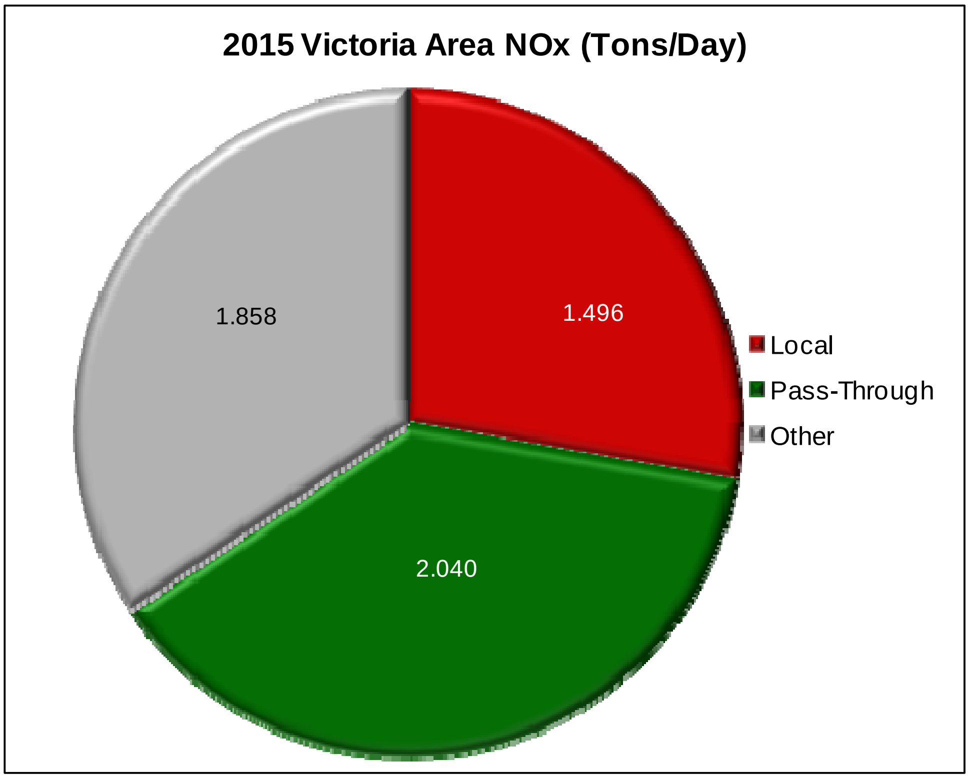

2010 Victoria Area CO (Tons/Day)
1.011
1.212
23.229
Local
Pass-Through
Other

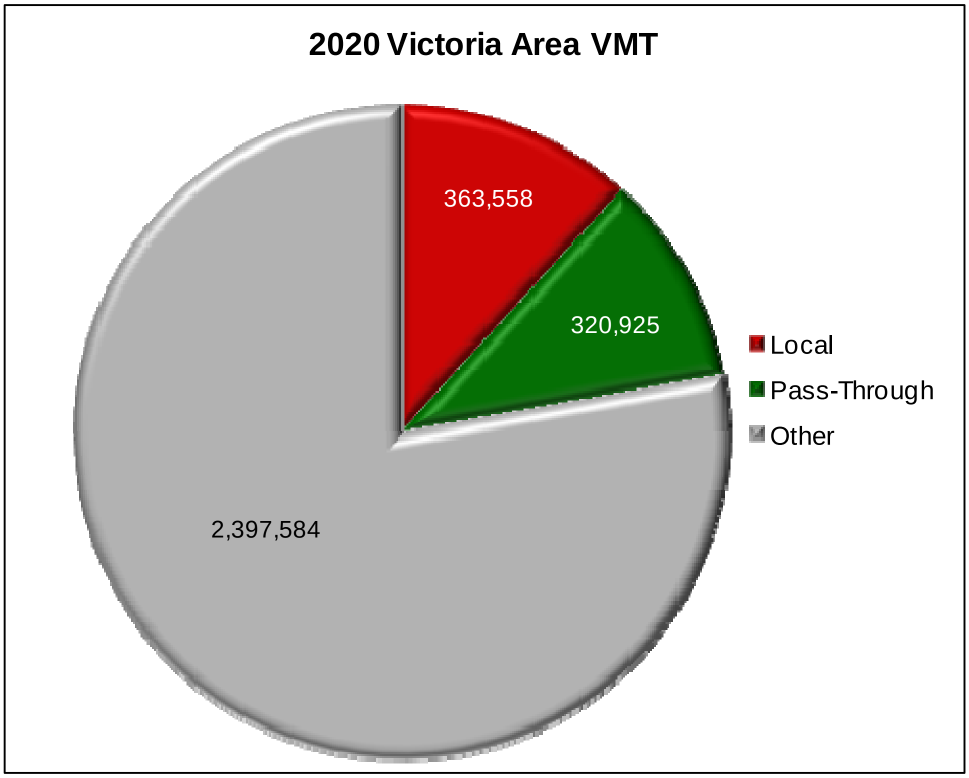

2010 Victoria Area NOx (Tons/Day)
2.738
2.808
3.633
Local
Pass-Through
Other

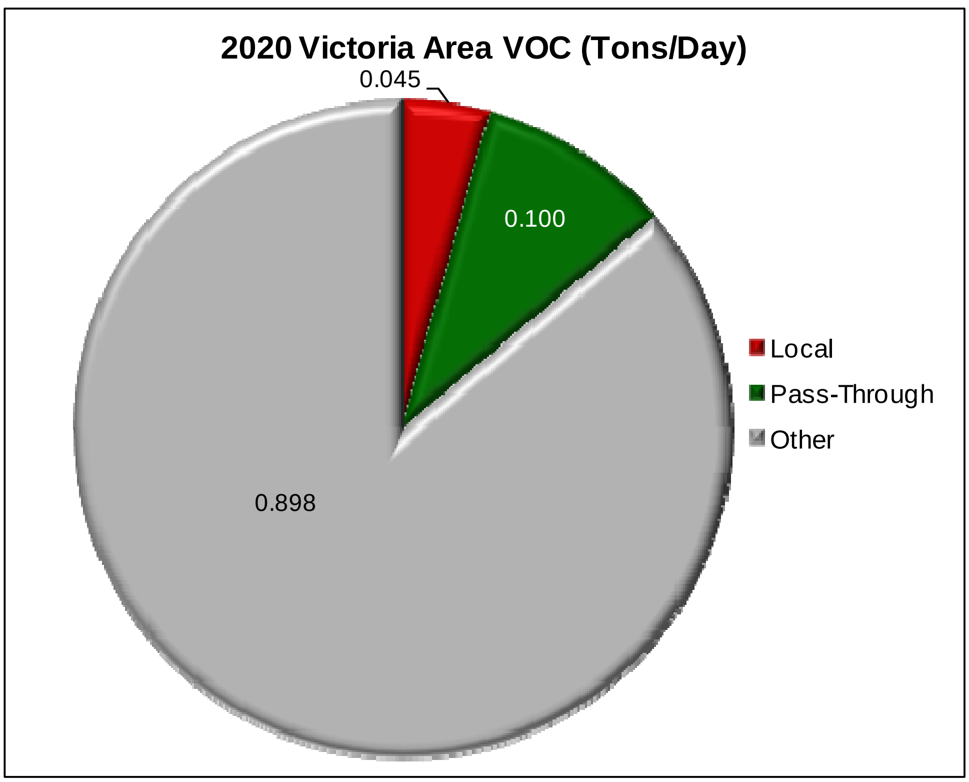

2015 Victoria Area VMT
342,521
302,354
2,258,845
Local
Pass-Through
Other

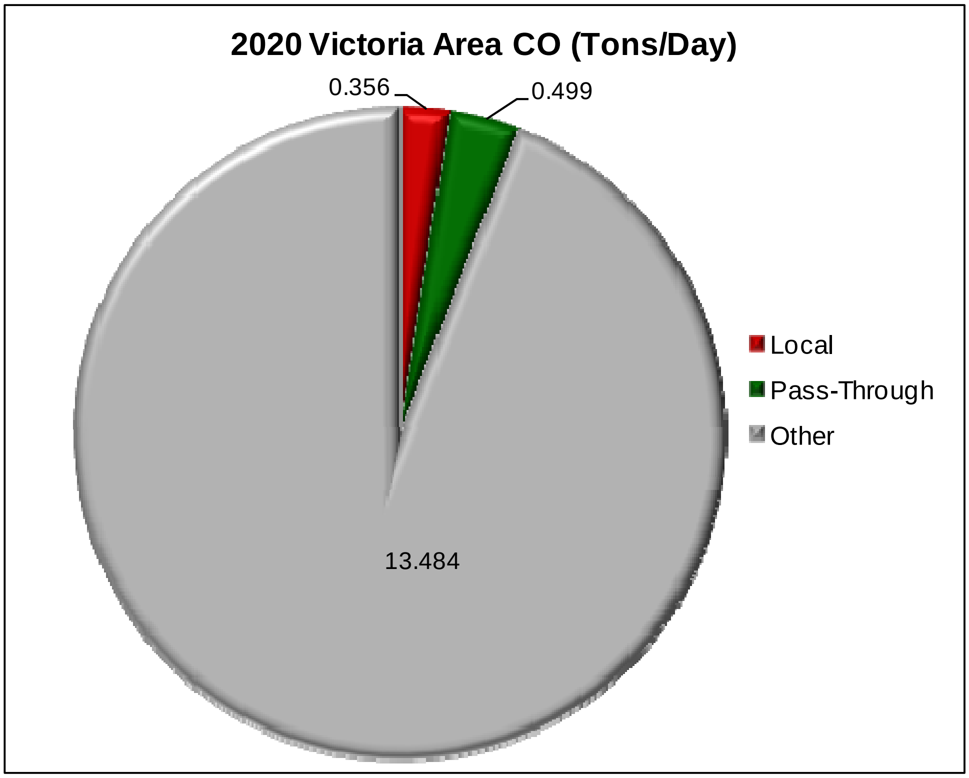

2015 Victoria Area VOC (Tons/Day)
0.097
0.163
1.189
Local
Pass-Through
Other

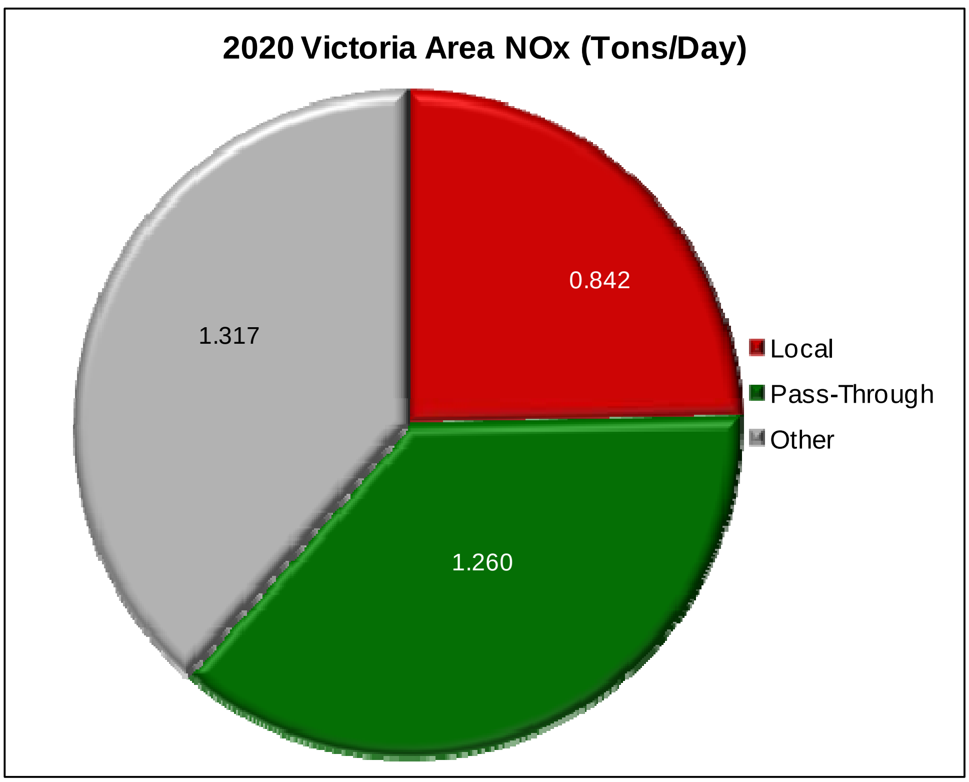

2015 Victoria Area CO (Tons/Day)
0.598
0.759
16.237
Local
Pass-Through
Other

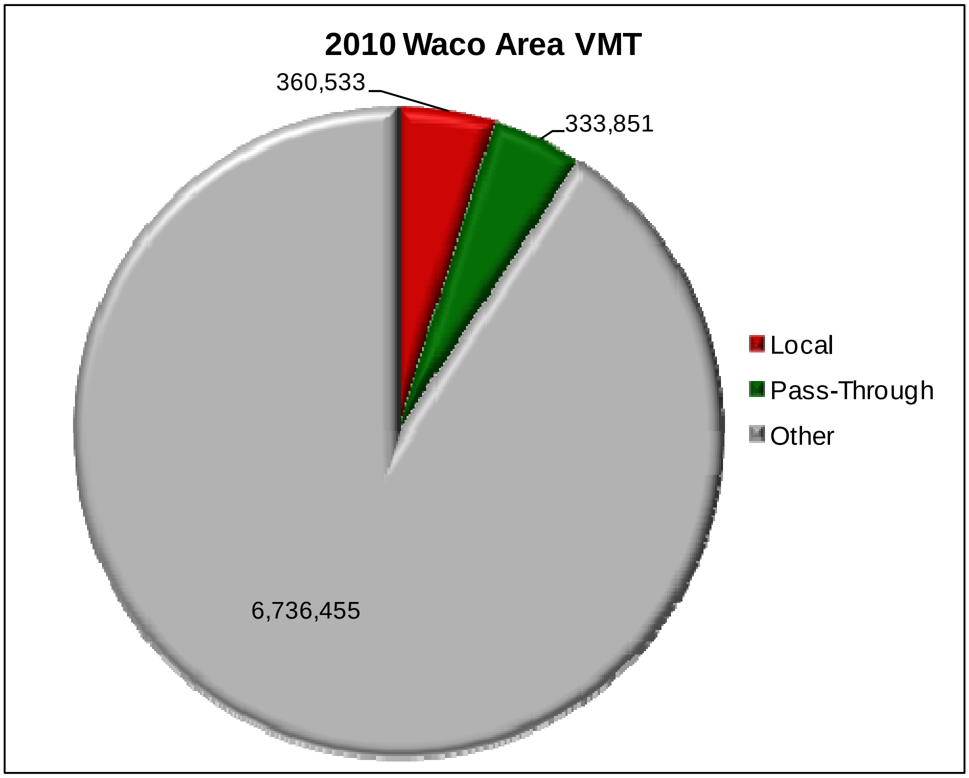

2015 Victoria Area NOx (Tons/Day)
1.858
1.496
2.040
Local
Pass-Through
Other

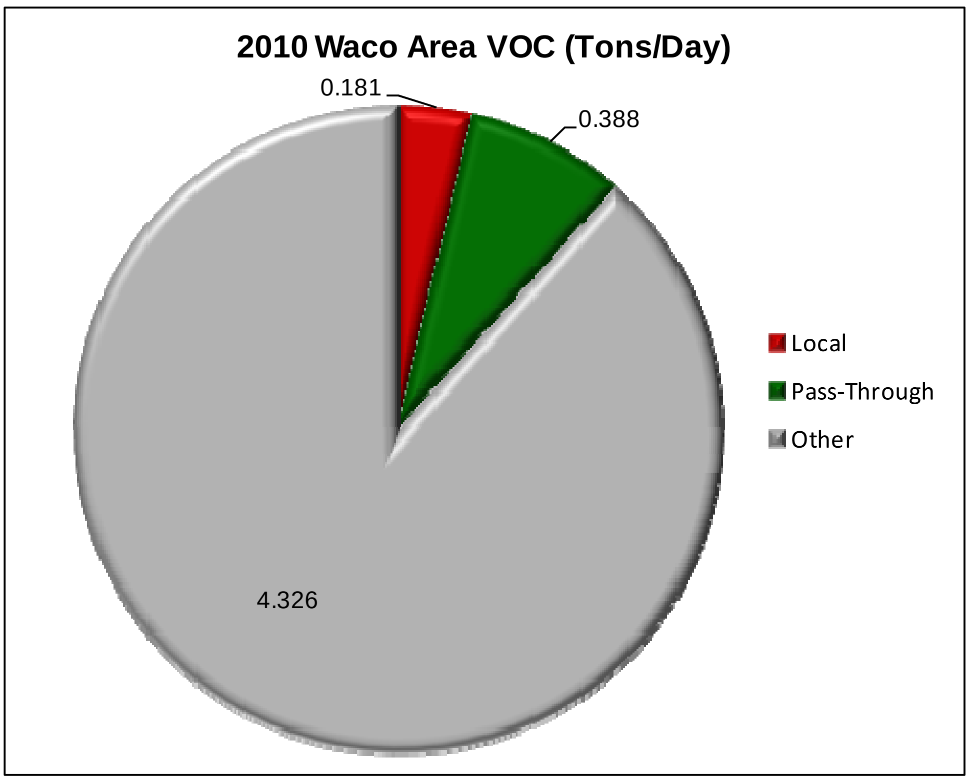

2020 Victoria Area VMT
363,558
320,925
2,397,584
Local
Pass-Through
Other

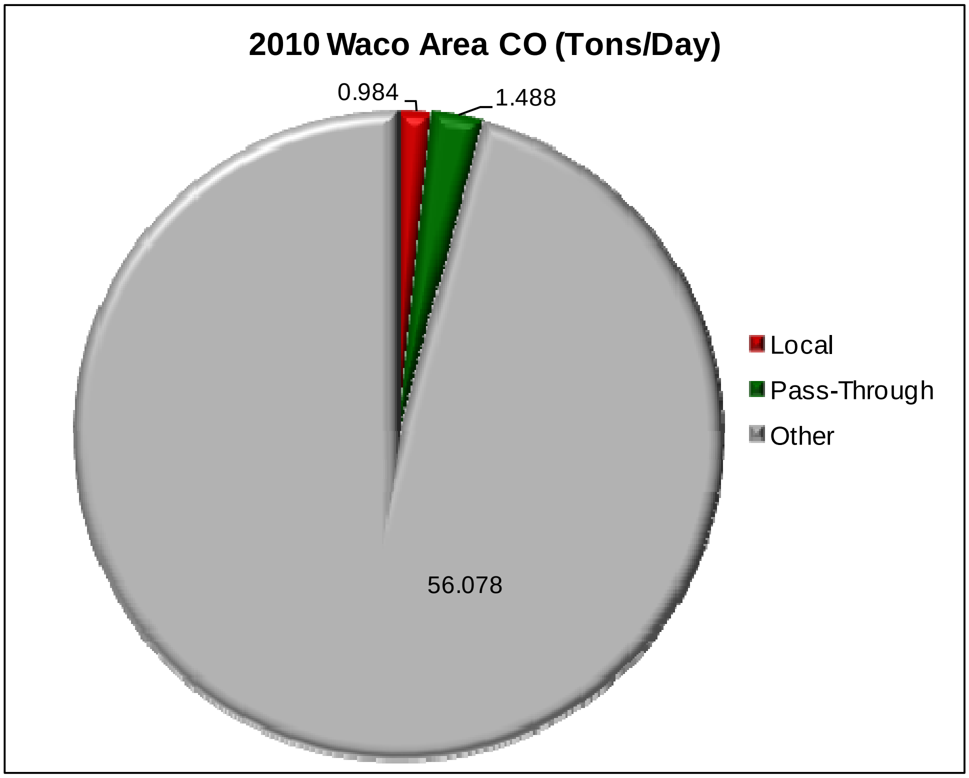

2020 Victoria Area VOC (Tons/Day)
0.045
0.100
0.898
Local
Pass-Through
Other


2020 Victoria Area CO (Tons/Day)
0.356
0.499
13.484
Local
Pass-Through
Other

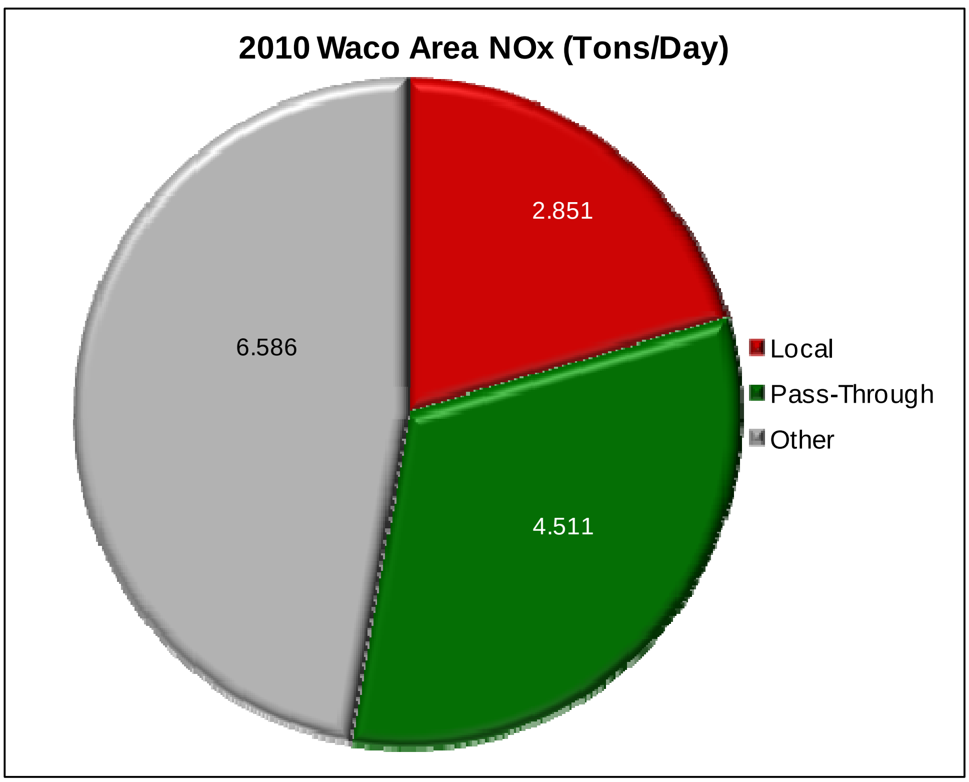

2020 Victoria Area NOx (Tons/Day)
0.842
1.317
1.260
Local
Pass-Through
Other


2010 Waco Area VMT
360,533
333,851
6,736,455
Local
Pass-Through
Other

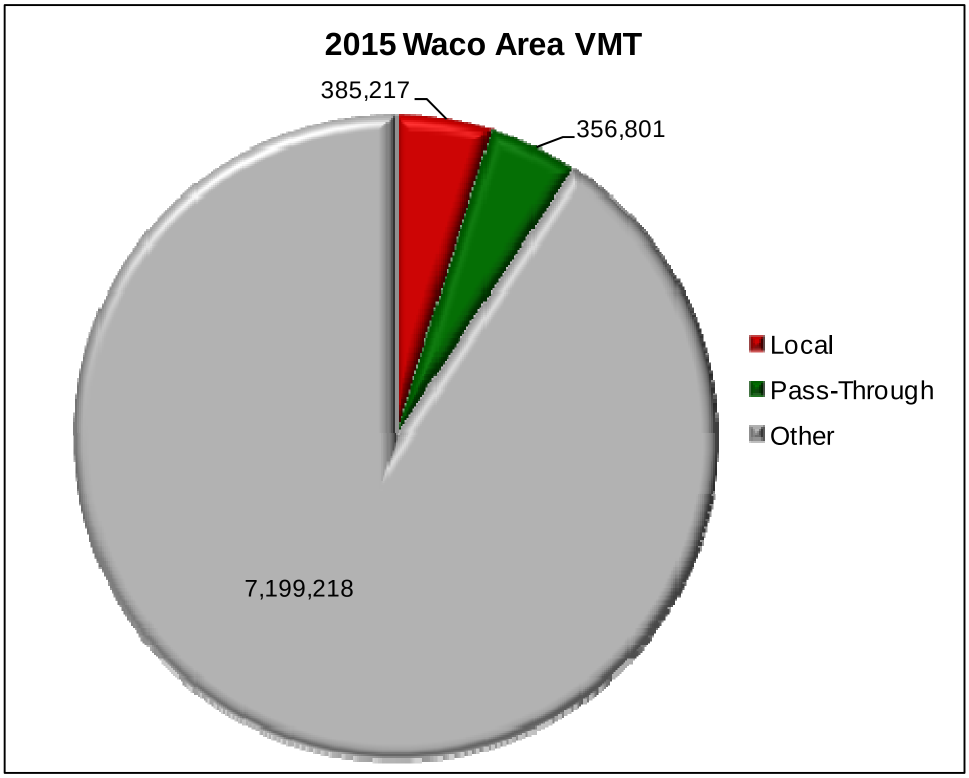

2010 Waco Area VOC (Tons/Day)
0.181
0.388
4.326
Local
Pass-Through
Other

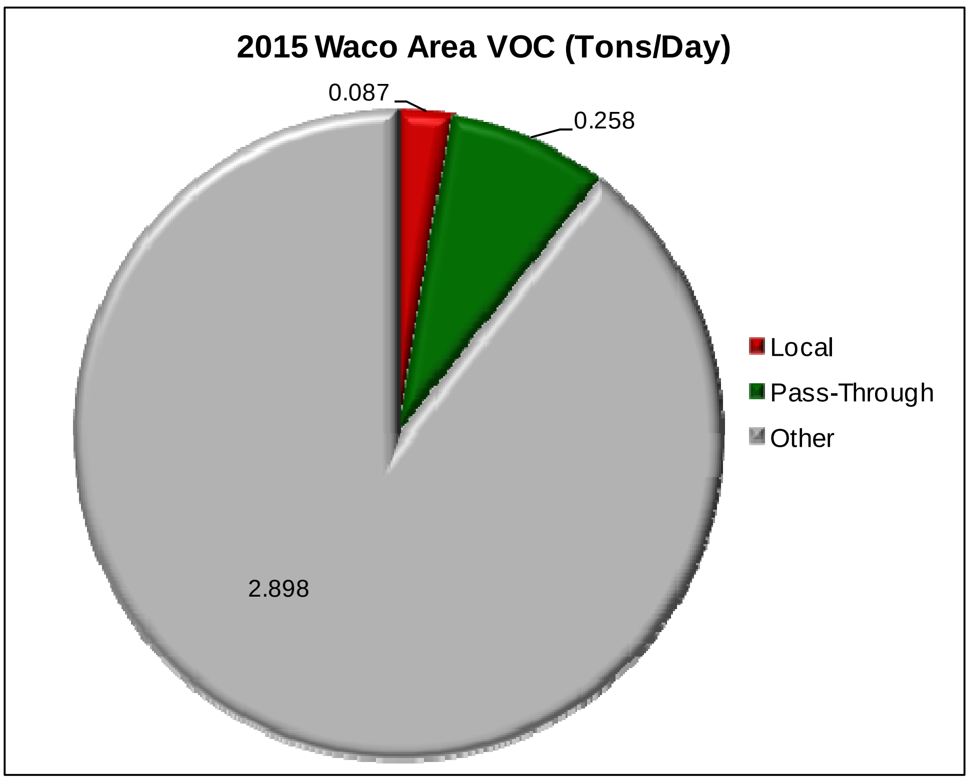


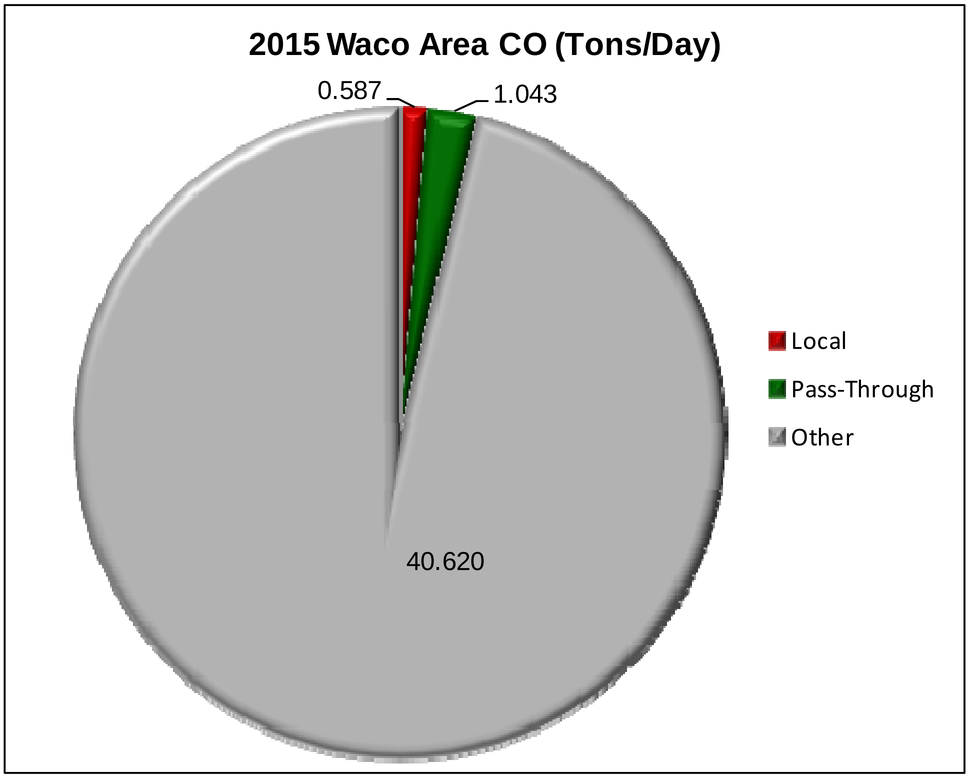
2010 Waco Area CO (Tons/Day)
0.984
1.488
56.078
Local
Pass-Through
Other

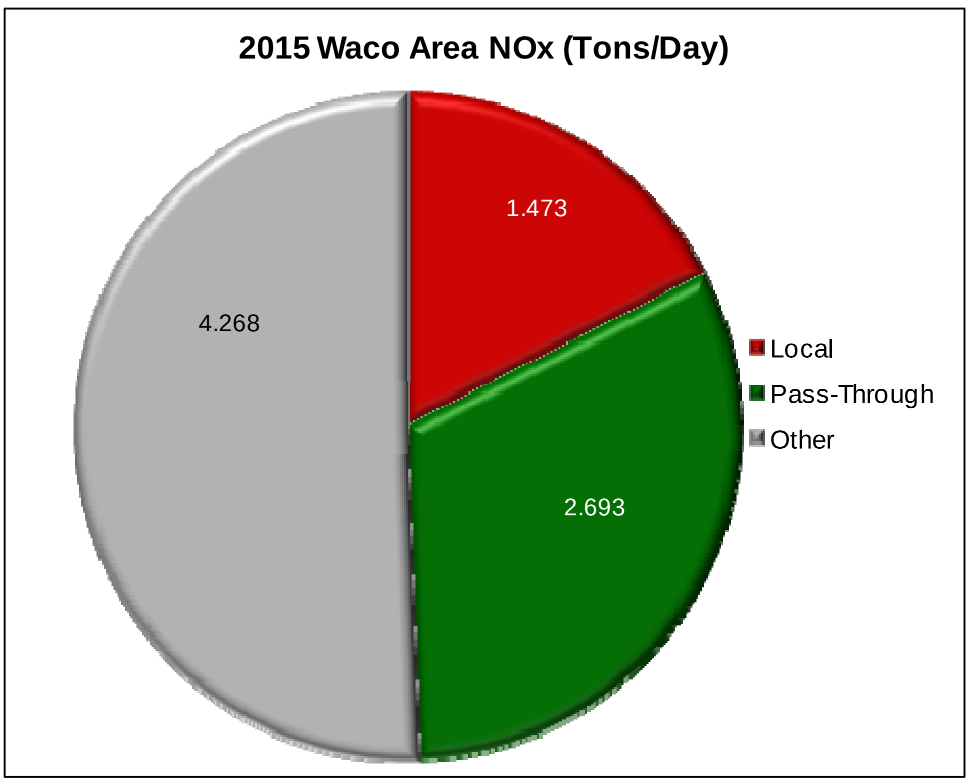


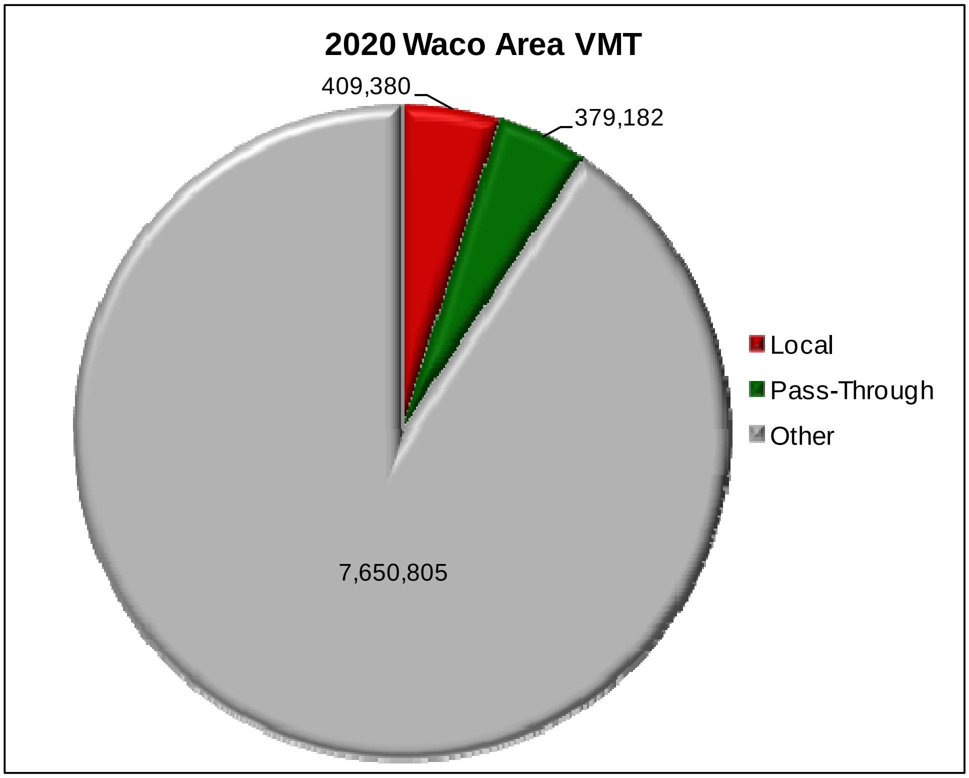
2010 Waco Area NOx (Tons/Day)
2.851
6.586
4.511
Local
Pass-Through
Other

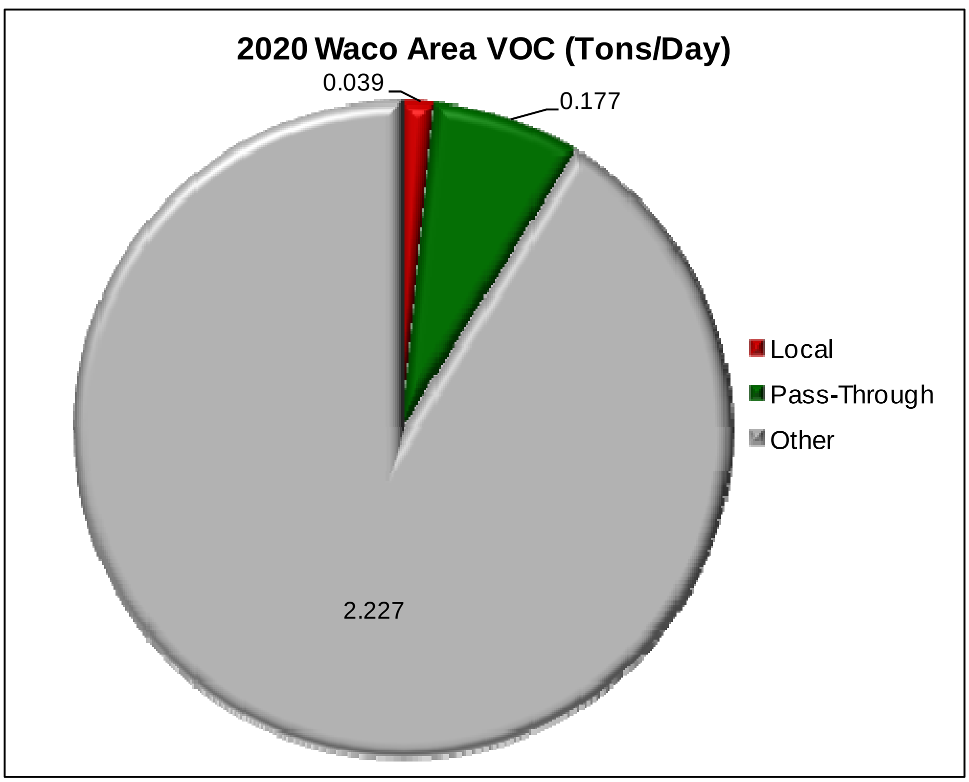

2015 Waco Area VMT
385,217
356,801
7,199,218
Local
Pass-Through
Other

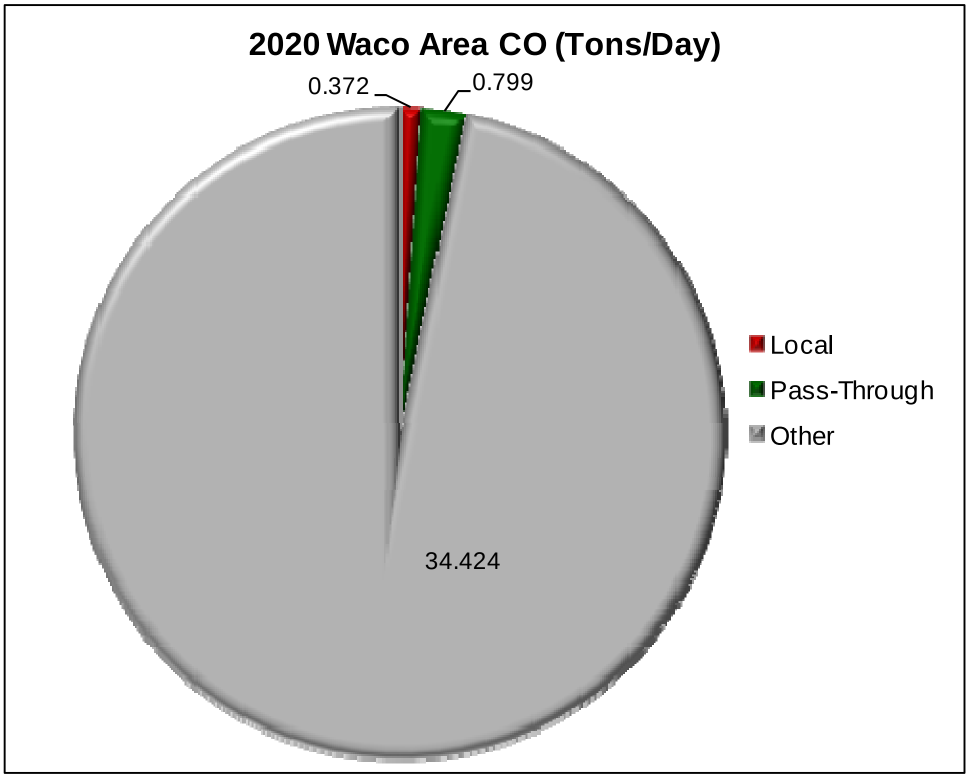

2015 Waco Area VOC (Tons/Day)
0.087
0.258
2.898
Local
Pass-Through
Other

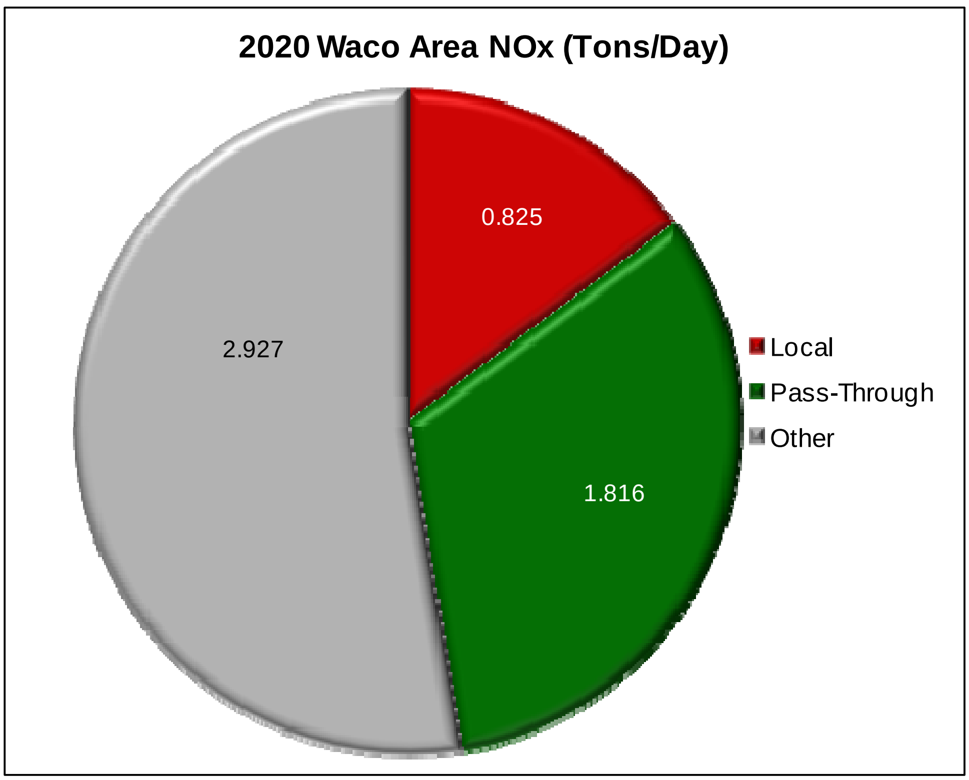

2015 Waco Area CO (Tons/Day)
0.587
1.043
40.620
Local
Pass-Through
Other

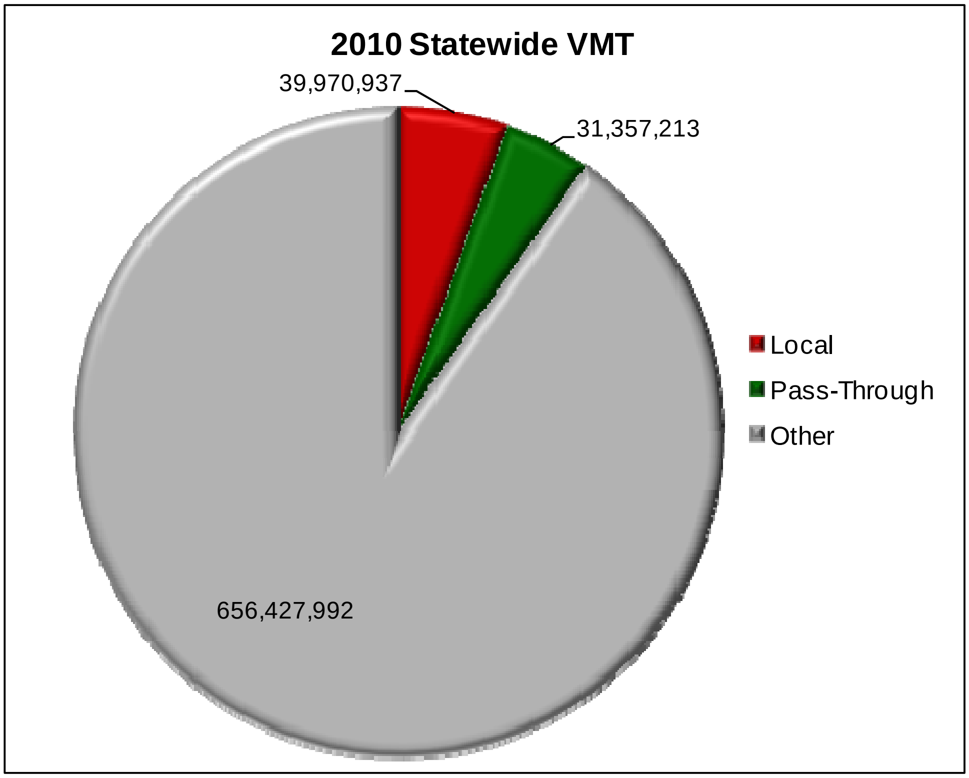

2015 Waco Area NOx (Tons/Day)
1.473
4.268
2.693
Local
Pass-Through
Other

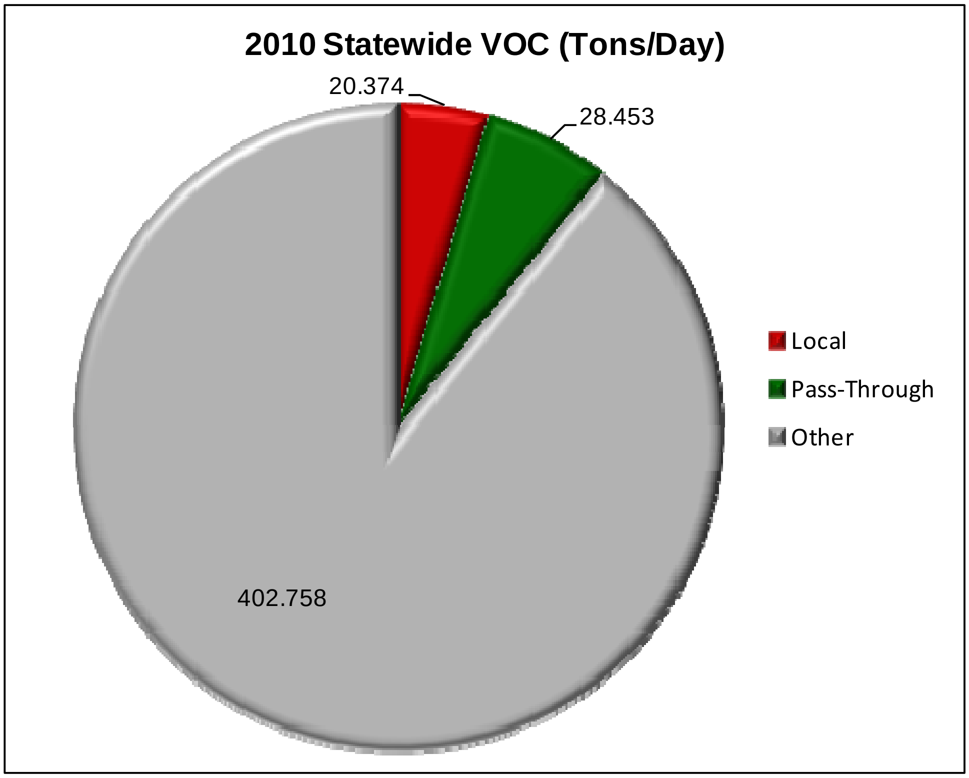

2020 Waco Area VMT
409,380
379,182
7,650,805
Local
Pass-Through
Other

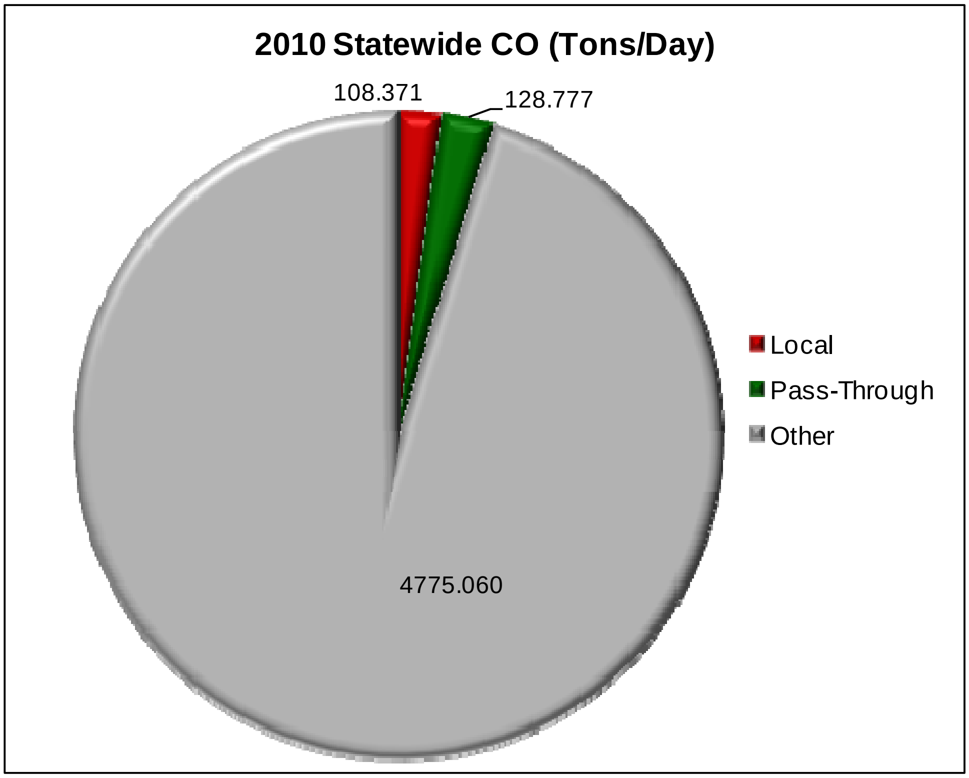

2020 Waco Area VOC (Tons/Day)
0.039
0.177
2.227
Local
Pass-Through
Other

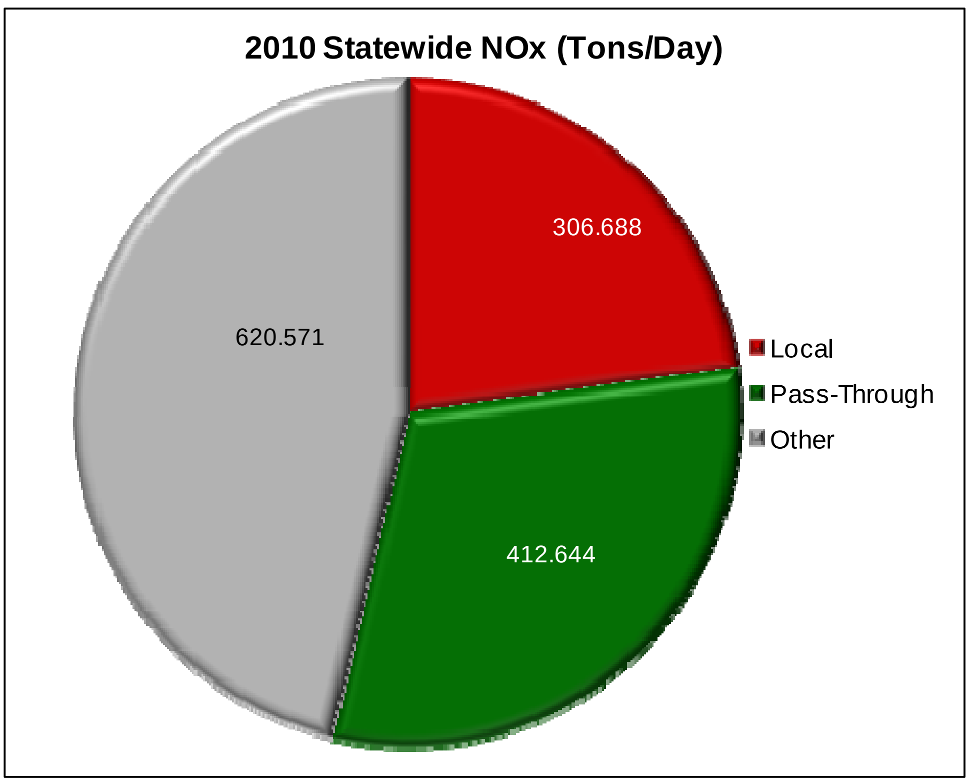

2020 Waco Area CO (Tons/Day)
0.372
0.799
34.424
Local
Pass-Through
Other

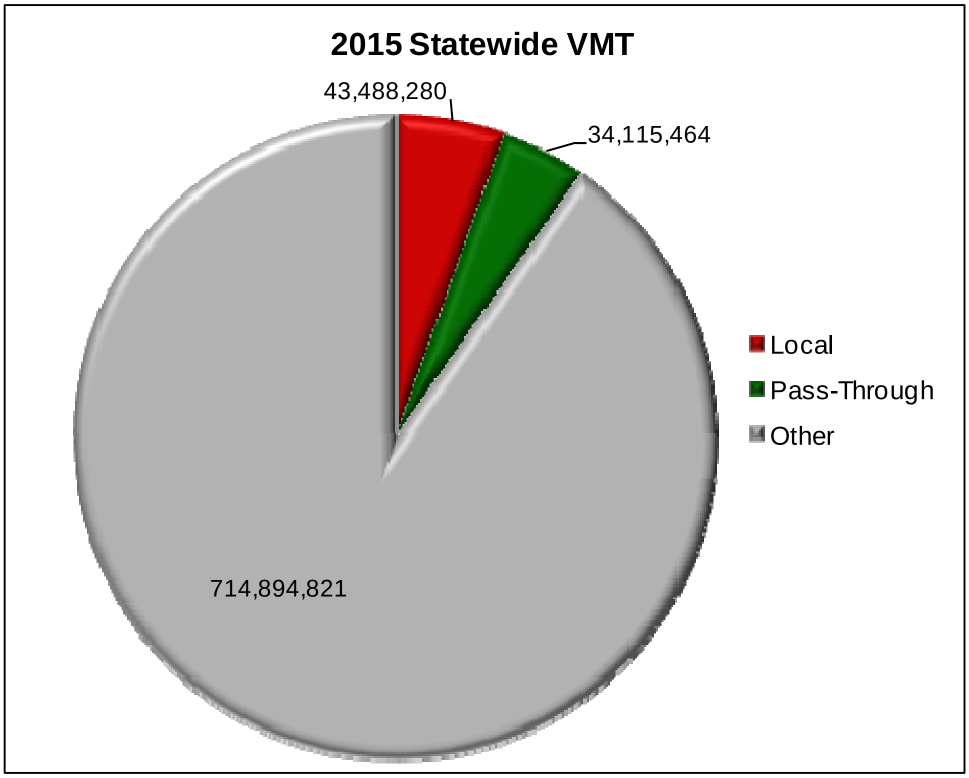

2020 Waco Area NOx (Tons/Day)
0.825
2.927
1.816
Local
Pass-Through
Other

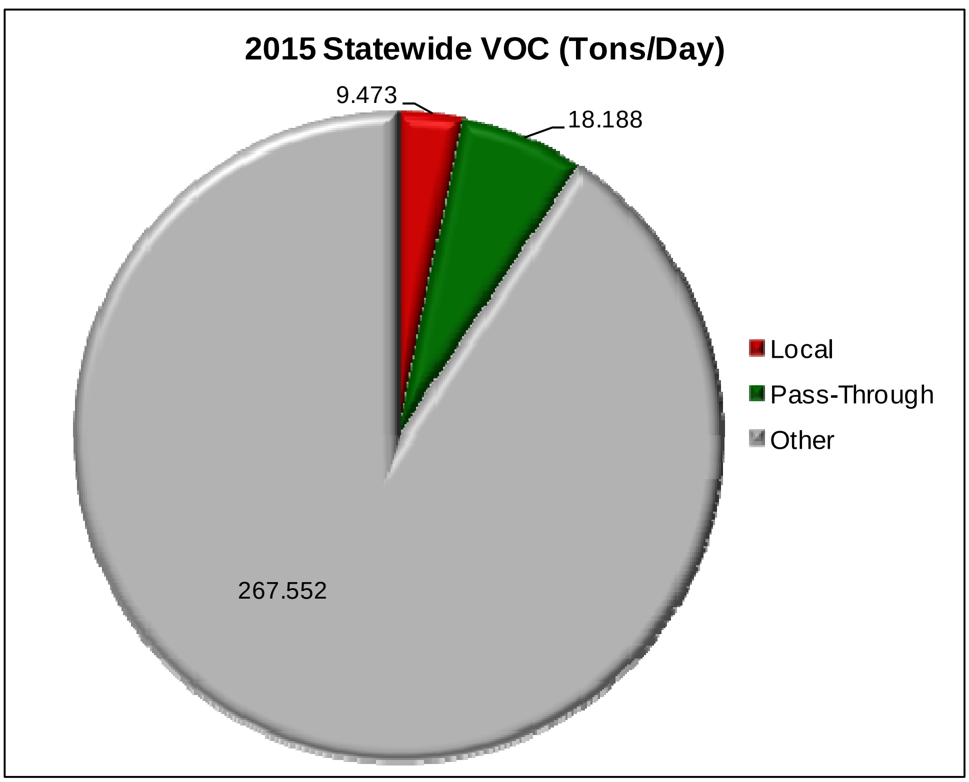

2010 Statewide VMT
39,970,937
31,357,213
656,427,992
Local
Pass-Through
Other

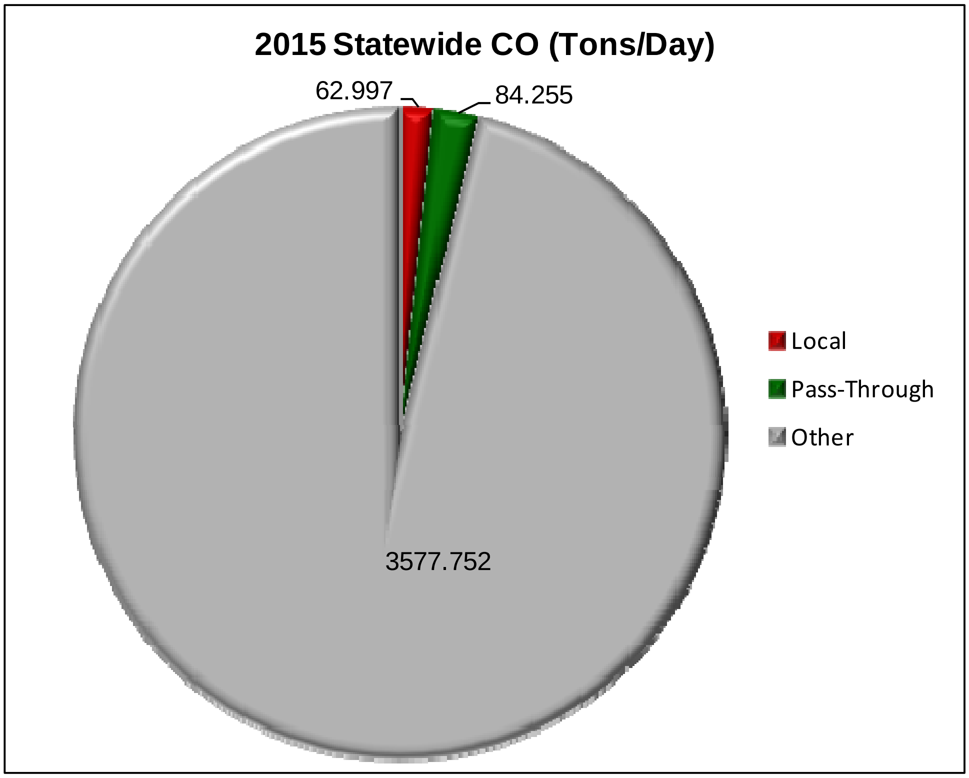

2010 Statewide VOC (Tons/Day)
20.374
28.453
402.758
Local
Pass-Through
Other

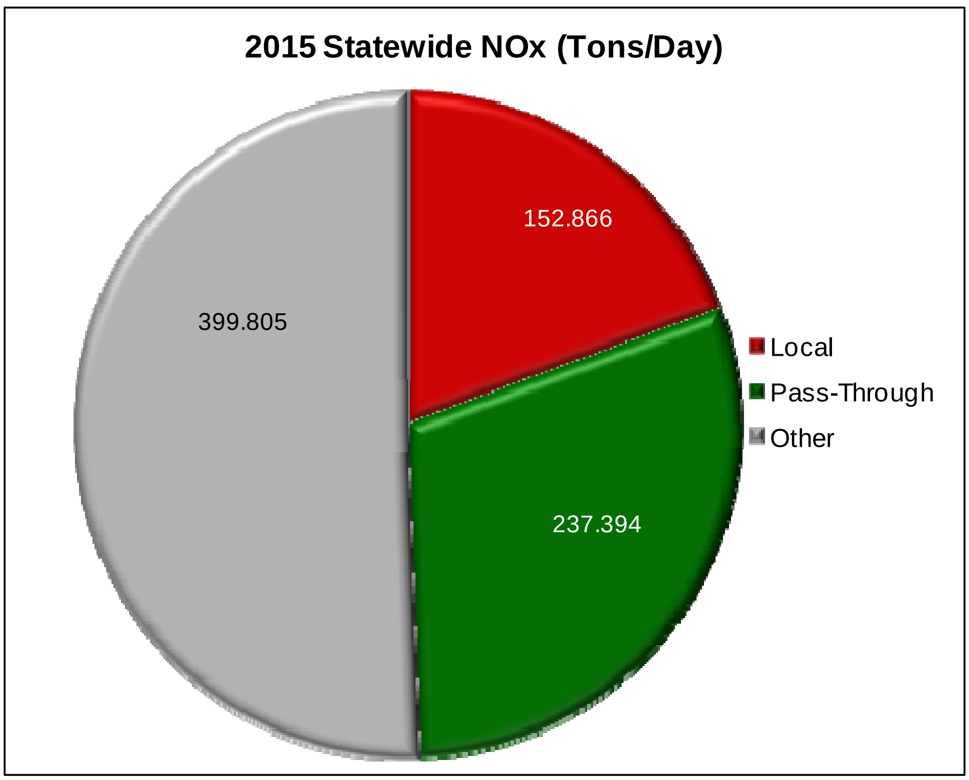

2010 Statewide CO (Tons/Day)
108.371
128.777
4775.060
Local
Pass-Through
Other

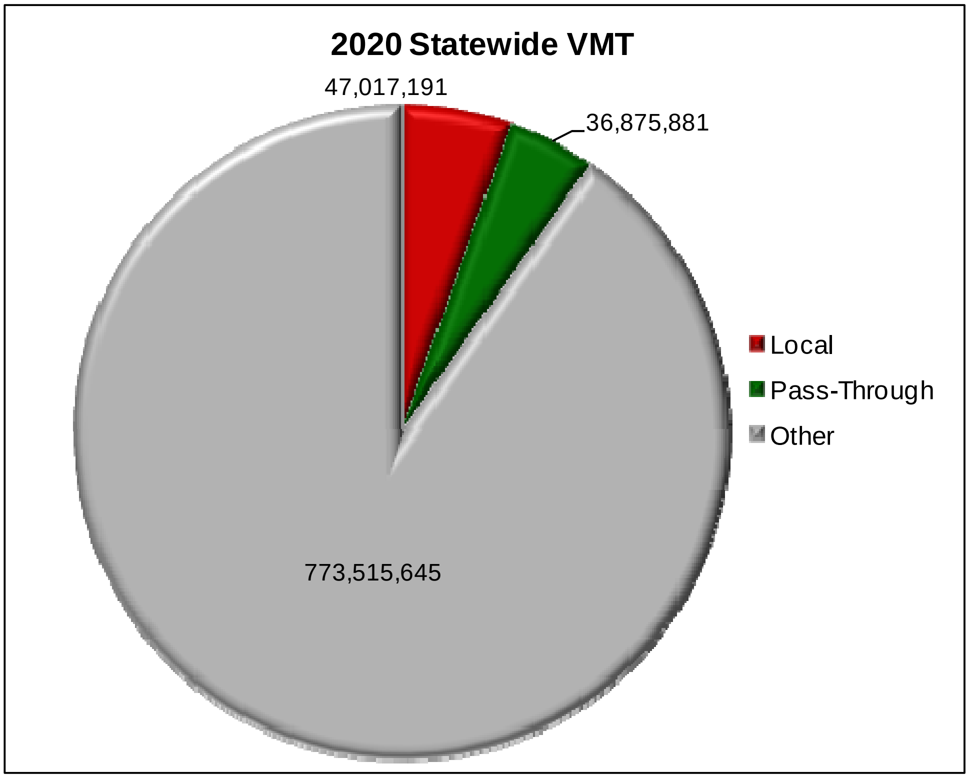

2010 Statewide NOx (Tons/Day)
306.688
620.571
412.644
Local
Pass-Through
Other

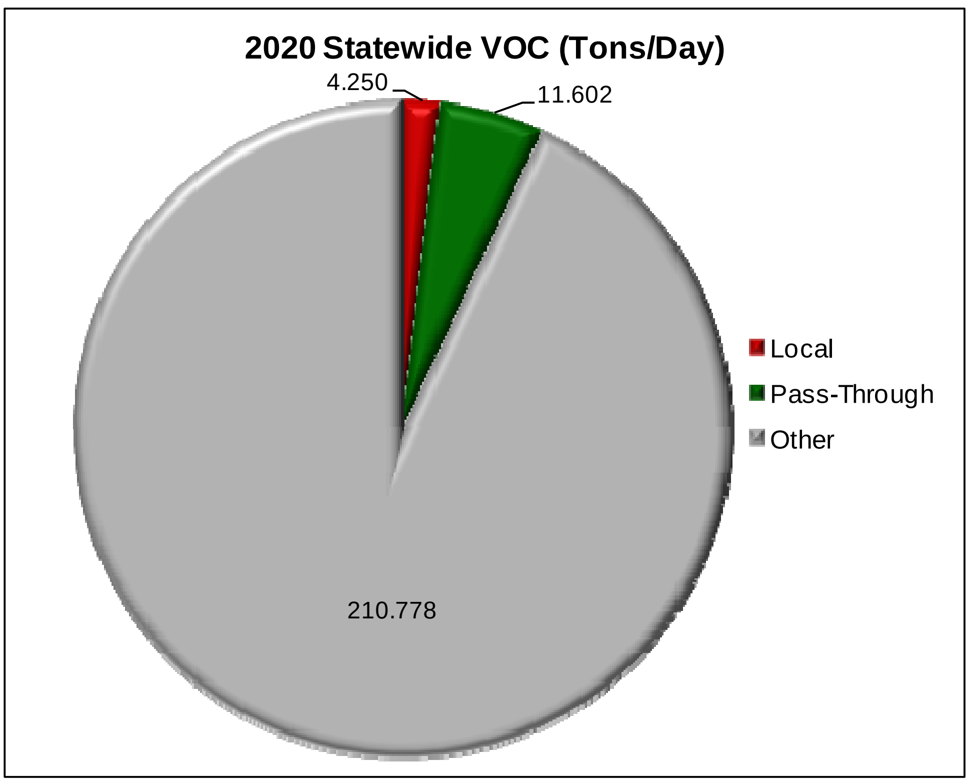

2015 Statewide VMT
43,488,280
34,115,464
714,894,821
Local
Pass-Through
Other

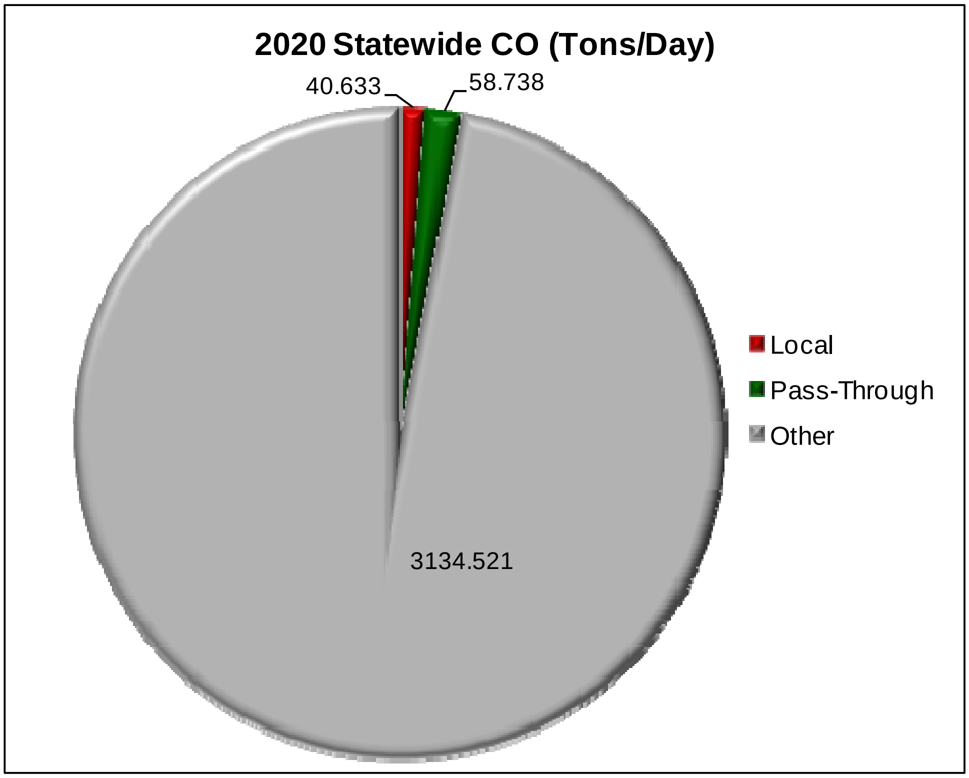

2015 Statewide VOC (Tons/Day)
9.473
18.188
267.552
Local
Pass-Through
Other


2015 Statewide CO (Tons/Day)
62.997
84.255
3577.752
Local
Pass-Through
Other


2015 Statewide NOx (Tons/Day)
152.866
399.805
237.394
Local
Pass-Through
Other


2020 Statewide VMT
47,017,191
36,875,881
773,515,645
Local
Pass-Through
Other


2020 Statewide VOC (Tons/Day)
4.250
11.602
210.778
Local
Pass-Through
Other


2020 Statewide CO (Tons/Day)
40.633
58.738
3134.521
Local
Pass-Through
Other

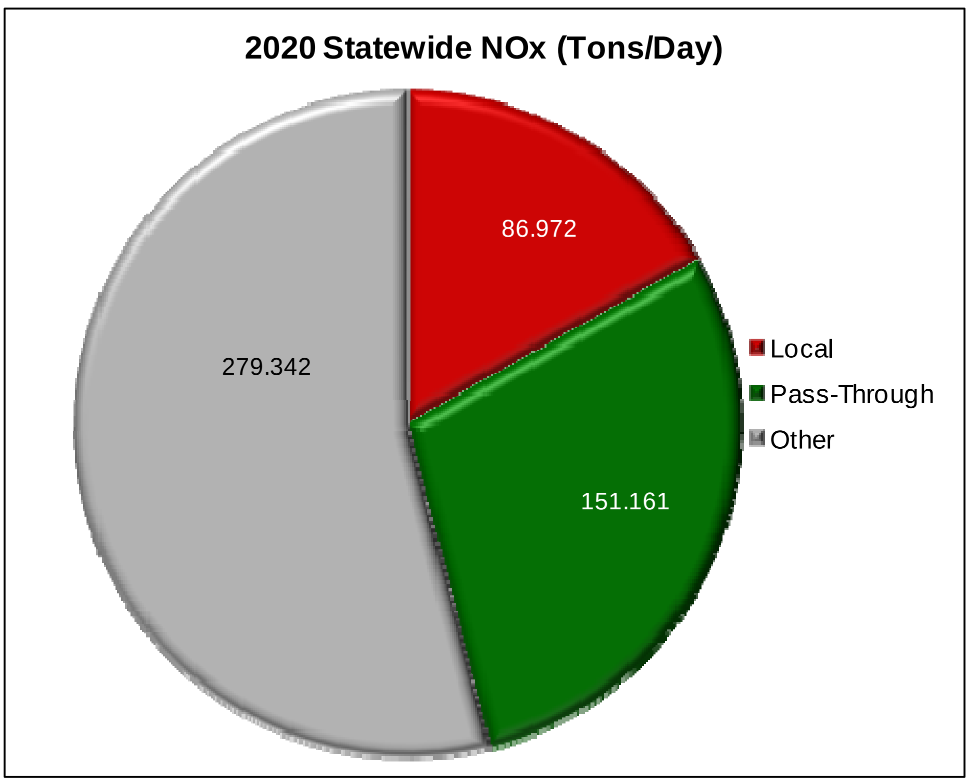

2020 Statewide NOx (Tons/Day)
86.972
279.342
151.161
Local
Pass-Through
Other

Table 34. Austin-Round Rock Area Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-Through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	1,426,224	0.691	3.754	10.577	822,920	0.594	3.130	10.519	44,068,827	25.640	328.065	57.373
2009	1,462,950	0.694	3.749	10.052	844,122	0.579	3.025	9.961	45,176,810	25.230	308.410	55.588
2010	1,499,646	0.718	3.856	9.583	865,307	0.582	3.017	9.531	46,282,940	25.039	292.406	54.131
2011	1,536,458	0.605	3.457	8.621	886,556	0.519	2.777	8.701	47,392,267	22.830	263.623	49.622
2012	1,573,594	0.492	3.046	7.393	907,993	0.462	2.531	7.809	48,511,006	20.943	249.690	44.600
2013	1,610,794	0.417	2.761	6.233	929,466	0.420	2.310	6.765	49,631,185	19.178	237.808	39.778
2014	1,648,086	0.355	2.497	5.347	950,992	0.385	2.117	5.993	50,753,173	17.891	230.497	35.594
2015	1,684,001	0.309	2.296	4.631	972,817	0.356	1.969	5.395	51,880,431	16.902	223.418	32.402
2016	1,721,495	0.260	2.110	4.120	994,485	0.323	1.827	4.907	53,008,245	15.781	211.618	29.469
2017	1,759,234	0.217	1.942	3.671	1,016,293	0.286	1.674	4.443	54,143,086	15.039	208.309	26.914
2018	1,797,084	0.176	1.786	3.281	1,038,167	0.252	1.526	3.993	55,280,412	14.497	206.793	24.823
2019	1,835,152	0.153	1.696	2.962	1,060,166	0.229	1.430	3.639	56,423,780	14.147	206.210	23.091
2020	1,873,383	0.135	1.633	2.698	1,082,261	0.211	1.353	3.307	57,571,904	13.777	204.128	21.652
2021	1,911,837	0.122	1.589	2.494	1,104,483	0.197	1.300	3.065	58,727,000	13.579	204.819	20.564
2022	1,950,541	0.108	1.550	2.333	1,126,850	0.181	1.239	2.840	59,889,676	13.448	206.199	19.724
2023	1,989,412	0.100	1.530	2.227	1,149,313	0.172	1.202	2.684	61,057,193	13.406	208.219	19.156
2024	2,028,560	0.094	1.519	2.141	1,171,936	0.165	1.178	2.565	62,233,471	13.644	210.320	18.712
2025	2,067,787	0.090	1.520	2.079	1,194,607	0.160	1.164	2.465	63,411,292	13.672	212.978	18.426
2026	2,107,351	0.086	1.524	2.045	1,217,471	0.156	1.155	2.400	64,599,483	13.101	212.821	17.903
2027	2,146,901	0.083	1.531	2.016	1,240,328	0.153	1.150	2.350	65,786,448	13.170	216.145	17.833
2028	2,186,734	0.081	1.543	2.006	1,263,349	0.151	1.149	2.314	66,981,996	13.105	219.425	17.840
2029	2,226,596	0.080	1.558	1.998	1,286,387	0.149	1.153	2.283	68,177,668	13.216	222.752	17.868
2030	2,266,638	0.079	1.576	2.006	1,309,528	0.149	1.162	2.284	69,378,800	13.408	226.217	17.967

Table 35. Beaumont-Port Arthur Area Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-Through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	790,958	0.390	2.018	6.204	727,764	0.741	3.212	10.565	12,939,315	8.940	114.319	29.207
2009	797,472	0.369	1.923	5.657	733,655	0.708	3.072	9.872	13,045,610	8.573	104.608	27.443
2010	803,921	0.380	1.965	5.321	739,490	0.692	3.010	9.318	13,150,787	8.359	97.745	26.223
2011	810,411	0.306	1.693	4.685	745,362	0.615	2.754	8.427	13,256,690	7.540	87.273	23.772
2012	816,876	0.251	1.474	3.955	751,211	0.549	2.499	7.525	13,362,229	6.788	81.102	21.125
2013	823,255	0.213	1.317	3.281	756,981	0.500	2.272	6.500	13,466,370	6.165	76.215	18.502
2014	829,648	0.180	1.173	2.800	762,766	0.461	2.076	5.747	13,570,745	5.649	72.349	16.393
2015	835,646	0.155	1.059	2.426	768,246	0.428	1.923	5.165	13,673,238	5.215	68.583	14.761
2016	842,090	0.130	0.951	2.135	774,080	0.390	1.781	4.692	13,778,547	4.774	64.455	13.306
2017	848,405	0.109	0.857	1.887	779,802	0.349	1.634	4.248	13,881,681	4.409	62.045	12.010
2018	854,668	0.091	0.780	1.684	785,474	0.313	1.494	3.827	13,983,989	4.131	60.259	10.912
2019	860,888	0.079	0.724	1.505	791,108	0.287	1.399	3.496	14,085,640	3.917	58.886	9.991
2020	867,065	0.069	0.678	1.351	796,705	0.268	1.324	3.193	14,186,590	3.721	57.380	9.185
2021	873,151	0.062	0.646	1.240	802,215	0.252	1.269	2.969	14,286,076	3.570	56.501	8.566
2022	879,310	0.055	0.616	1.147	807,800	0.235	1.208	2.763	14,386,775	3.437	55.806	8.035
2023	885,246	0.049	0.592	1.068	813,179	0.225	1.168	2.616	14,483,825	3.344	55.375	7.633
2024	891,353	0.046	0.576	1.010	818,720	0.217	1.139	2.501	14,583,767	3.310	55.071	7.315
2025	897,342	0.043	0.564	0.960	824,153	0.211	1.118	2.405	14,681,741	3.252	54.928	7.054
2026	903,277	0.040	0.554	0.927	829,540	0.206	1.101	2.336	14,778,861	3.112	54.380	6.808
2027	909,159	0.038	0.546	0.898	834,877	0.202	1.088	2.280	14,875,131	3.081	54.466	6.666
2028	915,021	0.037	0.540	0.878	840,201	0.199	1.078	2.236	14,971,101	3.044	54.563	6.560
2029	920,890	0.035	0.536	0.857	845,534	0.197	1.073	2.197	15,067,209	3.033	54.723	6.470
2030	926,590	0.034	0.534	0.847	850,709	0.196	1.071	2.181	15,160,561	3.037	54.914	6.421

Table 36. Corpus Christi Area Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-Through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	681,622	0.356	1.825	5.217	350,833	0.314	1.453	4.510	12,777,928	8.291	115.173	22.105
2009	693,742	0.347	1.776	4.836	357,293	0.304	1.403	4.254	12,996,210	8.002	106.843	21.122
2010	706,120	0.346	1.780	4.533	363,878	0.303	1.395	4.053	13,219,649	7.819	100.631	20.386
2011	718,516	0.292	1.583	4.052	370,479	0.269	1.279	3.690	13,443,164	7.085	90.267	18.654
2012	730,765	0.238	1.387	3.439	377,009	0.240	1.163	3.305	13,663,714	6.443	84.720	16.703
2013	743,044	0.202	1.241	2.911	383,549	0.219	1.061	2.869	13,885,044	5.883	80.113	14.855
2014	755,268	0.175	1.115	2.513	390,072	0.202	0.972	2.548	14,104,902	5.451	76.753	13.299
2015	767,090	0.151	1.012	2.187	396,667	0.187	0.903	2.299	14,325,877	5.095	73.387	12.109
2016	779,184	0.128	0.921	1.953	403,133	0.170	0.837	2.095	14,543,190	4.716	69.432	11.005
2017	791,250	0.109	0.836	1.738	409,583	0.152	0.767	1.903	14,760,057	4.423	67.483	10.028
2018	803,288	0.089	0.754	1.533	416,018	0.135	0.700	1.719	14,976,411	4.198	66.118	9.194
2019	815,221	0.079	0.707	1.389	422,402	0.124	0.656	1.575	15,190,648	4.036	65.204	8.526
2020	827,039	0.070	0.672	1.263	428,730	0.115	0.620	1.440	15,402,633	3.878	64.015	7.953
2021	838,859	0.063	0.641	1.155	435,060	0.108	0.594	1.340	15,614,617	3.762	63.563	7.488
2022	850,510	0.055	0.610	1.068	441,308	0.100	0.565	1.249	15,823,229	3.661	63.237	7.104
2023	862,226	0.050	0.595	1.014	447,586	0.095	0.547	1.184	16,033,173	3.600	63.240	6.838
2024	873,846	0.047	0.581	0.964	453,822	0.092	0.535	1.134	16,241,005	3.593	63.244	6.614
2025	885,379	0.044	0.572	0.919	460,009	0.089	0.526	1.092	16,447,450	3.557	63.486	6.436
2026	896,942	0.042	0.567	0.897	466,212	0.087	0.520	1.064	16,654,387	3.413	63.177	6.243
2027	908,403	0.040	0.563	0.876	472,362	0.085	0.515	1.041	16,859,380	3.403	63.667	6.165
2028	919,876	0.038	0.561	0.862	478,519	0.084	0.512	1.024	17,064,661	3.377	64.149	6.116
2029	931,264	0.037	0.561	0.849	484,631	0.083	0.511	1.009	17,268,330	3.385	64.692	6.079
2030	942,640	0.037	0.563	0.846	490,736	0.082	0.512	1.005	17,471,820	3.409	65.274	6.071

Table 37. Dallas-Fort Worth Area Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-Through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	7,552,811	3.675	20.073	62.406	5,857,883	5.558	25.718	87.445	179,919,377	109.506	1,119.506	297.646
2009	7,714,387	3.638	19.675	58.852	5,984,551	5.364	24.800	82.677	183,646,363	106.232	1,091.771	286.890
2010	7,877,150	3.725	19.917	55.477	6,112,156	5.327	24.580	79.012	187,400,103	103.380	1,079.823	279.860
2011	8,040,257	3.096	17.593	49.130	6,240,041	4.775	22.691	72.269	191,160,898	92.410	993.697	252.658
2012	8,204,645	2.557	15.483	41.908	6,368,912	4.294	20.761	65.202	194,953,138	84.329	939.806	226.512
2013	8,369,349	2.202	13.993	34.922	6,498,067	3.951	19.029	56.877	198,749,612	77.015	892.160	200.977
2014	8,535,103	1.922	12.718	30.131	6,628,037	3.670	17.522	50.783	202,571,012	71.494	860.994	180.274
2015	8,696,600	1.672	11.619	26.279	6,758,377	3.433	16.359	46.082	206,409,856	67.208	831.368	164.495
2016	8,863,826	1.424	10.612	23.393	6,889,550	3.151	15.256	42.239	210,269,118	62.356	781.953	150.205
2017	9,031,715	1.180	9.619	20.839	7,021,245	2.828	14.071	38.574	214,143,485	59.058	765.785	137.595
2018	9,200,497	0.973	8.782	18.566	7,153,633	2.546	12.929	35.046	218,038,871	56.626	756.774	126.941
2019	9,370,054	0.845	8.280	16.858	7,286,614	2.348	12.182	32.273	221,953,426	54.988	751.696	118.296
2020	9,540,576	0.723	7.816	15.222	7,420,317	2.204	11.599	29.702	225,892,646	53.375	742.051	110.853
2021	9,712,404	0.644	7.532	14.087	7,555,006	2.086	11.191	27.830	229,865,314	52.358	742.029	105.315
2022	9,885,175	0.564	7.255	13.154	7,690,410	1.952	10.720	26.092	233,861,779	51.576	744.205	100.815
2023	10,059,452	0.522	7.121	12.463	7,826,932	1.877	10.440	24.916	237,897,964	51.232	749.252	97.764
2024	10,234,260	0.493	7.054	12.006	7,963,855	1.819	10.259	24.016	241,947,704	52.130	755.029	95.484
2025	10,410,662	0.473	7.029	11.629	8,101,954	1.787	10.158	23.280	246,040,578	52.123	762.934	93.901
2026	10,587,543	0.453	7.021	11.448	8,240,409	1.755	10.085	22.815	250,145,766	49.763	759.529	91.533
2027	10,765,041	0.435	7.023	11.304	8,379,315	1.733	10.051	22.459	254,267,957	49.927	769.781	91.069
2028	10,943,990	0.424	7.050	11.229	8,519,302	1.721	10.052	22.222	258,428,356	49.645	779.769	90.969
2029	11,123,299	0.417	7.101	11.182	8,659,592	1.717	10.090	22.033	262,595,472	49.975	790.107	91.012
2030	11,303,713	0.412	7.164	11.210	8,800,719	1.720	10.167	22.077	266,790,607	50.608	800.997	91.449

Table 38. El Paso Area Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-Through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	512,534	0.322	1.687	6.109	469,438	0.751	2.596	9.563	15,647,405	13.131	155.070	33.335
2009	520,968	0.317	1.664	5.786	477,163	0.724	2.525	9.094	15,904,892	12.922	144.085	32.132
2010	529,635	0.322	1.682	5.526	485,102	0.716	2.517	8.741	16,169,503	12.956	136.126	31.284
2011	538,190	0.288	1.563	5.112	492,937	0.648	2.365	8.085	16,430,657	11.917	121.285	29.057
2012	546,712	0.253	1.420	4.522	500,742	0.591	2.211	7.409	16,690,837	11.051	112.849	26.509
2013	555,271	0.222	1.276	3.969	508,582	0.552	2.073	6.627	16,952,142	10.137	106.091	24.061
2014	563,734	0.198	1.154	3.488	516,333	0.522	1.954	6.059	17,210,513	9.484	101.927	21.904
2015	571,586	0.180	1.067	3.132	524,180	0.496	1.865	5.625	17,472,290	8.988	97.723	20.259
2016	579,965	0.158	0.973	2.818	531,864	0.463	1.781	5.269	17,728,441	8.308	87.840	18.681
2017	588,351	0.134	0.867	2.507	539,554	0.426	1.692	4.930	17,984,762	7.852	85.192	17.196
2018	596,815	0.109	0.761	2.204	547,316	0.394	1.606	4.609	18,243,495	7.476	83.297	15.900
2019	605,059	0.095	0.698	1.974	554,877	0.372	1.552	4.361	18,495,496	7.202	81.929	14.830
2020	613,306	0.083	0.644	1.748	562,440	0.357	1.511	4.134	18,747,607	6.900	79.366	13.890
2021	621,458	0.073	0.601	1.561	569,915	0.343	1.483	3.973	18,996,784	6.694	78.514	13.147
2022	629,678	0.062	0.555	1.402	577,454	0.329	1.452	3.824	19,248,071	6.523	77.857	12.515
2023	637,832	0.055	0.523	1.276	584,932	0.321	1.435	3.726	19,497,309	6.414	77.663	12.046
2024	645,993	0.050	0.502	1.190	592,416	0.315	1.425	3.654	19,746,788	6.578	77.752	11.669
2025	654,076	0.045	0.482	1.097	599,828	0.312	1.422	3.598	19,993,855	6.499	78.024	11.361
2026	662,246	0.042	0.468	1.043	607,321	0.309	1.421	3.565	20,243,605	5.937	75.464	10.826
2027	670,325	0.038	0.453	0.986	614,730	0.307	1.423	3.543	20,490,572	5.885	75.989	10.658
2028	678,499	0.035	0.445	0.946	622,225	0.307	1.428	3.532	20,740,412	5.733	76.293	10.547
2029	686,547	0.034	0.440	0.908	629,606	0.307	1.435	3.525	20,986,434	5.703	76.784	10.451
2030	694,656	0.032	0.436	0.887	637,043	0.308	1.446	3.539	21,234,305	5.726	77.348	10.405

Table 39. Houston-Galveston-Brazoria Area Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-Through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	5,959,074	3.134	16.867	46.771	2,821,033	3.364	13.379	39.500	145,230,248	88.303	880.610	206.660
2009	6,075,565	3.081	16.634	44.075	2,876,756	3.261	13.026	37.498	148,001,562	85.484	860.662	197.045
2010	6,192,504	3.113	16.691	41.221	2,932,703	3.241	12.981	35.916	150,782,279	81.984	835.101	187.984
2011	6,309,820	2.617	14.913	36.809	2,988,820	2.916	12.093	32.999	153,573,073	73.447	777.099	170.594
2012	6,427,429	2.170	13.218	31.366	3,045,088	2.638	11.196	29.900	156,369,368	66.789	735.316	152.520
2013	6,545,914	1.855	11.938	26.434	3,101,787	2.446	10.413	26.395	159,185,502	60.711	696.705	135.732
2014	6,664,416	1.597	10.795	22.779	3,158,480	2.292	9.735	23.826	162,002,895	56.015	670.324	121.584
2015	6,777,034	1.385	9.864	19.821	3,215,592	2.163	9.218	21.847	164,833,973	52.324	645.719	110.902
2016	6,896,163	1.174	9.036	17.623	3,272,651	2.007	8.731	20.237	167,667,661	48.538	613.709	101.067
2017	7,015,560	0.975	8.237	15.622	3,329,846	1.829	8.212	18.711	170,506,979	45.832	600.659	92.464
2018	7,135,118	0.799	7.531	13.867	3,387,124	1.675	7.714	17.259	173,349,553	43.789	592.866	85.350
2019	7,255,026	0.697	7.117	12.498	3,444,569	1.569	7.402	16.128	176,200,364	42.406	588.197	79.533
2020	7,375,236	0.611	6.782	11.286	3,502,171	1.492	7.157	15.080	179,057,308	41.193	581.686	74.687
2021	7,496,174	0.550	6.560	10.393	3,560,126	1.428	6.997	14.330	181,931,550	40.391	581.483	71.033
2022	7,617,735	0.481	6.322	9.650	3,618,361	1.359	6.812	13.640	184,821,982	39.788	582.944	68.112
2023	7,739,554	0.441	6.190	9.131	3,676,720	1.321	6.711	13.177	187,718,926	39.509	586.505	66.129
2024	7,862,073	0.409	6.104	8.744	3,735,397	1.293	6.657	12.835	190,634,121	39.856	590.675	64.652
2025	7,984,356	0.387	6.056	8.401	3,793,975	1.278	6.639	12.560	193,542,259	39.809	596.062	63.598
2026	8,107,122	0.369	6.037	8.217	3,852,777	1.265	6.634	12.397	196,463,211	38.492	596.387	62.328
2027	8,230,601	0.351	6.028	8.067	3,911,925	1.256	6.645	12.282	199,401,379	38.592	603.454	62.025
2028	8,353,190	0.340	6.044	7.980	3,970,644	1.251	6.668	12.213	202,317,824	38.498	610.620	61.969
2029	8,477,035	0.332	6.072	7.916	4,029,951	1.252	6.709	12.168	205,266,711	38.754	618.026	62.005
2030	8,600,564	0.327	6.119	7.909	4,089,118	1.256	6.765	12.214	208,207,007	39.184	625.661	62.254

Table 40. Laredo Area Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	475,824	0.269	1.382	4.662	320,983	0.469	1.768	5.536	4,152,759	4.176	48.314	14.850
2009	489,973	0.279	1.424	4.548	330,528	0.460	1.733	5.315	4,276,246	4.240	46.537	14.550
2010	504,146	0.310	1.583	4.691	340,089	0.462	1.743	5.150	4,399,941	4.395	45.902	14.616
2011	518,261	0.273	1.448	4.307	349,611	0.420	1.640	4.785	4,523,135	4.084	42.191	13.602
2012	532,732	0.228	1.279	3.754	359,373	0.383	1.528	4.388	4,649,426	3.764	39.930	12.329
2013	547,182	0.198	1.141	3.302	369,121	0.361	1.432	3.923	4,775,541	3.486	37.947	11.101
2014	561,745	0.177	1.033	2.929	378,945	0.344	1.349	3.589	4,902,641	3.282	36.758	10.101
2015	576,265	0.158	0.932	2.565	388,846	0.329	1.286	3.334	5,030,801	3.104	35.256	9.257
2016	590,971	0.141	0.859	2.315	398,770	0.306	1.221	3.114	5,159,187	2.908	33.221	8.571
2017	605,916	0.122	0.771	2.082	408,854	0.282	1.156	2.912	5,289,659	2.753	32.520	7.932
2018	620,791	0.102	0.686	1.859	418,891	0.262	1.092	2.717	5,419,513	2.636	32.169	7.363
2019	635,855	0.088	0.624	1.691	429,056	0.248	1.053	2.567	5,551,028	2.556	31.955	6.917
2020	651,014	0.078	0.576	1.517	439,285	0.238	1.024	2.427	5,683,361	2.483	31.676	6.499
2021	666,153	0.069	0.541	1.391	449,500	0.230	1.007	2.329	5,815,528	2.425	31.647	6.184
2022	681,543	0.060	0.501	1.264	459,885	0.221	0.985	2.239	5,949,881	2.377	31.727	5.903
2023	697,052	0.055	0.481	1.196	470,350	0.217	0.976	2.183	6,085,277	2.357	31.975	5.737
2024	712,691	0.049	0.459	1.125	480,902	0.214	0.973	2.145	6,221,800	2.393	32.312	5.596
2025	728,510	0.045	0.447	1.064	491,576	0.213	0.975	2.117	6,359,900	2.383	32.781	5.487
2026	744,564	0.043	0.438	1.035	502,409	0.213	0.980	2.106	6,500,054	2.279	32.604	5.385
2027	760,866	0.040	0.432	1.004	513,409	0.213	0.987	2.103	6,642,369	2.283	33.157	5.355
2028	777,321	0.039	0.429	0.985	524,513	0.214	0.997	2.107	6,786,028	2.271	33.624	5.350
2029	793,921	0.038	0.429	0.968	535,714	0.215	1.009	2.114	6,930,938	2.288	34.200	5.354
2030	810,630	0.037	0.431	0.965	546,989	0.218	1.024	2.137	7,076,809	2.320	34.799	5.392

Table 41. Lower Rio Grande Valley Area Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	277,212	0.158	0.827	2.609	187,451	0.200	0.841	2.718	7,801,537	6.441	79.135	13.890
2009	283,833	0.158	0.825	2.472	191,928	0.194	0.818	2.582	7,987,869	6.437	75.287	13.548
2010	290,554	0.162	0.847	2.392	196,473	0.194	0.819	2.479	8,177,017	6.575	72.999	13.403
2011	297,305	0.145	0.785	2.213	201,038	0.175	0.762	2.278	8,367,007	6.083	66.940	12.441
2012	303,979	0.122	0.696	1.925	205,551	0.158	0.703	2.064	8,554,836	5.554	62.913	11.223
2013	310,722	0.109	0.638	1.693	210,110	0.147	0.651	1.814	8,744,591	5.095	60.099	10.090
2014	317,525	0.098	0.583	1.497	214,711	0.137	0.606	1.631	8,936,058	4.727	57.989	9.067
2015	324,032	0.088	0.538	1.327	219,261	0.129	0.571	1.490	9,125,431	4.434	55.904	8.259
2016	330,750	0.077	0.494	1.204	223,807	0.119	0.538	1.374	9,314,639	4.129	53.134	7.516
2017	337,478	0.067	0.449	1.085	228,359	0.108	0.502	1.264	9,504,100	3.884	51.906	6.838
2018	344,211	0.055	0.398	0.958	232,915	0.099	0.467	1.158	9,693,728	3.695	51.127	6.261
2019	350,950	0.048	0.368	0.860	237,476	0.092	0.445	1.075	9,883,513	3.557	50.680	5.783
2020	357,629	0.043	0.345	0.776	241,995	0.087	0.428	0.998	10,071,596	3.434	50.098	5.380
2021	364,405	0.038	0.326	0.700	246,580	0.083	0.416	0.943	10,262,417	3.344	50.004	5.053
2022	371,141	0.033	0.304	0.638	251,138	0.078	0.402	0.891	10,452,123	3.271	50.038	4.785
2023	377,901	0.029	0.288	0.589	255,712	0.076	0.395	0.857	10,642,504	3.229	50.278	4.591
2024	384,754	0.026	0.279	0.555	260,349	0.074	0.390	0.831	10,835,497	3.249	50.648	4.443
2025	391,630	0.024	0.270	0.516	265,002	0.073	0.388	0.810	11,029,135	3.235	51.123	4.320
2026	398,493	0.022	0.265	0.494	269,646	0.072	0.387	0.797	11,222,430	3.126	51.118	4.186
2027	405,417	0.021	0.260	0.476	274,331	0.072	0.387	0.788	11,417,398	3.132	51.779	4.139
2028	412,313	0.020	0.257	0.460	278,998	0.071	0.388	0.782	11,611,623	3.123	52.420	4.111
2029	419,181	0.019	0.255	0.447	283,645	0.071	0.391	0.778	11,805,046	3.146	53.123	4.095
2030	426,155	0.018	0.255	0.441	288,364	0.072	0.394	0.780	12,001,452	3.187	53.873	4.101

Table 42. San Antonio Area Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-Through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	2,163,644	1.125	5.969	17.637	1,397,150	1.221	5.900	19.321	50,184,650	36.746	463.081	85.806
2009	2,199,110	1.121	5.899	16.654	1,420,067	1.178	5.662	18.168	50,982,984	35.953	431.586	82.705
2010	2,234,175	1.142	5.956	15.634	1,442,727	1.172	5.593	17.267	51,771,112	35.461	402.029	79.417
2011	2,269,646	0.954	5.272	13.948	1,465,648	1.041	5.123	15.678	52,568,760	32.260	359.670	72.664
2012	2,304,814	0.788	4.631	12.061	1,488,373	0.927	4.646	14.020	53,358,120	29.508	337.363	65.327
2013	2,340,097	0.666	4.108	10.103	1,511,171	0.844	4.221	12.121	54,149,941	27.063	319.115	58.044
2014	2,375,238	0.572	3.669	8.634	1,533,878	0.776	3.852	10.725	54,937,965	25.201	306.387	51.897
2015	2,408,406	0.494	3.313	7.496	1,556,224	0.719	3.565	9.641	55,713,612	23.693	293.542	47.106
2016	2,443,257	0.420	3.015	6.682	1,578,757	0.653	3.296	8.758	56,494,414	21.970	273.163	42.886
2017	2,478,027	0.347	2.709	5.911	1,601,237	0.580	3.013	7.922	57,272,987	20.717	265.849	39.030
2018	2,512,460	0.284	2.439	5.224	1,623,498	0.516	2.740	7.125	58,043,187	19.785	260.938	35.789
2019	2,546,845	0.245	2.276	4.708	1,645,728	0.470	2.560	6.496	58,811,971	19.073	257.348	33.107
2020	2,581,101	0.215	2.149	4.225	1,667,876	0.437	2.415	5.913	59,577,586	18.337	251.826	30.751
2021	2,614,960	0.195	2.066	3.886	1,689,766	0.409	2.311	5.483	60,333,691	17.807	249.740	28.908
2022	2,648,528	0.170	1.970	3.584	1,711,468	0.378	2.194	5.085	61,082,743	17.353	248.423	27.359
2023	2,682,219	0.156	1.916	3.382	1,733,250	0.360	2.119	4.807	61,834,840	17.066	248.198	26.242
2024	2,715,443	0.144	1.876	3.228	1,754,730	0.345	2.066	4.588	62,575,911	17.227	248.144	25.320
2025	2,748,592	0.136	1.849	3.081	1,776,159	0.336	2.031	4.405	63,315,395	17.013	248.653	24.565
2026	2,781,618	0.129	1.832	3.004	1,797,510	0.327	2.003	4.279	64,052,226	16.020	245.080	23.549
2027	2,814,099	0.122	1.814	2.923	1,818,509	0.320	1.982	4.176	64,775,983	15.928	246.772	23.167
2028	2,846,522	0.118	1.807	2.871	1,839,470	0.315	1.968	4.097	65,498,553	15.686	248.300	22.902
2029	2,878,710	0.114	1.804	2.826	1,860,279	0.311	1.962	4.029	66,215,923	15.666	249.999	22.691
2030	2,910,440	0.111	1.806	2.804	1,880,792	0.309	1.964	4.008	66,922,461	15.746	251.832	22.581

Table 43. Northeast Texas Area Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-Through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	1,096,840	0.595	3.241	10.648	1,114,454	0.990	4.783	17.190	16,602,224	12.776	162.087	45.115
2009	1,111,051	0.577	3.147	9.948	1,129,099	0.953	4.572	16.114	16,811,267	12.379	149.992	42.854
2010	1,125,251	0.578	3.129	9.230	1,143,729	0.944	4.495	15.276	17,020,085	12.111	140.357	40.977
2011	1,139,552	0.487	2.791	8.246	1,158,466	0.838	4.097	13.833	17,230,393	10.945	125.178	37.314
2012	1,153,827	0.411	2.479	7.164	1,173,165	0.745	3.695	12.360	17,440,548	9.960	116.681	33.464
2013	1,168,078	0.353	2.224	6.141	1,187,845	0.678	3.332	10.652	17,650,216	9.097	109.614	29.545
2014	1,182,302	0.305	1.989	5.333	1,202,503	0.623	3.017	9.402	17,859,472	8.419	104.396	26.342
2015	1,196,410	0.269	1.808	4.689	1,216,823	0.576	2.771	8.433	18,068,591	7.854	99.144	23.826
2016	1,210,617	0.229	1.635	4.168	1,231,459	0.522	2.543	7.642	18,277,649	7.213	91.794	21.593
2017	1,224,801	0.195	1.475	3.705	1,246,076	0.462	2.303	6.894	18,486,334	6.723	88.380	19.568
2018	1,238,883	0.163	1.334	3.305	1,260,589	0.409	2.073	6.181	18,693,489	6.348	86.034	17.813
2019	1,252,894	0.139	1.224	2.940	1,275,028	0.372	1.917	5.617	18,899,724	6.054	84.132	16.309
2020	1,266,793	0.122	1.141	2.624	1,289,347	0.344	1.793	5.098	19,104,311	5.772	81.940	15.001
2021	1,280,796	0.108	1.078	2.388	1,303,779	0.321	1.702	4.713	19,310,421	5.555	80.722	13.980
2022	1,294,770	0.094	1.017	2.174	1,318,178	0.296	1.601	4.358	19,516,254	5.359	79.781	13.084
2023	1,308,704	0.085	0.978	2.023	1,332,547	0.281	1.535	4.109	19,721,394	5.222	79.246	12.439
2024	1,322,725	0.077	0.943	1.889	1,346,997	0.269	1.487	3.913	19,928,128	5.227	78.940	11.899
2025	1,336,783	0.072	0.921	1.785	1,361,487	0.261	1.453	3.749	20,135,323	5.134	78.976	11.474
2026	1,350,748	0.068	0.905	1.720	1,375,876	0.253	1.425	3.634	20,341,402	4.812	77.507	11.007
2027	1,364,781	0.064	0.890	1.652	1,390,335	0.247	1.404	3.541	20,548,512	4.764	77.817	10.765
2028	1,378,786	0.060	0.879	1.598	1,404,771	0.243	1.390	3.468	20,755,221	4.678	77.982	10.579
2029	1,392,867	0.058	0.875	1.555	1,419,282	0.240	1.382	3.407	20,963,119	4.659	78.391	10.433
2030	1,406,877	0.057	0.874	1.535	1,433,730	0.239	1.381	3.386	21,169,920	4.672	78.864	10.362

Table 44. McAllen-Edinburg-Mission Area Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-Through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	540,334	0.343	1.861	5.626	397,757	0.494	2.093	6.401	13,571,120	11.844	146.081	27.269
2009	556,798	0.345	1.866	5.364	409,876	0.485	2.047	6.134	13,984,611	11.952	140.074	26.755
2010	573,217	0.357	1.924	5.226	421,964	0.489	2.057	5.934	14,397,016	12.228	136.398	26.566
2011	589,737	0.321	1.798	4.863	434,124	0.443	1.925	5.491	14,811,926	11.357	125.763	24.807
2012	606,465	0.273	1.608	4.267	446,438	0.404	1.788	5.020	15,232,063	10.412	118.789	22.531
2013	623,185	0.247	1.482	3.773	458,747	0.379	1.664	4.453	15,652,020	9.606	113.934	20.351
2014	640,196	0.225	1.360	3.361	471,269	0.359	1.557	4.045	16,079,261	8.957	110.331	18.417
2015	656,817	0.205	1.265	3.002	483,758	0.341	1.475	3.730	16,505,730	8.434	106.736	16.909
2016	673,937	0.181	1.168	2.740	496,368	0.318	1.397	3.472	16,935,951	7.881	101.707	15.512
2017	691,035	0.156	1.067	2.481	508,961	0.291	1.310	3.220	17,365,620	7.432	99.701	14.205
2018	708,302	0.129	0.950	2.205	521,678	0.267	1.226	2.979	17,799,527	7.088	98.531	13.081
2019	725,622	0.114	0.881	1.990	534,435	0.250	1.173	2.790	18,234,785	6.845	98.026	12.154
2020	743,009	0.102	0.830	1.802	547,240	0.239	1.133	2.614	18,671,720	6.629	97.277	11.365
2021	760,395	0.091	0.787	1.634	560,045	0.229	1.108	2.488	19,108,625	6.469	97.430	10.725
2022	777,918	0.078	0.737	1.495	572,951	0.218	1.076	2.370	19,548,969	6.343	97.839	10.200
2023	795,530	0.069	0.702	1.387	585,923	0.213	1.060	2.296	19,991,569	6.277	98.654	9.829
2024	813,202	0.064	0.682	1.311	598,939	0.209	1.052	2.241	20,435,654	6.343	99.775	9.555
2025	831,219	0.058	0.663	1.226	612,209	0.207	1.051	2.199	20,888,433	6.334	101.114	9.327
2026	849,121	0.055	0.653	1.178	625,394	0.205	1.052	2.177	21,338,308	6.125	101.370	9.083
2027	867,268	0.050	0.643	1.138	638,760	0.205	1.057	2.164	21,794,335	6.155	103.051	9.013
2028	885,453	0.048	0.639	1.106	652,154	0.205	1.064	2.159	22,251,332	6.156	104.676	8.982
2029	903,651	0.046	0.638	1.079	665,557	0.206	1.075	2.158	22,708,644	6.221	106.466	8.979
2030	921,995	0.044	0.640	1.068	679,067	0.208	1.089	2.176	23,169,612	6.320	108.345	9.025

Table 45. Victoria Area Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-Through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	312,316	0.191	1.046	3.189	275,668	0.272	1.284	4.071	2,646,670	2.345	29.138	10.101
2009	316,611	0.188	1.018	2.987	279,459	0.262	1.230	3.824	2,683,069	2.282	27.063	9.598
2010	320,994	0.188	1.011	2.808	283,328	0.261	1.212	3.633	2,720,215	2.233	25.452	9.179
2011	325,310	0.161	0.908	2.539	287,137	0.232	1.107	3.296	2,756,787	2.017	22.694	8.393
2012	329,587	0.137	0.805	2.225	290,912	0.207	1.000	2.953	2,793,028	1.833	21.115	7.540
2013	333,907	0.121	0.730	1.932	294,725	0.189	0.905	2.554	2,829,643	1.678	19.681	6.659
2014	338,196	0.108	0.657	1.691	298,511	0.175	0.823	2.264	2,865,984	1.554	18.640	5.949
2015	342,521	0.097	0.598	1.496	302,354	0.163	0.759	2.040	2,903,719	1.449	17.594	5.394
2016	346,807	0.083	0.538	1.339	306,138	0.148	0.698	1.856	2,940,061	1.329	16.324	4.908
2017	351,010	0.071	0.482	1.197	309,847	0.132	0.634	1.680	2,975,685	1.232	15.654	4.461
2018	355,279	0.060	0.429	1.064	313,617	0.118	0.573	1.514	3,011,883	1.154	15.143	4.061
2019	359,427	0.052	0.389	0.945	317,278	0.107	0.532	1.382	3,047,047	1.097	14.749	3.719
2020	363,558	0.045	0.356	0.842	320,925	0.100	0.499	1.260	3,082,067	1.043	14.339	3.418
2021	367,603	0.039	0.331	0.760	324,495	0.094	0.475	1.169	3,116,355	0.998	14.078	3.181
2022	371,634	0.034	0.307	0.688	328,053	0.087	0.448	1.086	3,150,528	0.959	13.836	2.972
2023	375,667	0.030	0.289	0.633	331,613	0.082	0.430	1.028	3,184,715	0.934	13.731	2.819
2024	379,655	0.027	0.275	0.587	335,134	0.079	0.418	0.982	3,218,529	0.928	13.633	2.693
2025	383,615	0.025	0.265	0.548	338,629	0.077	0.409	0.943	3,252,099	0.912	13.649	2.591
2026	387,531	0.023	0.257	0.523	342,086	0.075	0.402	0.916	3,285,295	0.861	13.381	2.496
2027	391,455	0.021	0.250	0.497	345,550	0.073	0.396	0.895	3,318,564	0.852	13.413	2.436
2028	395,324	0.020	0.246	0.479	348,965	0.072	0.393	0.878	3,351,358	0.839	13.412	2.393
2029	399,182	0.019	0.242	0.463	352,371	0.072	0.391	0.864	3,384,066	0.835	13.474	2.355
2030	403,035	0.018	0.240	0.453	355,772	0.071	0.390	0.859	3,416,731	0.836	13.550	2.337

Table 46. Waco Area Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-Through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	350,533	0.180	0.989	3.216	324,591	0.410	1.558	5.012	7,224,732	5.122	67.358	15.139
2009	355,525	0.180	0.984	3.033	329,215	0.394	1.503	4.728	7,327,635	5.019	62.830	14.525
2010	360,533	0.181	0.984	2.851	333,851	0.388	1.488	4.511	7,430,839	4.895	58.550	13.948
2011	365,546	0.156	0.889	2.574	338,494	0.350	1.385	4.129	7,534,170	4.444	52.409	12.797
2012	370,522	0.132	0.797	2.257	343,101	0.317	1.281	3.737	7,636,723	4.057	49.072	11.560
2013	375,479	0.114	0.722	1.949	347,692	0.293	1.187	3.282	7,738,895	3.722	46.299	10.318
2014	380,392	0.098	0.646	1.684	352,241	0.274	1.105	2.949	7,840,161	3.460	44.241	9.262
2015	385,217	0.087	0.587	1.473	356,801	0.258	1.043	2.693	7,941,236	3.243	42.250	8.434
2016	390,103	0.075	0.537	1.319	361,326	0.239	0.986	2.485	8,041,962	2.993	39.184	7.710
2017	394,981	0.065	0.489	1.178	365,845	0.218	0.925	2.287	8,142,528	2.807	37.986	7.051
2018	399,796	0.054	0.437	1.039	370,304	0.200	0.866	2.098	8,241,776	2.664	37.120	6.470
2019	404,608	0.045	0.398	0.921	374,762	0.187	0.828	1.951	8,340,993	2.553	36.483	5.984
2020	409,380	0.039	0.372	0.825	379,182	0.177	0.799	1.816	8,439,367	2.444	35.594	5.569
2021	414,155	0.035	0.352	0.749	383,605	0.170	0.778	1.719	8,537,805	2.363	35.201	5.240
2022	418,917	0.030	0.329	0.675	388,015	0.161	0.755	1.628	8,635,972	2.290	34.887	4.949
2023	423,640	0.027	0.316	0.626	392,390	0.156	0.740	1.566	8,733,329	2.242	34.747	4.745
2024	428,360	0.024	0.305	0.585	396,762	0.153	0.731	1.518	8,830,639	2.256	34.663	4.575
2025	433,073	0.022	0.296	0.543	401,127	0.150	0.726	1.479	8,927,790	2.223	34.714	4.433
2026	437,785	0.021	0.292	0.524	405,491	0.148	0.722	1.453	9,024,925	2.085	34.121	4.267
2027	442,494	0.019	0.288	0.502	409,853	0.147	0.721	1.433	9,121,996	2.070	34.319	4.197
2028	447,218	0.018	0.284	0.484	414,228	0.146	0.721	1.420	9,219,385	2.037	34.464	4.144
2029	451,933	0.018	0.282	0.471	418,595	0.146	0.722	1.408	9,316,583	2.032	34.676	4.105
2030	456,644	0.017	0.282	0.466	422,959	0.146	0.726	1.408	9,413,702	2.041	34.919	4.090

Table 47. Statewide Summer Weekday Emissions (Tons/Day) and VMT.

Year	Local Diesel Category				Pass-Through Diesel Category				All Vehicle Types			
	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X	VMT	VOC	CO	NO_X
2008	38,566,054	20.381	109.672	346.713	30,256,842	29.706	135.217	459.220	702,041,676	472.676	5,514.224	1,453.066
2009	39,267,690	20.092	107.677	325.942	30,806,397	28.698	130.178	433.067	714,884,016	460.795	5,234.094	1,390.659
2010	39,970,937	20.374	108.371	306.688	31,357,213	28.453	128.777	412.644	727,756,142	451.585	5,012.208	1,339.903
2011	40,675,942	17.233	96.737	274.927	31,909,384	25.439	118.499	376.220	740,662,497	408.173	4,557.584	1,221.519
2012	41,382,229	14.386	85.541	237.136	32,462,459	22.837	108.060	338.482	753,598,043	372.036	4,280.363	1,095.671
2013	42,089,504	12.415	76.940	201.715	33,016,226	20.986	98.695	294.481	766,554,455	339.938	4,047.065	971.393
2014	42,797,007	10.790	69.208	174.587	33,570,018	19.472	90.560	262.287	779,525,072	315.124	3,884.422	869.097
2015	43,488,280	9.473	62.997	152.866	34,115,464	18.188	84.255	237.394	792,498,565	295.212	3,725.004	790.065
2016	44,195,305	8.128	57.360	136.584	34,668,794	16.669	78.318	217.045	805,480,301	273.008	3,489.014	719.906
2017	44,901,404	6.836	51.781	121.572	35,221,266	14.939	71.991	197.695	818,458,519	256.635	3,395.505	656.413
2018	45,606,975	5.643	46.646	107.771	35,773,188	13.435	65.918	179.198	831,436,525	244.200	3,334.032	601.569
2019	46,312,877	4.873	43.313	96.891	36,325,301	12.375	61.896	164.625	844,426,862	235.272	3,292.652	556.689
2020	47,017,191	4.250	40.633	86.972	36,875,881	11.602	58.738	151.161	857,408,717	226.630	3,233.893	517.475
2021	47,722,619	3.796	38.760	79.571	37,427,167	10.959	56.483	141.283	870,424,596	220.548	3,215.779	487.398
2022	48,428,803	3.296	36.751	73.077	37,978,845	10.246	53.926	132.140	883,468,930	215.419	3,206.431	461.856
2023	49,134,920	2.994	35.557	68.410	38,530,185	9.834	52.341	125.861	896,535,775	212.400	3,211.743	443.838
2024	49,841,273	2.763	34.714	64.885	39,081,381	9.513	51.266	120.990	909,623,833	214.436	3,221.266	429.614
2025	50,547,733	2.595	34.148	61.710	39,632,448	9.322	50.599	116.969	922,730,928	212.859	3,241.606	418.458
2026	51,254,670	2.452	33.762	59.926	40,183,786	9.138	50.079	114.305	935,857,471	202.225	3,212.238	405.216
2027	51,961,310	2.317	33.441	58.222	40,734,640	8.999	49.757	112.206	948,993,725	201.826	3,243.406	400.083
2028	52,667,505	2.230	33.308	57.064	41,284,949	8.916	49.610	110.691	962,136,256	199.851	3,271.599	396.837
2029	53,373,991	2.164	33.299	56.004	41,835,417	8.874	49.648	109.443	975,293,614	200.356	3,304.118	394.407
2030	54,080,220	2.119	33.408	55.667	42,385,635	8.870	49.875	109.331	988,454,147	202.081	3,338.921	394.251

Another aspect of interest emanating from this study is the change in values and relationships over time, though this was not the primary focus of the study. Some of these longitudinal relationships are captured by comparing the sequential years in the previous graphics. To further highlight these longitudinal relationships, the trends of VMT and an array of pollutants are plotted of the entire analysis period for the primary vehicle category of interest, local diesel vehicles.

Specifically, VMT trends for the 2008-to-2030 period are shown separately for general context. The remaining graphs are devoted to selected pollutants for the targeted local heavy-duty diesel vehicle categories. The exact values represented in the graphs are provided in tables following the graphs.

Though VMT varies widely between regions, VMT trends vary little across regions. Only slight differences in rate of growth (slope) are visible. Note however, that the scales are different between regions, which impact the graphed slope. For direct comparisons between regions, the tables should be used.

For VOC and NO_x, downward trends in these criteria pollutants (VOC in red and NO_x in blue) reflect the constant reduction in emissions attributable to improvements in vehicle technology in response to current regulations and technologies. After the respective regulations and technologies are incorporated into the majority of the fleet, emissions trends for these pollutants tend to follow trends in VMT, though at a much lower rate pe VMT. Note especially the dominance of NOx reflecting the high NO_x emitter character of heavy duty diesel vehicles.

Downward trends in the other criteria pollutant CO (red) on the plots, reflect emissions control regulations, their impact, and their implementation. The slight upward trend in the out years follows VMT and reflects the full implementation of technology based controls. CO_2 (blue) more closely follows VMT for the entire period, reflecting fewer controls for this pollutant, due in part to its recent recognition as being subject to regulation.

Similar effects in SO_2 (blue) reflect sequential emissions control regulations and VMT growth. Again, the slight upward trend in the out years (difficult to see at this scale) follows VMT and reflects the full implementation of technology based controls.

Regarding the other two pollutants shown on these plots, the downward trend in $PM_{2.5}$ (red) reflects long standing and multifaceted (hence, incremental) emissions control regulations and technologies. NH_3 (green) generally follows CO due to the close chemical process relationship between the two pollutants. As is the case with CO, the slight upward trend in the out years for NH_3 follows VMT growth.

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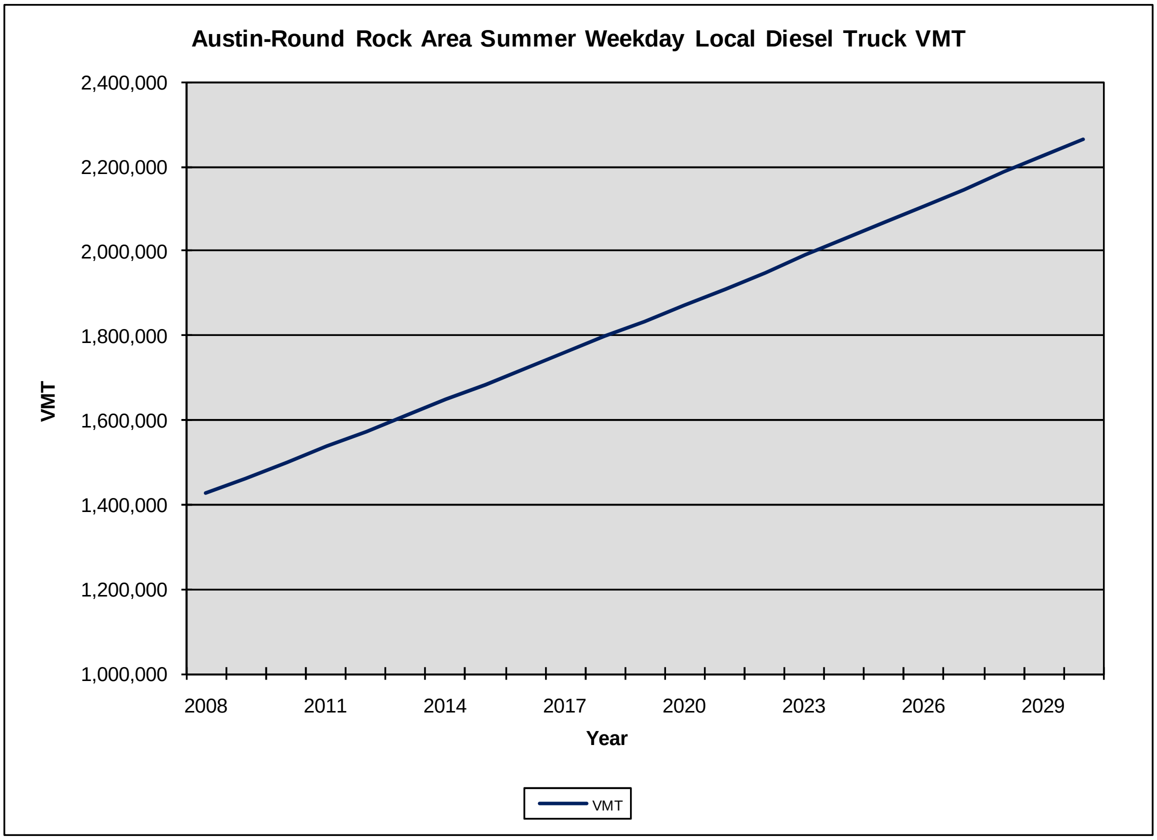
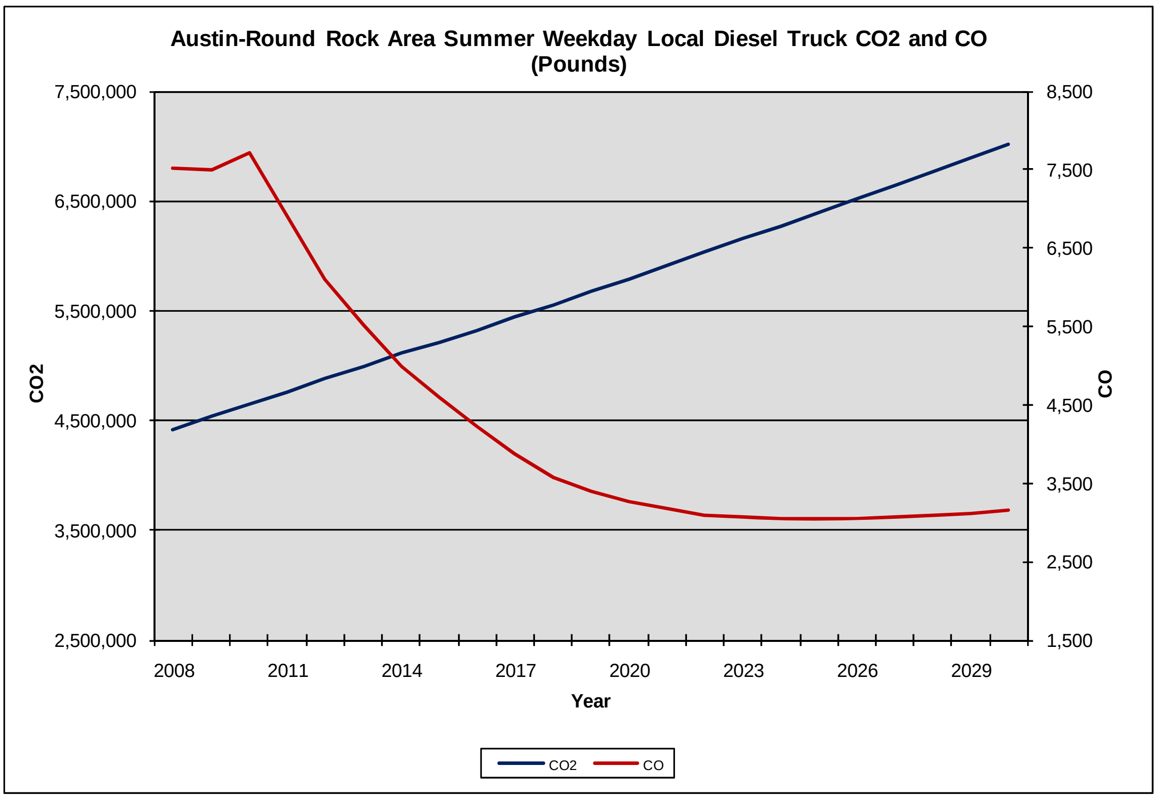
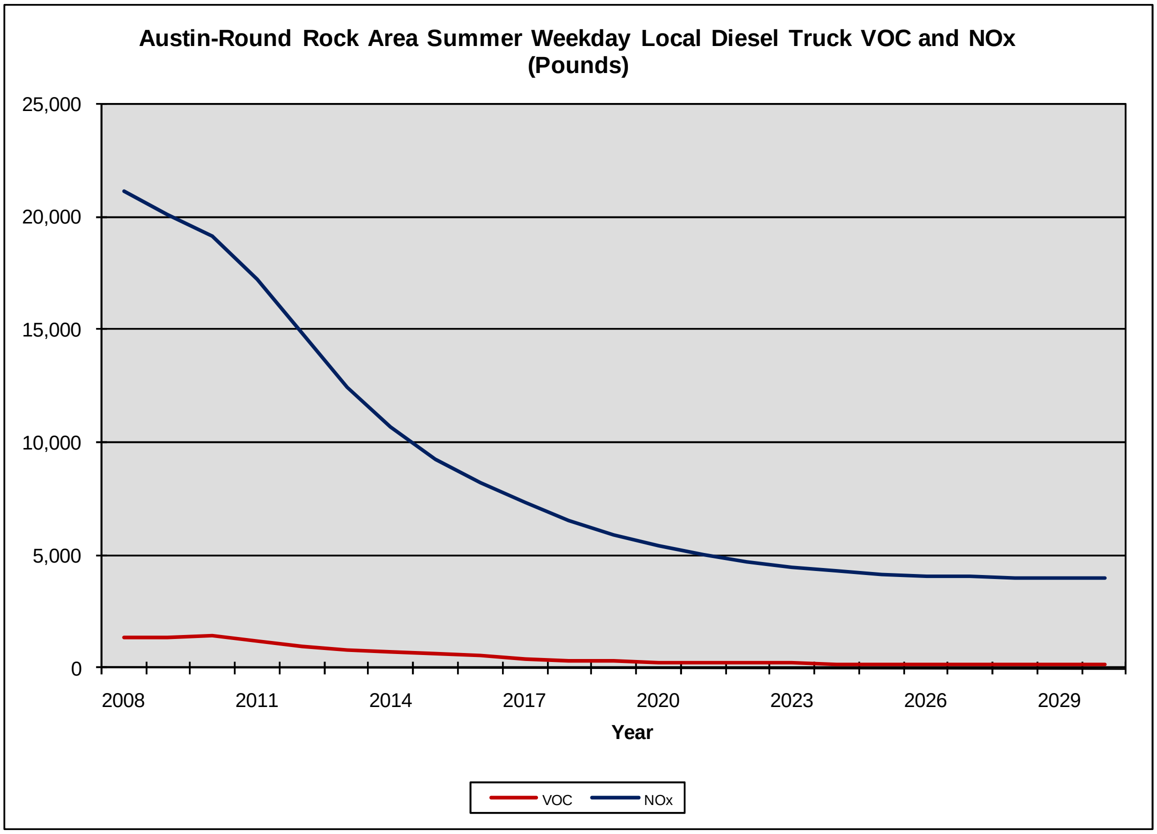
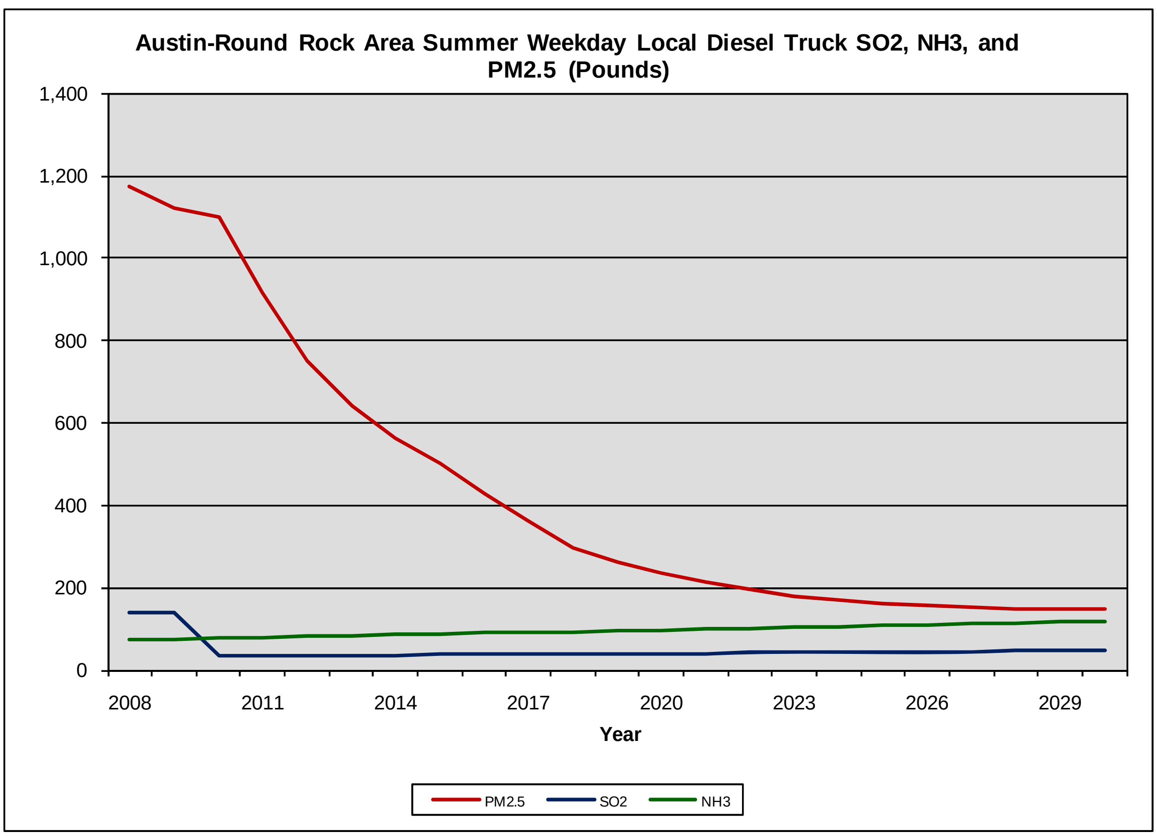
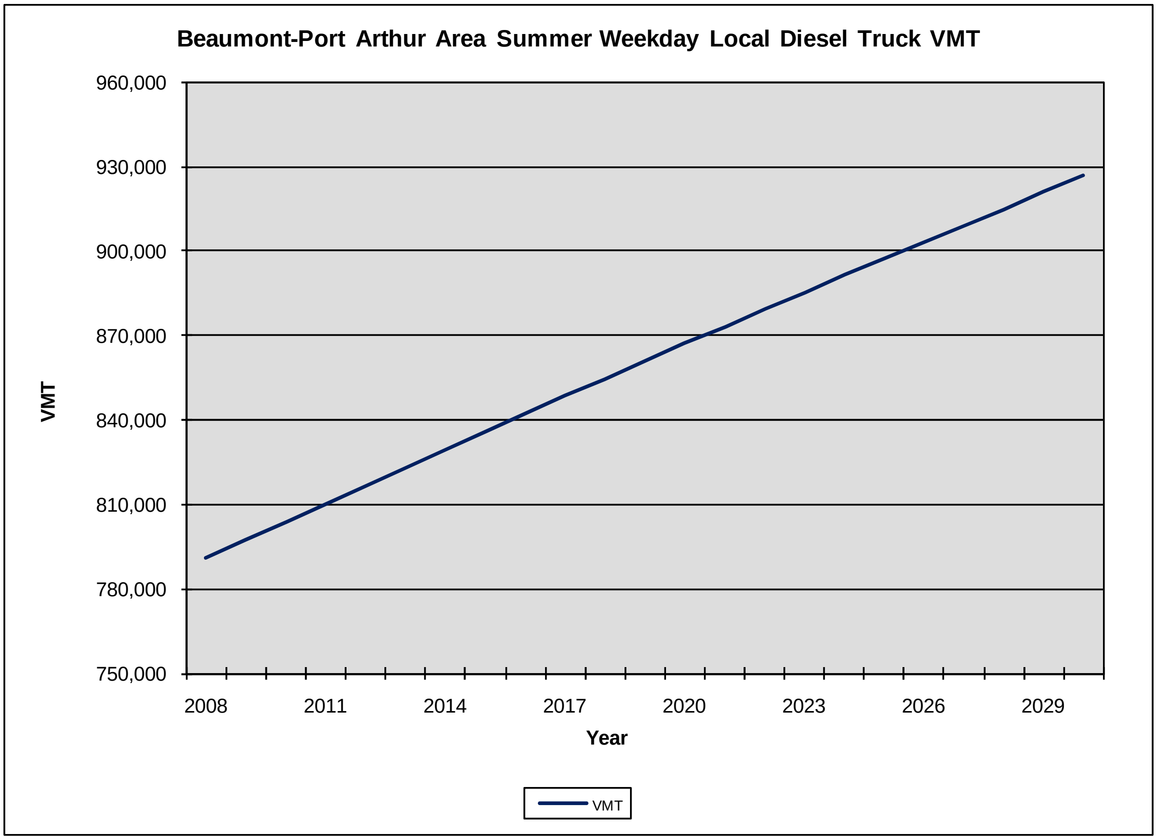

Austin-Round Rock Area Summer Weekday Local Diesel Truck VMT
2,400,000
2,200,000
2,000,000
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT

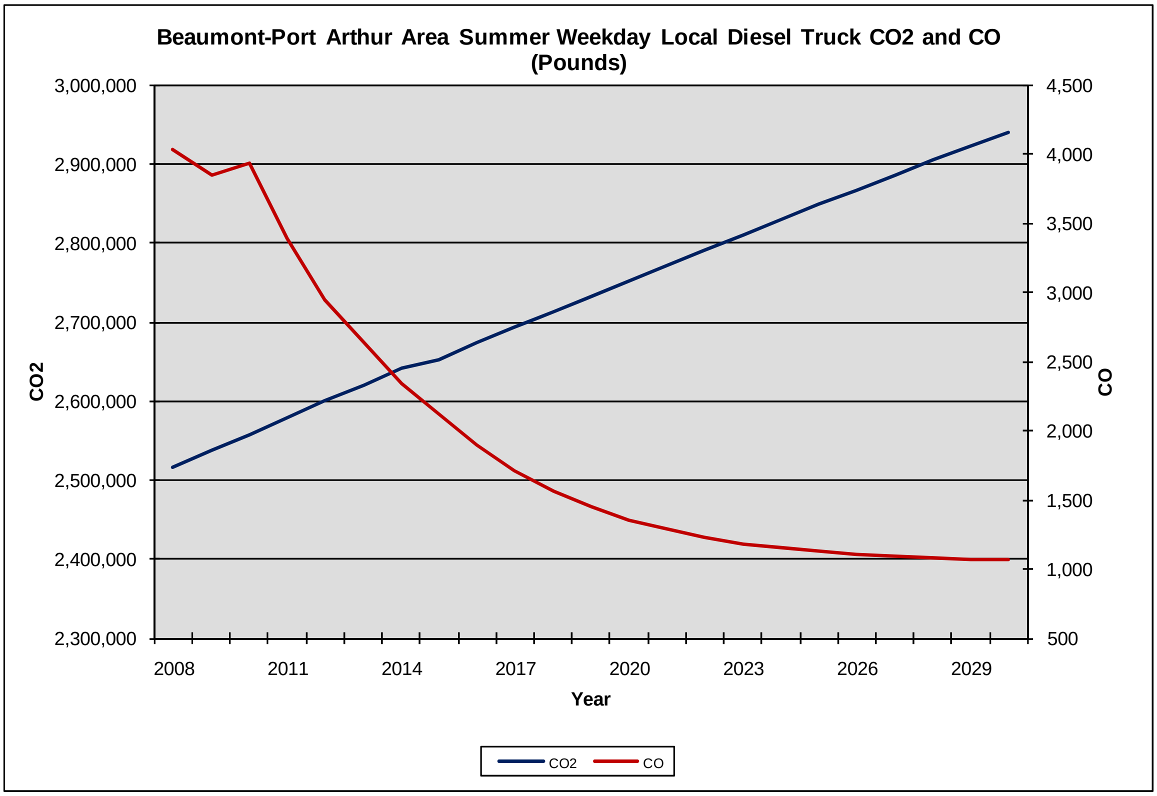

Austin-Round Rock Area Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
7,500,000
6,500,000
5,500,000
4,500,000
3,500,000
2,500,000
CO2
8,500
7,500
6,500
5,500
4,500
3,500
2,500
1,500
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO


Austin-Round Rock Area Summer Weekday Local Diesel Truck VOC and NOx (Pounds)
25,000
20,000
15,000
10,000
5,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx

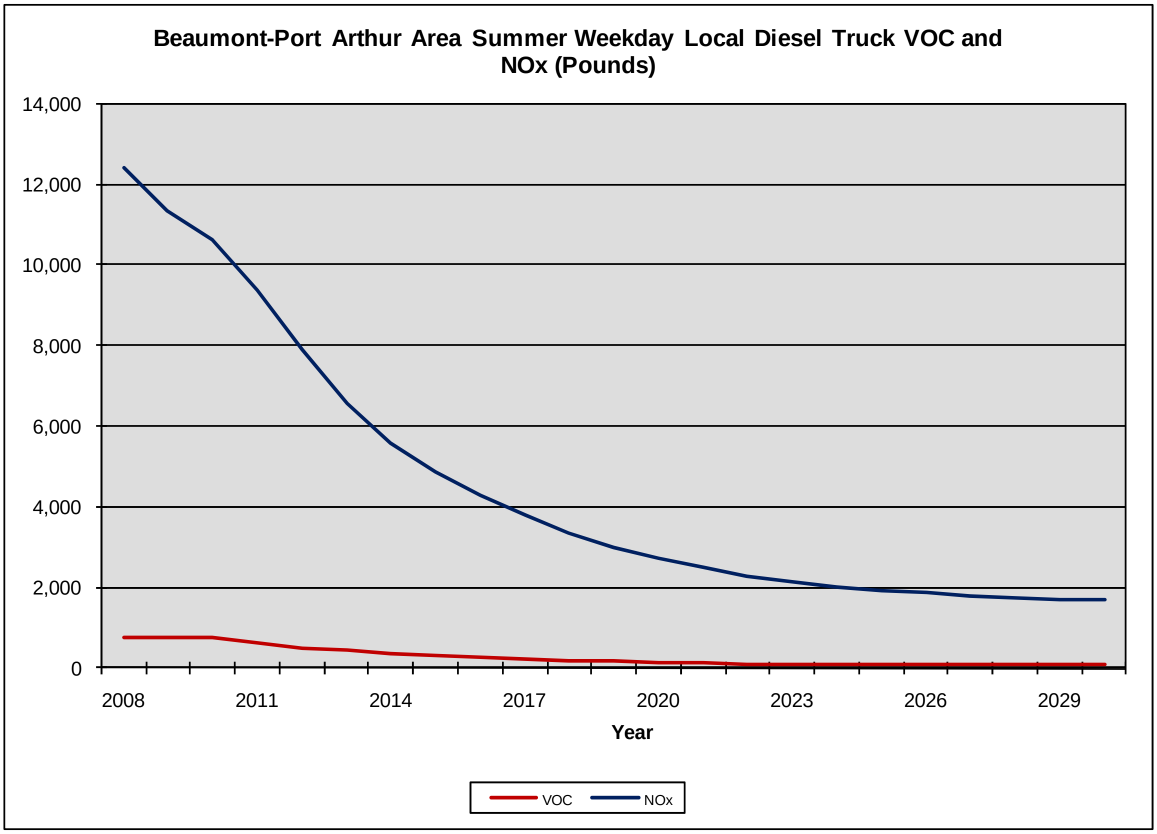

Austin-Round Rock Area Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5 (Pounds)
1,400
1,200
1,000
800
600
400
200
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3

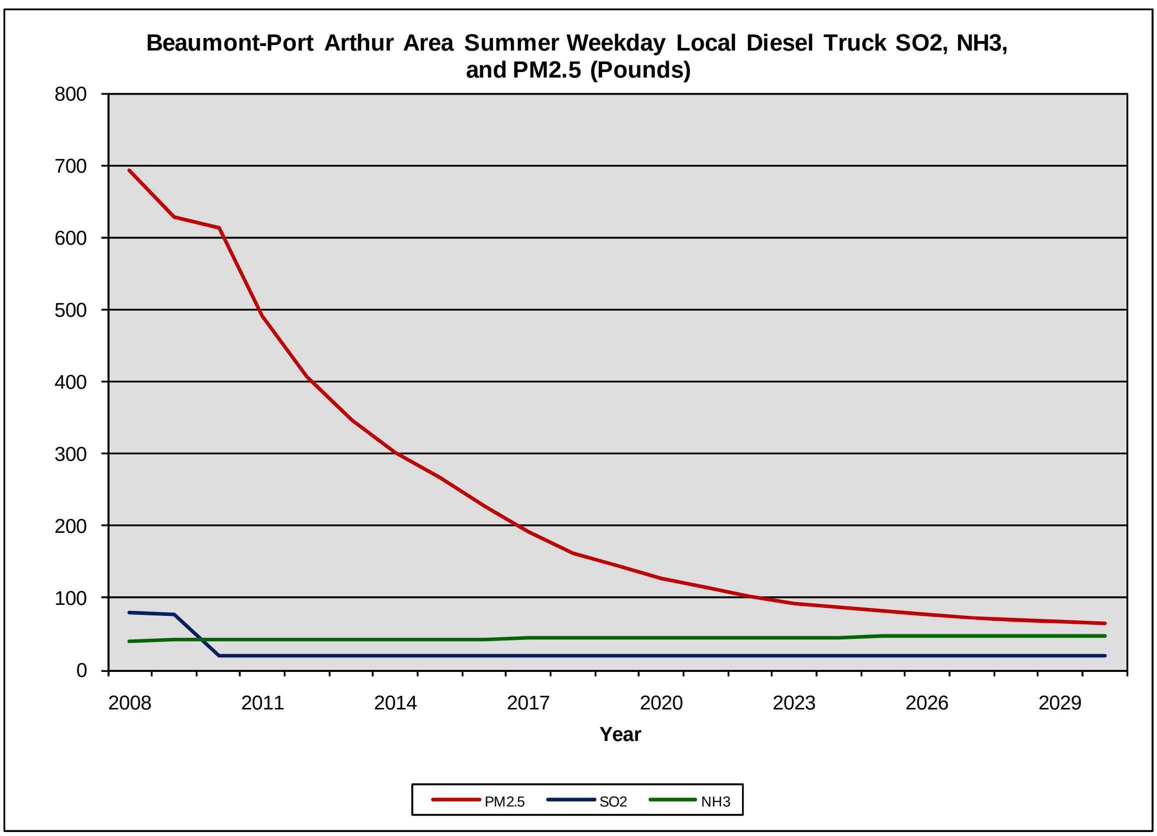


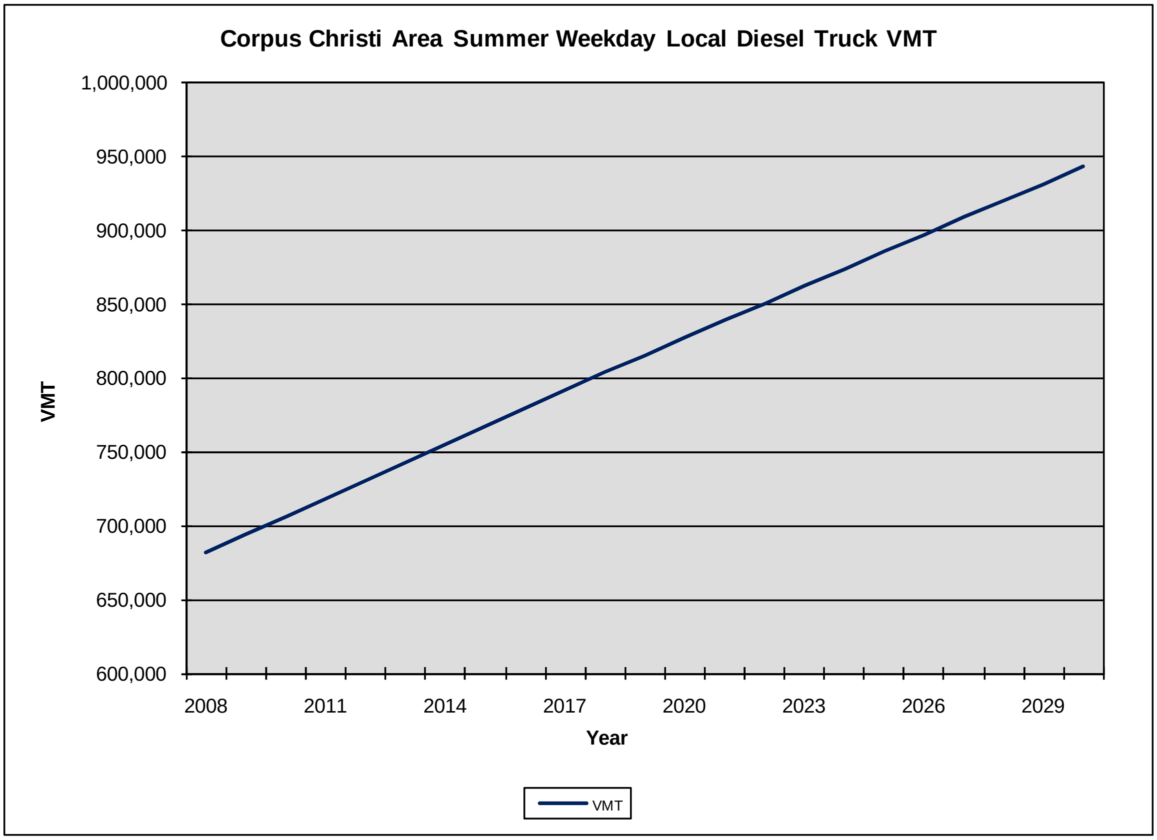
Beaumont-Port Arthur Area Summer Weekday Local Diesel Truck VMT
960,000
930,000
900,000
870,000
840,000
810,000
780,000
750,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT

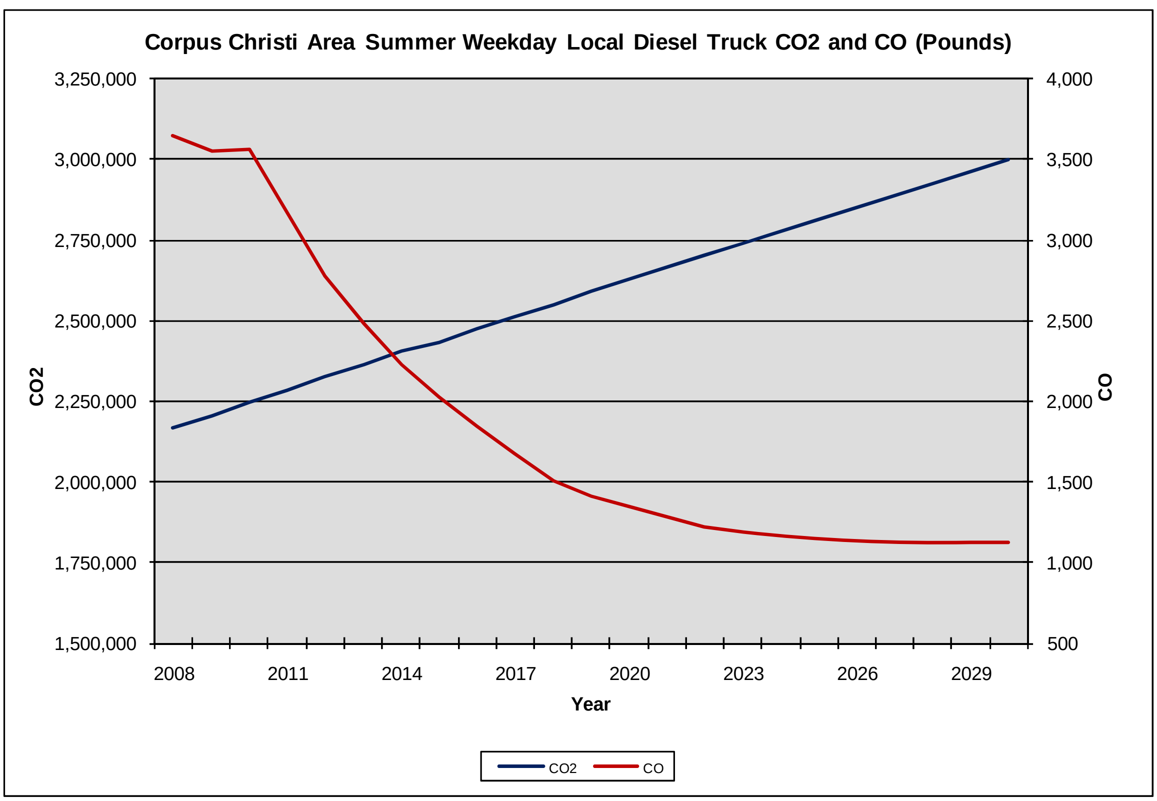


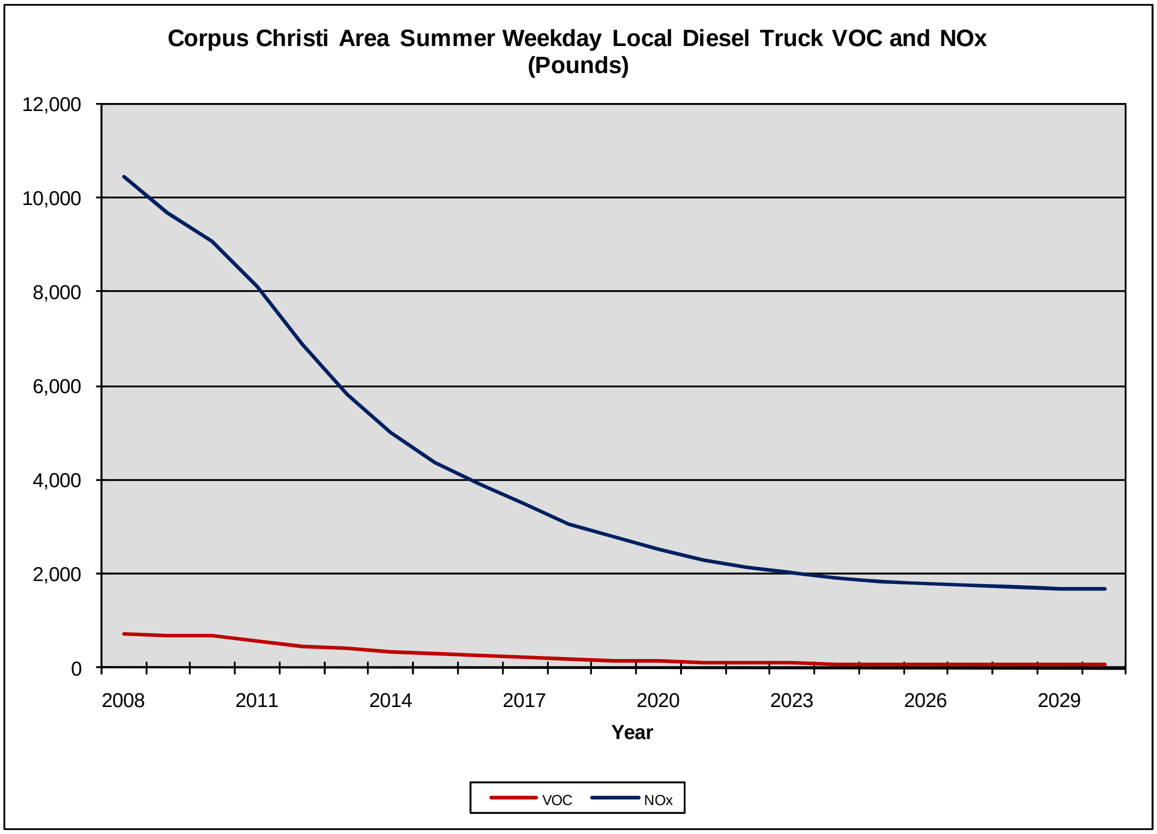
Beaumont-Port Arthur Area Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
3,000,000
2,900,000
2,800,000
2,700,000
2,600,000
2,500,000
2,400,000
2,300,000
CO2
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO


Beaumont-Port Arthur Area Summer Weekday Local Diesel Truck VOC and NOx (Pounds)
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx

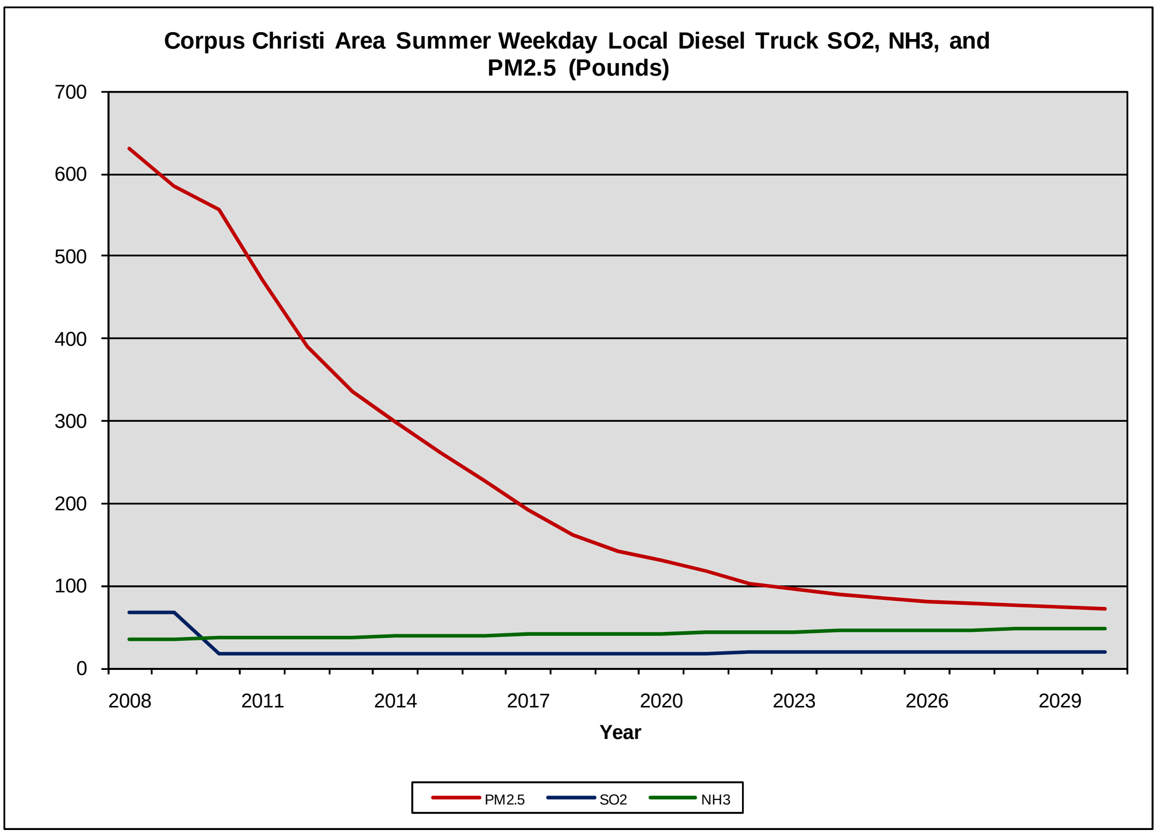

Beaumont-Port Arthur Area Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5 (Pounds)
800
700
600
500
400
300
200
100
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3


Corpus Christi Area Summer Weekday Local Diesel Truck VMT
1,000,000
950,000
900,000
850,000
800,000
750,000
700,000
650,000
600,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT

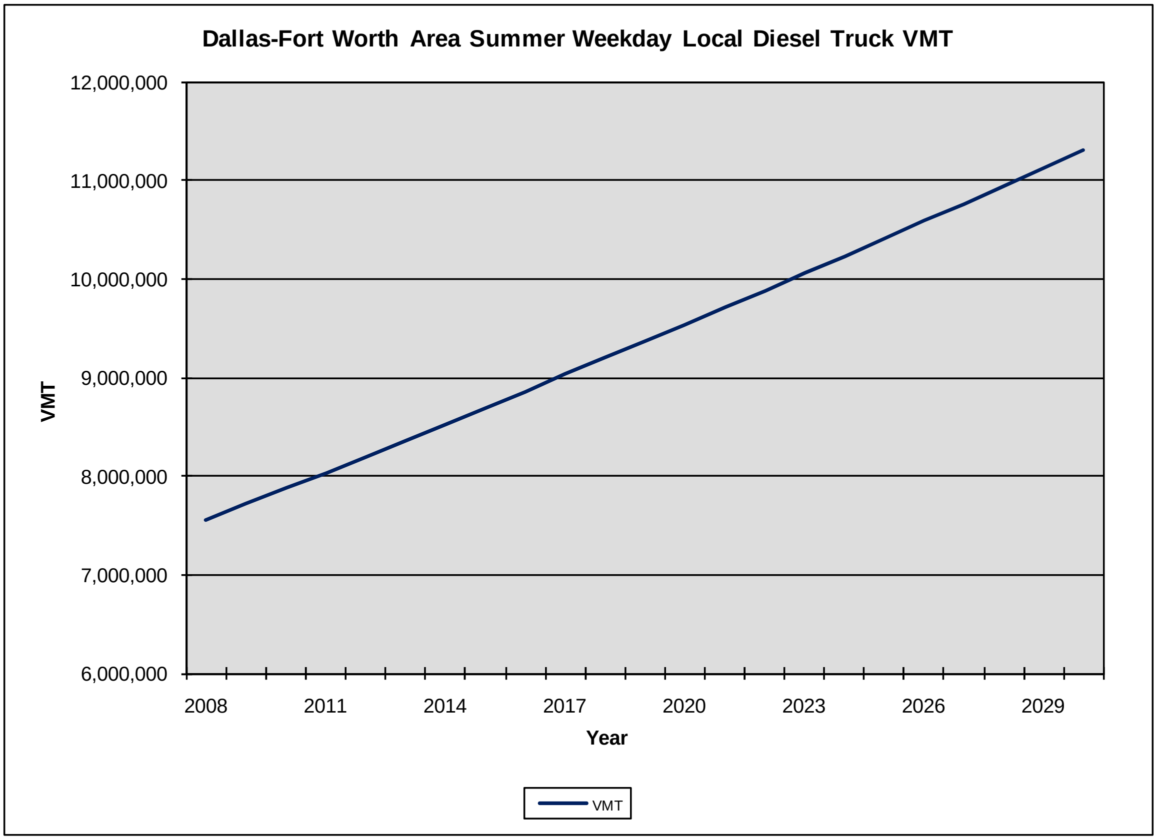

Corpus Christi Area Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
3,250,000
3,000,000
2,750,000
2,500,000
2,250,000
2,000,000
1,750,000
1,500,000
CO2
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO

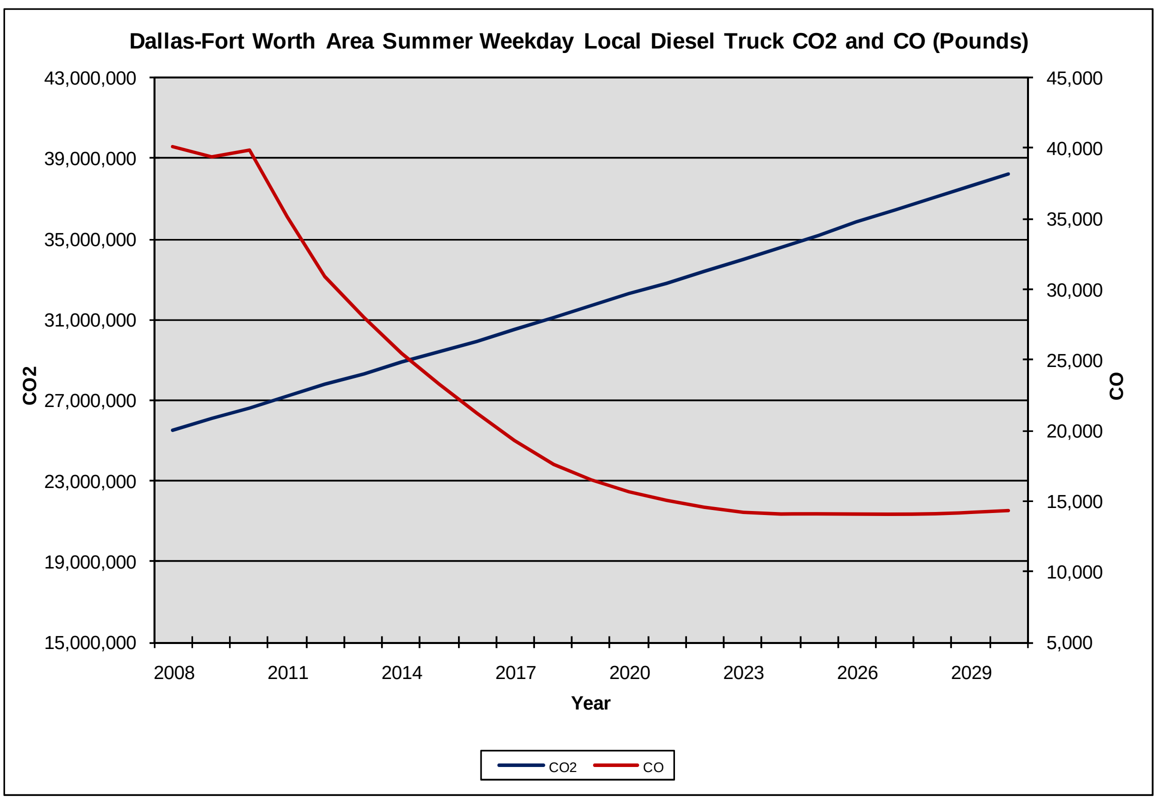


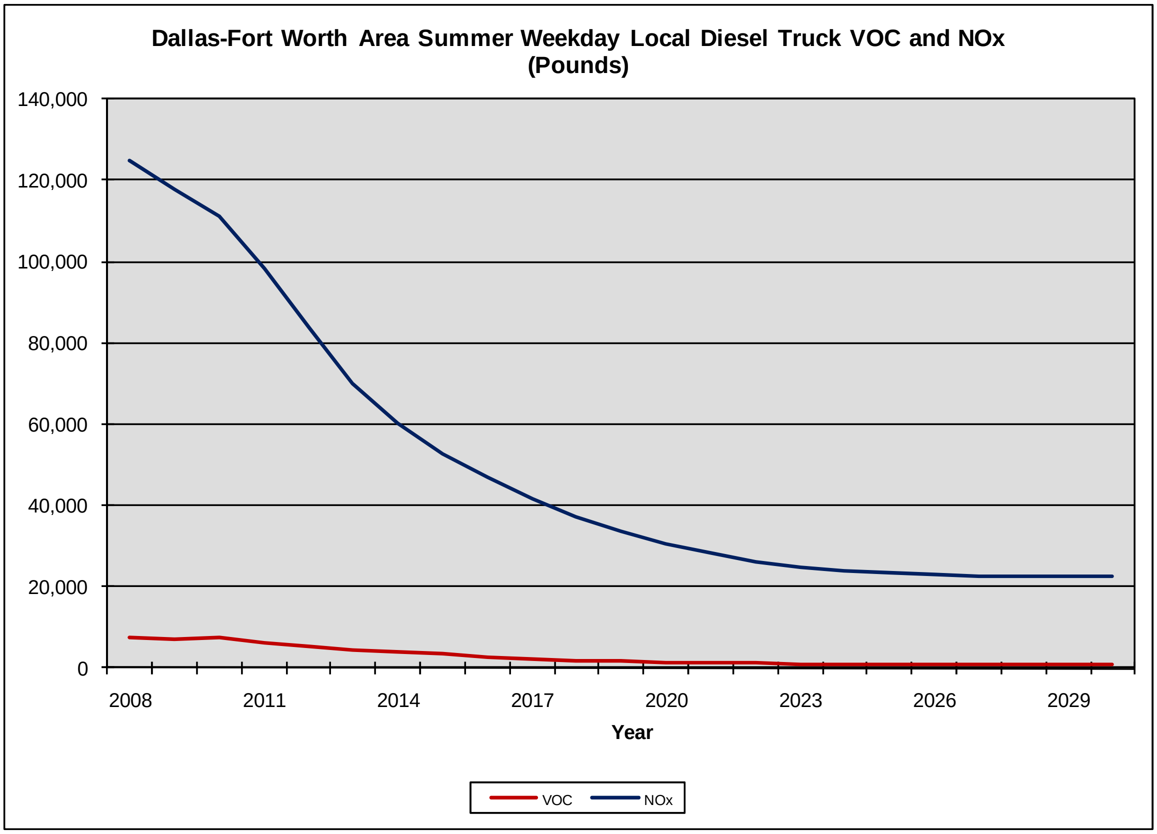
Corpus Christi Area Summer Weekday Local Diesel Truck VOC and NOx (Pounds)
12,000
10,000
8,000
6,000
4,000
2,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx



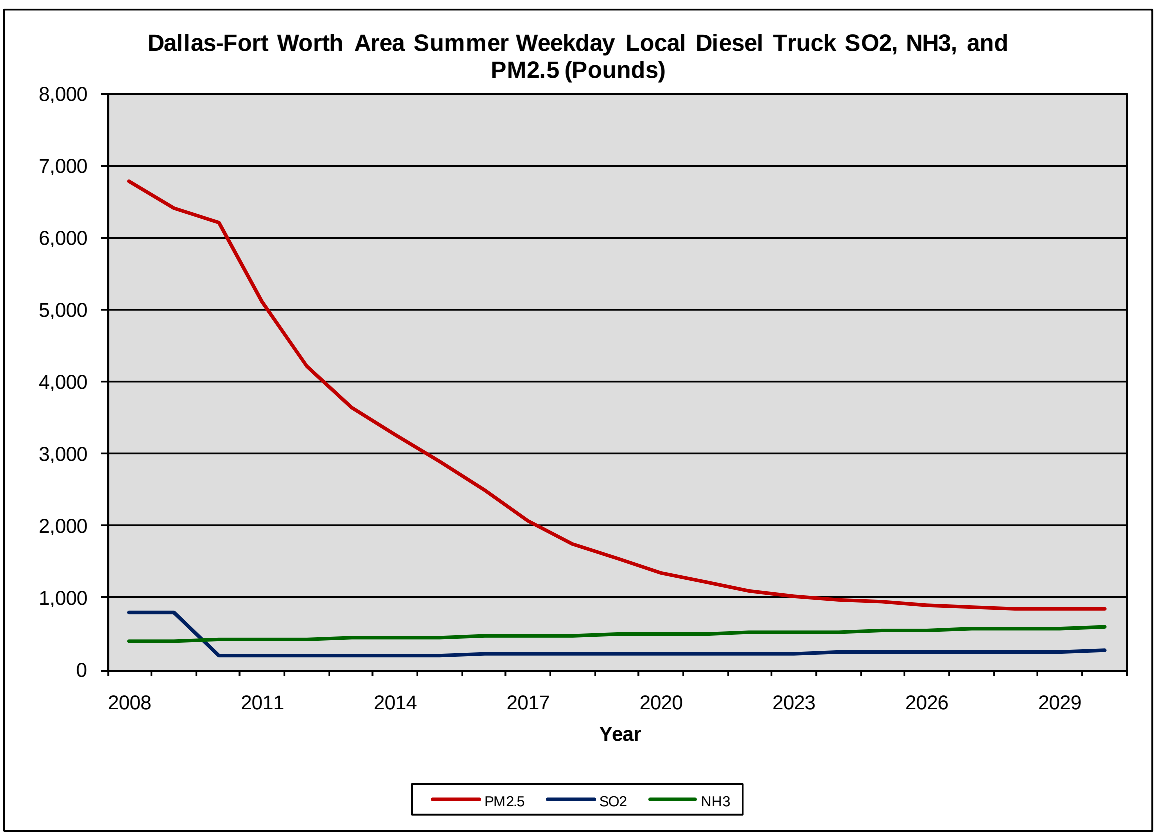
Corpus Christi Area Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5 (Pounds)
700
600
500
400
300
200
100
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3


Dallas-Fort Worth Area Summer Weekday Local Diesel Truck VMT
12,000,000
11,000,000
10,000,000
9,000,000
8,000,000
7,000,000
6,000,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT

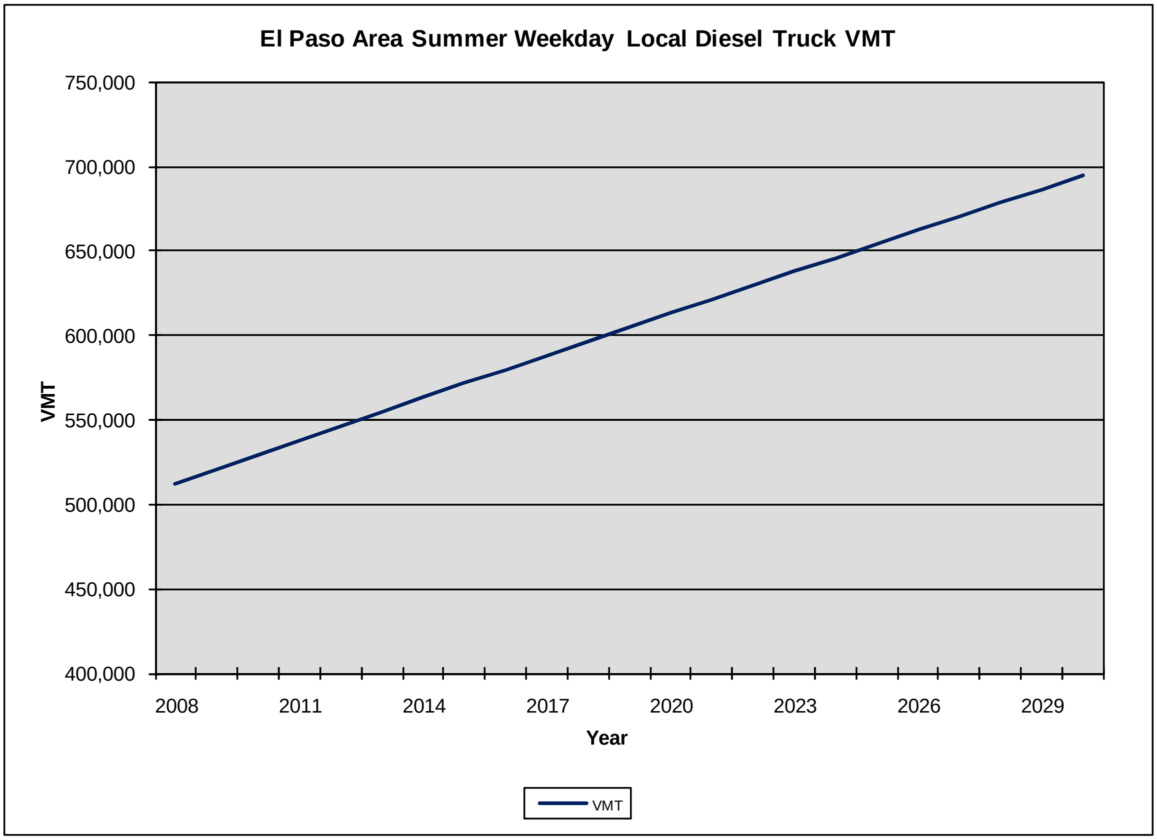

Dallas-Fort Worth Area Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
43,000,000
39,000,000
35,000,000
31,000,000
27,000,000
23,000,000
19,000,000
15,000,000
CO2
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO



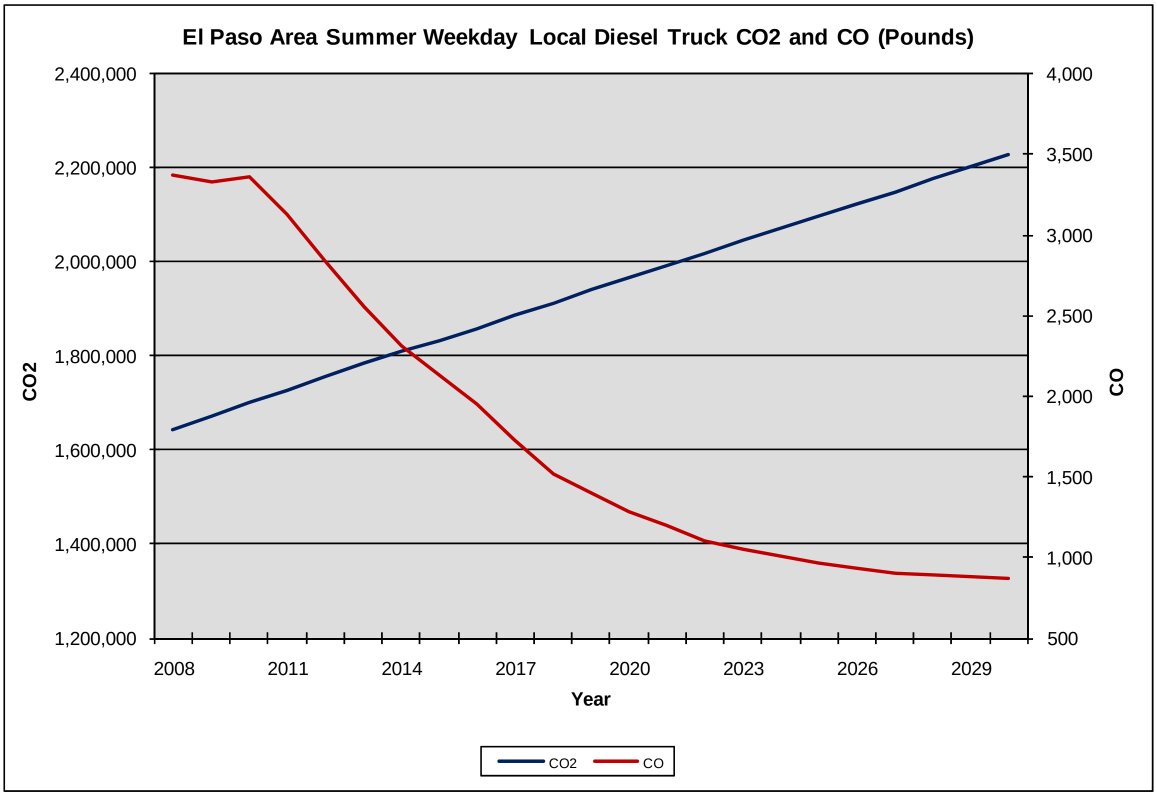
Dallas-Fort Worth Area Summer Weekday Local Diesel Truck VOC and NOx (Pounds)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx



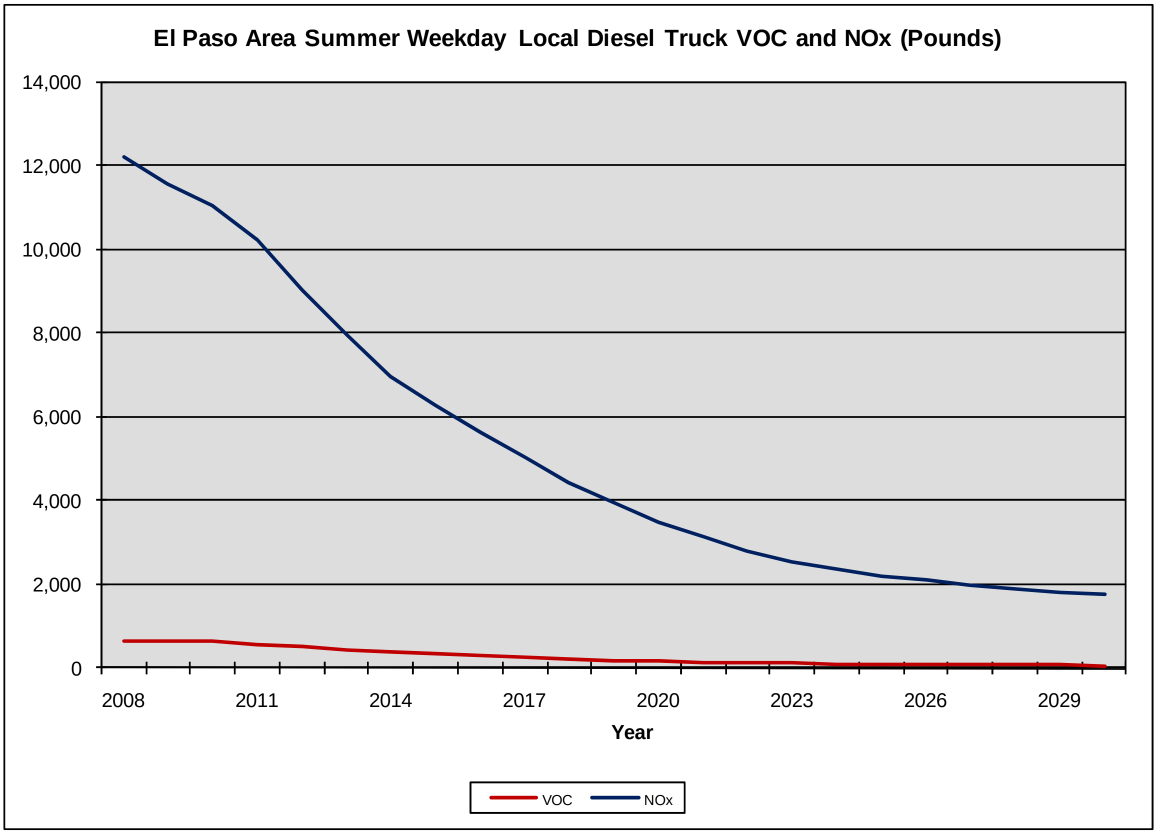
Dallas-Fort Worth Area Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5 (Pounds)
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3

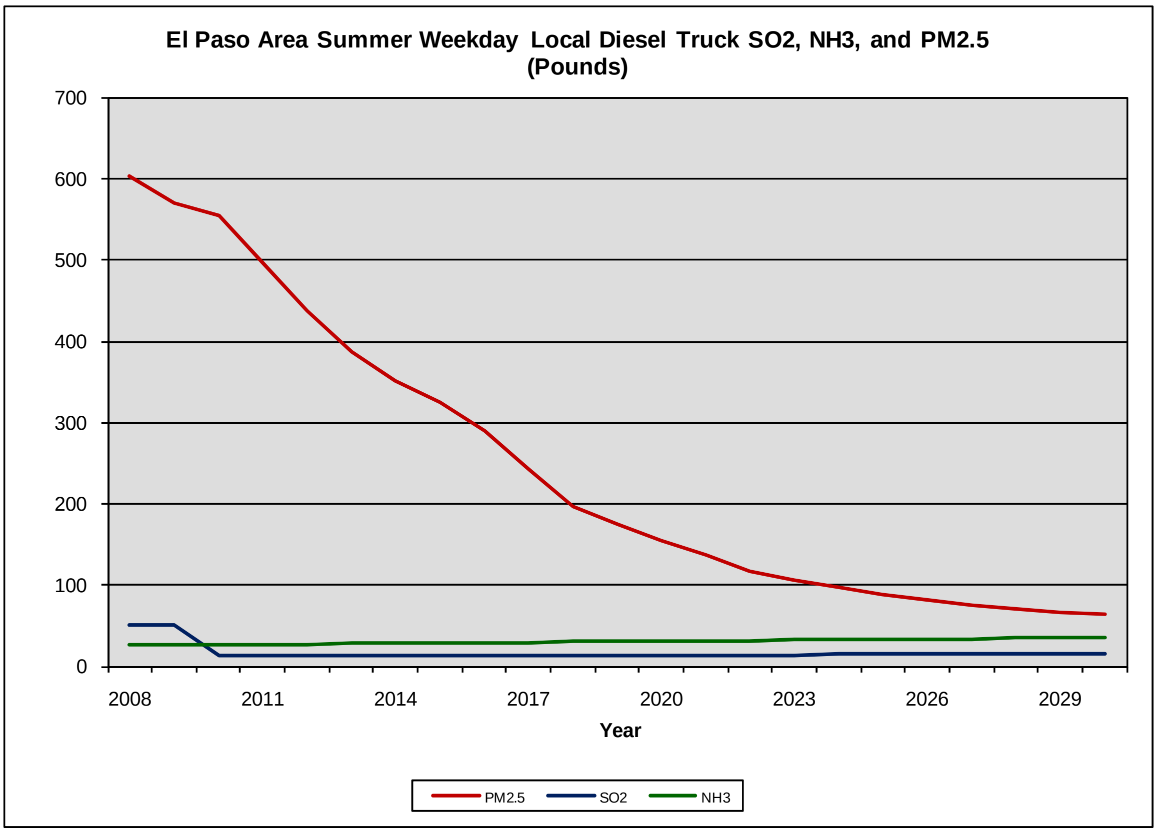


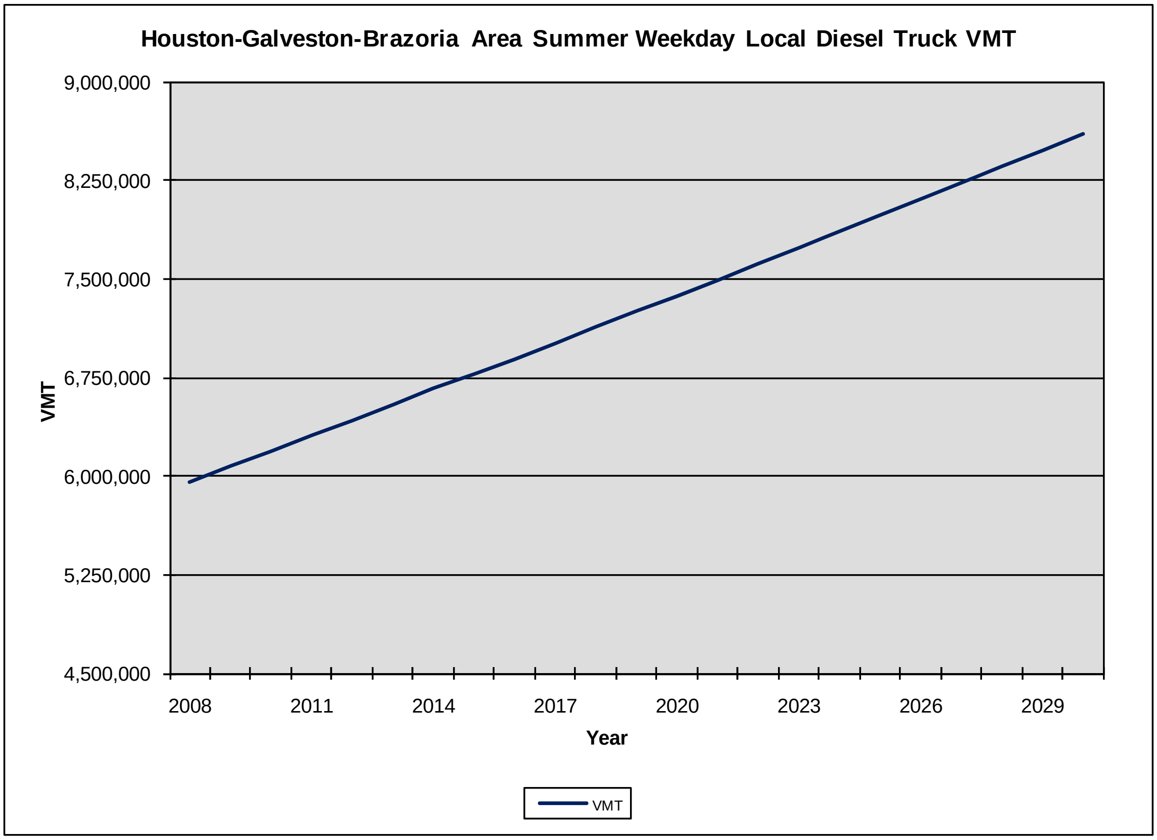
El Paso Area Summer Weekday Local Diesel Truck VMT
750,000
700,000
650,000
600,000
550,000
500,000
450,000
400,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT



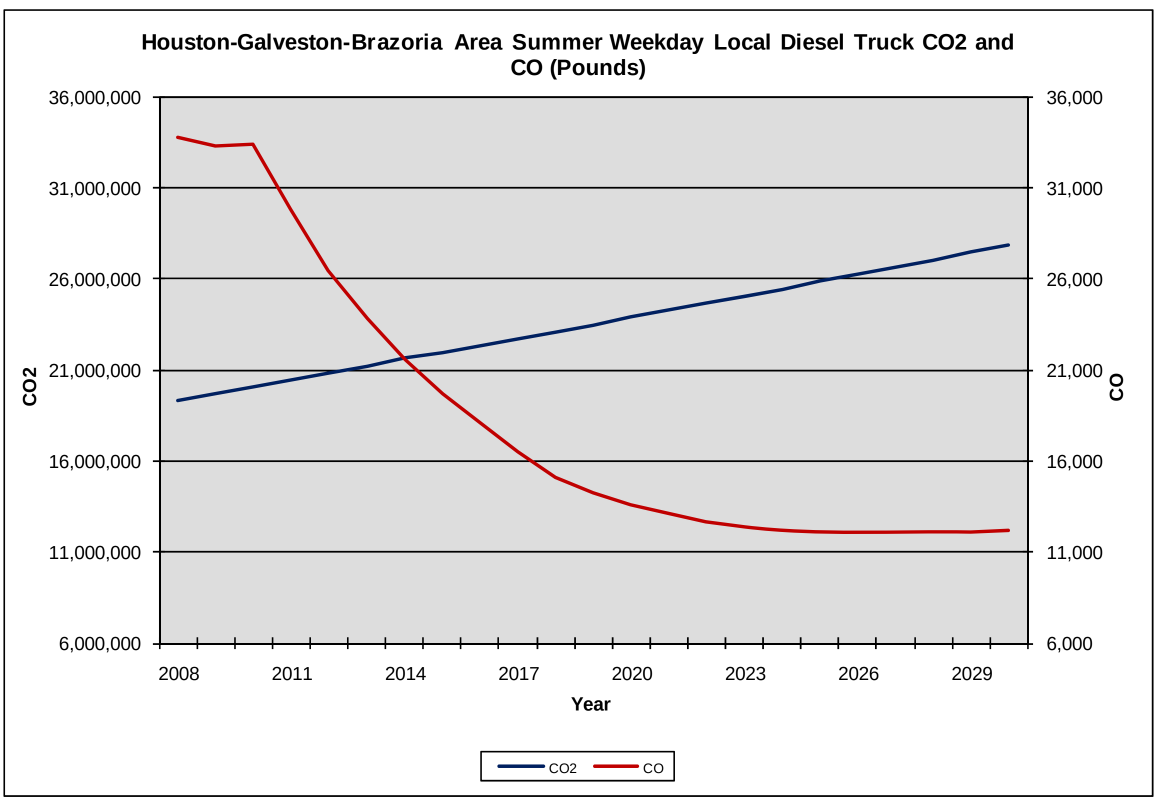
El Paso Area Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
2,400,000
2,200,000
2,000,000
1,800,000
1,600,000
1,400,000
1,200,000
CO2
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO


El Paso Area Summer Weekday Local Diesel Truck VOC and NOx (Pounds)
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx

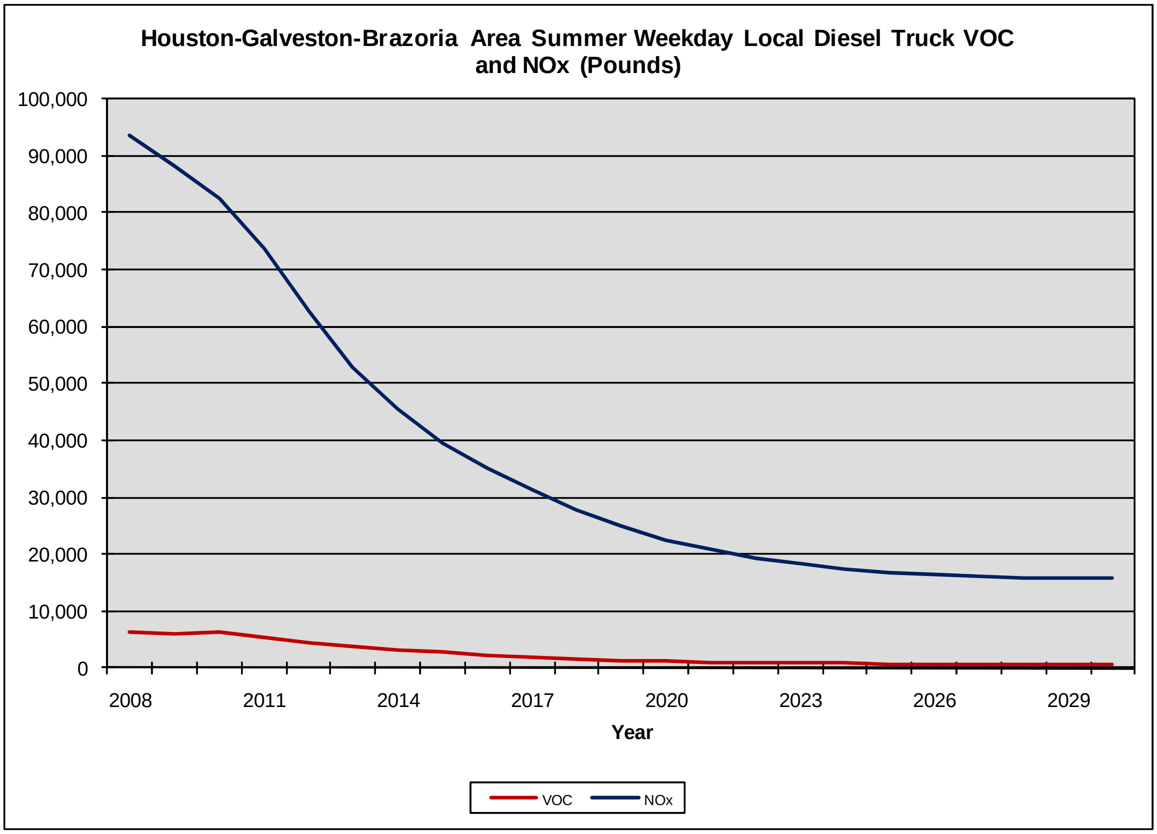

El Paso Area Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5 (Pounds)
700
600
500
400
300
200
100
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3

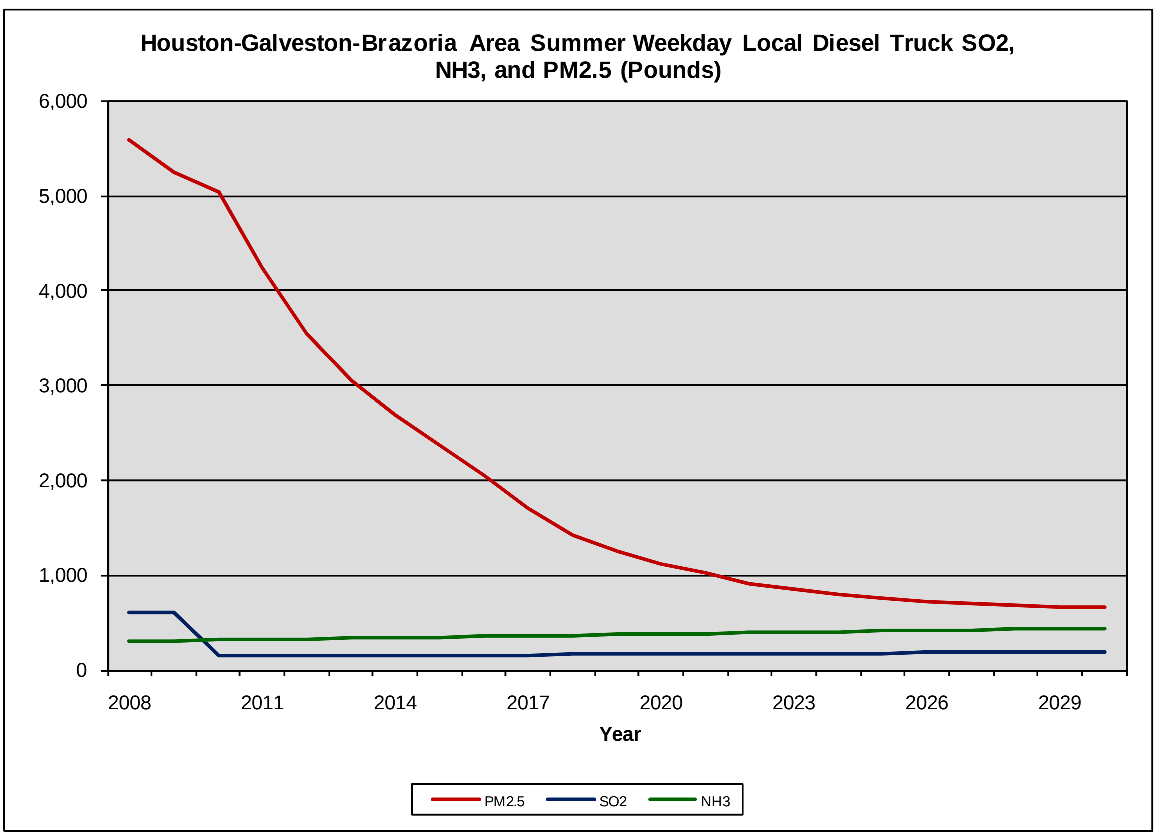


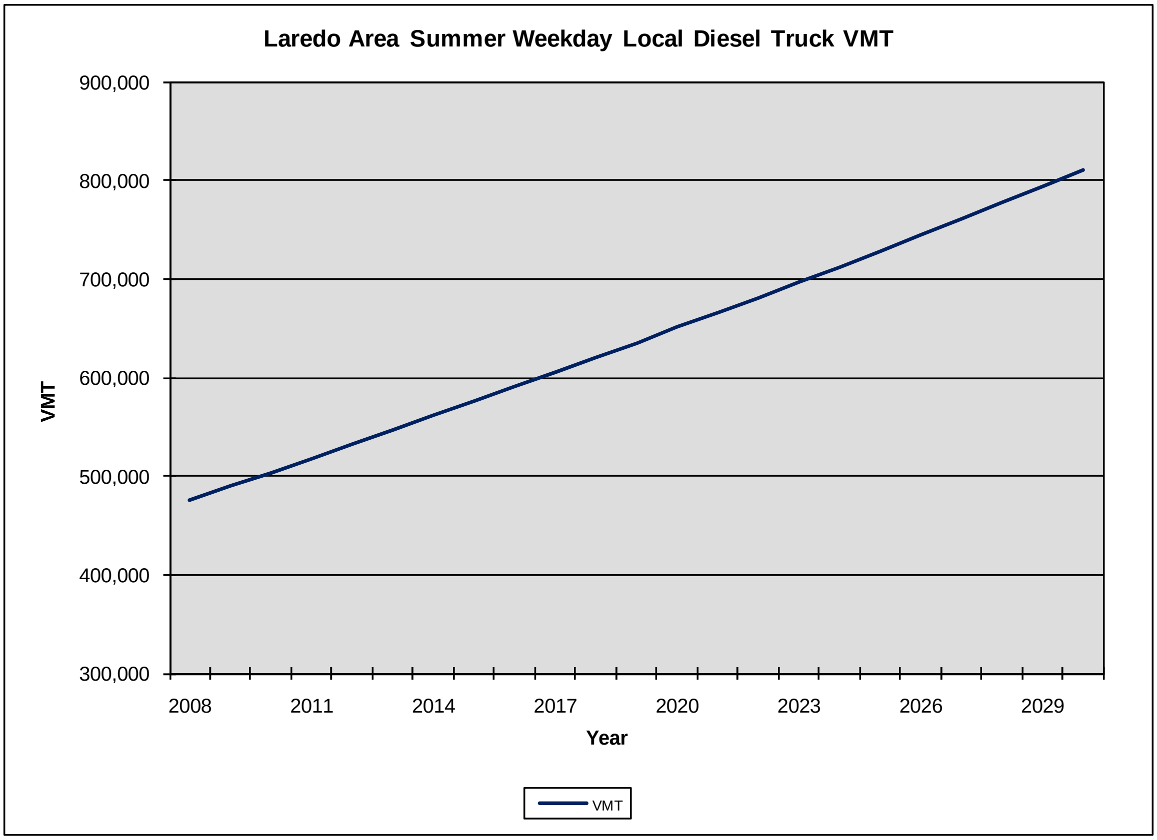
Houston-Galveston-Brazoria Area Summer Weekday Local Diesel Truck VMT
9,000,000
8,250,000
7,500,000
6,750,000
6,000,000
5,250,000
4,500,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT

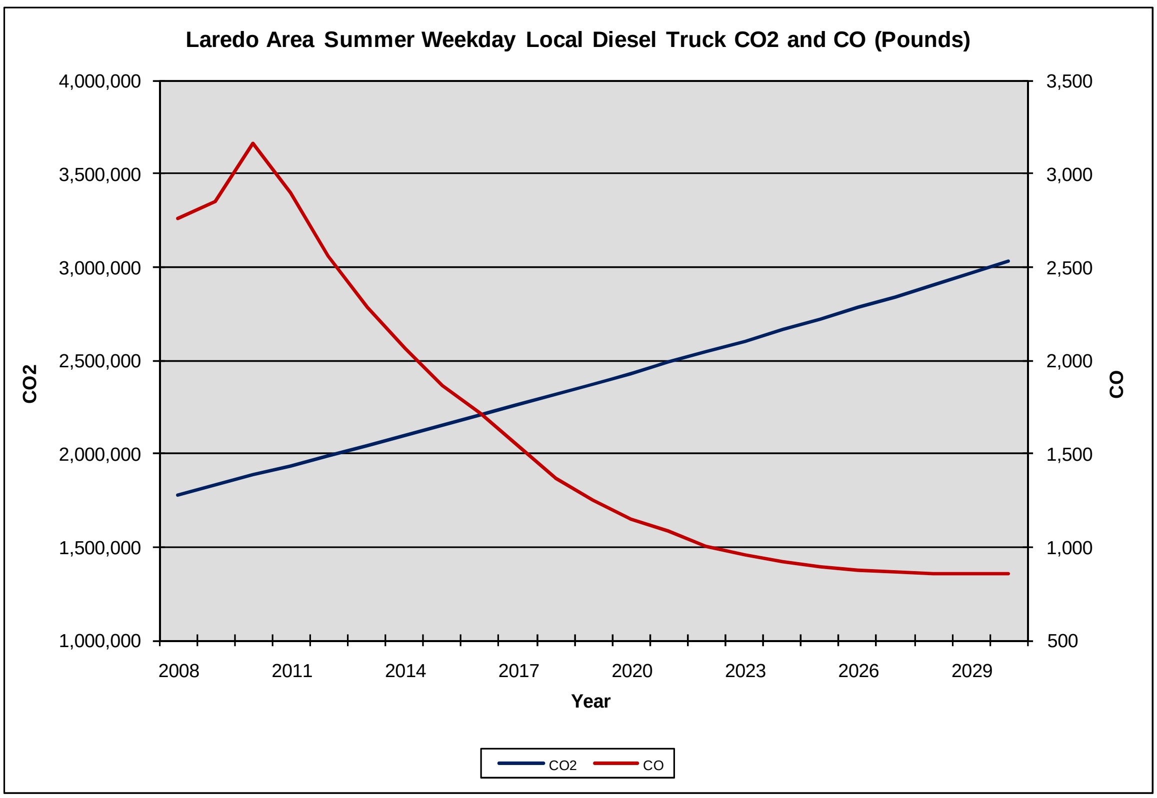


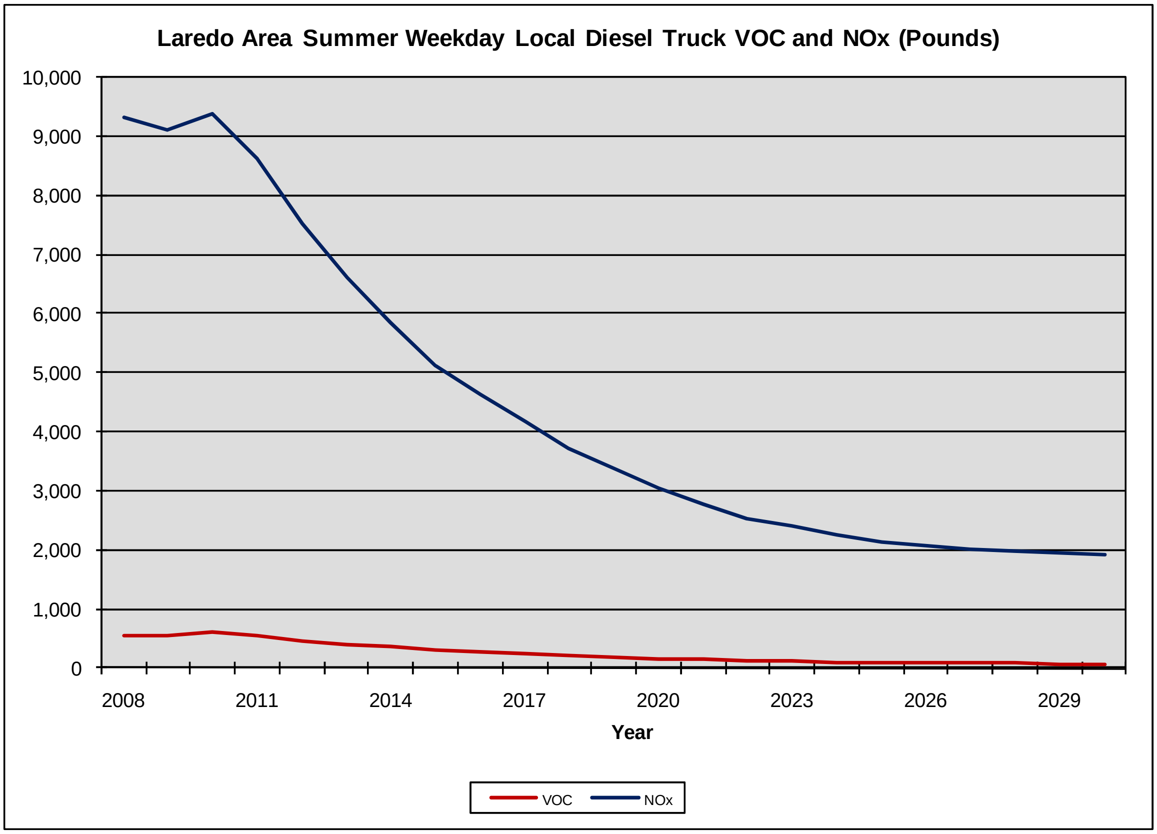
Houston-Galveston-Brazoria Area Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
36,000,000
31,000,000
26,000,000
21,000,000
16,000,000
11,000,000
6,000,000
CO2
36,000
31,000
26,000
21,000
16,000
11,000
6,000
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO

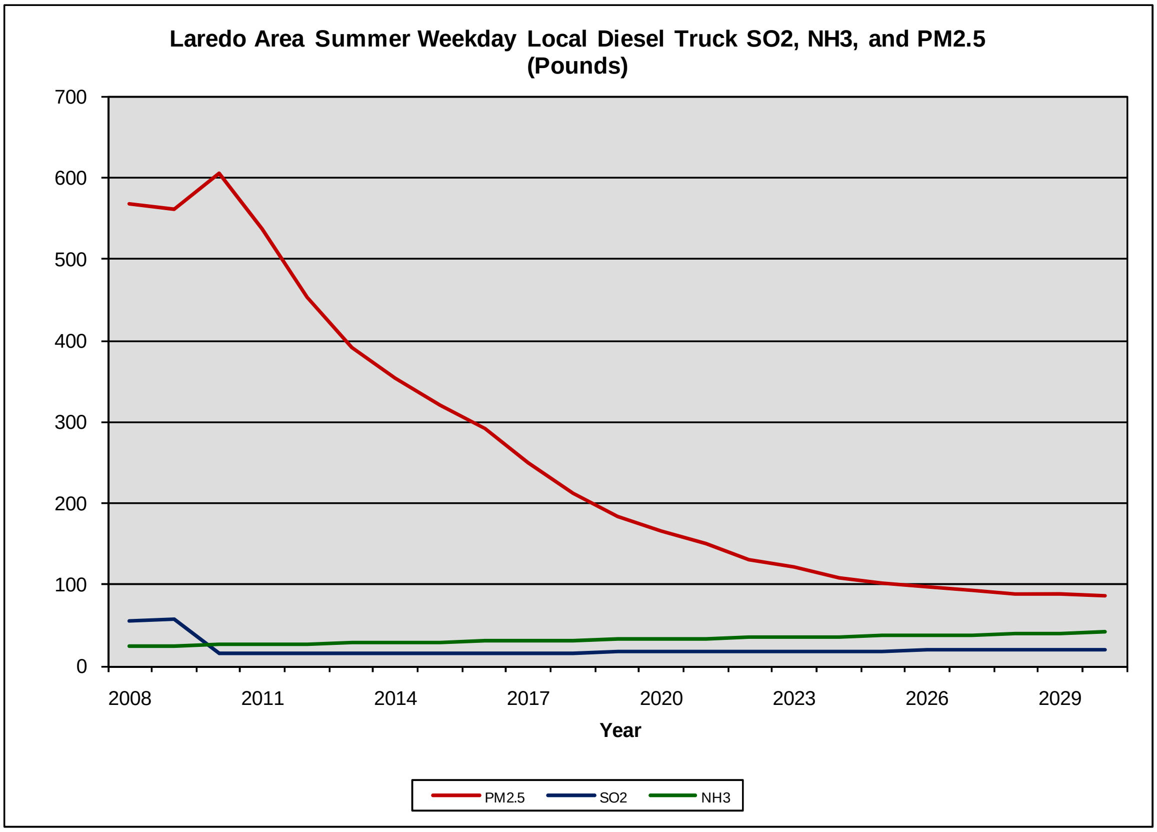

Houston-Galveston-Brazoria Area Summer Weekday Local Diesel Truck VOC and NOx (Pounds)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx

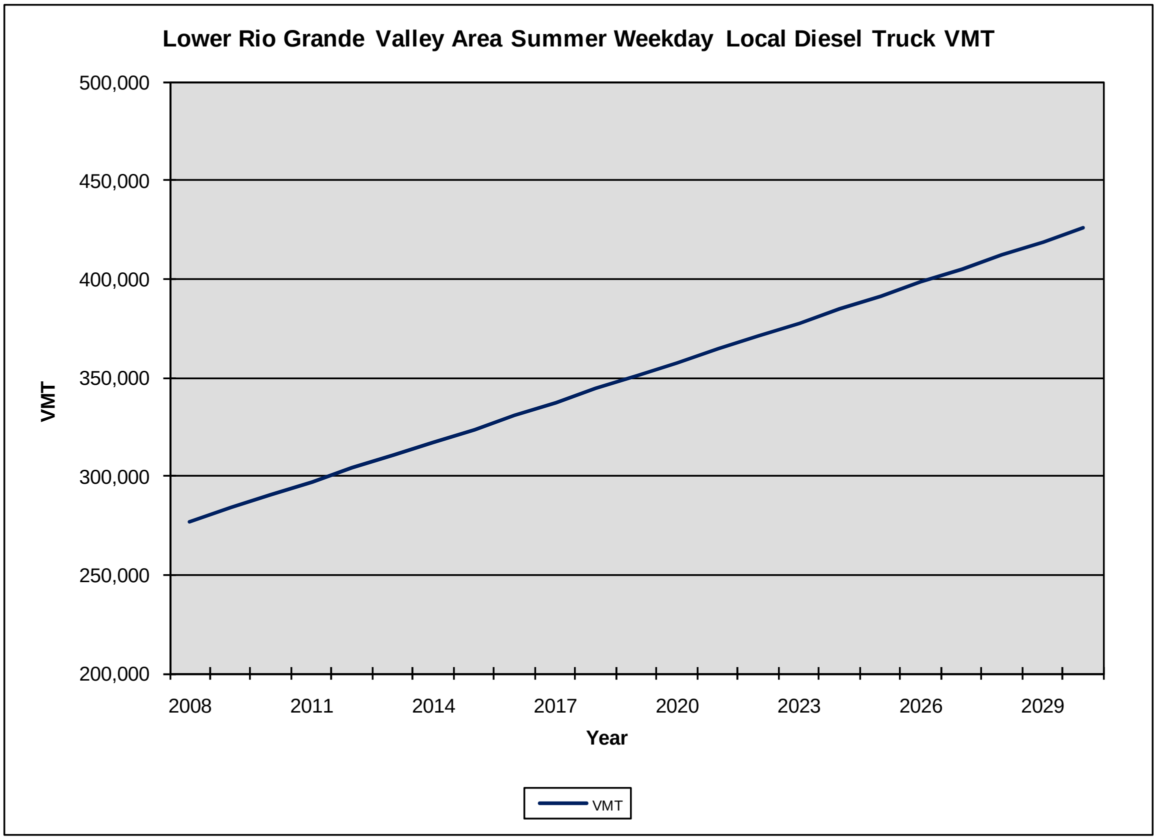

Houston-Galveston-Brazoria Area Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5 (Pounds)
6,000
5,000
4,000
3,000
2,000
1,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3

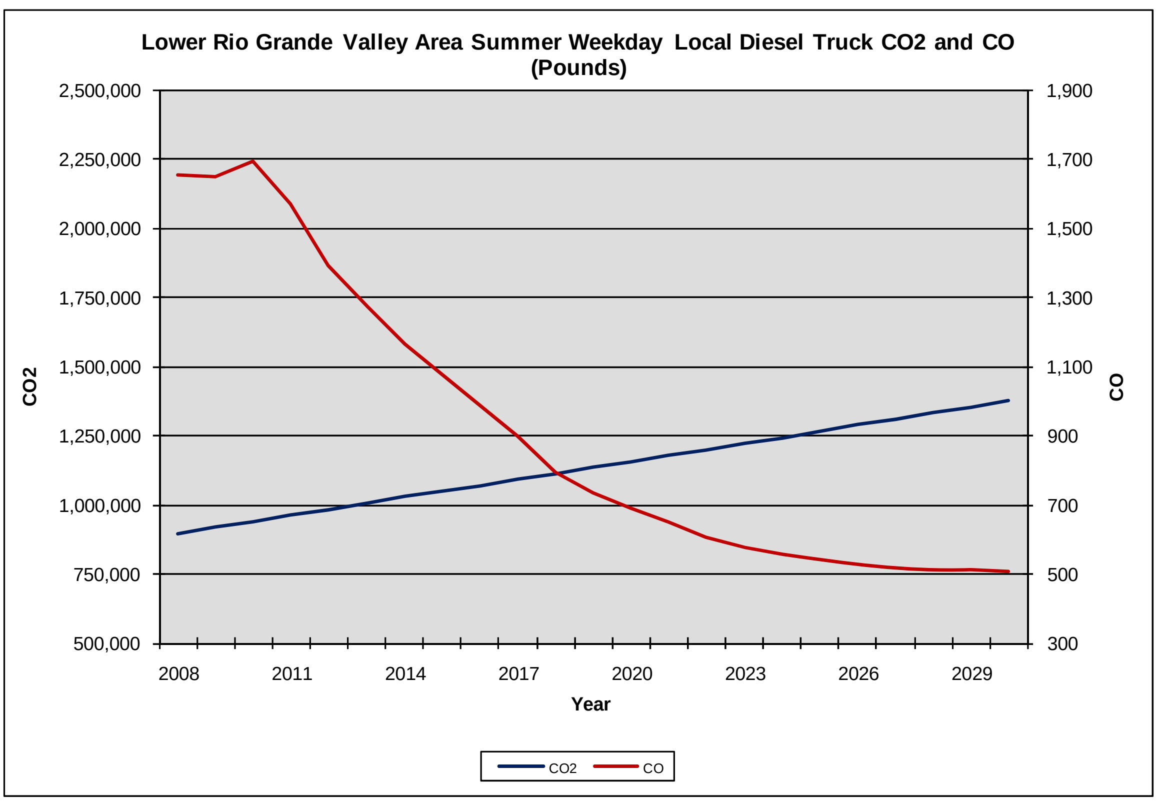

Laredo Area Summer Weekday Local Diesel Truck VMT
900,000
800,000
700,000
600,000
500,000
400,000
300,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT

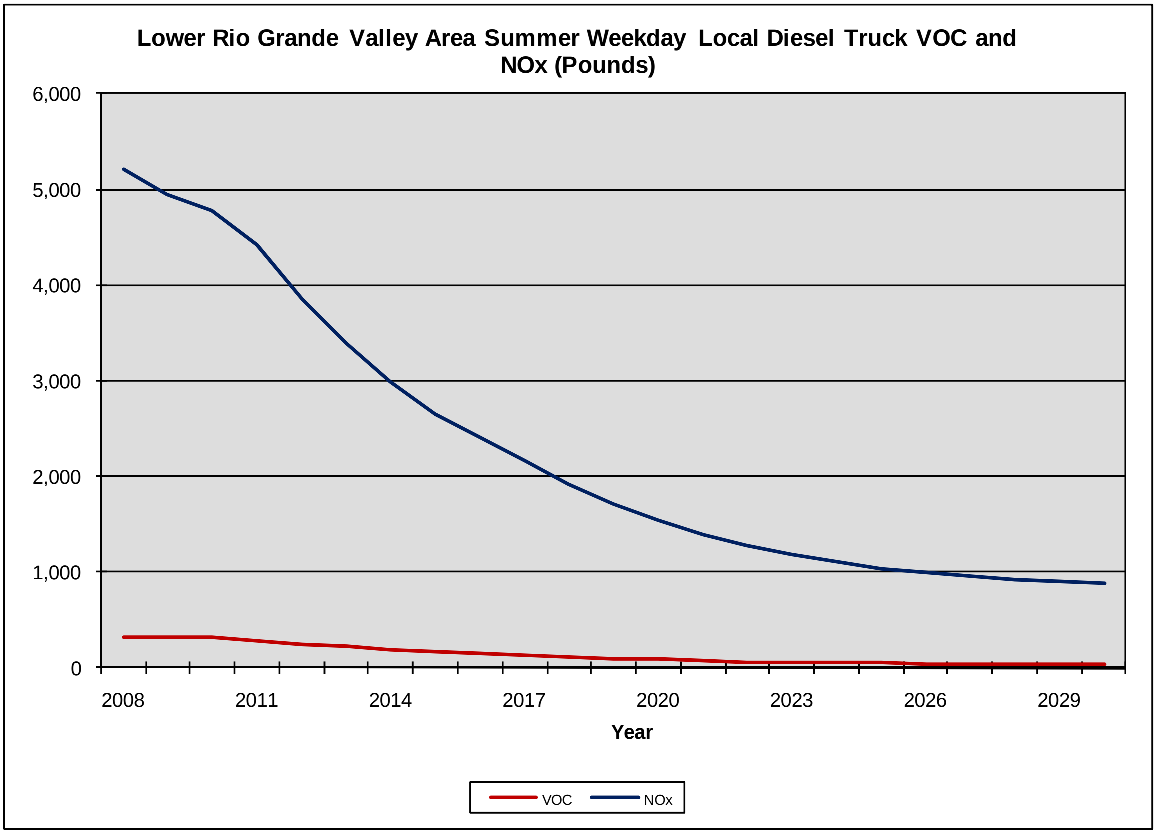

Laredo Area Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
CO2
3,500
3,000
2,500
2,000
1,500
1,000
500
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO

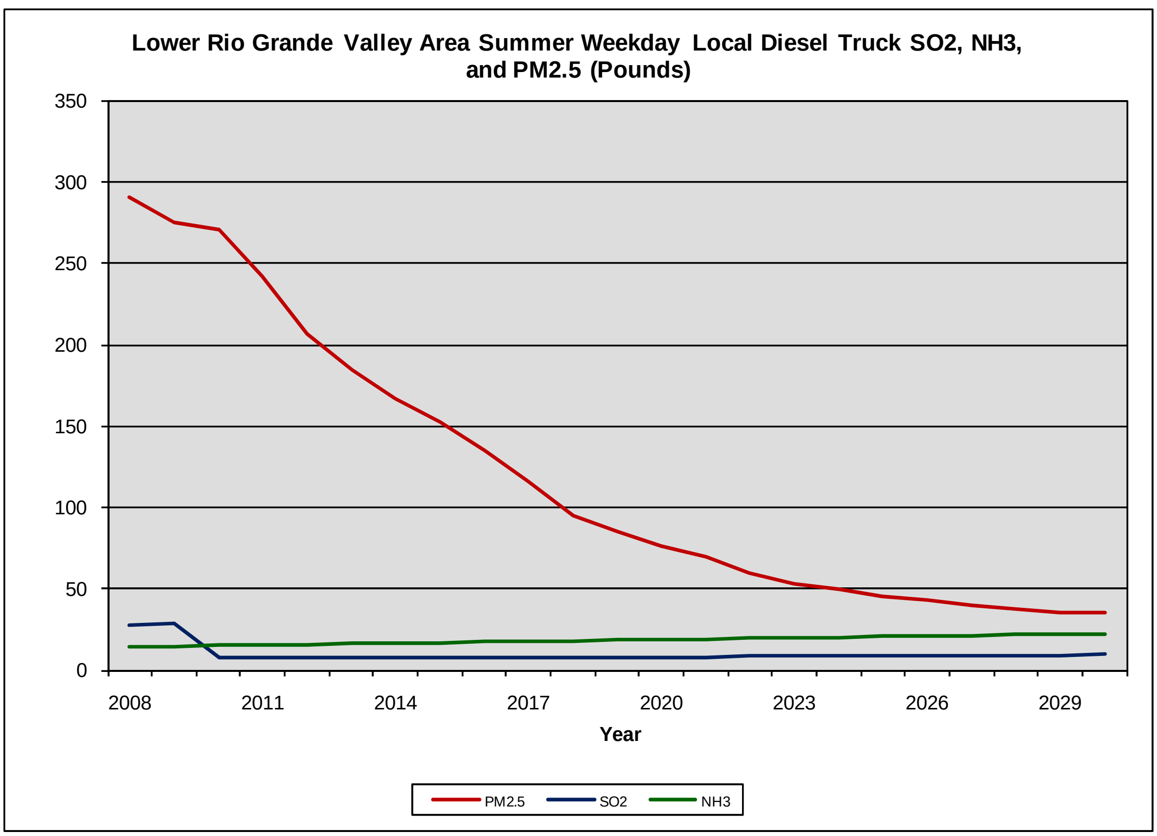

Laredo Area Summer Weekday Local Diesel Truck VOC and NOx (Pounds)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx

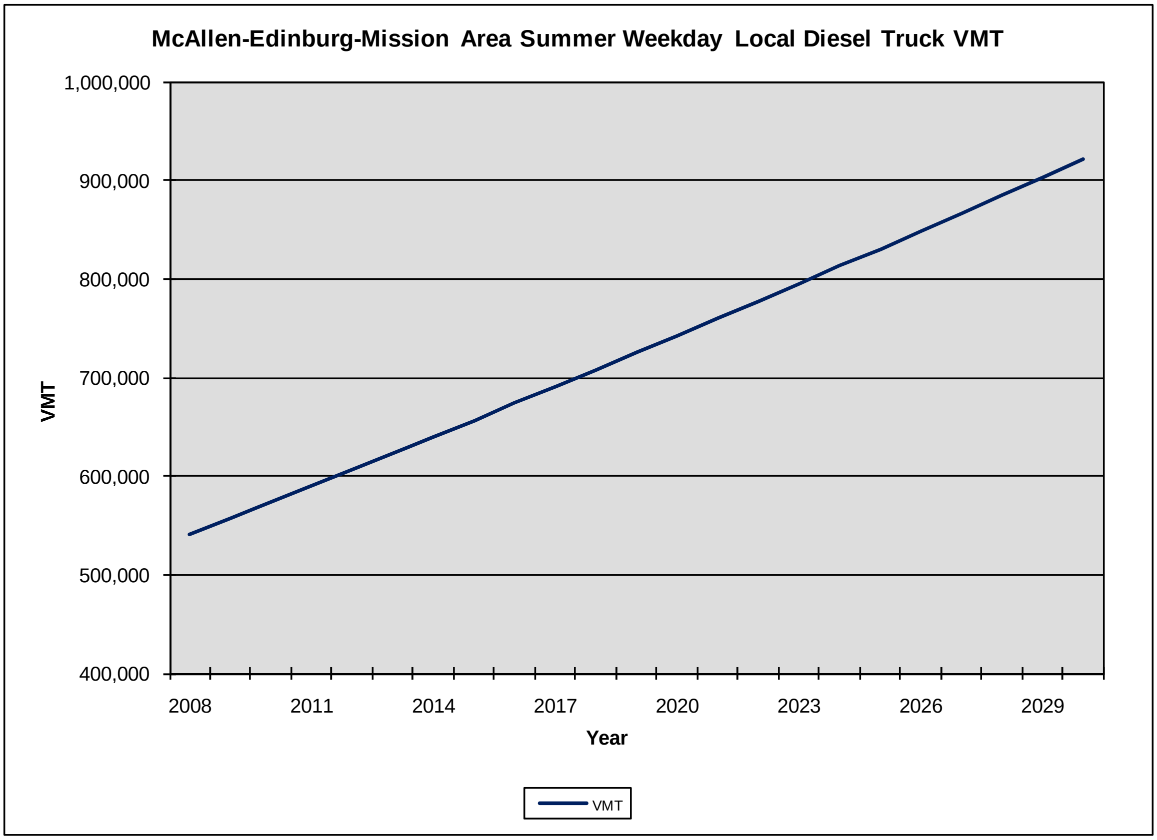

Laredo Area Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5 (Pounds)
700
600
500
400
300
200
100
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3

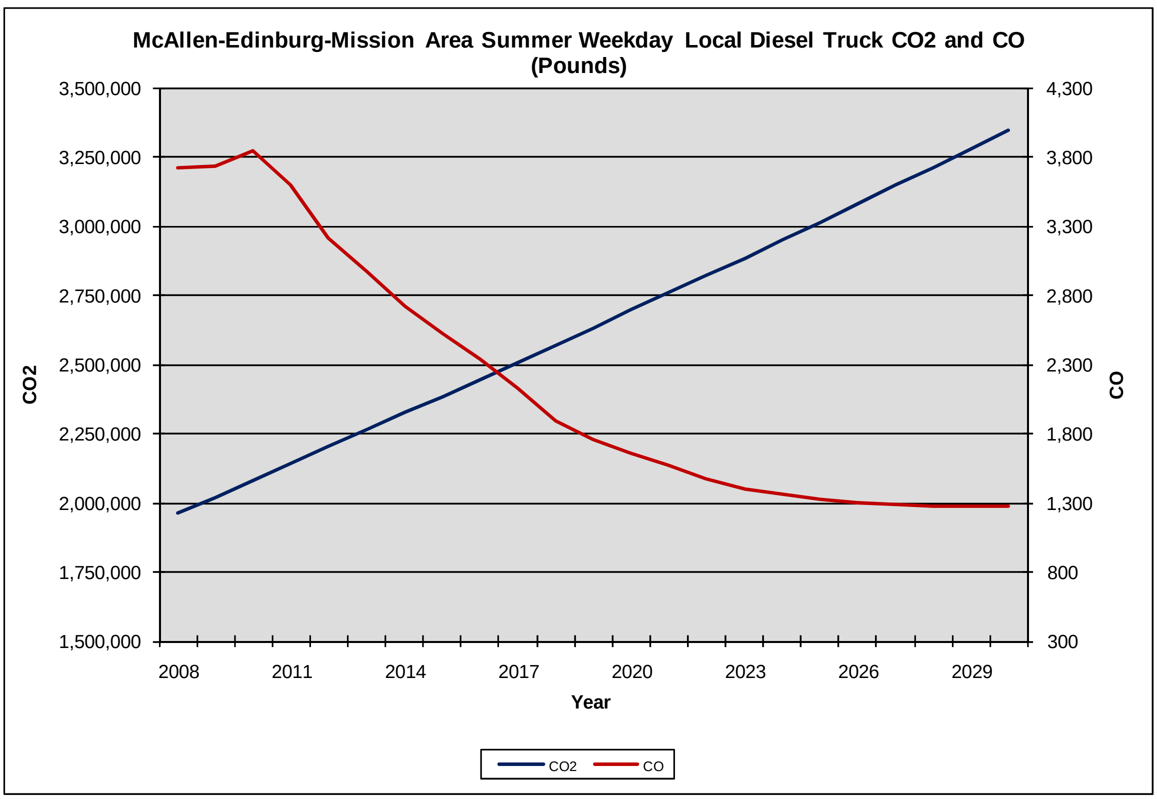

Lower Rio Grande Valley Area Summer Weekday Local Diesel Truck VMT
500,000
450,000
400,000
350,000
300,000
250,000
200,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT

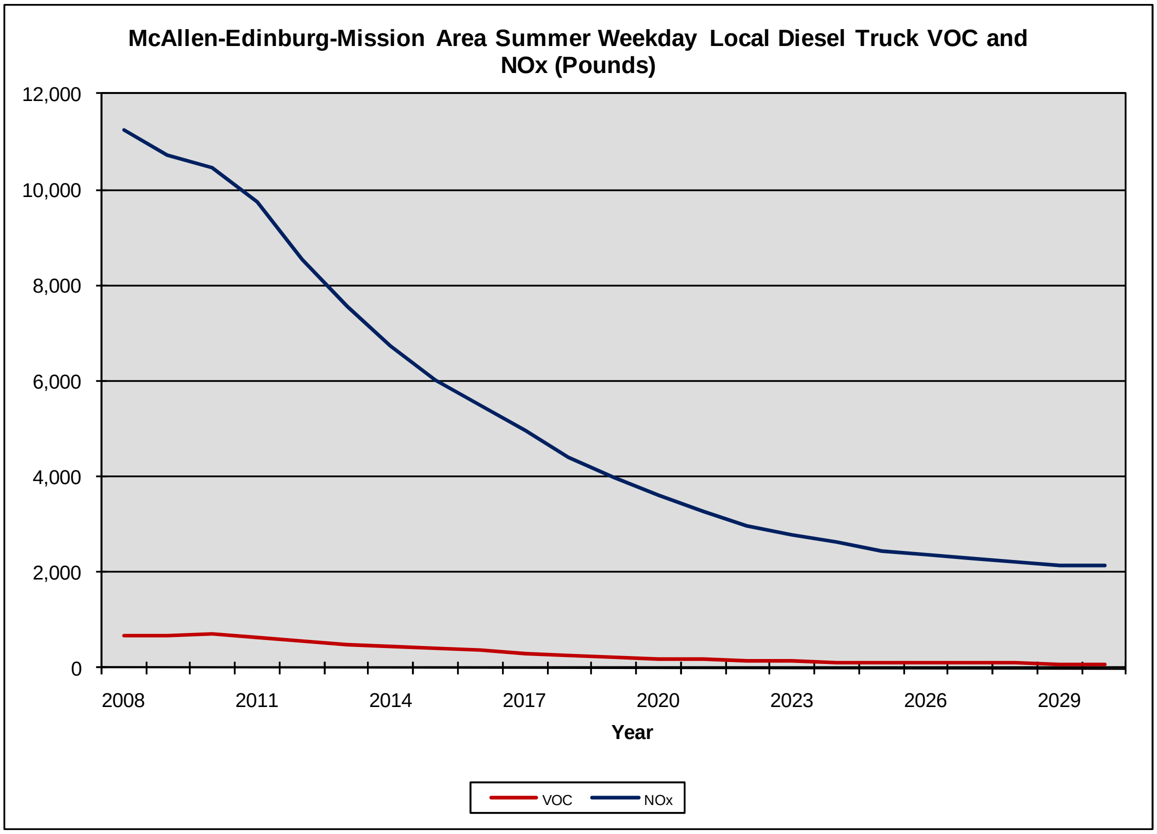

Lower Rio Grande Valley Area Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
2,500,000
2,250,000
2,000,000
1,750,000
1,500,000
1,250,000
1,000,000
750,000
500,000
CO2
1,900
1,700
1,500
1,300
1,100
900
700
500
300
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO

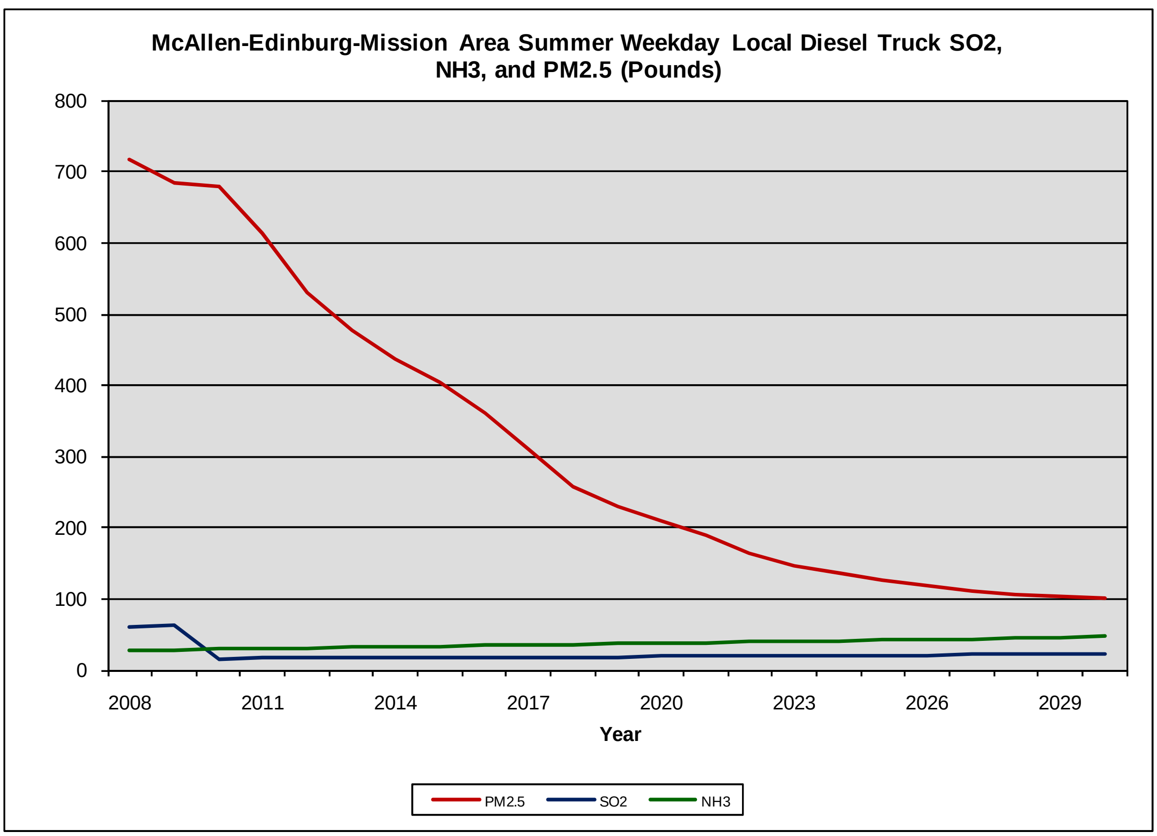

Lower Rio Grande Valley Area Summer Weekday Local Diesel Truck VOC and NOx (Pounds)
6,000
5,000
4,000
3,000
2,000
1,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx

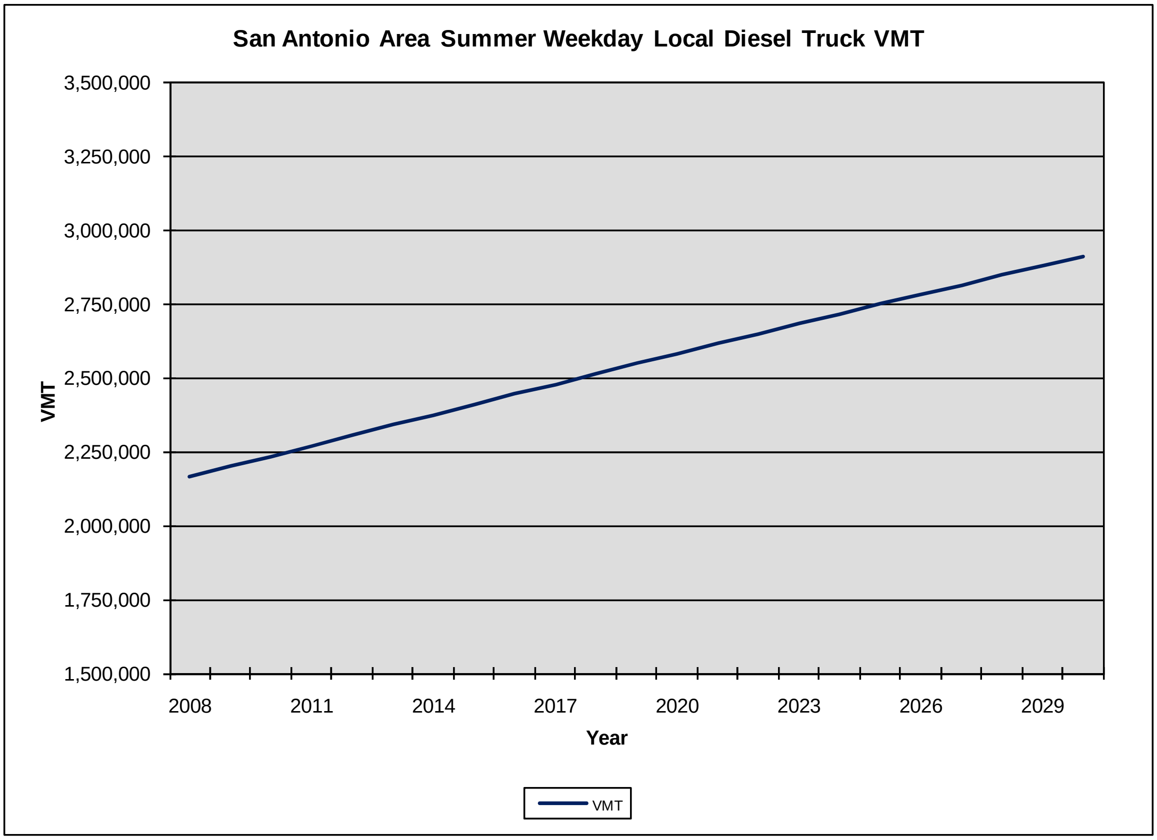

Lower Rio Grande Valley Area Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5 (Pounds)
350
300
250
200
150
100
50
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3

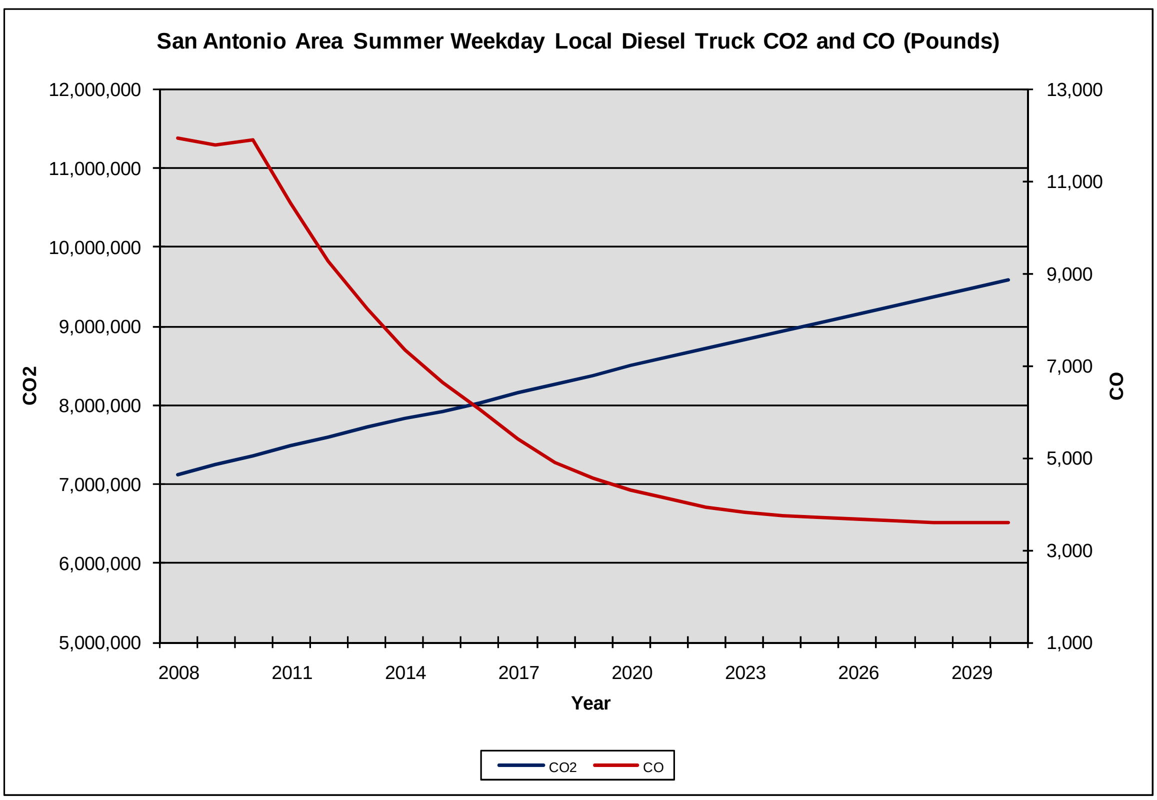

McAllen-Edinburg-Mission Area Summer Weekday Local Diesel Truck VMT
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT

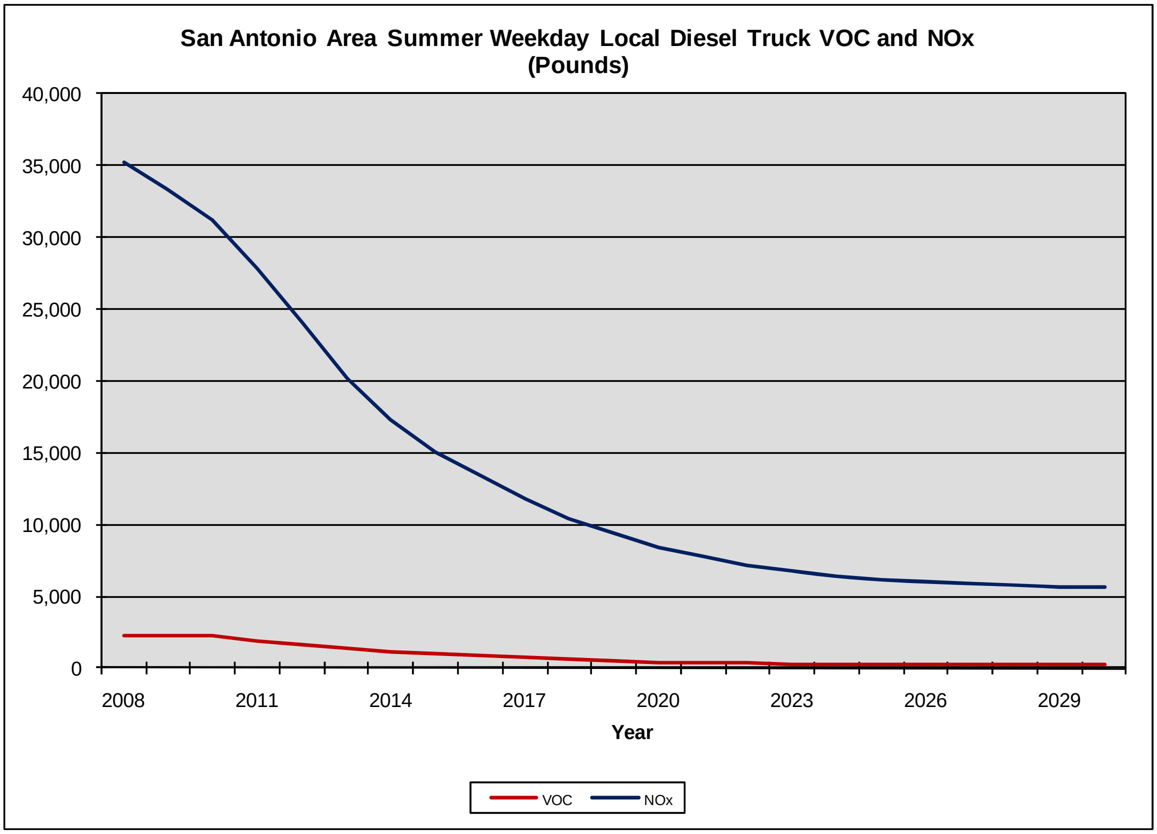

McAllen-Edinburg-Mission Area Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
3,500,000
3,250,000
3,000,000
2,750,000
2,500,000
2,250,000
2,000,000
1,750,000
1,500,000
CO2
4,300
3,800
3,300
2,800
2,300
1,800
1,300
800
300
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO

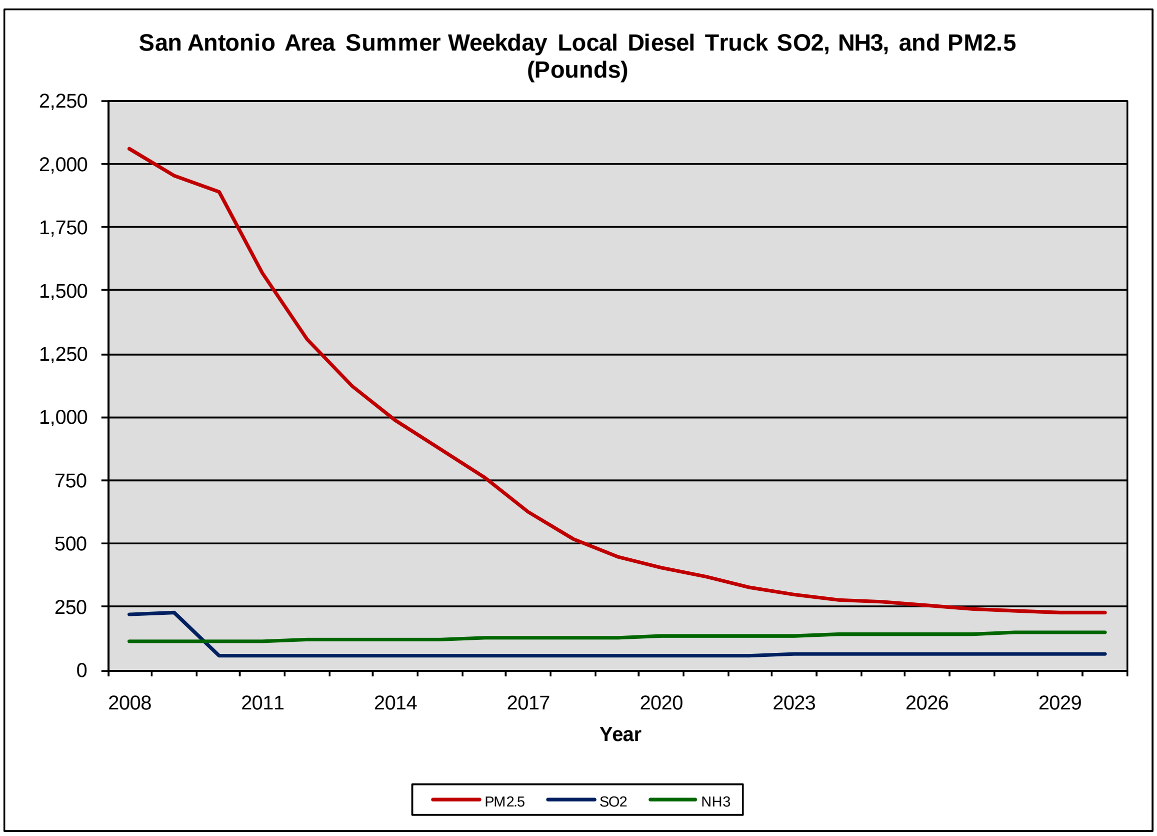

McAllen-Edinburg-Mission Area Summer Weekday Local Diesel Truck VOC and NOx (Pounds)
12,000
10,000
8,000
6,000
4,000
2,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx

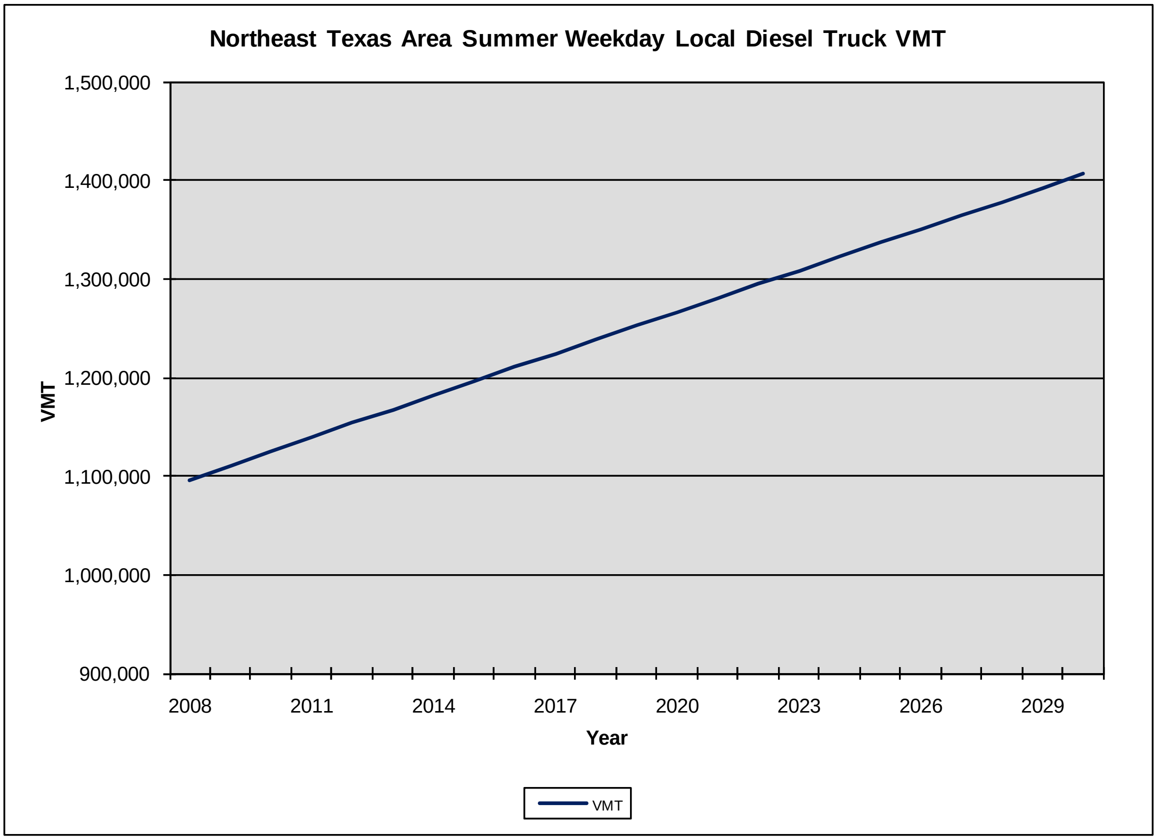

McAllen-Edinburg-Mission Area Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5 (Pounds)
800
700
600
500
400
300
200
100
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3


San Antonio Area Summer Weekday Local Diesel Truck VMT
3,500,000
3,250,000
3,000,000
2,750,000
2,500,000
2,250,000
2,000,000
1,750,000
1,500,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT

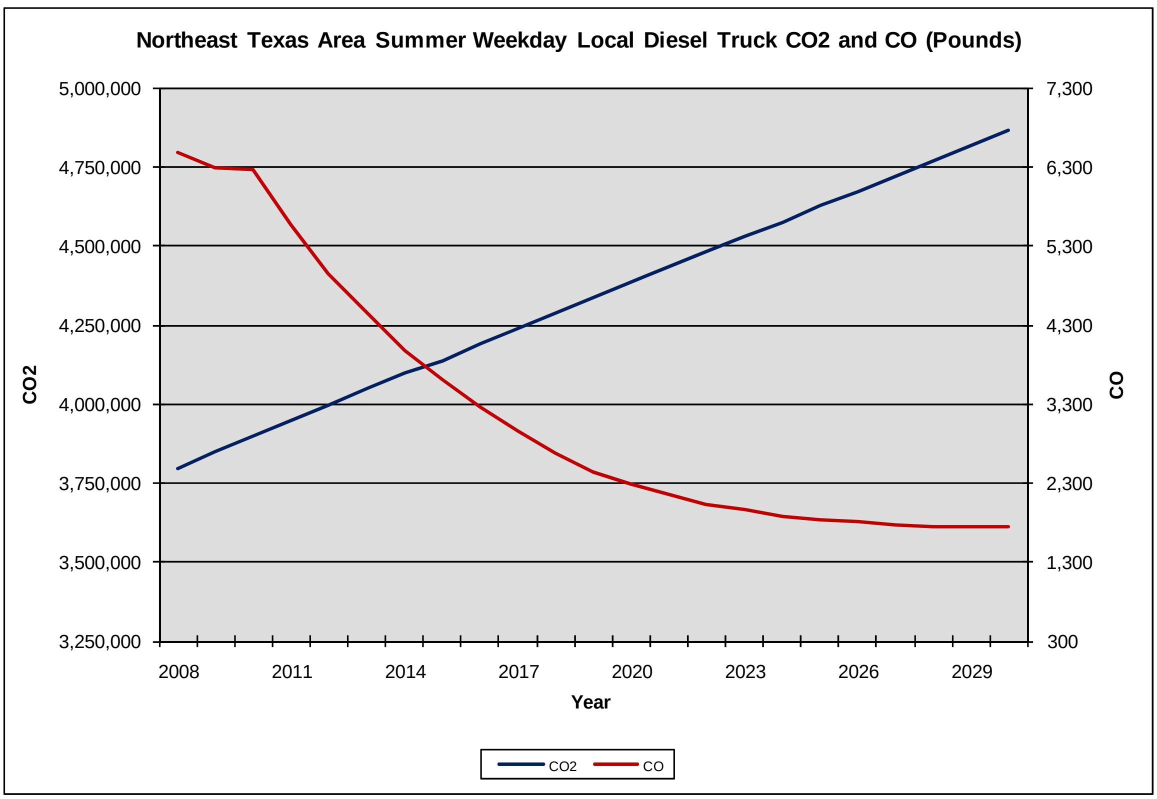

San Antonio Area Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
12,000,000
11,000,000
10,000,000
9,000,000
8,000,000
7,000,000
6,000,000
5,000,000
CO2
13,000
11,000
9,000
7,000
5,000
3,000
1,000
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO


San Antonio Area Summer Weekday Local Diesel Truck VOC and NOx
(Pounds)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx

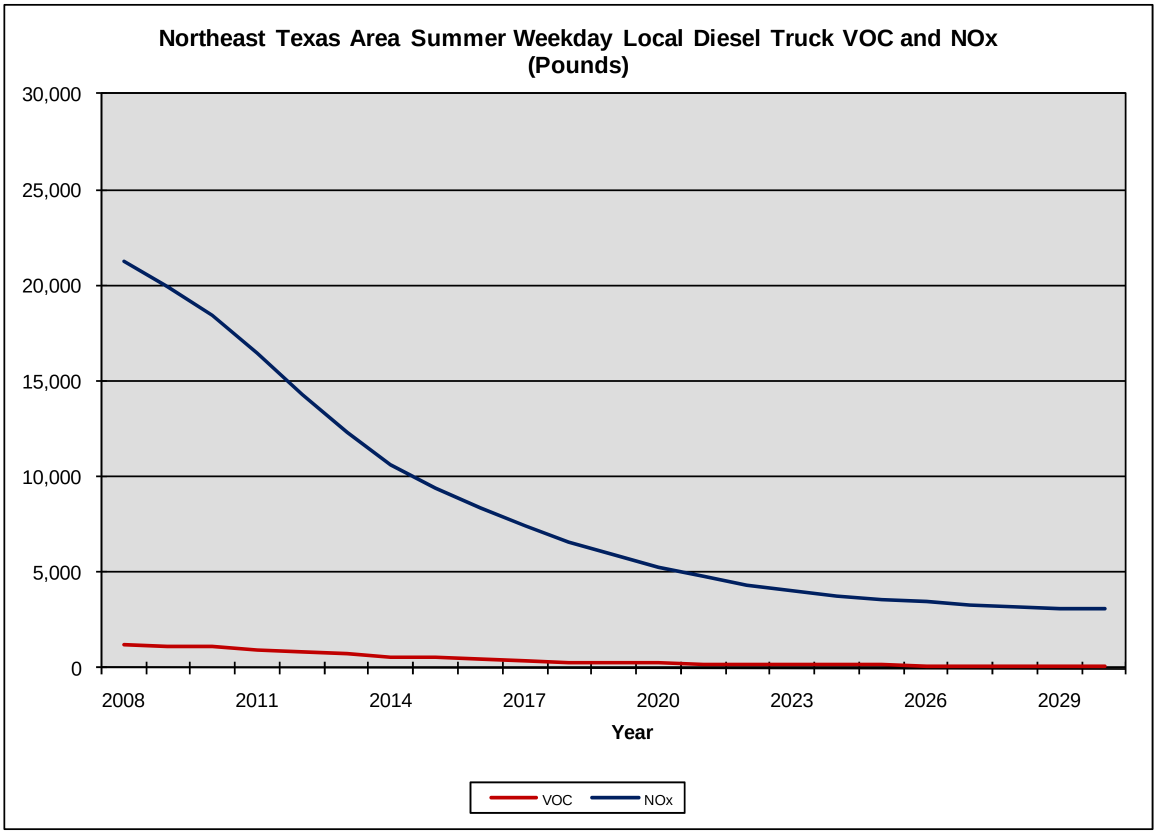

San Antonio Area Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5
(Pounds)
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3

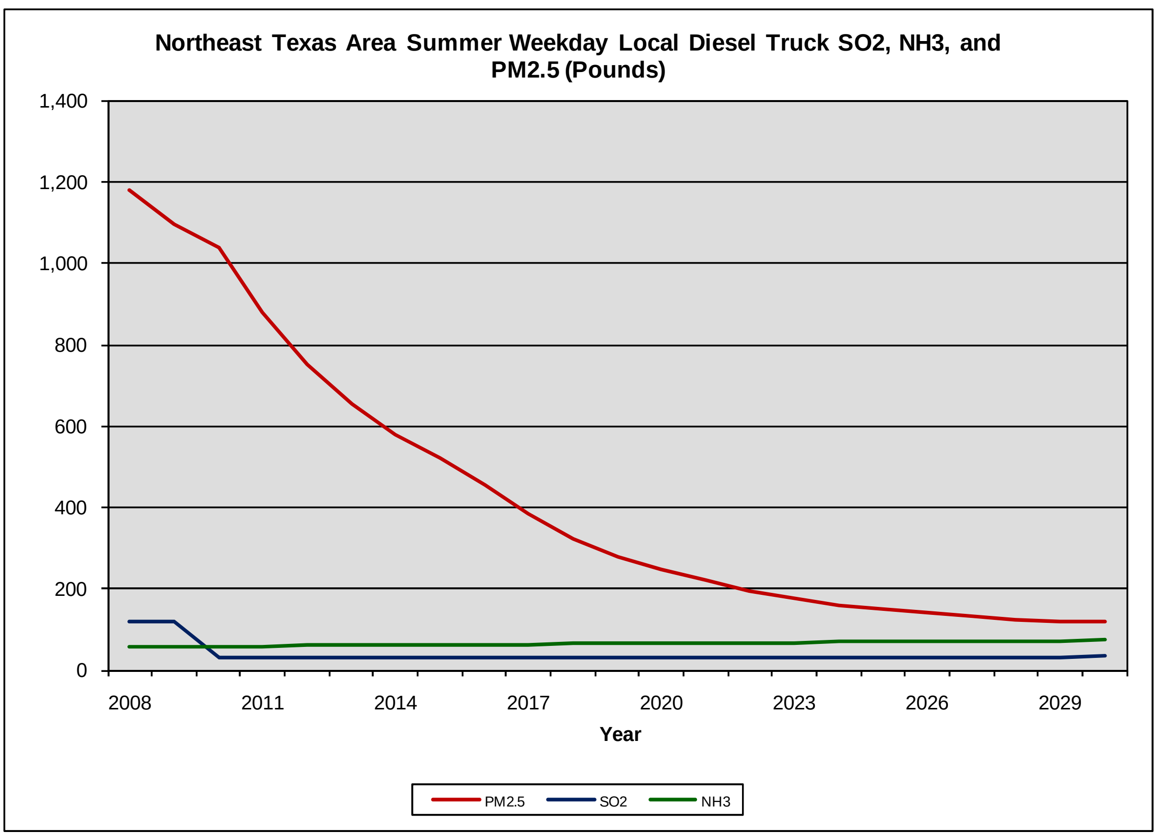


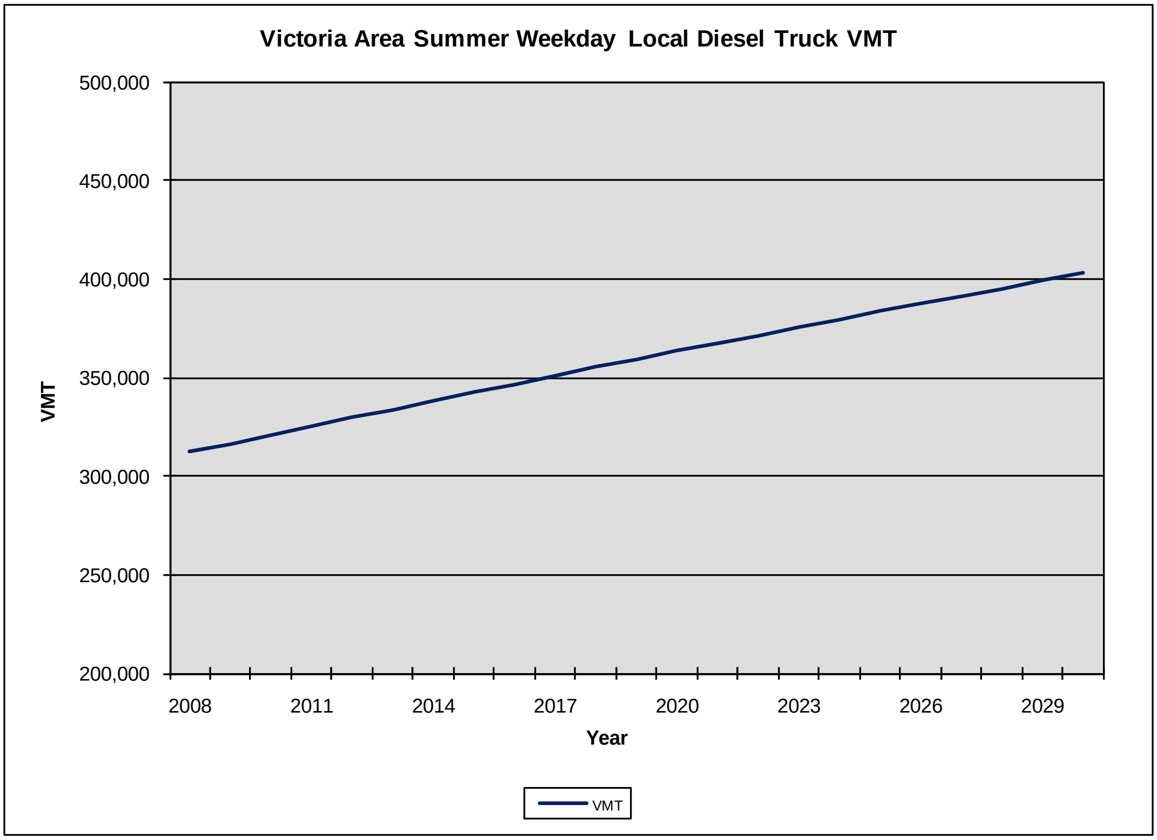
Northeast Texas Area Summer Weekday Local Diesel Truck VMT
1,500,000
1,400,000
1,300,000
1,200,000
1,100,000
1,000,000
900,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT

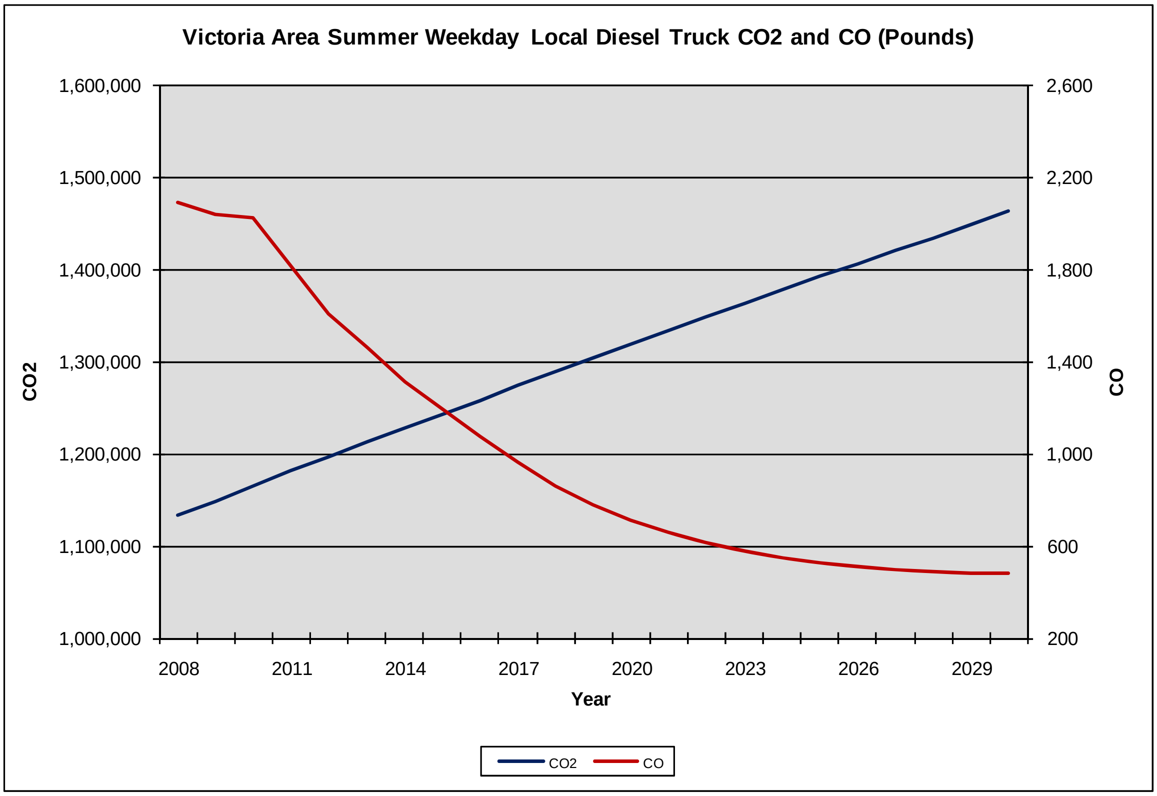


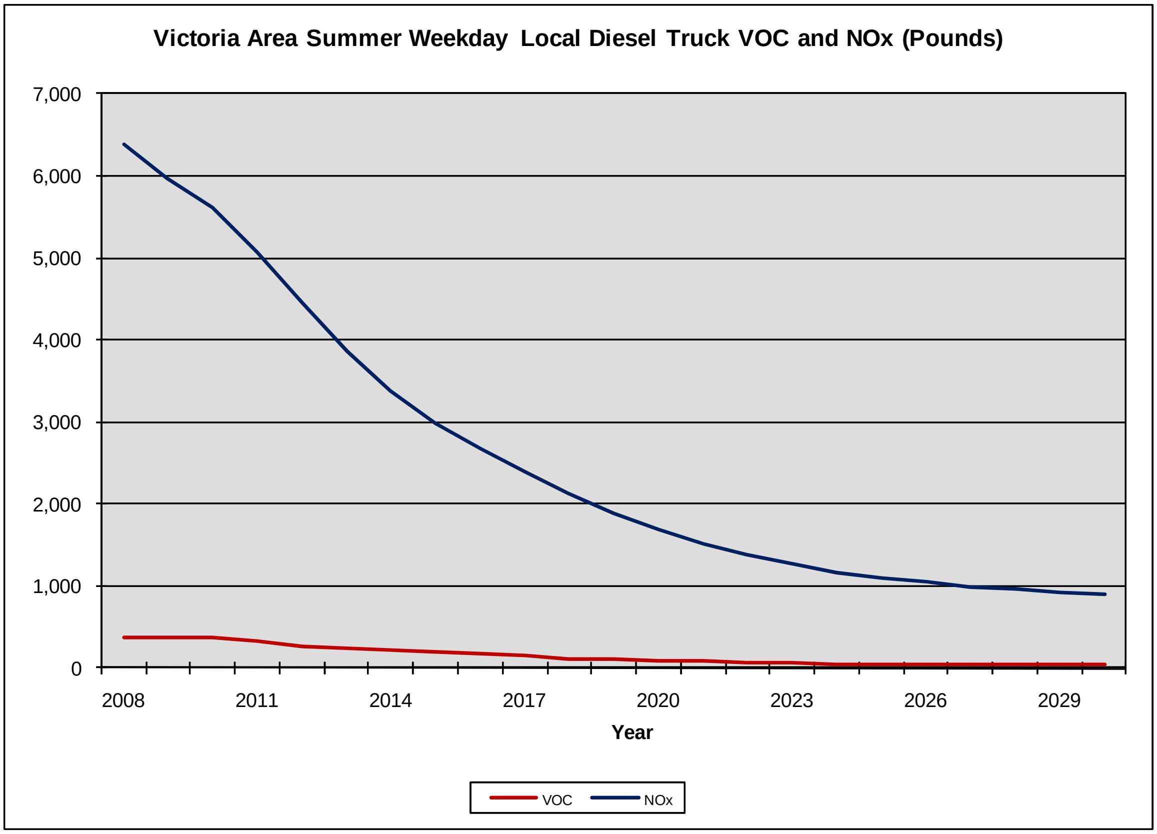
Northeast Texas Area Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
5,000,000
4,750,000
4,500,000
4,250,000
4,000,000
3,750,000
3,500,000
3,250,000
CO2
7,300
6,300
5,300
4,300
3,300
2,300
1,300
300
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO

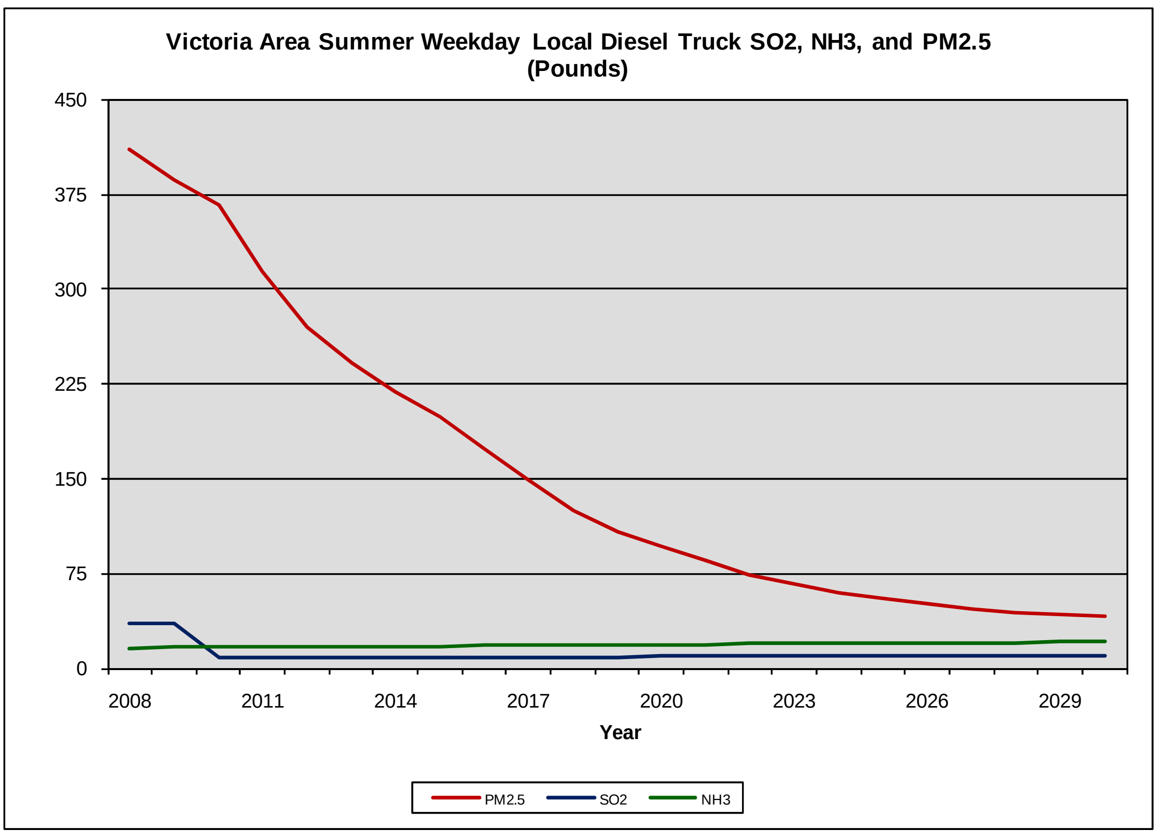

Northeast Texas Area Summer Weekday Local Diesel Truck VOC and NOx (Pounds)
30,000
25,000
20,000
15,000
10,000
5,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx

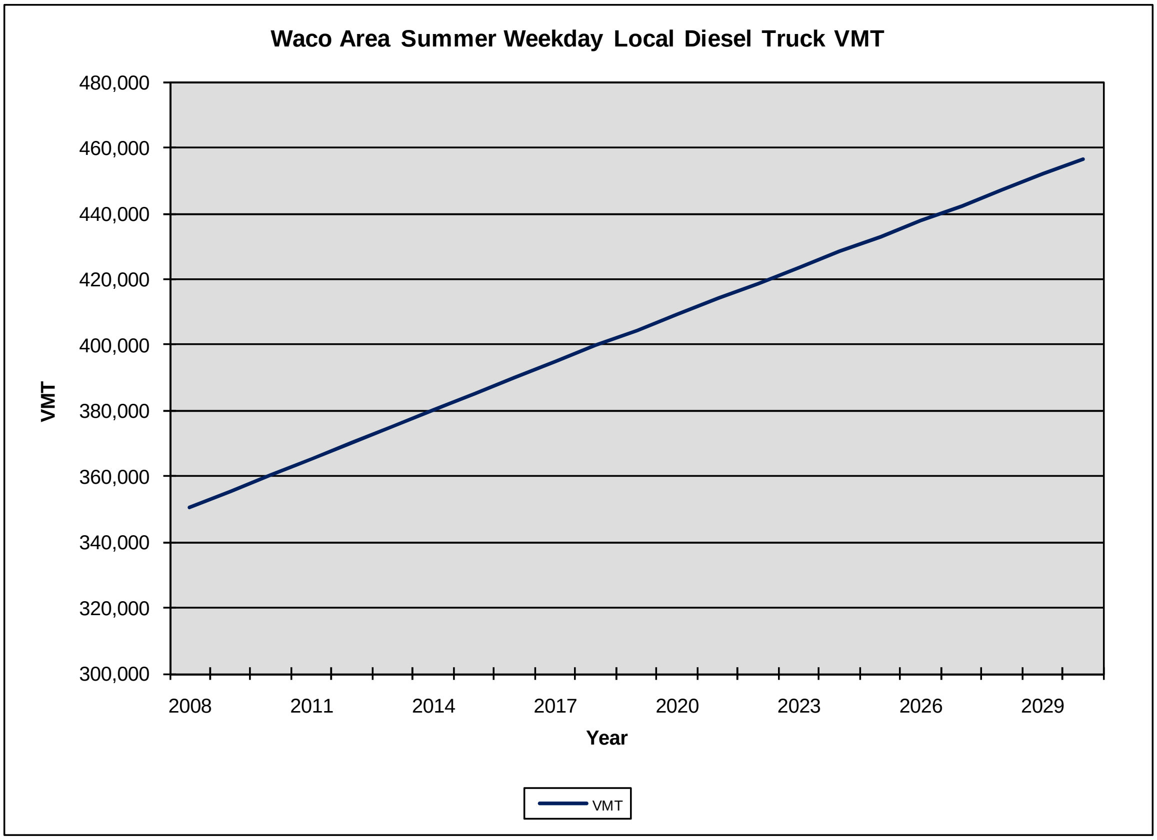

Northeast Texas Area Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5 (Pounds)
1,400
1,200
1,000
800
600
400
200
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3

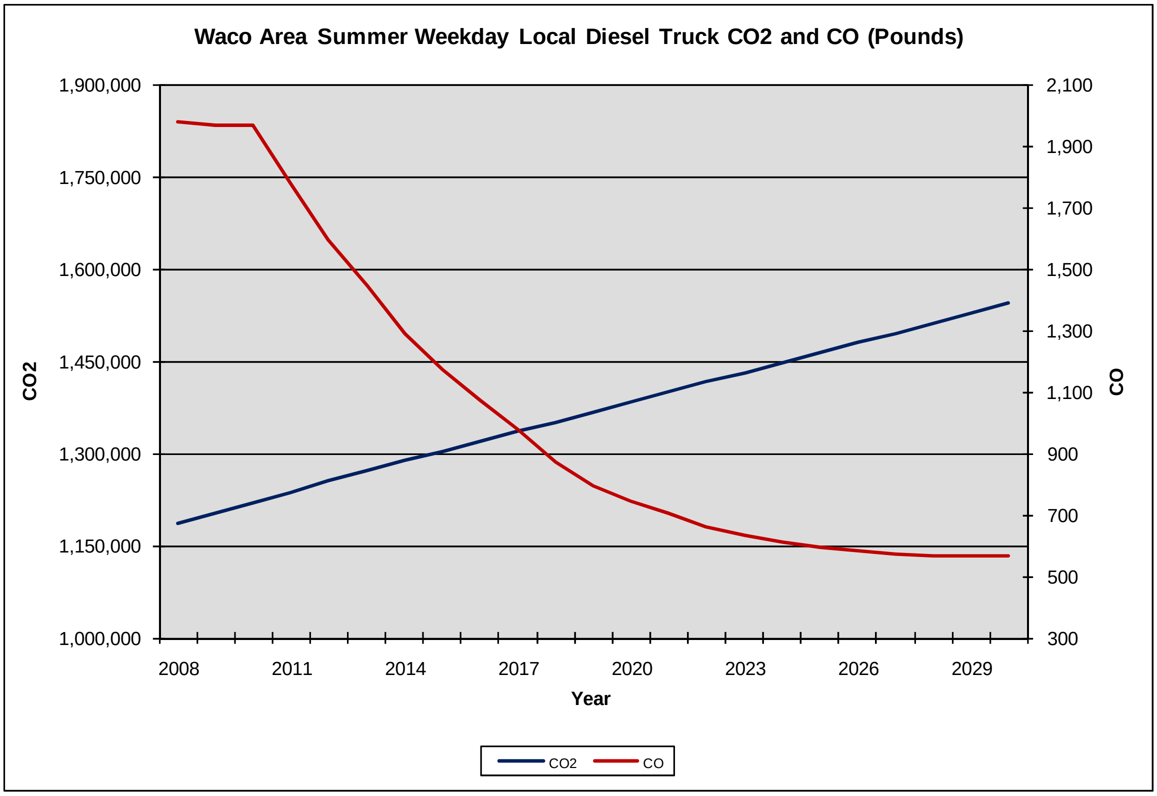

Victoria Area Summer Weekday Local Diesel Truck VMT
500,000
450,000
400,000
350,000
300,000
250,000
200,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT

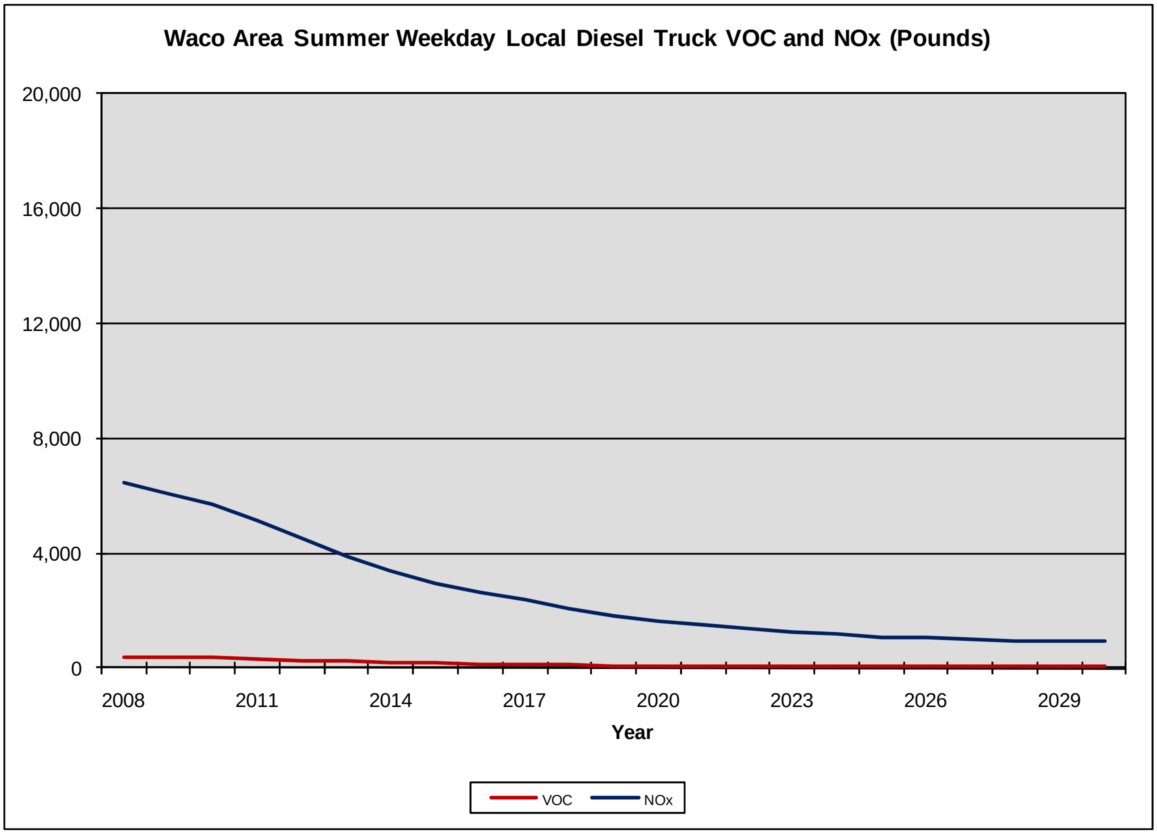

Victoria Area Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
1,600,000
1,500,000
1,400,000
1,300,000
1,200,000
1,100,000
1,000,000
CO2
2,600
2,200
1,800
1,400
1,000
600
200
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO


Victoria Area Summer Weekday Local Diesel Truck VOC and NOx (Pounds)
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx

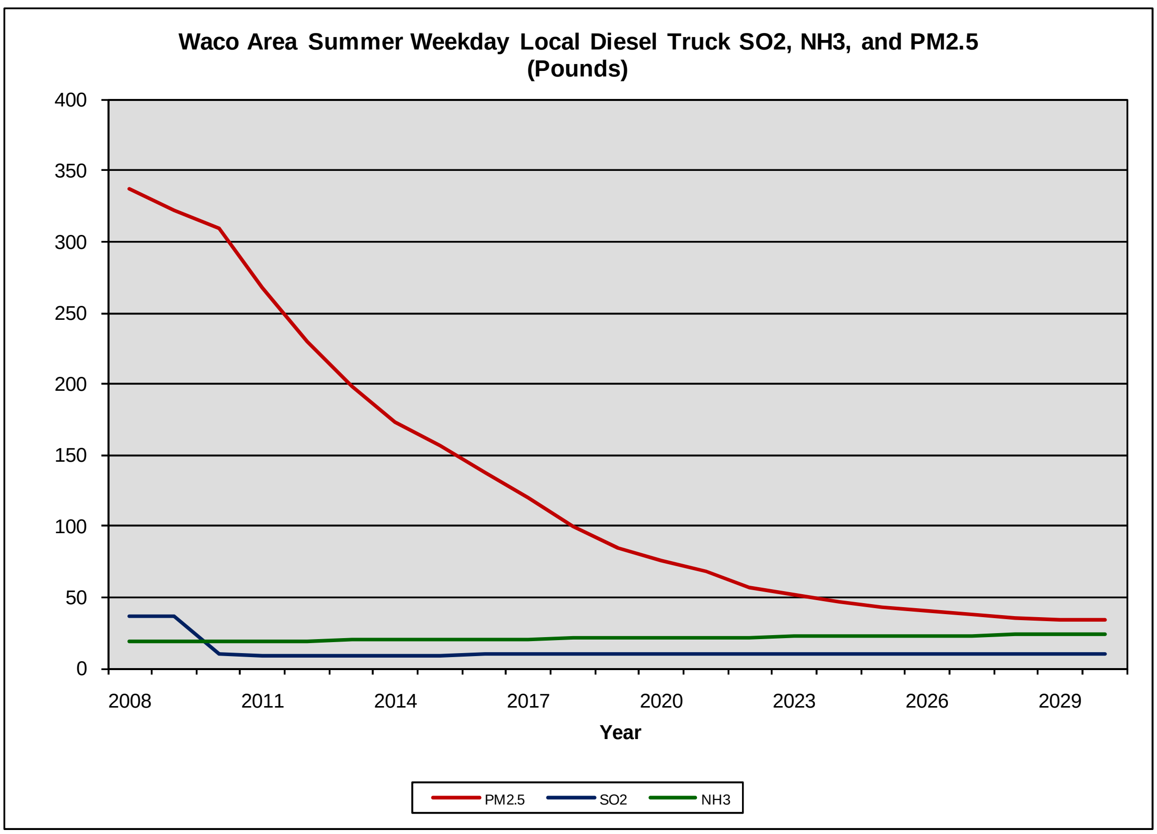

Victoria Area Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5 (Pounds)
450
375
300
225
150
75
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3


Waco Area Summer Weekday Local Diesel Truck VMT
480,000
460,000
440,000
420,000
400,000
380,000
360,000
340,000
320,000
300,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT

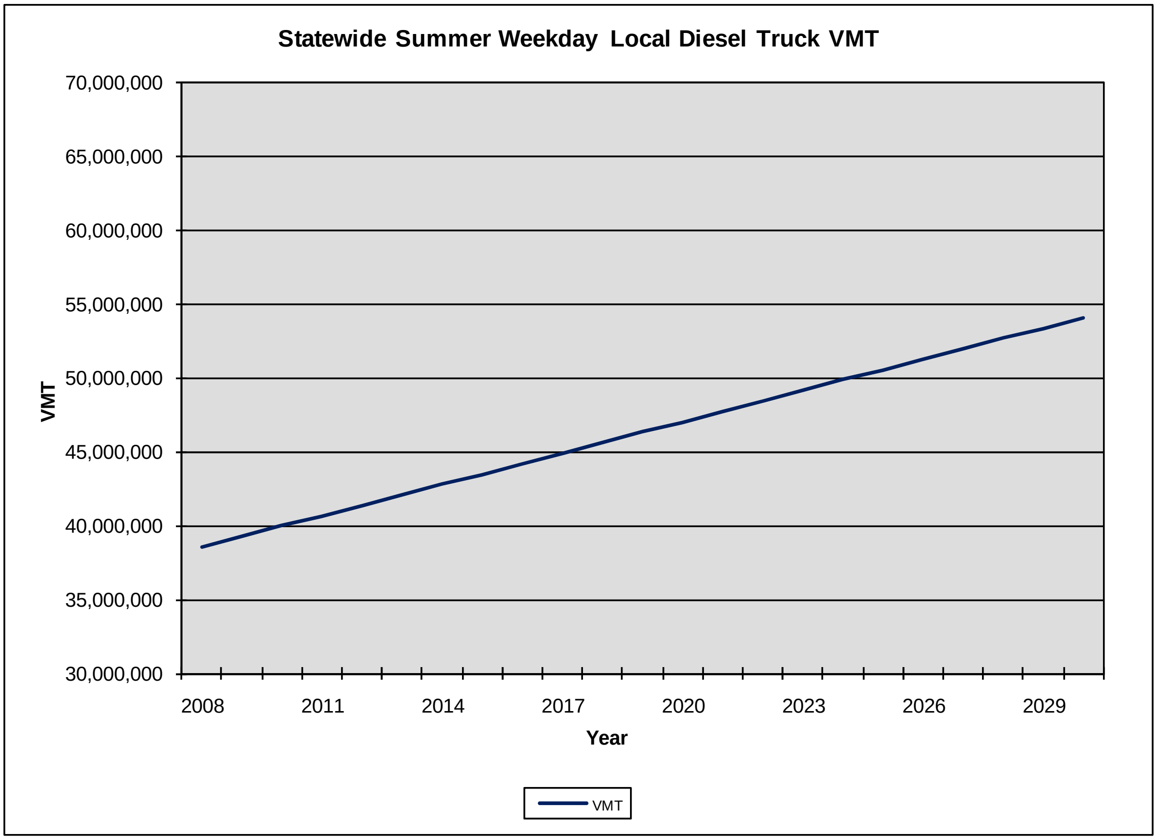

Waco Area Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
1,900,000
1,750,000
1,600,000
1,450,000
1,300,000
1,150,000
1,000,000
CO2
2,100
1,900
1,700
1,500
1,300
1,100
900
700
500
300
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO

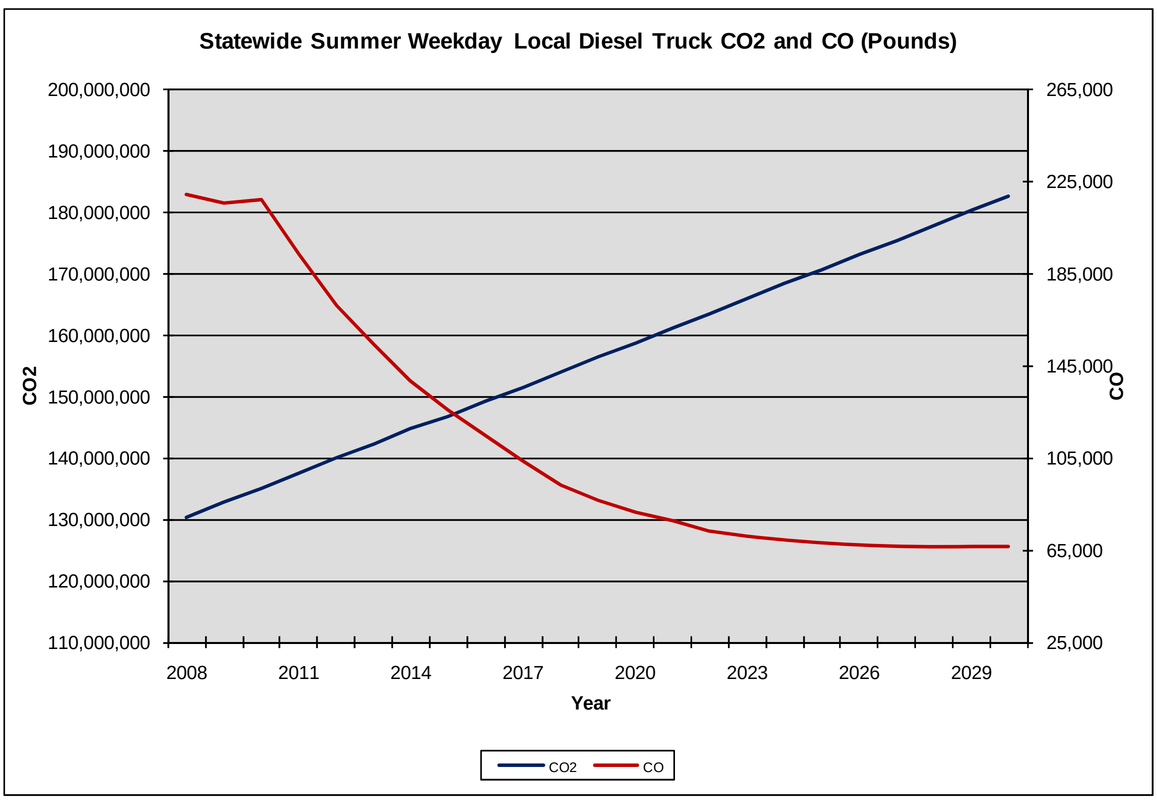


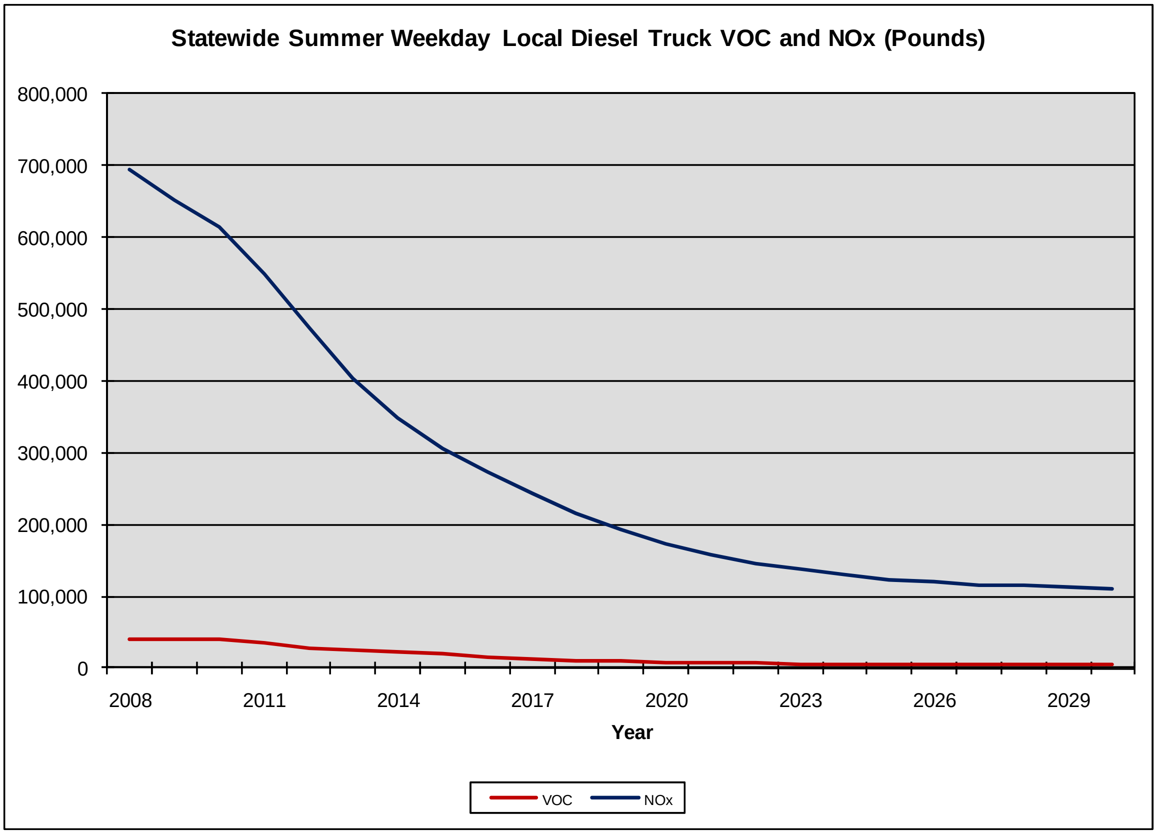
Waco Area Summer Weekday Local Diesel Truck VOC and NOx (Pounds)
20,000
16,000
12,000
8,000
4,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx

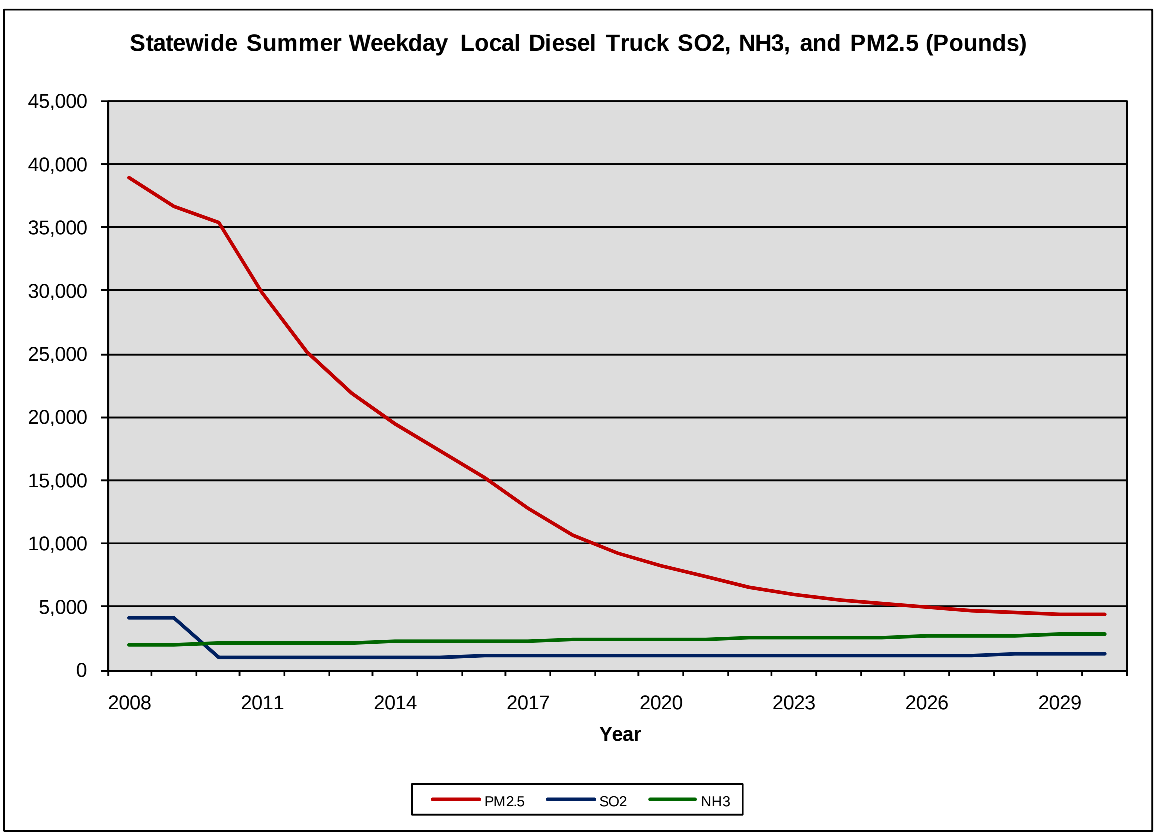


Waco Area Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5 (Pounds)
400
350
300
250
200
150
100
50
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3


Statewide Summer Weekday Local Diesel Truck VMT
70,000,000
65,000,000
60,000,000
55,000,000
50,000,000
45,000,000
40,000,000
35,000,000
30,000,000
VMT
2008
2011
2014
2017
2020
2023
2026
2029
Year
VMT


Statewide Summer Weekday Local Diesel Truck CO2 and CO (Pounds)
200,000,000
190,000,000
180,000,000
170,000,000
160,000,000
150,000,000
140,000,000
130,000,000
120,000,000
110,000,000
CO2
265,000
225,000
185,000
145,000
105,000
65,000
25,000
CO
2008
2011
2014
2017
2020
2023
2026
2029
Year
CO2
CO


Statewide Summer Weekday Local Diesel Truck VOC and NOx (Pounds)
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
VOC
NOx


Statewide Summer Weekday Local Diesel Truck SO2, NH3, and PM2.5 (Pounds)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2008
2011
2014
2017
2020
2023
2026
2029
Year
PM2.5
SO2
NH3

Local Diesel Category/SUT Definitions

Source Use Type Description	Source Use Type Abbreviation[1]
Transit Bus	TB42D
School Bus	SB43D
Refuse Truck	RFT51D
Single Unit Short-Haul Truck	SUSH52D
Combination Short-Haul Truck	CSH61D

[1] The SUT/fuel type labels are the SUT abbreviation, the MOVES numeric ID number, and and fuel typedesignation, e.g., RFT51D, and SB43D are diesel-powered refuse trucks and diesel-powered school buses.

Austin-Round Rock Area Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.691	3.754	10.577	2,209.932	0.069	0.037	0.587	1,426,224
2009	0.694	3.749	10.052	2,266.953	0.070	0.038	0.561	1,462,950
2010	0.718	3.856	9.583	2,323.887	0.018	0.039	0.550	1,499,646
2011	0.605	3.457	8.621	2,381.294	0.018	0.040	0.458	1,536,458
2012	0.492	3.046	7.393	2,439.239	0.018	0.041	0.375	1,573,594
2013	0.417	2.761	6.233	2,497.205	0.018	0.042	0.322	1,610,794
2014	0.355	2.497	5.347	2,555.275	0.018	0.043	0.281	1,648,086
2015	0.309	2.296	4.631	2,603.346	0.019	0.044	0.250	1,684,001
2016	0.260	2.110	4.120	2,661.490	0.019	0.045	0.215	1,721,495
2017	0.217	1.942	3.671	2,720.009	0.019	0.046	0.181	1,759,234
2018	0.176	1.786	3.281	2,778.692	0.019	0.047	0.149	1,797,084
2019	0.153	1.696	2.962	2,837.692	0.020	0.048	0.131	1,835,152
2020	0.135	1.633	2.698	2,896.943	0.020	0.049	0.119	1,873,383
2021	0.122	1.589	2.494	2,956.525	0.020	0.050	0.108	1,911,837
2022	0.108	1.550	2.333	3,016.498	0.021	0.051	0.097	1,950,541
2023	0.100	1.530	2.227	3,076.725	0.021	0.052	0.090	1,989,412
2024	0.094	1.519	2.141	3,137.364	0.022	0.053	0.084	2,028,560
2025	0.090	1.520	2.079	3,198.138	0.022	0.054	0.082	2,067,787
2026	0.086	1.524	2.045	3,259.428	0.022	0.055	0.079	2,107,351
2027	0.083	1.531	2.016	3,320.700	0.023	0.056	0.077	2,146,901
2028	0.081	1.543	2.006	3,382.413	0.023	0.057	0.075	2,186,734
2029	0.080	1.558	1.998	3,444.160	0.024	0.058	0.074	2,226,596
2030	0.079	1.576	2.006	3,506.187	0.024	0.059	0.074	2,266,638

Beaumont-Port Arthur Area Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.390	2.018	6.204	1,257.880	0.039	0.020	0.347	790,958
2009	0.369	1.923	5.657	1,268.596	0.039	0.021	0.314	797,472
2010	0.380	1.965	5.321	1,278.948	0.010	0.021	0.306	803,921
2011	0.306	1.693	4.685	1,289.428	0.010	0.021	0.246	810,411
2012	0.251	1.474	3.955	1,299.866	0.010	0.021	0.203	816,876
2013	0.213	1.317	3.281	1,310.125	0.010	0.021	0.174	823,255
2014	0.180	1.173	2.800	1,320.382	0.010	0.021	0.151	829,648
2015	0.155	1.059	2.426	1,326.326	0.010	0.022	0.133	835,646
2016	0.130	0.951	2.135	1,336.583	0.010	0.022	0.114	842,090
2017	0.109	0.857	1.887	1,346.633	0.010	0.022	0.096	848,405
2018	0.091	0.780	1.684	1,356.585	0.010	0.022	0.082	854,668
2019	0.079	0.724	1.505	1,366.465	0.010	0.022	0.072	860,888
2020	0.069	0.678	1.351	1,376.266	0.010	0.022	0.063	867,065
2021	0.062	0.646	1.240	1,385.910	0.010	0.023	0.057	873,151
2022	0.055	0.616	1.147	1,395.673	0.010	0.023	0.051	879,310
2023	0.049	0.592	1.068	1,405.078	0.010	0.023	0.046	885,246
2024	0.046	0.576	1.010	1,414.752	0.010	0.023	0.043	891,353
2025	0.043	0.564	0.960	1,424.241	0.010	0.023	0.041	897,342
2026	0.040	0.554	0.927	1,433.640	0.010	0.023	0.039	903,277
2027	0.038	0.546	0.898	1,442.956	0.010	0.023	0.037	909,159
2028	0.037	0.540	0.878	1,452.241	0.010	0.024	0.035	915,021
2029	0.035	0.536	0.857	1,461.537	0.010	0.024	0.034	920,890
2030	0.034	0.534	0.847	1,470.564	0.010	0.024	0.033	926,590

Corpus Christi Area Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.356	1.825	5.217	1,082.585	0.034	0.017	0.315	681,622
2009	0.347	1.776	4.836	1,102.304	0.034	0.018	0.292	693,742
2010	0.346	1.780	4.533	1,122.296	0.009	0.018	0.278	706,120
2011	0.292	1.583	4.052	1,142.368	0.009	0.018	0.236	718,516
2012	0.238	1.387	3.439	1,162.241	0.009	0.019	0.196	730,765
2013	0.202	1.241	2.911	1,182.104	0.009	0.019	0.168	743,044
2014	0.175	1.115	2.513	1,201.856	0.009	0.019	0.149	755,268
2015	0.151	1.012	2.187	1,217.196	0.009	0.020	0.131	767,090
2016	0.128	0.921	1.953	1,236.651	0.009	0.020	0.114	779,184
2017	0.109	0.836	1.738	1,256.047	0.009	0.020	0.096	791,250
2018	0.089	0.754	1.533	1,275.389	0.009	0.021	0.081	803,288
2019	0.079	0.707	1.389	1,294.559	0.009	0.021	0.071	815,221
2020	0.070	0.672	1.263	1,313.543	0.009	0.021	0.065	827,039
2021	0.063	0.641	1.155	1,332.521	0.009	0.021	0.059	838,859
2022	0.055	0.610	1.068	1,351.235	0.009	0.022	0.052	850,510
2023	0.050	0.595	1.014	1,370.045	0.009	0.022	0.048	862,226
2024	0.047	0.581	0.964	1,388.708	0.010	0.022	0.045	873,846
2025	0.044	0.572	0.919	1,407.230	0.010	0.023	0.043	885,379
2026	0.042	0.567	0.897	1,425.794	0.010	0.023	0.041	896,942
2027	0.040	0.563	0.876	1,444.192	0.010	0.023	0.039	908,403
2028	0.038	0.561	0.862	1,462.614	0.010	0.024	0.038	919,876
2029	0.037	0.561	0.849	1,480.895	0.010	0.024	0.037	931,264
2030	0.037	0.563	0.846	1,499.161	0.010	0.024	0.036	942,640

Dallas-Fort Worth Area Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	3.675	20.073	62.406	12,765.582	0.398	0.198	3.392	7,552,811
2009	3.638	19.675	58.852	13,041.393	0.401	0.202	3.202	7,714,387
2010	3.725	19.917	55.477	13,318.036	0.104	0.206	3.102	7,877,150
2011	3.096	17.593	49.130	13,597.567	0.103	0.211	2.558	8,040,257
2012	2.557	15.483	41.908	13,879.290	0.103	0.215	2.111	8,204,645
2013	2.202	13.993	34.922	14,161.224	0.103	0.219	1.827	8,369,349
2014	1.922	12.718	30.131	14,444.676	0.104	0.224	1.632	8,535,103
2015	1.672	11.619	26.279	14,687.947	0.105	0.228	1.444	8,696,600
2016	1.424	10.612	23.393	14,972.907	0.107	0.232	1.250	8,863,826
2017	1.180	9.619	20.839	15,258.938	0.108	0.237	1.039	9,031,715
2018	0.973	8.782	18.566	15,546.432	0.109	0.241	0.872	9,200,497
2019	0.845	8.280	16.858	15,835.143	0.110	0.245	0.770	9,370,054
2020	0.723	7.816	15.222	16,125.411	0.112	0.250	0.677	9,540,576
2021	0.644	7.532	14.087	16,417.772	0.114	0.254	0.612	9,712,404
2022	0.564	7.255	13.154	16,711.697	0.115	0.259	0.544	9,885,175
2023	0.522	7.121	12.463	17,008.076	0.117	0.263	0.509	10,059,452
2024	0.493	7.054	12.006	17,305.311	0.119	0.268	0.484	10,234,260
2025	0.473	7.029	11.629	17,605.163	0.121	0.273	0.468	10,410,662
2026	0.453	7.021	11.448	17,905.745	0.123	0.277	0.453	10,587,543
2027	0.435	7.023	11.304	18,207.366	0.125	0.282	0.438	10,765,041
2028	0.424	7.050	11.229	18,511.362	0.127	0.287	0.427	10,943,990
2029	0.417	7.101	11.182	18,815.974	0.129	0.291	0.424	11,123,299
2030	0.412	7.164	11.210	19,122.440	0.131	0.296	0.422	11,303,713

El Paso Area Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.322	1.687	6.109	822.067	0.026	0.013	0.302	512,534
2009	0.317	1.664	5.786	835.885	0.026	0.013	0.285	520,968
2010	0.322	1.682	5.526	850.017	0.007	0.013	0.277	529,635
2011	0.288	1.563	5.112	863.931	0.007	0.014	0.248	538,190
2012	0.253	1.420	4.522	877.837	0.007	0.014	0.219	546,712
2013	0.222	1.276	3.969	891.765	0.007	0.014	0.193	555,271
2014	0.198	1.154	3.488	905.493	0.007	0.014	0.176	563,734
2015	0.180	1.067	3.132	915.942	0.007	0.014	0.162	571,586
2016	0.158	0.973	2.818	929.452	0.007	0.015	0.144	579,965
2017	0.134	0.867	2.507	942.961	0.007	0.015	0.121	588,351
2018	0.109	0.761	2.204	956.594	0.007	0.015	0.099	596,815
2019	0.095	0.698	1.974	969.860	0.007	0.015	0.087	605,059
2020	0.083	0.644	1.748	983.118	0.007	0.015	0.077	613,306
2021	0.073	0.601	1.561	996.213	0.007	0.016	0.069	621,458
2022	0.062	0.555	1.402	1,009.417	0.007	0.016	0.059	629,678
2023	0.055	0.523	1.276	1,022.504	0.007	0.016	0.053	637,832
2024	0.050	0.502	1.190	1,035.596	0.007	0.016	0.048	645,993
2025	0.045	0.482	1.097	1,048.573	0.007	0.017	0.044	654,076
2026	0.042	0.468	1.043	1,061.674	0.007	0.017	0.041	662,246
2027	0.038	0.453	0.986	1,074.634	0.007	0.017	0.038	670,325
2028	0.035	0.445	0.946	1,087.742	0.007	0.017	0.035	678,499
2029	0.034	0.440	0.908	1,100.645	0.008	0.017	0.033	686,547
2030	0.032	0.436	0.887	1,113.643	0.008	0.018	0.032	694,656

Houston-Galveston-Brazoria Area Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	3.134	16.867	46.771	9,659.153	0.302	0.153	2.794	5,959,074
2009	3.081	16.634	44.075	9,850.655	0.303	0.156	2.628	6,075,565
2010	3.113	16.691	41.221	10,041.649	0.078	0.159	2.518	6,192,504
2011	2.617	14.913	36.809	10,234.154	0.078	0.162	2.117	6,309,820
2012	2.170	13.218	31.366	10,427.180	0.078	0.165	1.771	6,427,429
2013	1.855	11.938	26.434	10,621.335	0.078	0.168	1.526	6,545,914
2014	1.597	10.795	22.779	10,815.244	0.078	0.171	1.343	6,664,416
2015	1.385	9.864	19.821	10,969.684	0.079	0.174	1.184	6,777,034
2016	1.174	9.036	17.623	11,163.793	0.080	0.177	1.022	6,896,163
2017	0.975	8.237	15.622	11,358.298	0.080	0.180	0.851	7,015,560
2018	0.799	7.531	13.867	11,552.988	0.081	0.183	0.711	7,135,118
2019	0.697	7.117	12.498	11,748.174	0.082	0.186	0.626	7,255,026
2020	0.611	6.782	11.286	11,943.830	0.083	0.190	0.563	7,375,236
2021	0.550	6.560	10.393	12,140.584	0.084	0.193	0.514	7,496,174
2022	0.481	6.322	9.650	12,338.330	0.085	0.196	0.457	7,617,735
2023	0.441	6.190	9.131	12,536.437	0.086	0.199	0.423	7,739,554
2024	0.409	6.104	8.744	12,735.646	0.088	0.202	0.396	7,862,073
2025	0.387	6.056	8.401	12,934.509	0.089	0.205	0.379	7,984,356
2026	0.369	6.037	8.217	13,134.093	0.090	0.208	0.365	8,107,122
2027	0.351	6.028	8.067	13,334.807	0.091	0.212	0.350	8,230,601
2028	0.340	6.044	7.980	13,534.089	0.093	0.215	0.340	8,353,190
2029	0.332	6.072	7.916	13,735.350	0.094	0.218	0.334	8,477,035
2030	0.327	6.119	7.909	13,936.115	0.095	0.221	0.332	8,600,564

Laredo Area Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.269	1.382	4.662	889.551	0.028	0.012	0.284	475,824
2009	0.279	1.424	4.548	916.087	0.028	0.012	0.280	489,973
2010	0.310	1.583	4.691	942.482	0.007	0.013	0.303	504,146
2011	0.273	1.448	4.307	969.059	0.007	0.013	0.269	518,261
2012	0.228	1.279	3.754	996.350	0.008	0.014	0.227	532,732
2013	0.198	1.141	3.302	1,023.553	0.008	0.014	0.196	547,182
2014	0.177	1.033	2.929	1,050.932	0.008	0.014	0.177	561,745
2015	0.158	0.932	2.565	1,076.145	0.008	0.015	0.160	576,265
2016	0.141	0.859	2.315	1,103.686	0.008	0.015	0.146	590,971
2017	0.122	0.771	2.082	1,131.658	0.008	0.015	0.125	605,916
2018	0.102	0.686	1.859	1,159.496	0.008	0.016	0.106	620,791
2019	0.088	0.624	1.691	1,187.681	0.008	0.016	0.091	635,855
2020	0.078	0.576	1.517	1,216.032	0.009	0.017	0.083	651,014
2021	0.069	0.541	1.391	1,244.333	0.009	0.017	0.075	666,153
2022	0.060	0.501	1.264	1,273.101	0.009	0.017	0.065	681,543
2023	0.055	0.481	1.196	1,302.088	0.009	0.018	0.061	697,052
2024	0.049	0.459	1.125	1,331.307	0.009	0.018	0.055	712,691
2025	0.045	0.447	1.064	1,360.876	0.009	0.018	0.051	728,510
2026	0.043	0.438	1.035	1,390.866	0.010	0.019	0.049	744,564
2027	0.040	0.432	1.004	1,421.326	0.010	0.019	0.047	760,866
2028	0.039	0.429	0.985	1,452.068	0.010	0.020	0.045	777,321
2029	0.038	0.429	0.968	1,483.080	0.010	0.020	0.044	793,921
2030	0.037	0.431	0.965	1,514.289	0.010	0.021	0.043	810,630

Lower Rio Grande Valley Area Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.158	0.827	2.609	448.432	0.014	0.007	0.146	277,212
2009	0.158	0.825	2.472	459.312	0.014	0.007	0.138	283,833
2010	0.162	0.847	2.392	470.279	0.004	0.008	0.135	290,554
2011	0.145	0.785	2.213	481.333	0.004	0.008	0.121	297,305
2012	0.122	0.696	1.925	492.278	0.004	0.008	0.103	303,979
2013	0.109	0.638	1.693	503.315	0.004	0.008	0.092	310,722
2014	0.098	0.583	1.497	514.423	0.004	0.008	0.084	317,525
2015	0.088	0.538	1.327	523.762	0.004	0.008	0.076	324,032
2016	0.077	0.494	1.204	534.674	0.004	0.009	0.068	330,750
2017	0.067	0.449	1.085	545.594	0.004	0.009	0.058	337,478
2018	0.055	0.398	0.958	556.519	0.004	0.009	0.048	344,211
2019	0.048	0.368	0.860	567.445	0.004	0.009	0.042	350,950
2020	0.043	0.345	0.776	578.267	0.004	0.009	0.038	357,629
2021	0.038	0.326	0.700	589.239	0.004	0.010	0.035	364,405
2022	0.033	0.304	0.638	600.146	0.004	0.010	0.030	371,141
2023	0.029	0.288	0.589	611.086	0.004	0.010	0.027	377,901
2024	0.026	0.279	0.555	622.174	0.004	0.010	0.025	384,754
2025	0.024	0.270	0.516	633.302	0.004	0.010	0.023	391,630
2026	0.022	0.265	0.494	644.402	0.004	0.010	0.021	398,493
2027	0.021	0.260	0.476	655.601	0.005	0.011	0.020	405,417
2028	0.020	0.257	0.460	666.756	0.005	0.011	0.019	412,313
2029	0.019	0.255	0.447	677.863	0.005	0.011	0.018	419,181
2030	0.018	0.255	0.441	689.142	0.005	0.011	0.017	426,155

San Antonio Area Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	1.125	5.969	17.637	3,564.924	0.112	0.056	1.031	2,163,644
2009	1.121	5.899	16.654	3,623.853	0.112	0.057	0.977	2,199,110
2010	1.142	5.956	15.634	3,681.915	0.029	0.058	0.945	2,234,175
2011	0.954	5.272	13.948	3,740.944	0.029	0.059	0.785	2,269,646
2012	0.788	4.631	12.061	3,799.558	0.028	0.059	0.654	2,304,814
2013	0.666	4.108	10.103	3,858.243	0.028	0.060	0.560	2,340,097
2014	0.572	3.669	8.634	3,916.604	0.028	0.061	0.494	2,375,238
2015	0.494	3.313	7.496	3,961.154	0.029	0.062	0.437	2,408,406
2016	0.420	3.015	6.682	4,018.758	0.029	0.063	0.379	2,443,257
2017	0.347	2.709	5.911	4,076.221	0.029	0.064	0.312	2,478,027
2018	0.284	2.439	5.224	4,133.103	0.029	0.065	0.258	2,512,460
2019	0.245	2.276	4.708	4,189.867	0.029	0.066	0.224	2,546,845
2020	0.215	2.149	4.225	4,246.419	0.030	0.067	0.202	2,581,101
2021	0.195	2.066	3.886	4,302.275	0.030	0.067	0.185	2,614,960
2022	0.170	1.970	3.584	4,357.656	0.030	0.068	0.163	2,648,528
2023	0.156	1.916	3.382	4,413.210	0.030	0.069	0.150	2,682,219
2024	0.144	1.876	3.228	4,467.994	0.031	0.070	0.140	2,715,443
2025	0.136	1.849	3.081	4,522.654	0.031	0.071	0.133	2,748,592
2026	0.129	1.832	3.004	4,577.087	0.031	0.072	0.128	2,781,618
2027	0.122	1.814	2.923	4,630.631	0.032	0.073	0.122	2,814,099
2028	0.118	1.807	2.871	4,684.078	0.032	0.073	0.117	2,846,522
2029	0.114	1.804	2.826	4,737.123	0.032	0.074	0.114	2,878,710
2030	0.111	1.806	2.804	4,789.416	0.033	0.075	0.112	2,910,440

Northeast Texas Area Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.595	3.241	10.648	1,899.190	0.060	0.028	0.590	1,096,840
2009	0.577	3.147	9.948	1,924.319	0.060	0.029	0.548	1,111,051
2010	0.578	3.129	9.230	1,949.126	0.015	0.029	0.518	1,125,251
2011	0.487	2.791	8.246	1,974.239	0.015	0.030	0.440	1,139,552
2012	0.411	2.479	7.164	1,999.367	0.015	0.030	0.377	1,153,827
2013	0.353	2.224	6.141	2,024.374	0.015	0.030	0.327	1,168,078
2014	0.305	1.989	5.333	2,049.274	0.015	0.031	0.290	1,182,302
2015	0.269	1.808	4.689	2,069.343	0.015	0.031	0.261	1,196,410
2016	0.229	1.635	4.168	2,094.063	0.015	0.031	0.227	1,210,617
2017	0.195	1.475	3.705	2,118.731	0.015	0.032	0.193	1,224,801
2018	0.163	1.334	3.305	2,143.216	0.015	0.032	0.162	1,238,883
2019	0.139	1.224	2.940	2,167.557	0.015	0.033	0.138	1,252,894
2020	0.122	1.141	2.624	2,191.680	0.015	0.033	0.123	1,266,793
2021	0.108	1.078	2.388	2,215.963	0.015	0.033	0.110	1,280,796
2022	0.094	1.017	2.174	2,240.201	0.016	0.034	0.097	1,294,770
2023	0.085	0.978	2.023	2,264.358	0.016	0.034	0.089	1,308,704
2024	0.077	0.943	1.889	2,288.657	0.016	0.034	0.081	1,322,725
2025	0.072	0.921	1.785	2,313.036	0.016	0.035	0.075	1,336,783
2026	0.068	0.905	1.720	2,337.228	0.016	0.035	0.071	1,350,748
2027	0.064	0.890	1.652	2,361.549	0.016	0.035	0.066	1,364,781
2028	0.060	0.879	1.598	2,385.815	0.016	0.036	0.062	1,378,786
2029	0.058	0.875	1.555	2,410.208	0.017	0.036	0.061	1,392,867
2030	0.057	0.874	1.535	2,434.484	0.017	0.037	0.059	1,406,877

McAllen-Edinburg-Mission Area Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.343	1.861	5.626	980.184	0.031	0.014	0.359	540,334
2009	0.345	1.866	5.364	1,010.465	0.031	0.014	0.342	556,798
2010	0.357	1.924	5.226	1,040.464	0.008	0.015	0.339	573,217
2011	0.321	1.798	4.863	1,070.744	0.008	0.015	0.307	589,737
2012	0.273	1.608	4.267	1,101.437	0.008	0.015	0.265	606,465
2013	0.247	1.482	3.773	1,132.078	0.008	0.016	0.239	623,185
2014	0.225	1.360	3.361	1,163.185	0.009	0.016	0.219	640,196
2015	0.205	1.265	3.002	1,191.200	0.009	0.017	0.202	656,817
2016	0.181	1.168	2.740	1,222.370	0.009	0.017	0.180	673,937
2017	0.156	1.067	2.481	1,253.486	0.009	0.018	0.155	691,035
2018	0.129	0.950	2.205	1,284.898	0.009	0.018	0.128	708,302
2019	0.114	0.881	1.990	1,316.390	0.009	0.018	0.115	725,622
2020	0.102	0.830	1.802	1,347.987	0.009	0.019	0.104	743,009
2021	0.091	0.787	1.634	1,379.566	0.010	0.019	0.095	760,395
2022	0.078	0.737	1.495	1,411.392	0.010	0.020	0.083	777,918
2023	0.069	0.702	1.387	1,443.365	0.010	0.020	0.074	795,530
2024	0.064	0.682	1.311	1,475.444	0.010	0.021	0.069	813,202
2025	0.058	0.663	1.226	1,508.156	0.010	0.021	0.063	831,219
2026	0.055	0.653	1.178	1,540.641	0.011	0.022	0.060	849,121
2027	0.050	0.643	1.138	1,573.575	0.011	0.022	0.056	867,268
2028	0.048	0.639	1.106	1,606.575	0.011	0.022	0.053	885,453
2029	0.046	0.638	1.079	1,639.593	0.011	0.023	0.051	903,651
2030	0.044	0.640	1.068	1,672.879	0.011	0.023	0.050	921,995

Victoria Area Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.191	1.046	3.189	566.579	0.018	0.008	0.205	312,316
2009	0.188	1.018	2.987	574.587	0.018	0.008	0.193	316,611
2010	0.188	1.011	2.808	582.600	0.005	0.008	0.183	320,994
2011	0.161	0.908	2.539	590.572	0.005	0.008	0.157	325,310
2012	0.137	0.805	2.225	598.499	0.005	0.009	0.135	329,587
2013	0.121	0.730	1.932	606.466	0.005	0.009	0.121	333,907
2014	0.108	0.657	1.691	614.348	0.005	0.009	0.109	338,196
2015	0.097	0.598	1.496	621.225	0.005	0.009	0.099	342,521
2016	0.083	0.538	1.339	629.053	0.005	0.009	0.087	346,807
2017	0.071	0.482	1.197	636.725	0.005	0.009	0.074	351,010
2018	0.060	0.429	1.064	644.517	0.005	0.009	0.062	355,279
2019	0.052	0.389	0.945	652.076	0.005	0.009	0.054	359,427
2020	0.045	0.356	0.842	659.599	0.005	0.009	0.048	363,558
2021	0.039	0.331	0.760	666.954	0.005	0.010	0.042	367,603
2022	0.034	0.307	0.688	674.283	0.005	0.010	0.037	371,634
2023	0.030	0.289	0.633	681.611	0.005	0.010	0.033	375,667
2024	0.027	0.275	0.587	688.858	0.005	0.010	0.030	379,655
2025	0.025	0.265	0.548	696.055	0.005	0.010	0.028	383,615
2026	0.023	0.257	0.523	703.163	0.005	0.010	0.026	387,531
2027	0.021	0.250	0.497	710.289	0.005	0.010	0.024	391,455
2028	0.020	0.246	0.479	717.311	0.005	0.010	0.022	395,324
2029	0.019	0.242	0.463	724.311	0.005	0.010	0.021	399,182
2030	0.018	0.240	0.453	731.303	0.005	0.010	0.021	403,035

Waco Area Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.180	0.989	3.216	593.072	0.019	0.009	0.169	350,533
2009	0.180	0.984	3.033	601.678	0.019	0.009	0.161	355,525
2010	0.181	0.984	2.851	610.234	0.005	0.009	0.155	360,533
2011	0.156	0.889	2.574	618.833	0.005	0.010	0.134	365,546
2012	0.132	0.797	2.257	627.393	0.005	0.010	0.115	370,522
2013	0.114	0.722	1.949	635.900	0.005	0.010	0.099	375,479
2014	0.098	0.646	1.684	644.300	0.005	0.010	0.087	380,392
2015	0.087	0.587	1.473	651.024	0.005	0.010	0.078	385,217
2016	0.075	0.537	1.319	659.328	0.005	0.010	0.069	390,103
2017	0.065	0.489	1.178	667.611	0.005	0.010	0.060	394,981
2018	0.054	0.437	1.039	675.784	0.005	0.011	0.050	399,796
2019	0.045	0.398	0.921	683.952	0.005	0.011	0.042	404,608
2020	0.039	0.372	0.825	692.041	0.005	0.011	0.038	409,380
2021	0.035	0.352	0.749	700.126	0.005	0.011	0.034	414,155
2022	0.030	0.329	0.675	708.190	0.005	0.011	0.029	418,917
2023	0.027	0.316	0.626	716.183	0.005	0.011	0.026	423,640
2024	0.024	0.305	0.585	724.169	0.005	0.011	0.023	428,360
2025	0.022	0.296	0.543	732.146	0.005	0.011	0.021	433,073
2026	0.021	0.292	0.524	740.115	0.005	0.012	0.020	437,785
2027	0.019	0.288	0.502	748.079	0.005	0.012	0.019	442,494
2028	0.018	0.284	0.484	756.070	0.005	0.012	0.018	447,218
2029	0.018	0.282	0.471	764.041	0.005	0.012	0.017	451,933
2030	0.017	0.282	0.466	772.005	0.005	0.012	0.017	456,644

Statewide Local Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	20.381	109.672	346.713	65,154.823	2.038	1.003	19.501	38,566,054
2009	20.092	107.677	325.942	66,355.466	2.048	1.021	18.353	39,267,690
2010	20.374	108.371	306.688	67,551.551	0.528	1.039	17.674	39,970,937
2011	17.233	96.737	274.927	68,755.992	0.524	1.058	14.955	40,675,942
2012	14.386	85.541	237.136	69,963.840	0.522	1.076	12.587	41,382,229
2013	12.415	76.940	201.715	71,170.958	0.523	1.094	10.937	42,089,504
2014	10.790	69.208	174.587	72,376.535	0.526	1.113	9.706	42,797,007
2015	9.473	62.997	152.866	73,381.675	0.529	1.131	8.682	43,488,280
2016	8.128	57.360	136.584	74,580.943	0.535	1.149	7.594	44,195,305
2017	6.836	51.781	121.572	75,778.230	0.539	1.167	6.379	44,901,404
2018	5.643	46.646	107.771	76,974.175	0.543	1.186	5.310	45,606,975
2019	4.873	43.313	96.891	78,170.085	0.548	1.204	4.635	46,312,877
2020	4.250	40.633	86.972	79,362.736	0.553	1.222	4.130	47,017,191
2021	3.796	38.760	79.571	80,556.539	0.560	1.241	3.722	47,722,619
2022	3.296	36.751	73.077	81,751.491	0.566	1.259	3.273	48,428,803
2023	2.994	35.557	68.410	82,945.814	0.573	1.277	2.994	49,134,920
2024	2.763	34.714	64.885	84,140.147	0.580	1.296	2.777	49,841,273
2025	2.595	34.148	61.710	85,334.866	0.587	1.314	2.629	50,547,733
2026	2.452	33.762	59.926	86,529.684	0.595	1.332	2.499	51,254,670
2027	2.317	33.441	58.222	87,724.005	0.603	1.351	2.376	51,961,310
2028	2.230	33.308	57.064	88,917.378	0.610	1.369	2.273	52,667,505
2029	2.164	33.299	56.004	90,110.947	0.618	1.387	2.223	53,373,991
2030	2.119	33.408	55.667	91,304.072	0.626	1.406	2.188	54,080,220

APPENDIX A:
SUMMER WEEKDAY AND ANNUAL TOTAL VMT BY COUNTY, REGION AND YEAR

------------------------------- Yr=2008 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
1	2008	Austin	21	Bastrop	2,215,102	765,341,572
2	2008	Austin	55	Caldwell	1,037,388	358,428,573
3	2008	Austin	209	Hays	4,541,943	1,569,290,034
4	2008	Austin	453	Travis	26,691,915	9,222,343,341
5	2008	Austin	491	Williamson	9,582,479	3,310,849,451
Region					44,068,826	15,226,252,971

-------------------------------- Yr=2008 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
6	2008	BPA	199	Hardin	1,690,441	558,867,069
7	2008	BPA	245	Jefferson	8,101,561	2,678,411,274
8	2008	BPA	361	Orange	3,147,313	1,040,515,455
Region					12,939,314	4,277,793,799

------------------------------- Yr=2008 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
9	2008	Corpus	355	Nueces	10,466,696	3,473,577,438
10	2008	Corpus	409	San Patricio	2,311,232	767,027,341
Region					12,777,927	4,240,604,779

-------------------------------- Yr=2008 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
11	2008	DFW	85	Collin	17,133,973	5,666,318,230
12	2008	DFW	113	Dallas	74,835,456	24,748,580,766
13	2008	DFW	121	Denton	12,989,273	4,295,638,671
14	2008	DFW	139	Ellis	5,356,145	1,771,312,754
15	2008	DFW	221	Hood	1,281,910	423,935,968
16	2008	DFW	231	Hunt	3,176,950	1,050,638,342
17	2008	DFW	251	Johnson	4,150,447	1,372,580,295
18	2008	DFW	257	Kaufman	3,945,649	1,304,852,266
19	2008	DFW	367	Parker	3,933,505	1,300,836,142
20	2008	DFW	397	Rockwall	1,914,506	633,139,705
21	2008	DFW	439	Tarrant	48,250,203	15,956,661,452
22	2008	DFW	497	Wise	2,951,360	976,034,167
Region					179,919,376	59,500,528,757

-------------------------------- Yr=2008 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
23	2008	ELP	141	El Paso	15,647,405	5,459,023,532

------------------------------ Yr=2008 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
24	2008	Houston	39	Brazoria	6,122,067	2,139,780,597
25	2008	Houston	71	Chambers	2,520,115	880,828,808
26	2008	Houston	157	Fort Bend	9,070,549	3,170,331,658
27	2008	Houston	167	Galveston	5,933,106	2,073,734,794
28	2008	Houston	201	Harris	107,038,362	37,411,971,569
29	2008	Houston	291	Liberty	2,291,220	800,825,469
30	2008	Houston	339	Montgomery	10,245,824	3,581,112,977
31	2008	Houston	473	Waller	2,009,005	702,185,858
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Region					145,230,247	50,760,771,730

------------------------------- Yr=2008 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
32	2008	LRGV	61	Cameron	7,801,537	2,644,080,685

------------------------------- Yr=2008 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
33	2008	Laredo	479	Webb	4,152,759	1,492,310,846

-------------------------------- Yr=2008 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
34	2008	SA	29	Bexar	41,856,064	14,205,368,955
35	2008	SA	91	Comal	3,941,058	1,337,540,549
36	2008	SA	187	Guadalupe	3,372,737	1,144,660,299
37	2008	SA	493	Wilson	1,014,791	344,406,163
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Region					50,184,650	17,031,975,967

------------------------------- Yr=2008 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
38	2008	Tyler	183	Gregg	3,935,195	1,356,726,046
39	2008	Tyler	203	Harrison	3,094,933	1,067,031,249
40	2008	Tyler	401	Rusk	1,856,702	640,129,864
41	2008	Tyler	423	Smith	6,520,022	2,247,889,535
42	2008	Tyler	459	Upshur	1,195,372	412,125,192
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Region					16,602,224	5,723,901,886

------------------------------- Yr=2008 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
43	2008	Valley	215	Hidalgo	13,571,120	4,767,423,998

------------------------------ Yr=2008 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
44	2008	Victoria	469	Victoria	2,646,670	945,808,798

------------------------------- Yr=2008 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
45	2008	Waco	309	McLennan	7,224,732	2,559,086,697
Yr					512,766,789	174,629,564,444

------------------------------ Yr=2009 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
46	2009	Austin	21	Bastrop	2,286,722	790,086,919
47	2009	Austin	55	Caldwell	1,065,104	368,004,852
48	2009	Austin	209	Hays	4,692,788	1,621,408,637
49	2009	Austin	453	Travis	27,241,946	9,412,385,212
50	2009	Austin	491	Williamson	9,890,250	3,417,187,513
Region					45,176,809	15,609,073,133

------------------------------- Yr=2009 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
51	2009	BPA	199	Hardin	1,716,413	567,453,756
52	2009	BPA	245	Jefferson	8,148,576	2,693,954,874
53	2009	BPA	361	Orange	3,180,621	1,051,527,254
Region					13,045,611	4,312,935,884

------------------------------ Yr=2009 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
54	2009	Corpus	355	Nueces	10,626,287	3,526,540,898
55	2009	Corpus	409	San Patricio	2,369,923	786,505,159
Region					12,996,210	4,313,046,057

------------------------------- Yr=2009 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
56	2009	DFW	85	Collin	17,728,524	5,862,940,230
57	2009	DFW	113	Dallas	76,009,453	25,136,829,163
58	2009	DFW	121	Denton	13,434,564	4,442,899,419
59	2009	DFW	139	Ellis	5,490,286	1,815,674,007
60	2009	DFW	221	Hood	1,311,889	433,850,490
61	2009	DFW	231	Hunt	3,241,267	1,071,908,616
62	2009	DFW	251	Johnson	4,253,589	1,406,690,175
63	2009	DFW	257	Kaufman	4,061,534	1,343,176,058
64	2009	DFW	367	Parker	4,019,971	1,329,431,047
65	2009	DFW	397	Rockwall	1,969,848	651,441,689
66	2009	DFW	439	Tarrant	49,097,913	16,237,005,024
67	2009	DFW	497	Wise	3,027,525	1,001,222,559
Region					183,646,364	60,733,068,477

------------------------------- Yr=2009 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
68	2009	ELP	141	El Paso	15,904,892	5,548,854,830

------------------------------ Yr=2009 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
69	2009	Houston	39	Brazoria	6,222,648	2,174,935,423
70	2009	Houston	71	Chambers	2,575,362	900,138,713
71	2009	Houston	157	Fort Bend	9,311,454	3,254,532,884
72	2009	Houston	167	Galveston	5,984,483	2,091,692,267
73	2009	Houston	201	Harris	108,918,233	38,069,022,507
74	2009	Houston	291	Liberty	2,340,702	818,120,466
75	2009	Houston	339	Montgomery	10,578,751	3,697,477,578
76	2009	Houston	473	Waller	2,069,929	723,480,063
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Region					148,001,563	51,729,399,901

------------------------------- Yr=2009 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
77	2009	LRGV	61	Cameron	7,987,869	2,707,231,946

------------------------------ Yr=2009 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
78	2009	Laredo	479	Webb	4,276,246	1,536,686,150

-------------------------------- Yr=2009 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
79	2009	SA	29	Bexar	42,443,978	14,404,898,850
80	2009	SA	91	Comal	4,046,631	1,373,370,467
81	2009	SA	187	Guadalupe	3,451,381	1,171,350,923
82	2009	SA	493	Wilson	1,040,994	353,299,016
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Region					50,982,983	17,302,919,256

------------------------------ Yr=2009 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
83	2009	Tyler	183	Gregg	3,965,043	1,367,016,796
84	2009	Tyler	203	Harrison	3,147,624	1,085,197,299
85	2009	Tyler	401	Rusk	1,874,896	646,402,466
86	2009	Tyler	423	Smith	6,607,784	2,278,147,133
87	2009	Tyler	459	Upshur	1,215,920	419,209,440
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Region					16,811,268	5,795,973,134

------------------------------ Yr=2009 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
88	2009	Valley	215	Hidalgo	13,984,611	4,912,679,993

----------------------------- Yr=2009 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
89	2009	Victoria	469	Victoria	2,683,069	958,816,348

------------------------------- Yr=2009 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
90	2009	Waco	309	McLennan	7,327,635	2,595,535,966
Yr					522,825,129	178,056,221,073

------------------------------- Yr=2010 Region=Austin -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
91	2010	Austin	21	Bastrop	2,358,787	814,986,133
92	2010	Austin	55	Caldwell	1,092,968	377,632,345
93	2010	Austin	209	Hays	4,844,667	1,673,884,375
94	2010	Austin	453	Travis	27,786,786	9,600,633,340
95	2010	Austin	491	Williamson	10,199,732	3,524,117,190
Region					46,282,941	15,991,253,383

------------------------------- Yr=2010 Region=BPA -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
96	2010	BPA	199	Hardin	1,741,846	575,861,978
97	2010	BPA	245	Jefferson	8,194,816	2,709,241,769
98	2010	BPA	361	Orange	3,214,125	1,062,603,691
Region					13,150,787	4,347,707,439

------------------------------- Yr=2010 Region=Corpus -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
99	2010	Corpus	355	Nueces	10,790,814	3,581,142,432
100	2010	Corpus	409	San Patricio	2,428,835	806,056,426
Region					13,219,649	4,387,198,859

------------------------------- Yr=2010 Region=DFW -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
101	2010	DFW	85	Collin	18,327,013	6,060,864,480
102	2010	DFW	113	Dallas	77,187,772	25,526,507,246
103	2010	DFW	121	Denton	13,882,289	4,590,964,859
104	2010	DFW	139	Ellis	5,626,024	1,860,563,448
105	2010	DFW	221	Hood	1,341,883	443,769,544
106	2010	DFW	231	Hunt	3,304,904	1,092,953,631
107	2010	DFW	251	Johnson	4,357,794	1,441,151,166
108	2010	DFW	257	Kaufman	4,178,364	1,381,812,560
109	2010	DFW	367	Parker	4,106,979	1,358,205,126
110	2010	DFW	397	Rockwall	2,026,144	670,059,074
111	2010	DFW	439	Tarrant	49,955,823	16,520,721,252
112	2010	DFW	497	Wise	3,105,114	1,026,881,601
Region					187,400,101	61,974,453,988

------------------------------- Yr=2010 Region=ELP -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
113	2010	ELP	141	El Paso	16,169,503	5,641,171,499

------------------------------ Yr=2010 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
114	2010	Houston	39	Brazoria	6,323,261	2,210,101,784
115	2010	Houston	71	Chambers	2,631,274	919,681,003
116	2010	Houston	157	Fort Bend	9,554,628	3,339,526,647
117	2010	Houston	167	Galveston	6,035,492	2,109,520,809
118	2010	Houston	201	Harris	110,800,350	38,726,858,782
119	2010	Houston	291	Liberty	2,390,299	835,455,586
120	2010	Houston	339	Montgomery	10,916,046	3,815,368,665
121	2010	Houston	473	Waller	2,130,929	744,800,646
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Region					150,782,279	52,701,313,922

------------------------------- Yr=2010 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
122	2010	LRGV	61	Cameron	8,177,017	2,771,337,856

------------------------------ Yr=2010 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
123	2010	Laredo	479	Webb	4,399,941	1,581,136,435

-------------------------------- Yr=2010 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
124	2010	SA	29	Bexar	43,020,240	14,600,474,321
125	2010	SA	91	Comal	4,153,465	1,409,628,593
126	2010	SA	187	Guadalupe	3,530,171	1,198,091,356
127	2010	SA	493	Wilson	1,067,236	362,205,142
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Region					51,771,113	17,570,399,412

------------------------------ Yr=2010 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
128	2010	Tyler	183	Gregg	3,994,121	1,377,041,639
129	2010	Tyler	203	Harrison	3,200,499	1,103,427,027
130	2010	Tyler	401	Rusk	1,893,429	652,791,990
131	2010	Tyler	423	Smith	6,695,143	2,308,265,411
132	2010	Tyler	459	Upshur	1,236,893	426,440,059
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Region					17,020,084	5,867,966,127

------------------------------ Yr=2010 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
133	2010	Valley	215	Hidalgo	14,397,016	5,057,554,652

----------------------------- Yr=2010 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
134	2010	Victoria	469	Victoria	2,720,215	972,090,796

-------------------------------- Yr=2010 Region=Waco --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
135	2010	Waco	309	McLennan	7,430,839	2,632,092,161
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Yr					532,921,484	181,495,676,528

------------------------------- Yr=2011 Region=Austin -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
136	2011	Austin	21	Bastrop	2,431,927	840,256,755
137	2011	Austin	55	Caldwell	1,121,129	387,362,269
138	2011	Austin	209	Hays	4,995,897	1,726,136,146
139	2011	Austin	453	Travis	28,330,571	9,788,516,805
140	2011	Austin	491	Williamson	10,512,743	3,632,265,803
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Region					47,392,268	16,374,537,777

-------------------------------- Yr=2011 Region=BPA ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
141	2011	BPA	199	Hardin	1,767,410	584,313,464
142	2011	BPA	245	Jefferson	8,242,220	2,724,913,723
143	2011	BPA	361	Orange	3,247,060	1,073,492,087
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Region					13,256,689	4,382,719,274

------------------------------- Yr=2011 Region=Corpus -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
144	2011	Corpus	355	Nueces	10,954,811	3,635,568,101
145	2011	Corpus	409	San Patricio	2,488,353	825,808,454
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Region					13,443,164	4,461,376,555

-------------------------------- Yr=2011 Region=DFW ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
146	2011	DFW	85	Collin	18,925,082	6,258,650,003
147	2011	DFW	113	Dallas	78,369,229	25,917,222,839
148	2011	DFW	121	Denton	14,332,890	4,739,981,635
149	2011	DFW	139	Ellis	5,762,950	1,905,845,648
150	2011	DFW	221	Hood	1,372,287	453,824,407
151	2011	DFW	231	Hunt	3,368,039	1,113,832,659
152	2011	DFW	251	Johnson	4,462,267	1,475,701,106
153	2011	DFW	257	Kaufman	4,296,324	1,420,822,783
154	2011	DFW	367	Parker	4,194,142	1,387,030,403
155	2011	DFW	397	Rockwall	2,082,601	688,730,018
156	2011	DFW	439	Tarrant	50,812,256	16,803,949,333
157	2011	DFW	497	Wise	3,182,831	1,052,583,428
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Region					191,160,897	63,218,174,262

-------------------------------- Yr=2011 Region=ELP ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
158	2011	ELP	141	El Paso	16,430,657	5,732,282,288

------------------------------ Yr=2011 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
159	2011	Houston	39	Brazoria	6,424,535	2,245,498,861
160	2011	Houston	71	Chambers	2,687,352	939,281,390
161	2011	Houston	157	Fort Bend	9,799,271	3,425,034,093
162	2011	Houston	167	Galveston	6,086,847	2,127,470,467
163	2011	Houston	201	Harris	112,690,269	39,387,421,777
164	2011	Houston	291	Liberty	2,439,939	852,805,750
165	2011	Houston	339	Montgomery	11,254,189	3,933,556,158
166	2011	Houston	473	Waller	2,190,671	765,681,606
Region					153,573,073	53,676,750,102

------------------------------- Yr=2011 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
167	2011	LRGV	61	Cameron	8,367,007	2,835,728,833

------------------------------ Yr=2011 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
168	2011	Laredo	479	Webb	4,523,135	1,625,406,767

-------------------------------- Yr=2011 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
169	2011	SA	29	Bexar	43,605,036	14,798,945,991
170	2011	SA	91	Comal	4,260,426	1,445,929,542
171	2011	SA	187	Guadalupe	3,609,533	1,225,025,496
172	2011	SA	493	Wilson	1,093,765	371,208,603
Region					52,568,759	17,841,109,631

------------------------------- Yr=2011 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
173	2011	Tyler	183	Gregg	4,023,600	1,387,205,216
174	2011	Tyler	203	Harrison	3,253,721	1,121,776,150
175	2011	Tyler	401	Rusk	1,911,867	659,149,032
176	2011	Tyler	423	Smith	6,783,292	2,338,656,271
177	2011	Tyler	459	Upshur	1,257,913	433,686,945
Region					17,230,392	5,940,473,614

------------------------------ Yr=2011 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
178	2011	Valley	215	Hidalgo	14,811,926	5,203,309,056

----------------------------- Yr=2011 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
179	2011	Victoria	469	Victoria	2,756,787	985,159,939

------------------------------- Yr=2011 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
180	2011	Waco	309	McLennan	7,534,170	2,668,693,381
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Yr					543,048,925	184,945,721,478

------------------------------ Yr=2012 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
181	2012	Austin	21	Bastrop	2,505,896	865,813,892
182	2012	Austin	55	Caldwell	1,149,466	397,152,720
183	2012	Austin	209	Hays	5,149,020	1,779,041,660
184	2012	Austin	453	Travis	28,877,194	9,977,380,916
185	2012	Austin	491	Williamson	10,829,430	3,741,684,350
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Region					48,511,005	16,761,073,538

------------------------------- Yr=2012 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
186	2012	BPA	199	Hardin	1,792,679	592,667,606
187	2012	BPA	245	Jefferson	8,290,462	2,740,862,917
188	2012	BPA	361	Orange	3,279,088	1,084,080,791
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Region					13,362,229	4,417,611,314

------------------------------ Yr=2012 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
189	2012	Corpus	355	Nueces	11,115,947	3,689,044,085
190	2012	Corpus	409	San Patricio	2,547,767	845,526,207
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Region					13,663,714	4,534,570,291

------------------------------- Yr=2012 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
191	2012	DFW	85	Collin	19,525,357	6,457,164,962
192	2012	DFW	113	Dallas	79,565,907	26,312,972,116
193	2012	DFW	121	Denton	14,786,493	4,889,991,111
194	2012	DFW	139	Ellis	5,900,858	1,951,452,887
195	2012	DFW	221	Hood	1,402,801	463,915,489
196	2012	DFW	231	Hunt	3,431,962	1,134,972,521
197	2012	DFW	251	Johnson	4,567,745	1,510,583,432
198	2012	DFW	257	Kaufman	4,414,907	1,460,038,940
199	2012	DFW	367	Parker	4,281,208	1,415,823,680
200	2012	DFW	397	Rockwall	2,139,725	707,621,147
201	2012	DFW	439	Tarrant	51,675,652	17,089,480,089
202	2012	DFW	497	Wise	3,260,523	1,078,276,698
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Region					194,953,137	64,472,293,072

------------------------------- Yr=2012 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
203	2012	ELP	141	El Paso	16,690,837	5,823,053,046

------------------------------ Yr=2012 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
204	2012	Houston	39	Brazoria	6,525,677	2,280,849,796
205	2012	Houston	71	Chambers	2,743,306	958,838,205
206	2012	Houston	157	Fort Bend	10,045,258	3,511,011,192
207	2012	Houston	167	Galveston	6,137,375	2,145,131,012
208	2012	Houston	201	Harris	114,580,508	40,048,096,968
209	2012	Houston	291	Liberty	2,490,239	870,386,610
210	2012	Houston	339	Montgomery	11,595,611	4,052,889,752
211	2012	Houston	473	Waller	2,251,394	786,905,473
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Region					156,369,367	54,654,109,007

------------------------------- Yr=2012 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
212	2012	LRGV	61	Cameron	8,554,836	2,899,387,251

------------------------------- Yr=2012 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
213	2012	Laredo	479	Webb	4,649,426	1,670,789,805

--------------------------------- Yr=2012 Region=SA ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
214	2012	SA	29	Bexar	44,179,233	14,993,820,621
215	2012	SA	91	Comal	4,368,291	1,482,537,376
216	2012	SA	187	Guadalupe	3,689,612	1,252,203,155
217	2012	SA	493	Wilson	1,120,984	380,446,555
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Region					53,358,120	18,109,007,707

------------------------------- Yr=2012 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
218	2012	Tyler	183	Gregg	4,053,214	1,397,415,038
219	2012	Tyler	203	Harrison	3,306,065	1,139,822,808
220	2012	Tyler	401	Rusk	1,930,174	665,460,609
221	2012	Tyler	423	Smith	6,872,179	2,369,301,540
222	2012	Tyler	459	Upshur	1,278,916	440,928,406
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Region					17,440,548	6,012,928,401

------------------------------- Yr=2012 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
223	2012	Valley	215	Hidalgo	15,232,063	5,350,899,889

------------------------------ Yr=2012 Region=Victoria ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
224	2012	Victoria	469	Victoria	2,793,028	998,111,029

------------------------------- Yr=2012 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
225	2012	Waco	309	McLennan	7,636,723	2,705,018,834
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Yr					553,215,033	188,408,853,184

------------------------------ Yr=2013 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
226	2013	Austin	21	Bastrop	2,580,556	891,609,791
227	2013	Austin	55	Caldwell	1,178,125	407,054,915
228	2013	Austin	209	Hays	5,302,230	1,831,977,439
229	2013	Austin	453	Travis	29,421,649	10,165,495,990
230	2013	Austin	491	Williamson	11,148,625	3,851,969,923
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Region					49,631,186	17,148,108,057

------------------------------- Yr=2013 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
231	2013	BPA	199	Hardin	1,817,703	600,940,626
232	2013	BPA	245	Jefferson	8,337,959	2,756,565,675
233	2013	BPA	361	Orange	3,310,708	1,094,534,338
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Region					13,466,370	4,452,040,639

------------------------------ Yr=2013 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
234	2013	Corpus	355	Nueces	11,278,188	3,742,886,879
235	2013	Corpus	409	San Patricio	2,606,856	865,136,233
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Region					13,885,044	4,608,023,112

------------------------------- Yr=2013 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
236	2013	DFW	85	Collin	20,127,730	6,656,373,562
237	2013	DFW	113	Dallas	80,755,154	26,706,264,124
238	2013	DFW	121	Denton	15,242,870	5,040,918,085
239	2013	DFW	139	Ellis	6,040,282	1,997,561,229
240	2013	DFW	221	Hood	1,433,355	474,020,151
241	2013	DFW	231	Hunt	3,495,831	1,156,094,596
242	2013	DFW	251	Johnson	4,673,803	1,545,657,700
243	2013	DFW	257	Kaufman	4,534,320	1,499,529,672
244	2013	DFW	367	Parker	4,368,989	1,444,853,728
245	2013	DFW	397	Rockwall	2,197,010	726,565,835
246	2013	DFW	439	Tarrant	52,541,224	17,375,730,741
247	2013	DFW	497	Wise	3,339,044	1,104,243,800
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Region					198,749,614	65,727,813,223

------------------------------- Yr=2013 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
248	2013	ELP	141	El Paso	16,952,142	5,914,216,419

------------------------------ Yr=2013 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
249	2013	Houston	39	Brazoria	6,627,489	2,316,435,292
250	2013	Houston	71	Chambers	2,800,423	978,801,692
251	2013	Houston	157	Fort Bend	10,293,848	3,597,898,245
252	2013	Houston	167	Galveston	6,188,228	2,162,904,856
253	2013	Houston	201	Harris	116,482,582	40,712,908,579
254	2013	Houston	291	Liberty	2,540,668	888,012,604
255	2013	Houston	339	Montgomery	11,938,588	4,172,766,757
256	2013	Houston	473	Waller	2,313,676	808,674,471
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Region					159,185,502	55,638,402,496

------------------------------- Yr=2013 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
257	2013	LRGV	61	Cameron	8,744,591	2,963,698,676

------------------------------ Yr=2013 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
258	2013	Laredo	479	Webb	4,775,541	1,716,109,860

-------------------------------- Yr=2013 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
259	2013	SA	29	Bexar	44,754,744	15,189,140,819
260	2013	SA	91	Comal	4,476,954	1,519,416,406
261	2013	SA	187	Guadalupe	3,770,000	1,279,485,969
262	2013	SA	493	Wilson	1,148,243	389,697,780
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Region					54,149,941	18,377,740,974

------------------------------- Yr=2013 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
263	2013	Tyler	183	Gregg	4,082,811	1,407,619,076
264	2013	Tyler	203	Harrison	3,358,825	1,158,012,739
265	2013	Tyler	401	Rusk	1,948,763	671,869,616
266	2013	Tyler	423	Smith	6,960,117	2,399,619,710
267	2013	Tyler	459	Upshur	1,299,700	448,093,971
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Region					17,650,216	6,085,215,112

------------------------------ Yr=2013 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
268	2013	Valley	215	Hidalgo	15,652,020	5,498,427,167

----------------------------- Yr=2013 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
269	2013	Victoria	469	Victoria	2,829,643	1,011,195,567

------------------------------- Yr=2013 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
270	2013	Waco	309	McLennan	7,738,895	2,741,209,216
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Yr					563,410,705	191,882,200,519

------------------------------ Yr=2014 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
271	2014	Austin	21	Bastrop	2,656,122	917,718,734
272	2014	Austin	55	Caldwell	1,206,839	416,975,734
273	2014	Austin	209	Hays	5,456,824	1,885,391,420
274	2014	Austin	453	Travis	29,962,496	10,352,364,317
275	2014	Austin	491	Williamson	11,470,892	3,963,316,327
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Region					50,753,172	17,535,766,531

------------------------------- Yr=2014 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
276	2014	BPA	199	Hardin	1,842,744	609,219,056
277	2014	BPA	245	Jefferson	8,385,425	2,772,258,163
278	2014	BPA	361	Orange	3,342,576	1,105,070,155
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Region					13,570,745	4,486,547,374

------------------------------ Yr=2014 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
279	2014	Corpus	355	Nueces	11,438,263	3,796,011,131
280	2014	Corpus	409	San Patricio	2,666,639	884,976,403
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Region					14,104,903	4,680,987,534

------------------------------- Yr=2014 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
281	2014	DFW	85	Collin	20,733,946	6,856,853,084
282	2014	DFW	113	Dallas	81,957,401	27,103,855,113
283	2014	DFW	121	Denton	15,701,362	5,192,544,460
284	2014	DFW	139	Ellis	6,179,603	2,043,635,712
285	2014	DFW	221	Hood	1,464,088	484,183,665
286	2014	DFW	231	Hunt	3,560,077	1,177,341,160
287	2014	DFW	251	Johnson	4,780,145	1,580,825,594
288	2014	DFW	257	Kaufman	4,654,863	1,539,394,125
289	2014	DFW	367	Parker	4,457,081	1,473,986,163
290	2014	DFW	397	Rockwall	2,255,339	745,855,678
291	2014	DFW	439	Tarrant	53,409,362	17,662,829,488
292	2014	DFW	497	Wise	3,417,745	1,130,270,802
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Region					202,571,013	66,991,575,044

------------------------------- Yr=2014 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
293	2014	ELP	141	El Paso	17,210,513	6,004,356,197

------------------------------ Yr=2014 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
294	2014	Houston	39	Brazoria	6,729,291	2,352,016,943
295	2014	Houston	71	Chambers	2,856,750	998,489,222
296	2014	Houston	157	Fort Bend	10,544,285	3,685,431,068
297	2014	Houston	167	Galveston	6,238,812	2,180,584,935
298	2014	Houston	201	Harris	118,383,987	41,377,486,056
299	2014	Houston	291	Liberty	2,591,241	905,688,751
300	2014	Houston	339	Montgomery	12,284,406	4,293,636,720
301	2014	Houston	473	Waller	2,374,123	829,801,622
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Region					162,002,894	56,623,135,317

------------------------------- Yr=2014 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
302	2014	LRGV	61	Cameron	8,936,058	3,028,590,179

------------------------------- Yr=2014 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
303	2014	Laredo	479	Webb	4,902,641	1,761,783,823

-------------------------------- Yr=2014 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
304	2014	SA	29	Bexar	45,325,235	15,382,757,646
305	2014	SA	91	Comal	4,586,712	1,556,666,556
306	2014	SA	187	Guadalupe	3,850,308	1,306,741,112
307	2014	SA	493	Wilson	1,175,710	399,019,794
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Region					54,937,964	18,645,185,108

------------------------------- Yr=2014 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
308	2014	Tyler	183	Gregg	4,112,391	1,417,817,337
309	2014	Tyler	203	Harrison	3,411,378	1,176,131,034
310	2014	Tyler	401	Rusk	1,966,844	678,103,247
311	2014	Tyler	423	Smith	7,048,564	2,430,113,544
312	2014	Tyler	459	Upshur	1,320,295	455,194,484
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Region					17,859,472	6,157,359,645

------------------------------ Yr=2014 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
313	2014	Valley	215	Hidalgo	16,079,261	5,648,513,403

----------------------------- Yr=2014 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
314	2014	Victoria	469	Victoria	2,865,984	1,024,182,589

-------------------------------- Yr=2014 Region=Waco --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
315	2014	Waco	309	McLennan	7,840,161	2,777,078,806
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Yr					573,634,781	195,365,061,549

------------------------------- Yr=2015 Region=Austin -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
316	2015	Austin	21	Bastrop	2,732,057	943,955,016
317	2015	Austin	55	Caldwell	1,235,714	426,952,423
318	2015	Austin	209	Hays	5,612,557	1,939,198,853
319	2015	Austin	453	Travis	30,502,886	10,539,074,950
320	2015	Austin	491	Williamson	11,797,217	4,076,065,268
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Region					51,880,431	17,925,246,510

-------------------------------- Yr=2015 Region=BPA ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
321	2015	BPA	199	Hardin	1,867,326	617,346,061
322	2015	BPA	245	Jefferson	8,432,037	2,787,668,279
323	2015	BPA	361	Orange	3,373,875	1,115,417,930
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Region					13,673,238	4,520,432,270

------------------------------- Yr=2015 Region=Corpus -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
324	2015	Corpus	355	Nueces	11,599,263	3,849,441,893
325	2015	Corpus	409	San Patricio	2,726,614	904,880,231
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Region					14,325,877	4,754,322,124

-------------------------------- Yr=2015 Region=DFW ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
326	2015	DFW	85	Collin	21,343,910	7,058,572,203
327	2015	DFW	113	Dallas	83,162,995	27,502,553,114
328	2015	DFW	121	Denton	16,162,674	5,345,103,375
329	2015	DFW	139	Ellis	6,320,215	2,090,136,810
330	2015	DFW	221	Hood	1,494,725	494,315,490
331	2015	DFW	231	Hunt	3,624,162	1,198,534,374
332	2015	DFW	251	Johnson	4,886,841	1,616,110,527
333	2015	DFW	257	Kaufman	4,776,744	1,579,700,947
334	2015	DFW	367	Parker	4,545,250	1,503,144,195
335	2015	DFW	397	Rockwall	2,314,118	765,294,296
336	2015	DFW	439	Tarrant	54,281,569	17,951,274,338
337	2015	DFW	497	Wise	3,496,653	1,156,366,264
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Region					206,409,856	68,261,105,934

-------------------------------- Yr=2015 Region=ELP ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
338	2015	ELP	141	El Paso	17,472,290	6,095,684,325

------------------------------ Yr=2015 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
339	2015	Houston	39	Brazoria	6,831,247	2,387,652,428
340	2015	Houston	71	Chambers	2,913,701	1,018,394,614
341	2015	Houston	157	Fort Bend	10,795,269	3,773,154,688
342	2015	Houston	167	Galveston	6,287,886	2,197,737,573
343	2015	Houston	201	Harris	120,295,816	42,045,707,293
344	2015	Houston	291	Liberty	2,642,072	923,455,168
345	2015	Houston	339	Montgomery	12,632,004	4,415,129,137
346	2015	Houston	473	Waller	2,435,978	851,421,148
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Region					164,833,973	57,612,652,049

------------------------------- Yr=2015 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
347	2015	LRGV	61	Cameron	9,125,431	3,092,772,327

------------------------------ Yr=2015 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
348	2015	Laredo	479	Webb	5,030,801	1,807,838,682

-------------------------------- Yr=2015 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
349	2015	SA	29	Bexar	45,882,666	15,571,941,993
350	2015	SA	91	Comal	4,696,553	1,593,945,251
351	2015	SA	187	Guadalupe	3,931,137	1,334,173,357
352	2015	SA	493	Wilson	1,203,256	408,368,355
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Region					55,713,611	18,908,428,955

------------------------------ Yr=2015 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
353	2015	Tyler	183	Gregg	4,141,569	1,427,876,865
354	2015	Tyler	203	Harrison	3,463,815	1,194,209,531
355	2015	Tyler	401	Rusk	1,985,415	684,505,758
356	2015	Tyler	423	Smith	7,136,854	2,460,552,863
357	2015	Tyler	459	Upshur	1,340,938	462,311,258
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Region					18,068,589	6,229,456,274

------------------------------ Yr=2015 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
358	2015	Valley	215	Hidalgo	16,505,730	5,798,328,689

----------------------------- Yr=2015 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
359	2015	Victoria	469	Victoria	2,903,719	1,037,667,474

------------------------------- Yr=2015 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
360	2015	Waco	309	McLennan	7,941,236	2,812,880,859
Yr					583,884,784	198,856,816,469

------------------------------- Yr=2016 Region=Austin -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
361	2016	Austin	21	Bastrop	2,808,575	970,392,918
362	2016	Austin	55	Caldwell	1,264,724	436,975,669
363	2016	Austin	209	Hays	5,769,324	1,993,363,422
364	2016	Austin	453	Travis	31,039,083	10,724,336,792
365	2016	Austin	491	Williamson	12,126,539	4,189,849,542
Region					53,008,245	18,314,918,343

------------------------------- Yr=2016 Region=BPA -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
366	2016	BPA	199	Hardin	1,892,039	625,516,330
367	2016	BPA	245	Jefferson	8,481,724	2,804,094,944
368	2016	BPA	361	Orange	3,404,784	1,125,636,425
Region					13,778,547	4,555,247,698

------------------------------- Yr=2016 Region=Corpus -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
369	2016	Corpus	355	Nueces	11,756,734	3,901,701,883
370	2016	Corpus	409	San Patricio	2,786,456	924,739,987
Region					14,543,190	4,826,441,870

------------------------------- Yr=2016 Region=DFW -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
371	2016	DFW	85	Collin	21,960,085	7,262,345,386
372	2016	DFW	113	Dallas	84,379,247	27,904,775,686
373	2016	DFW	121	Denton	16,625,760	5,498,248,883
374	2016	DFW	139	Ellis	6,461,010	2,136,698,853
375	2016	DFW	221	Hood	1,525,526	504,501,640
376	2016	DFW	231	Hunt	3,687,906	1,219,614,955
377	2016	DFW	251	Johnson	4,994,074	1,651,573,358
378	2016	DFW	257	Kaufman	4,898,948	1,620,114,550
379	2016	DFW	367	Parker	4,633,341	1,532,276,632
380	2016	DFW	397	Rockwall	2,373,617	784,970,951
381	2016	DFW	439	Tarrant	55,154,224	18,239,867,115
382	2016	DFW	497	Wise	3,575,380	1,182,401,823
Region					210,269,119	69,537,389,832

------------------------------- Yr=2016 Region=ELP -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
383	2016	ELP	141	El Paso	17,728,441	6,185,049,394

------------------------------ Yr=2016 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
384	2016	Houston	39	Brazoria	6,933,158	2,423,272,531
385	2016	Houston	71	Chambers	2,970,319	1,038,183,813
386	2016	Houston	157	Fort Bend	11,049,790	3,862,114,817
387	2016	Houston	167	Galveston	6,337,319	2,215,015,233
388	2016	Houston	201	Harris	122,204,352	42,712,777,356
389	2016	Houston	291	Liberty	2,692,674	941,141,346
390	2016	Houston	339	Montgomery	12,982,543	4,537,649,090
391	2016	Houston	473	Waller	2,497,506	872,926,373
Region					167,667,661	58,603,080,560

------------------------------- Yr=2016 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
392	2016	LRGV	61	Cameron	9,314,639	3,156,898,125

------------------------------- Yr=2016 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
393	2016	Laredo	479	Webb	5,159,187	1,853,974,521

-------------------------------- Yr=2016 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
394	2016	SA	29	Bexar	46,444,199	15,762,518,742
395	2016	SA	91	Comal	4,807,005	1,631,430,917
396	2016	SA	187	Guadalupe	4,012,226	1,361,694,156
397	2016	SA	493	Wilson	1,230,984	417,778,856
Region					56,494,414	19,173,422,671

------------------------------- Yr=2016 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
398	2016	Tyler	183	Gregg	4,170,847	1,437,971,077
399	2016	Tyler	203	Harrison	3,516,044	1,212,216,392
400	2016	Tyler	401	Rusk	2,003,401	690,706,911
401	2016	Tyler	423	Smith	7,225,934	2,491,264,762
402	2016	Tyler	459	Upshur	1,361,423	469,373,821
Region					18,277,648	6,301,532,963

------------------------------ Yr=2016 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
403	2016	Valley	215	Hidalgo	16,935,951	5,949,461,923

------------------------------ Yr=2016 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
404	2016	Victoria	469	Victoria	2,940,061	1,050,654,493

------------------------------- Yr=2016 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
405	2016	Waco	309	McLennan	8,041,962	2,848,559,099
Yr					594,159,065	202,356,631,492

------------------------------ Yr=2017 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
406	2017	Austin	21	Bastrop	2,886,245	997,228,759
407	2017	Austin	55	Caldwell	1,293,451	446,901,144
408	2017	Austin	209	Hays	5,927,159	2,047,897,236
409	2017	Austin	453	Travis	31,576,207	10,909,918,943
410	2017	Austin	491	Williamson	12,460,024	4,305,072,054
Region					54,143,086	18,707,018,135

------------------------------- Yr=2017 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
411	2017	BPA	199	Hardin	1,915,836	633,383,748
412	2017	BPA	245	Jefferson	8,530,153	2,820,105,745
413	2017	BPA	361	Orange	3,435,692	1,135,854,921
Region					13,881,681	4,589,344,414

------------------------------ Yr=2017 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
414	2017	Corpus	355	Nueces	11,914,009	3,953,896,551
415	2017	Corpus	409	San Patricio	2,846,048	944,516,499
Region					14,760,056	4,898,413,050

------------------------------- Yr=2017 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
416	2017	DFW	85	Collin	22,579,589	7,467,219,439
417	2017	DFW	113	Dallas	85,597,015	28,307,499,638
418	2017	DFW	121	Denton	17,092,450	5,652,586,385
419	2017	DFW	139	Ellis	6,602,441	2,183,470,818
420	2017	DFW	221	Hood	1,556,464	514,733,061
421	2017	DFW	231	Hunt	3,751,453	1,240,630,328
422	2017	DFW	251	Johnson	5,101,463	1,687,087,686
423	2017	DFW	257	Kaufman	5,022,397	1,660,940,010
424	2017	DFW	367	Parker	4,721,607	1,561,466,658
425	2017	DFW	397	Rockwall	2,433,944	804,921,353
426	2017	DFW	439	Tarrant	56,030,607	18,529,692,585
427	2017	DFW	497	Wise	3,654,055	1,208,420,268
Region					214,143,485	70,818,668,230

------------------------------- Yr=2017 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
428	2017	ELP	141	El Paso	17,984,762	6,274,474,058

------------------------------ Yr=2017 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
429	2017	Houston	39	Brazoria	7,035,235	2,458,950,314
430	2017	Houston	71	Chambers	3,027,769	1,058,263,495
431	2017	Houston	157	Fort Bend	11,306,401	3,951,805,108
432	2017	Houston	167	Galveston	6,385,578	2,231,882,662
433	2017	Houston	201	Harris	124,114,911	43,380,554,707
434	2017	Houston	291	Liberty	2,743,734	958,988,006
435	2017	Houston	339	Montgomery	13,334,594	4,660,697,634
436	2017	Houston	473	Waller	2,558,757	894,334,883
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Region					170,506,979	59,595,476,809

------------------------------- Yr=2017 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
437	2017	LRGV	61	Cameron	9,504,100	3,221,110,106

------------------------------ Yr=2017 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
438	2017	Laredo	479	Webb	5,289,659	1,900,860,160

-------------------------------- Yr=2017 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
439	2017	SA	29	Bexar	47,002,601	15,952,032,624
440	2017	SA	91	Comal	4,918,192	1,669,166,371
441	2017	SA	187	Guadalupe	4,093,365	1,389,231,557
442	2017	SA	493	Wilson	1,258,829	427,229,177
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Region					57,272,988	19,437,659,729

------------------------------ Yr=2017 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
443	2017	Tyler	183	Gregg	4,200,243	1,448,105,750
444	2017	Tyler	203	Harrison	3,568,342	1,230,247,131
445	2017	Tyler	401	Rusk	2,021,369	696,901,566
446	2017	Tyler	423	Smith	7,314,645	2,521,849,457
447	2017	Tyler	459	Upshur	1,381,735	476,376,753
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Region					18,486,333	6,373,480,658

------------------------------ Yr=2017 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
448	2017	Valley	215	Hidalgo	17,365,620	6,100,401,143

----------------------------- Yr=2017 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
449	2017	Victoria	469	Victoria	2,975,685	1,063,384,881

------------------------------- Yr=2017 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
450	2017	Waco	309	McLennan	8,142,528	2,884,181,059
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Yr					604,456,963	205,864,472,433

------------------------------ Yr=2018 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
451	2018	Austin	21	Bastrop	2,964,652	1,024,319,279
452	2018	Austin	55	Caldwell	1,322,569	456,961,639
453	2018	Austin	209	Hays	6,085,958	2,102,763,974
454	2018	Austin	453	Travis	32,109,666	11,094,234,636
455	2018	Austin	491	Williamson	12,797,567	4,421,697,107
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Region					55,280,412	19,099,976,635

------------------------------- Yr=2018 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
456	2018	BPA	199	Hardin	1,939,780	641,299,841
457	2018	BPA	245	Jefferson	8,577,821	2,835,864,978
458	2018	BPA	361	Orange	3,466,388	1,146,002,899
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Region					13,983,989	4,623,167,718

------------------------------ Yr=2018 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
459	2018	Corpus	355	Nueces	12,070,920	4,005,970,625
460	2018	Corpus	409	San Patricio	2,905,491	964,244,046
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Region					14,976,411	4,970,214,671

------------------------------- Yr=2018 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
461	2018	DFW	85	Collin	23,206,224	7,674,451,861
462	2018	DFW	113	Dallas	86,823,114	28,712,978,713
463	2018	DFW	121	Denton	17,562,028	5,807,878,985
464	2018	DFW	139	Ellis	6,744,076	2,230,310,498
465	2018	DFW	221	Hood	1,587,539	525,009,753
466	2018	DFW	231	Hunt	3,815,627	1,261,853,180
467	2018	DFW	251	Johnson	5,209,461	1,722,803,316
468	2018	DFW	257	Kaufman	5,146,169	1,701,872,251
469	2018	DFW	367	Parker	4,809,660	1,590,586,296
470	2018	DFW	397	Rockwall	2,494,954	825,097,888
471	2018	DFW	439	Tarrant	56,907,004	18,819,522,987
472	2018	DFW	497	Wise	3,733,015	1,234,532,844
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Region					218,038,872	72,106,898,573

------------------------------- Yr=2018 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
473	2018	ELP	141	El Paso	18,243,495	6,364,740,033

------------------------------ Yr=2018 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
474	2018	Houston	39	Brazoria	7,136,806	2,494,451,214
475	2018	Houston	71	Chambers	3,085,260	1,078,357,699
476	2018	Houston	157	Fort Bend	11,564,114	4,041,880,662
477	2018	Houston	167	Galveston	6,433,647	2,248,683,674
478	2018	Houston	201	Harris	126,026,169	44,048,575,954
479	2018	Houston	291	Liberty	2,794,092	976,588,925
480	2018	Houston	339	Montgomery	13,688,652	4,784,447,671
481	2018	Houston	473	Waller	2,620,813	916,024,748
Region					173,349,551	60,589,010,547

------------------------------- Yr=2018 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
482	2018	LRGV	61	Cameron	9,693,728	3,285,378,439

------------------------------ Yr=2018 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
483	2018	Laredo	479	Webb	5,419,513	1,947,523,859

-------------------------------- Yr=2018 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
484	2018	SA	29	Bexar	47,552,114	16,138,529,637
485	2018	SA	91	Comal	5,030,221	1,707,187,298
486	2018	SA	187	Guadalupe	4,173,982	1,416,591,853
487	2018	SA	493	Wilson	1,286,870	436,745,864
Region					58,043,187	19,699,054,652

------------------------------ Yr=2018 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
488	2018	Tyler	183	Gregg	4,229,068	1,458,043,887
489	2018	Tyler	203	Harrison	3,620,086	1,248,086,840
490	2018	Tyler	401	Rusk	2,038,771	702,901,356
491	2018	Tyler	423	Smith	7,403,549	2,552,500,785
492	2018	Tyler	459	Upshur	1,402,015	483,368,841
Region					18,693,490	6,444,901,709

------------------------------ Yr=2018 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
493	2018	Valley	215	Hidalgo	17,799,527	6,252,828,908

----------------------------- Yr=2018 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
494	2018	Victoria	469	Victoria	3,011,883	1,076,320,576

------------------------------- Yr=2018 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
495	2018	Waco	309	McLennan	8,241,776	2,919,335,899
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Yr					614,775,835	209,379,352,218

------------------------------ Yr=2019 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
496	2019	Austin	21	Bastrop	3,044,012	1,051,738,758
497	2019	Austin	55	Caldwell	1,351,565	466,980,232
498	2019	Austin	209	Hays	6,245,966	2,158,048,378
499	2019	Austin	453	Travis	32,642,697	11,278,402,490
500	2019	Austin	491	Williamson	13,139,540	4,539,852,203
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Region					56,423,779	19,495,022,061

------------------------------- Yr=2019 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
501	2019	BPA	199	Hardin	1,963,250	649,059,100
502	2019	BPA	245	Jefferson	8,626,374	2,851,916,853
503	2019	BPA	361	Orange	3,496,016	1,155,798,300
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Region					14,085,641	4,656,774,253

------------------------------ Yr=2019 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
504	2019	Corpus	355	Nueces	12,225,757	4,057,356,305
505	2019	Corpus	409	San Patricio	2,964,891	983,956,902
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Region					15,190,648	5,041,313,207

------------------------------- Yr=2019 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
506	2019	DFW	85	Collin	23,837,365	7,883,174,485
507	2019	DFW	113	Dallas	88,051,480	29,119,207,380
508	2019	DFW	121	Denton	18,034,153	5,964,013,876
509	2019	DFW	139	Ellis	6,886,284	2,277,339,786
510	2019	DFW	221	Hood	1,618,491	535,245,702
511	2019	DFW	231	Hunt	3,879,551	1,282,993,042
512	2019	DFW	251	Johnson	5,317,856	1,758,650,030
513	2019	DFW	257	Kaufman	5,270,933	1,743,132,453
514	2019	DFW	367	Parker	4,897,654	1,619,686,734
515	2019	DFW	397	Rockwall	2,556,343	845,399,396
516	2019	DFW	439	Tarrant	57,791,393	19,111,996,290
517	2019	DFW	497	Wise	3,811,923	1,260,628,304
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Region					221,953,426	73,401,467,477

------------------------------- Yr=2019 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
518	2019	ELP	141	El Paso	18,495,496	6,452,657,349

------------------------------ Yr=2019 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
519	2019	Houston	39	Brazoria	7,238,398	2,529,959,805
520	2019	Houston	71	Chambers	3,142,543	1,098,379,283
521	2019	Houston	157	Fort Bend	11,823,254	4,132,455,221
522	2019	Houston	167	Galveston	6,480,285	2,264,984,598
523	2019	Houston	201	Harris	127,943,441	44,718,699,556
524	2019	Houston	291	Liberty	2,844,794	994,310,208
525	2019	Houston	339	Montgomery	14,044,603	4,908,859,682
526	2019	Houston	473	Waller	2,683,046	937,776,166
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Region					176,200,363	61,585,424,518

------------------------------- Yr=2019 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
527	2019	LRGV	61	Cameron	9,883,513	3,349,699,805

------------------------------- Yr=2019 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
528	2019	Laredo	479	Webb	5,551,028	1,994,784,398

-------------------------------- Yr=2019 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
529	2019	SA	29	Bexar	48,099,507	16,324,307,240
530	2019	SA	91	Comal	5,142,628	1,745,336,691
531	2019	SA	187	Guadalupe	4,254,925	1,444,062,841
532	2019	SA	493	Wilson	1,314,911	446,262,547
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Region					58,811,971	19,959,969,319

------------------------------- Yr=2019 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
533	2019	Tyler	183	Gregg	4,258,045	1,468,034,050
534	2019	Tyler	203	Harrison	3,671,230	1,265,719,603
535	2019	Tyler	401	Rusk	2,056,098	708,875,163
536	2019	Tyler	423	Smith	7,492,401	2,583,133,939
537	2019	Tyler	459	Upshur	1,421,950	490,241,665
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Region					18,899,724	6,516,004,420

------------------------------ Yr=2019 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
538	2019	Valley	215	Hidalgo	18,234,785	6,405,731,672

----------------------------- Yr=2019 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
539	2019	Victoria	469	Victoria	3,047,047	1,088,886,719

------------------------------- Yr=2019 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
540	2019	Waco	309	McLennan	8,340,993	2,954,479,486
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Yr					625,118,414	212,902,214,684

------------------------------ Yr=2020 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
541	2020	Austin	21	Bastrop	3,123,955	1,079,359,861
542	2020	Austin	55	Caldwell	1,380,319	476,915,017
543	2020	Austin	209	Hays	6,406,412	2,213,484,113
544	2020	Austin	453	Travis	33,175,499	11,462,491,501
545	2020	Austin	491	Williamson	13,485,719	4,659,460,841
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Region					57,571,903	19,891,711,334

------------------------------- Yr=2020 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
546	2020	BPA	199	Hardin	1,986,377	656,704,790
547	2020	BPA	245	Jefferson	8,674,834	2,867,937,924
548	2020	BPA	361	Orange	3,525,379	1,165,505,555
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Region					14,186,589	4,690,148,269

------------------------------ Yr=2020 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
549	2020	Corpus	355	Nueces	12,378,535	4,108,058,617
550	2020	Corpus	409	San Patricio	3,024,098	1,003,606,102
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Region					15,402,633	5,111,664,719

------------------------------- Yr=2020 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
551	2020	DFW	85	Collin	24,475,827	8,094,318,128
552	2020	DFW	113	Dallas	89,295,607	29,530,648,437
553	2020	DFW	121	Denton	18,508,882	6,121,009,863
554	2020	DFW	139	Ellis	7,027,735	2,324,118,524
555	2020	DFW	221	Hood	1,649,771	545,590,300
556	2020	DFW	231	Hunt	3,943,510	1,304,144,759
557	2020	DFW	251	Johnson	5,426,391	1,794,543,557
558	2020	DFW	257	Kaufman	5,396,873	1,784,781,634
559	2020	DFW	367	Parker	4,984,856	1,648,524,807
560	2020	DFW	397	Rockwall	2,618,109	865,825,873
561	2020	DFW	439	Tarrant	58,674,202	19,403,946,929
562	2020	DFW	497	Wise	3,890,883	1,286,740,878
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Region					225,892,646	74,704,193,689

------------------------------- Yr=2020 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
563	2020	ELP	141	El Paso	18,747,607	6,540,613,224

------------------------------ Yr=2020 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
564	2020	Houston	39	Brazoria	7,339,760	2,565,387,645
565	2020	Houston	71	Chambers	3,200,200	1,118,531,585
566	2020	Houston	157	Fort Bend	12,084,672	4,223,825,990
567	2020	Houston	167	Galveston	6,526,487	2,281,133,147
568	2020	Houston	201	Harris	129,862,081	45,389,301,190
569	2020	Houston	291	Liberty	2,895,252	1,011,946,232
570	2020	Houston	339	Montgomery	14,402,421	5,033,923,782
571	2020	Houston	473	Waller	2,746,435	959,932,035
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Region					179,057,308	62,583,981,605

------------------------------- Yr=2020 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
572	2020	LRGV	61	Cameron	10,071,596	3,413,444,407

------------------------------- Yr=2020 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
573	2020	Laredo	479	Webb	5,683,361	2,042,338,861

-------------------------------- Yr=2020 Region=SA ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
574	2020	SA	29	Bexar	48,643,796	16,509,031,260
575	2020	SA	91	Comal	5,254,803	1,783,407,575
576	2020	SA	187	Guadalupe	4,335,918	1,471,550,430
577	2020	SA	493	Wilson	1,343,069	455,819,054
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Region					59,577,586	20,219,808,319

------------------------------- Yr=2020 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
578	2020	Tyler	183	Gregg	4,286,468	1,477,833,455
579	2020	Tyler	203	Harrison	3,721,958	1,283,209,093
580	2020	Tyler	401	Rusk	2,073,651	714,926,916
581	2020	Tyler	423	Smith	7,580,585	2,613,536,912
582	2020	Tyler	459	Upshur	1,441,649	497,033,169
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Region					19,104,312	6,586,539,544

------------------------------- Yr=2020 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
583	2020	Valley	215	Hidalgo	18,671,720	6,559,223,160

------------------------------ Yr=2020 Region=Victoria ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
584	2020	Victoria	469	Victoria	3,082,067	1,101,401,538

------------------------------- Yr=2020 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
585	2020	Waco	309	McLennan	8,439,367	2,989,324,789
Yr					635,488,695	216,434,393,458

------------------------------ Yr=2021 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
586	2021	Austin	21	Bastrop	3,204,681	1,107,251,559
587	2021	Austin	55	Caldwell	1,409,531	487,008,105
588	2021	Austin	209	Hays	6,565,754	2,268,538,497
589	2021	Austin	453	Travis	33,710,427	11,647,314,763
590	2021	Austin	491	Williamson	13,836,607	4,780,696,423
Region					58,726,999	20,290,809,347

------------------------------- Yr=2021 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
591	2021	BPA	199	Hardin	2,009,438	664,328,848
592	2021	BPA	245	Jefferson	8,722,626	2,883,738,230
593	2021	BPA	361	Orange	3,554,012	1,174,971,881
Region					14,286,076	4,723,038,959

------------------------------ Yr=2021 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
594	2021	Corpus	355	Nueces	12,531,252	4,158,740,829
595	2021	Corpus	409	San Patricio	3,083,365	1,023,274,890
Region					15,614,617	5,182,015,719

------------------------------- Yr=2021 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
596	2021	DFW	85	Collin	25,120,798	8,307,614,286
597	2021	DFW	113	Dallas	90,563,406	29,949,918,010
598	2021	DFW	121	Denton	18,981,235	6,277,219,959
599	2021	DFW	139	Ellis	7,170,292	2,371,262,929
600	2021	DFW	221	Hood	1,680,846	555,866,992
601	2021	DFW	231	Hunt	4,006,931	1,325,118,635
602	2021	DFW	251	Johnson	5,535,026	1,830,469,854
603	2021	DFW	257	Kaufman	5,523,897	1,826,789,287
604	2021	DFW	367	Parker	5,072,038	1,677,356,482
605	2021	DFW	397	Rockwall	2,680,451	886,442,781
606	2021	DFW	439	Tarrant	59,560,111	19,696,923,172
607	2021	DFW	497	Wise	3,970,283	1,312,998,925
Region					229,865,314	76,017,981,312

------------------------------- Yr=2021 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
608	2021	ELP	141	El Paso	18,996,784	6,627,545,504

------------------------------ Yr=2021 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
609	2021	Houston	39	Brazoria	7,441,122	2,600,815,484
610	2021	Houston	71	Chambers	3,258,397	1,138,872,699
611	2021	Houston	157	Fort Bend	12,344,705	4,314,712,428
612	2021	Houston	167	Galveston	6,571,762	2,296,957,419
613	2021	Houston	201	Harris	131,796,491	46,065,414,804
614	2021	Houston	291	Liberty	2,945,839	1,029,627,394
615	2021	Houston	339	Montgomery	14,762,881	5,159,911,682
616	2021	Houston	473	Waller	2,810,353	982,272,544
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Region					181,931,549	63,588,584,454

------------------------------- Yr=2021 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
617	2021	LRGV	61	Cameron	10,262,417	3,478,117,138

------------------------------- Yr=2021 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
618	2021	Laredo	479	Webb	5,815,528	2,089,833,340

--------------------------------- Yr=2021 Region=SA ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
619	2021	SA	29	Bexar	49,179,154	16,690,724,482
620	2021	SA	91	Comal	5,366,958	1,821,471,326
621	2021	SA	187	Guadalupe	4,416,404	1,498,866,452
622	2021	SA	493	Wilson	1,371,175	465,357,860
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Region					60,333,691	20,476,420,120

------------------------------- Yr=2021 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
623	2021	Tyler	183	Gregg	4,315,562	1,487,864,080
624	2021	Tyler	203	Harrison	3,772,987	1,300,802,056
625	2021	Tyler	401	Rusk	2,090,922	720,881,238
626	2021	Tyler	423	Smith	7,669,665	2,644,248,811
627	2021	Tyler	459	Upshur	1,461,285	503,802,990
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Region					19,310,421	6,657,599,175

------------------------------- Yr=2021 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
628	2021	Valley	215	Hidalgo	19,108,625	6,712,704,612

------------------------------ Yr=2021 Region=Victoria ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
629	2021	Victoria	469	Victoria	3,116,355	1,113,654,590

------------------------------- Yr=2021 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
630	2021	Waco	309	McLennan	8,537,805	3,024,192,608
Yr					645,906,181	219,982,496,879

------------------------------ Yr=2022 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
631	2022	Austin	21	Bastrop	3,286,159	1,135,403,244
632	2022	Austin	55	Caldwell	1,438,554	497,036,009
633	2022	Austin	209	Hays	6,725,429	2,323,707,895
634	2022	Austin	453	Travis	34,247,522	11,832,887,059
635	2022	Austin	491	Williamson	14,192,012	4,903,492,652
Region					59,889,676	20,692,526,860

------------------------------- Yr=2022 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
636	2022	BPA	199	Hardin	2,031,910	671,758,218
637	2022	BPA	245	Jefferson	8,772,344	2,900,175,162
638	2022	BPA	361	Orange	3,582,521	1,184,397,074
Region					14,386,775	4,756,330,454

------------------------------ Yr=2022 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
639	2022	Corpus	355	Nueces	12,680,760	4,208,357,786
640	2022	Corpus	409	San Patricio	3,142,469	1,042,889,811
Region					15,823,229	5,251,247,598

------------------------------- Yr=2022 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
641	2022	DFW	85	Collin	25,772,522	8,523,143,512
642	2022	DFW	113	Dallas	91,836,654	30,370,989,582
643	2022	DFW	121	Denton	19,457,260	6,434,644,610
644	2022	DFW	139	Ellis	7,312,725	2,418,366,705
645	2022	DFW	221	Hood	1,711,716	566,075,775
646	2022	DFW	231	Hunt	4,070,370	1,346,098,441
647	2022	DFW	251	Johnson	5,644,482	1,866,667,677
648	2022	DFW	257	Kaufman	5,651,428	1,868,964,734
649	2022	DFW	367	Parker	5,158,968	1,706,104,966
650	2022	DFW	397	Rockwall	2,743,548	907,309,629
651	2022	DFW	439	Tarrant	60,452,656	19,992,093,615
652	2022	DFW	497	Wise	4,049,450	1,339,179,959
Region					233,861,781	77,339,639,205

------------------------------- Yr=2022 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
653	2022	ELP	141	El Paso	19,248,071	6,715,213,932

------------------------------ Yr=2022 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
654	2022	Houston	39	Brazoria	7,542,351	2,636,197,181
655	2022	Houston	71	Chambers	3,315,265	1,158,749,042
656	2022	Houston	157	Fort Bend	12,608,727	4,406,993,150
657	2022	Houston	167	Galveston	6,616,690	2,312,660,575
658	2022	Houston	201	Harris	133,743,140	46,745,806,303
659	2022	Houston	291	Liberty	2,996,354	1,047,283,479
660	2022	Houston	339	Montgomery	15,124,656	5,286,359,010
661	2022	Houston	473	Waller	2,874,799	1,004,797,700
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Region					184,821,982	64,598,846,439

------------------------------- Yr=2022 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
662	2022	LRGV	61	Cameron	10,452,123	3,542,411,987

------------------------------ Yr=2022 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
663	2022	Laredo	479	Webb	5,949,881	2,138,113,609

--------------------------------- Yr=2022 Region=SA ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
664	2022	SA	29	Bexar	49,707,716	16,870,110,961
665	2022	SA	91	Comal	5,478,924	1,859,470,841
666	2022	SA	187	Guadalupe	4,496,809	1,526,154,801
667	2022	SA	493	Wilson	1,399,294	474,901,091
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Region					61,082,742	20,730,637,694

------------------------------ Yr=2022 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
668	2022	Tyler	183	Gregg	4,344,907	1,497,981,413
669	2022	Tyler	203	Harrison	3,823,485	1,318,211,952
670	2022	Tyler	401	Rusk	2,108,098	726,803,082
671	2022	Tyler	423	Smith	7,759,079	2,675,075,800
672	2022	Tyler	459	Upshur	1,480,685	510,491,495
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Region					19,516,254	6,728,563,742

------------------------------ Yr=2022 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
673	2022	Valley	215	Hidalgo	19,548,969	6,867,393,627

----------------------------- Yr=2022 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
674	2022	Victoria	469	Victoria	3,150,528	1,125,866,585

------------------------------- Yr=2022 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
675	2022	Waco	309	McLennan	8,635,972	3,058,964,749
Yr					656,367,983	223,545,756,481

------------------------------ Yr=2023 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
676	2023	Austin	21	Bastrop	3,368,390	1,163,814,914
677	2023	Austin	55	Caldwell	1,467,847	507,157,032
678	2023	Austin	209	Hays	6,884,911	2,378,810,704
679	2023	Austin	453	Travis	34,784,318	12,018,355,871
680	2023	Austin	491	Williamson	14,551,727	5,027,778,124
Region					61,057,194	21,095,916,644

------------------------------- Yr=2023 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
681	2023	BPA	199	Hardin	2,054,022	679,068,612
682	2023	BPA	245	Jefferson	8,819,608	2,915,800,909
683	2023	BPA	361	Orange	3,610,195	1,193,546,080
Region					14,483,825	4,788,415,600

------------------------------ Yr=2023 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
684	2023	Corpus	355	Nueces	12,831,599	4,258,416,927
685	2023	Corpus	409	San Patricio	3,201,574	1,062,504,734
Region					16,033,173	5,320,921,661

------------------------------- Yr=2023 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
686	2023	DFW	85	Collin	26,429,725	8,740,485,145
687	2023	DFW	113	Dallas	93,135,796	30,800,624,369
688	2023	DFW	121	Denton	19,933,364	6,592,095,582
689	2023	DFW	139	Ellis	7,455,221	2,465,490,796
690	2023	DFW	221	Hood	1,742,681	576,316,252
691	2023	DFW	231	Hunt	4,133,953	1,367,125,672
692	2023	DFW	251	Johnson	5,754,037	1,902,898,273
693	2023	DFW	257	Kaufman	5,779,974	1,911,475,771
694	2023	DFW	367	Parker	5,244,970	1,734,546,289
695	2023	DFW	397	Rockwall	2,807,132	928,337,153
696	2023	DFW	439	Tarrant	61,352,313	20,289,616,040
697	2023	DFW	497	Wise	4,128,798	1,365,420,893
Region					237,897,966	78,674,432,235

------------------------------- Yr=2023 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
698	2023	ELP	141	El Paso	19,497,309	6,802,167,247

------------------------------ Yr=2023 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
699	2023	Houston	39	Brazoria	7,643,471	2,671,540,425
700	2023	Houston	71	Chambers	3,371,842	1,178,523,718
701	2023	Houston	157	Fort Bend	12,871,090	4,498,694,140
702	2023	Houston	167	Galveston	6,660,980	2,328,141,034
703	2023	Houston	201	Harris	135,697,633	47,428,939,159
704	2023	Houston	291	Liberty	3,046,783	1,064,909,475
705	2023	Houston	339	Montgomery	15,487,505	5,413,181,784
706	2023	Houston	473	Waller	2,939,622	1,027,454,741
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Region					187,718,927	65,611,384,475

------------------------------- Yr=2023 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
707	2023	LRGV	61	Cameron	10,642,504	3,606,935,555

------------------------------- Yr=2023 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
708	2023	Laredo	479	Webb	6,085,277	2,186,768,779

-------------------------------- Yr=2023 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
709	2023	SA	29	Bexar	50,239,204	17,050,490,685
710	2023	SA	91	Comal	5,591,331	1,897,620,234
711	2023	SA	187	Guadalupe	4,577,035	1,553,382,272
712	2023	SA	493	Wilson	1,427,270	484,395,656
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Region					61,834,839	20,985,888,846

------------------------------- Yr=2023 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
713	2023	Tyler	183	Gregg	4,374,789	1,508,283,722
714	2023	Tyler	203	Harrison	3,874,236	1,335,709,401
715	2023	Tyler	401	Rusk	2,124,936	732,608,005
716	2023	Tyler	423	Smith	7,847,615	2,705,599,922
717	2023	Tyler	459	Upshur	1,499,818	517,087,837
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Region					19,721,393	6,799,288,886

------------------------------- Yr=2023 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
718	2023	Valley	215	Hidalgo	19,991,569	7,022,875,414

------------------------------ Yr=2023 Region=Victoria ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
719	2023	Victoria	469	Victoria	3,184,715	1,138,083,709

------------------------------- Yr=2023 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
720	2023	Waco	309	McLennan	8,733,329	3,093,449,867
Yr					666,882,019	227,126,528,920

------------------------------- Yr=2024 Region=Austin -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
721	2024	Austin	21	Bastrop	3,451,204	1,192,428,204
722	2024	Austin	55	Caldwell	1,497,086	517,259,431
723	2024	Austin	209	Hays	7,044,288	2,433,877,196
724	2024	Austin	453	Travis	35,325,450	12,205,322,753
725	2024	Austin	491	Williamson	14,915,443	5,153,445,735
Region					62,233,472	21,502,333,318

------------------------------- Yr=2024 Region=BPA -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
726	2024	BPA	199	Hardin	2,075,791	686,265,435
727	2024	BPA	245	Jefferson	8,870,801	2,932,725,577
728	2024	BPA	361	Orange	3,637,175	1,202,465,910
Region					14,583,767	4,821,456,922

------------------------------- Yr=2024 Region=Corpus -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
729	2024	Corpus	355	Nueces	12,980,062	4,307,687,178
730	2024	Corpus	409	San Patricio	3,260,943	1,082,207,798
Region					16,241,006	5,389,894,976

------------------------------- Yr=2024 Region=DFW -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
731	2024	DFW	85	Collin	27,095,048	8,960,511,827
732	2024	DFW	113	Dallas	94,433,362	31,229,737,917
733	2024	DFW	121	Denton	20,415,279	6,751,468,030
734	2024	DFW	139	Ellis	7,598,617	2,512,912,841
735	2024	DFW	221	Hood	1,773,058	586,362,061
736	2024	DFW	231	Hunt	4,197,357	1,388,093,620
737	2024	DFW	251	Johnson	5,863,607	1,939,133,549
738	2024	DFW	257	Kaufman	5,908,912	1,954,116,469
739	2024	DFW	367	Parker	5,330,565	1,762,853,229
740	2024	DFW	397	Rockwall	2,871,202	949,525,354
741	2024	DFW	439	Tarrant	62,252,939	20,587,458,967
742	2024	DFW	497	Wise	4,207,758	1,391,533,468
Region					241,947,703	80,013,707,332

------------------------------- Yr=2024 Region=ELP -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
743	2024	ELP	141	El Paso	19,746,788	6,889,204,693

------------------------------ Yr=2024 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
744	2024	Houston	39	Brazoria	7,745,217	2,707,102,849
745	2024	Houston	71	Chambers	3,427,213	1,197,877,195
746	2024	Houston	157	Fort Bend	13,133,527	4,590,420,817
747	2024	Houston	167	Galveston	6,704,164	2,343,234,703
748	2024	Houston	201	Harris	137,670,421	48,118,466,889
749	2024	Houston	291	Liberty	3,096,983	1,082,455,229
750	2024	Houston	339	Montgomery	15,851,471	5,540,394,825
751	2024	Houston	473	Waller	3,005,125	1,050,349,178
Region					190,634,123	66,630,301,687

------------------------------- Yr=2024 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
752	2024	LRGV	61	Cameron	10,835,497	3,672,344,159

------------------------------ Yr=2024 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
753	2024	Laredo	479	Webb	6,221,800	2,235,828,845

-------------------------------- Yr=2024 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
754	2024	SA	29	Bexar	50,760,709	17,227,482,233
755	2024	SA	91	Comal	5,703,632	1,935,733,941
756	2024	SA	187	Guadalupe	4,656,494	1,580,349,620
757	2024	SA	493	Wilson	1,455,076	493,832,703
Region					62,575,911	21,237,398,496

------------------------------- Yr=2024 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
758	2024	Tyler	183	Gregg	4,405,074	1,518,724,762
759	2024	Tyler	203	Harrison	3,924,110	1,352,904,386
760	2024	Tyler	401	Rusk	2,141,415	738,289,513
761	2024	Tyler	423	Smith	7,938,610	2,736,972,073
762	2024	Tyler	459	Upshur	1,518,919	523,673,340
Region					19,928,127	6,870,564,075

------------------------------ Yr=2024 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
763	2024	Valley	215	Hidalgo	20,435,654	7,178,879,030

----------------------------- Yr=2024 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
764	2024	Victoria	469	Victoria	3,218,529	1,150,167,387

------------------------------- Yr=2024 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
765	2024	Waco	309	McLennan	8,830,639	3,127,918,100
Yr					677,433,015	230,719,999,020

------------------------------ Yr=2025 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
766	2025	Austin	21	Bastrop	3,534,234	1,221,115,776
767	2025	Austin	55	Caldwell	1,526,514	527,427,013
768	2025	Austin	209	Hays	7,204,856	2,489,355,303
769	2025	Austin	453	Travis	35,862,161	12,390,761,996
770	2025	Austin	491	Williamson	15,283,527	5,280,622,986
Region					63,411,292	21,909,283,074

------------------------------- Yr=2025 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
771	2025	BPA	199	Hardin	2,097,134	693,321,652
772	2025	BPA	245	Jefferson	8,920,612	2,949,193,315
773	2025	BPA	361	Orange	3,663,995	1,211,332,851
Region					14,681,742	4,853,847,818

------------------------------ Yr=2025 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
774	2025	Corpus	355	Nueces	13,127,874	4,356,741,364
775	2025	Corpus	409	San Patricio	3,319,576	1,101,666,030
Region					16,447,449	5,458,407,394

------------------------------- Yr=2025 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
776	2025	DFW	85	Collin	27,762,915	9,181,379,824
777	2025	DFW	113	Dallas	95,768,244	31,671,192,423
778	2025	DFW	121	Denton	20,895,580	6,910,306,529
779	2025	DFW	139	Ellis	7,741,706	2,560,233,310
780	2025	DFW	221	Hood	1,803,490	596,425,982
781	2025	DFW	231	Hunt	4,260,832	1,409,085,281
782	2025	DFW	251	Johnson	5,973,303	1,975,410,959
783	2025	DFW	257	Kaufman	6,038,750	1,997,054,620
784	2025	DFW	367	Parker	5,415,986	1,791,102,580
785	2025	DFW	397	Rockwall	2,935,613	970,826,620
786	2025	DFW	439	Tarrant	63,157,829	20,886,712,099
787	2025	DFW	497	Wise	4,286,330	1,417,517,685
Region					246,040,578	81,367,247,911

------------------------------- Yr=2025 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
788	2025	ELP	141	El Paso	19,993,855	6,975,400,826

------------------------------ Yr=2025 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
789	2025	Houston	39	Brazoria	7,846,920	2,742,649,893
790	2025	Houston	71	Chambers	3,482,835	1,217,317,815
791	2025	Houston	157	Fort Bend	13,396,142	4,682,209,871
792	2025	Houston	167	Galveston	6,747,281	2,358,304,935
793	2025	Houston	201	Harris	139,633,846	48,804,721,574
794	2025	Houston	291	Liberty	3,147,312	1,100,046,118
795	2025	Houston	339	Montgomery	16,217,119	5,668,195,741
796	2025	Houston	473	Waller	3,070,804	1,073,305,165
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Region					193,542,258	67,646,751,110

-------------------------------- Yr=2025 Region=LRGV --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
797	2025	LRGV	61	Cameron	11,029,135	3,737,971,539

------------------------------- Yr=2025 Region=Laredo -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
798	2025	Laredo	479	Webb	6,359,900	2,285,455,758

--------------------------------- Yr=2025 Region=SA ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
799	2025	SA	29	Bexar	51,281,311	17,404,167,451
800	2025	SA	91	Comal	5,815,829	1,973,811,964
801	2025	SA	187	Guadalupe	4,735,268	1,607,084,519
802	2025	SA	493	Wilson	1,482,987	503,305,147
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Region					63,315,395	21,488,369,080

------------------------------- Yr=2025 Region=Tyler --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
803	2025	Tyler	183	Gregg	4,435,442	1,529,194,707
804	2025	Tyler	203	Harrison	3,974,423	1,370,250,604
805	2025	Tyler	401	Rusk	2,158,327	744,120,419
806	2025	Tyler	423	Smith	8,029,394	2,768,271,537
807	2025	Tyler	459	Upshur	1,537,737	530,161,259
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Region					20,135,324	6,941,998,526

------------------------------- Yr=2025 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
808	2025	Valley	215	Hidalgo	20,888,433	7,337,936,671

------------------------------ Yr=2025 Region=Victoria ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
809	2025	Victoria	469	Victoria	3,252,099	1,162,163,807

------------------------------- Yr=2025 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
810	2025	Waco	309	McLennan	8,927,790	3,162,330,054
Yr					688,025,250	234,327,163,569

------------------------------ Yr=2026 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
811	2026	Austin	21	Bastrop	3,618,507	1,250,233,120
812	2026	Austin	55	Caldwell	1,555,874	537,571,316
813	2026	Austin	209	Hays	7,365,652	2,544,912,099
814	2026	Austin	453	Travis	36,403,778	12,577,896,427
815	2026	Austin	491	Williamson	15,655,672	5,409,202,779
Region					64,599,483	22,319,815,740

------------------------------- Yr=2026 Region=BPA -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
816	2026	BPA	199	Hardin	2,118,085	700,248,076
817	2026	BPA	245	Jefferson	8,970,547	2,965,702,125
818	2026	BPA	361	Orange	3,690,229	1,220,005,875
Region					14,778,862	4,885,956,076

------------------------------ Yr=2026 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
819	2026	Corpus	355	Nueces	13,275,958	4,405,885,995
820	2026	Corpus	409	San Patricio	3,378,429	1,121,197,709
Region					16,654,387	5,527,083,704

------------------------------- Yr=2026 Region=DFW -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
821	2026	DFW	85	Collin	28,438,238	9,404,713,593
822	2026	DFW	113	Dallas	97,097,708	32,110,854,857
823	2026	DFW	121	Denton	21,379,268	7,070,265,574
824	2026	DFW	139	Ellis	7,884,999	2,607,621,495
825	2026	DFW	221	Hood	1,834,017	606,521,588
826	2026	DFW	231	Hunt	4,323,787	1,429,905,033
827	2026	DFW	251	Johnson	6,083,382	2,011,814,769
828	2026	DFW	257	Kaufman	6,169,233	2,040,206,329
829	2026	DFW	367	Parker	5,500,866	1,819,172,751
830	2026	DFW	397	Rockwall	3,000,240	992,199,301
831	2026	DFW	439	Tarrant	64,069,592	21,188,238,324
832	2026	DFW	497	Wise	4,364,436	1,443,347,871
Region					250,145,768	82,724,861,486

------------------------------- Yr=2026 Region=ELP -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
833	2026	ELP	141	El Paso	20,243,605	7,062,532,920

------------------------------ Yr=2026 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
834	2026	Houston	39	Brazoria	7,947,809	2,777,912,386
835	2026	Houston	71	Chambers	3,537,874	1,236,555,099
836	2026	Houston	157	Fort Bend	13,655,713	4,772,934,866
837	2026	Houston	167	Galveston	6,789,158	2,372,941,489
838	2026	Houston	201	Harris	141,614,966	49,497,161,387
839	2026	Houston	291	Liberty	3,197,583	1,117,616,948
840	2026	Houston	339	Montgomery	16,582,795	5,796,006,532
841	2026	Houston	473	Waller	3,137,313	1,096,551,301
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Region					196,463,210	68,667,680,008

------------------------------- Yr=2026 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
842	2026	LRGV	61	Cameron	11,222,430	3,803,482,900

------------------------------ Yr=2026 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
843	2026	Laredo	479	Webb	6,500,054	2,335,820,475

-------------------------------- Yr=2026 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
844	2026	SA	29	Bexar	51,800,313	17,580,309,633
845	2026	SA	91	Comal	5,927,437	2,011,690,154
846	2026	SA	187	Guadalupe	4,813,879	1,633,764,074
847	2026	SA	493	Wilson	1,510,597	512,675,826
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Region					64,052,227	21,738,439,687

------------------------------- Yr=2026 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
848	2026	Tyler	183	Gregg	4,466,447	1,539,884,309
849	2026	Tyler	203	Harrison	4,023,743	1,387,254,562
850	2026	Tyler	401	Rusk	2,174,675	749,756,459
851	2026	Tyler	423	Smith	8,119,950	2,799,492,253
852	2026	Tyler	459	Upshur	1,556,587	536,660,022
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Region					20,341,402	7,013,047,605

------------------------------ Yr=2026 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
853	2026	Valley	215	Hidalgo	21,338,308	7,495,974,072

------------------------------ Yr=2026 Region=Victoria ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
854	2026	Victoria	469	Victoria	3,285,295	1,174,026,783

------------------------------- Yr=2026 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
855	2026	Waco	309	McLennan	9,024,925	3,196,736,381
Yr					698,649,955	237,945,457,836

------------------------------- Yr=2027 Region=Austin -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
856	2027	Austin	21	Bastrop	3,703,195	1,279,493,721
857	2027	Austin	55	Caldwell	1,585,221	547,710,963
858	2027	Austin	209	Hays	7,527,097	2,600,692,864
859	2027	Austin	453	Travis	36,939,960	12,763,153,341
860	2027	Austin	491	Williamson	16,030,975	5,538,874,004
Region					65,786,448	22,729,924,893

------------------------------- Yr=2027 Region=BPA -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
861	2027	BPA	199	Hardin	2,138,790	707,093,379
862	2027	BPA	245	Jefferson	9,020,607	2,982,252,007
863	2027	BPA	361	Orange	3,715,734	1,228,437,970
Region					14,875,132	4,917,783,357

------------------------------- Yr=2027 Region=Corpus -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
864	2027	Corpus	355	Nueces	13,422,422	4,454,492,976
865	2027	Corpus	409	San Patricio	3,436,958	1,140,621,664
Region					16,859,380	5,595,114,640

------------------------------- Yr=2027 Region=DFW -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
866	2027	DFW	85	Collin	29,115,266	9,628,611,223
867	2027	DFW	113	Dallas	98,443,503	32,555,918,325
868	2027	DFW	121	Denton	21,864,344	7,230,683,368
869	2027	DFW	139	Ellis	8,027,740	2,654,826,847
870	2027	DFW	221	Hood	1,864,408	616,571,927
871	2027	DFW	231	Hunt	4,386,760	1,450,730,710
872	2027	DFW	251	Johnson	6,193,164	2,048,120,268
873	2027	DFW	257	Kaufman	6,300,778	2,083,708,881
874	2027	DFW	367	Parker	5,585,107	1,847,031,749
875	2027	DFW	397	Rockwall	3,064,939	1,013,595,784
876	2027	DFW	439	Tarrant	64,979,432	21,489,128,475
877	2027	DFW	497	Wise	4,442,516	1,469,169,501
Region					254,267,958	84,088,097,057

------------------------------- Yr=2027 Region=ELP -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
878	2027	ELP	141	El Paso	20,490,572	7,148,694,000

------------------------------ Yr=2027 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
879	2027	Houston	39	Brazoria	8,048,928	2,813,255,630
880	2027	Houston	71	Chambers	3,593,869	1,256,126,438
881	2027	Houston	157	Fort Bend	13,915,252	4,863,648,853
882	2027	Houston	167	Galveston	6,830,184	2,387,281,117
883	2027	Houston	201	Harris	143,611,327	50,194,927,821
884	2027	Houston	291	Liberty	3,247,840	1,135,182,761
885	2027	Houston	339	Montgomery	16,950,082	5,924,380,497
886	2027	Houston	473	Waller	3,203,897	1,119,823,816
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Region					199,401,379	69,694,626,932

------------------------------- Yr=2027 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
887	2027	LRGV	61	Cameron	11,417,398	3,869,561,083

------------------------------- Yr=2027 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
888	2027	Laredo	479	Webb	6,642,369	2,386,961,986

-------------------------------- Yr=2027 Region=SA ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
889	2027	SA	29	Bexar	52,307,089	17,752,302,456
890	2027	SA	91	Comal	6,038,730	2,049,461,292
891	2027	SA	187	Guadalupe	4,892,034	1,660,288,662
892	2027	SA	493	Wilson	1,538,130	522,019,963
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Region					64,775,983	21,984,072,374

------------------------------- Yr=2027 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
893	2027	Tyler	183	Gregg	4,498,073	1,550,787,791
894	2027	Tyler	203	Harrison	4,073,202	1,404,306,276
895	2027	Tyler	401	Rusk	2,190,702	755,282,074
896	2027	Tyler	423	Smith	8,210,910	2,830,852,291
897	2027	Tyler	459	Upshur	1,575,625	543,223,839
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Region					20,548,512	7,084,452,270

------------------------------ Yr=2027 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
898	2027	Valley	215	Hidalgo	21,794,335	7,656,172,369

----------------------------- Yr=2027 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
899	2027	Victoria	469	Victoria	3,318,564	1,185,915,419

-------------------------------- Yr=2027 Region=Waco --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
900	2027	Waco	309	McLennan	9,121,996	3,231,120,195
Yr					709,300,024	241,572,496,575

------------------------------- Yr=2028 Region=Austin -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
901	2028	Austin	21	Bastrop	3,788,451	1,308,950,637
902	2028	Austin	55	Caldwell	1,614,811	557,934,416
903	2028	Austin	209	Hays	7,689,330	2,656,746,020
904	2028	Austin	453	Travis	37,479,923	12,949,716,140
905	2028	Austin	491	Williamson	16,409,481	5,669,651,960
Region					66,981,995	23,142,999,173

-------------------------------- Yr=2028 Region=BPA ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
906	2028	BPA	199	Hardin	2,159,005	713,776,442
907	2028	BPA	245	Jefferson	9,071,194	2,998,976,450
908	2028	BPA	361	Orange	3,740,902	1,236,758,415
Region					14,971,101	4,949,511,307

------------------------------- Yr=2028 Region=Corpus -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
909	2028	Corpus	355	Nueces	13,569,189	4,503,200,452
910	2028	Corpus	409	San Patricio	3,495,472	1,160,040,721
Region					17,064,661	5,663,241,173

-------------------------------- Yr=2028 Region=DFW ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
911	2028	DFW	85	Collin	29,795,609	9,853,605,246
912	2028	DFW	113	Dallas	99,809,083	33,007,524,583
913	2028	DFW	121	Denton	22,352,217	7,392,026,178
914	2028	DFW	139	Ellis	8,170,911	2,702,174,402
915	2028	DFW	221	Hood	1,894,593	626,554,355
916	2028	DFW	231	Hunt	4,449,770	1,471,568,246
917	2028	DFW	251	Johnson	6,303,497	2,084,608,343
918	2028	DFW	257	Kaufman	6,433,291	2,127,531,768
919	2028	DFW	367	Parker	5,668,709	1,874,679,575
920	2028	DFW	397	Rockwall	3,130,071	1,035,135,089
921	2028	DFW	439	Tarrant	65,900,112	21,793,603,310
922	2028	DFW	497	Wise	4,520,493	1,494,956,899
Region					258,428,355	85,463,967,995

-------------------------------- Yr=2028 Region=ELP ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
923	2028	ELP	141	El Paso	20,740,412	7,235,857,641

------------------------------ Yr=2028 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
924	2028	Houston	39	Brazoria	8,149,509	2,848,410,455
925	2028	Houston	71	Chambers	3,648,368	1,275,174,910
926	2028	Houston	157	Fort Bend	14,174,529	4,954,271,113
927	2028	Houston	167	Galveston	6,870,429	2,401,347,257
928	2028	Houston	201	Harris	145,589,586	50,886,367,674
929	2028	Houston	291	Liberty	3,298,112	1,152,753,590
930	2028	Houston	339	Montgomery	17,316,860	6,052,576,617
931	2028	Houston	473	Waller	3,270,431	1,143,078,745
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Region					202,317,823	70,713,980,361

------------------------------- Yr=2028 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
932	2028	LRGV	61	Cameron	11,611,623	3,935,387,348

------------------------------- Yr=2028 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
933	2028	Laredo	479	Webb	6,786,028	2,438,586,371

-------------------------------- Yr=2028 Region=SA ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
934	2028	SA	29	Bexar	52,813,455	17,924,156,041
935	2028	SA	91	Comal	6,149,538	2,087,068,285
936	2028	SA	187	Guadalupe	4,969,911	1,686,719,164
937	2028	SA	493	Wilson	1,565,649	531,359,674
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Region					65,498,554	22,229,303,164

------------------------------- Yr=2028 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
938	2028	Tyler	183	Gregg	4,529,497	1,561,621,908
939	2028	Tyler	203	Harrison	4,122,314	1,421,238,597
940	2028	Tyler	401	Rusk	2,206,503	760,729,741
941	2028	Tyler	423	Smith	8,302,731	2,862,509,138
942	2028	Tyler	459	Upshur	1,594,176	549,619,599
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Region					20,755,222	7,155,718,982

------------------------------- Yr=2028 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
943	2028	Valley	215	Hidalgo	22,251,332	7,816,711,863

------------------------------ Yr=2028 Region=Victoria ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
944	2028	Victoria	469	Victoria	3,351,358	1,197,634,679

------------------------------- Yr=2028 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
945	2028	Waco	309	McLennan	9,219,385	3,265,616,567
Yr					719,977,849	245,208,516,622

------------------------------ Yr=2029 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
946	2029	Austin	21	Bastrop	3,874,107	1,338,545,505
947	2029	Austin	55	Caldwell	1,644,535	568,204,430
948	2029	Austin	209	Hays	7,852,298	2,713,053,410
949	2029	Austin	453	Travis	38,015,863	13,134,889,279
950	2029	Austin	491	Williamson	16,790,865	5,801,424,440
Region					68,177,668	23,556,117,064

------------------------------- Yr=2029 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
951	2029	BPA	199	Hardin	2,178,778	720,313,488
952	2029	BPA	245	Jefferson	9,122,931	3,016,080,813
953	2029	BPA	361	Orange	3,765,500	1,244,890,818
Region					15,067,209	4,981,285,119

------------------------------ Yr=2029 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
954	2029	Corpus	355	Nueces	13,714,639	4,551,470,775
955	2029	Corpus	409	San Patricio	3,553,691	1,179,361,844
Region					17,268,330	5,730,832,619

------------------------------- Yr=2029 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
956	2029	DFW	85	Collin	30,479,200	10,079,673,290
957	2029	DFW	113	Dallas	101,176,194	33,459,637,188
958	2029	DFW	121	Denton	22,841,580	7,553,861,579
959	2029	DFW	139	Ellis	8,314,778	2,749,752,196
960	2029	DFW	221	Hood	1,924,696	636,509,625
961	2029	DFW	231	Hunt	4,513,478	1,492,636,971
962	2029	DFW	251	Johnson	6,414,100	2,121,185,369
963	2029	DFW	257	Kaufman	6,566,288	2,171,514,825
964	2029	DFW	367	Parker	5,752,698	1,902,455,382
965	2029	DFW	397	Rockwall	3,195,742	1,056,852,925
966	2029	DFW	439	Tarrant	66,818,093	22,097,185,671
967	2029	DFW	497	Wise	4,598,625	1,520,795,643
Region					262,595,471	86,842,060,663

------------------------------- Yr=2029 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
968	2029	ELP	141	El Paso	20,986,434	7,321,689,209

------------------------------ Yr=2029 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
969	2029	Houston	39	Brazoria	8,249,748	2,883,446,077
970	2029	Houston	71	Chambers	3,702,825	1,294,208,857
971	2029	Houston	157	Fort Bend	14,431,391	5,044,049,464
972	2029	Houston	167	Galveston	6,909,745	2,415,089,118
973	2029	Houston	201	Harris	147,602,498	51,589,919,250
974	2029	Houston	291	Liberty	3,348,153	1,170,244,177
975	2029	Houston	339	Montgomery	17,685,109	6,181,286,508
976	2029	Houston	473	Waller	3,337,242	1,166,430,392
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Region					205,266,712	71,744,673,843

------------------------------- Yr=2029 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
977	2029	LRGV	61	Cameron	11,805,046	4,000,941,802

------------------------------- Yr=2029 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
978	2029	Laredo	479	Webb	6,930,938	2,490,660,634

-------------------------------- Yr=2029 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
979	2029	SA	29	Bexar	53,316,129	18,094,756,463
980	2029	SA	91	Comal	6,259,864	2,124,511,129
981	2029	SA	187	Guadalupe	5,047,022	1,712,889,544
982	2029	SA	493	Wilson	1,592,908	540,610,901
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Region					66,215,923	22,472,768,036

------------------------------- Yr=2029 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
983	2029	Tyler	183	Gregg	4,561,358	1,572,606,314
984	2029	Tyler	203	Harrison	4,171,542	1,438,210,714
985	2029	Tyler	401	Rusk	2,222,624	766,287,835
986	2029	Tyler	423	Smith	8,395,009	2,894,323,476
987	2029	Tyler	459	Upshur	1,612,586	555,966,571
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Region					20,963,118	7,227,394,910

------------------------------ Yr=2029 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
988	2029	Valley	215	Hidalgo	22,708,644	7,977,361,742

------------------------------ Yr=2029 Region=Victoria ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
989	2029	Victoria	469	Victoria	3,384,066	1,209,323,143

------------------------------- Yr=2029 Region=Waco -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
990	2029	Waco	309	McLennan	9,316,583	3,300,045,406
Yr					730,686,142	248,855,154,190

------------------------------ Yr=2030 Region=Austin ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
991	2030	Austin	21	Bastrop	3,960,668	1,368,453,416
992	2030	Austin	55	Caldwell	1,673,949	578,367,355
993	2030	Austin	209	Hays	8,015,670	2,769,500,023
994	2030	Austin	453	Travis	38,553,857	13,320,772,032
995	2030	Austin	491	Williamson	17,174,656	5,934,028,249
Region					69,378,800	23,971,121,073

------------------------------- Yr=2030 Region=BPA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
996	2030	BPA	199	Hardin	2,198,387	726,796,453
997	2030	BPA	245	Jefferson	9,172,804	3,032,569,086
998	2030	BPA	361	Orange	3,789,370	1,252,782,291
Region					15,160,562	5,012,147,831

------------------------------ Yr=2030 Region=Corpus ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
999	2030	Corpus	355	Nueces	13,860,043	4,599,726,022
1000	2030	Corpus	409	San Patricio	3,611,777	1,198,638,899
Region					17,471,820	5,798,364,921

------------------------------- Yr=2030 Region=DFW --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
1001	2030	DFW	85	Collin	31,166,607	10,307,003,307
1002	2030	DFW	113	Dallas	102,558,451	33,916,758,652
1003	2030	DFW	121	Denton	23,334,262	7,716,794,967
1004	2030	DFW	139	Ellis	8,458,993	2,797,445,105
1005	2030	DFW	221	Hood	1,954,799	646,464,892
1006	2030	DFW	231	Hunt	4,577,598	1,513,842,039
1007	2030	DFW	251	Johnson	6,525,057	2,157,879,431
1008	2030	DFW	257	Kaufman	6,700,507	2,215,902,116
1009	2030	DFW	367	Parker	5,836,320	1,930,109,608
1010	2030	DFW	397	Rockwall	3,261,503	1,078,600,515
1011	2030	DFW	439	Tarrant	67,739,831	22,402,010,590
1012	2030	DFW	497	Wise	4,676,679	1,546,608,713
Region					266,790,607	88,229,419,936

------------------------------- Yr=2030 Region=ELP --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
1013	2030	ELP	141	El Paso	21,234,305	7,408,165,779

------------------------------ Yr=2030 Region=Houston ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
1014	2030	Houston	39	Brazoria	8,349,889	2,918,447,091
1015	2030	Houston	71	Chambers	3,757,283	1,313,242,802
1016	2030	Houston	157	Fort Bend	14,685,650	5,132,917,865
1017	2030	Houston	167	Galveston	6,949,095	2,428,842,701
1018	2030	Houston	201	Harris	149,608,698	52,291,124,579
1019	2030	Houston	291	Liberty	3,398,540	1,187,855,128
1020	2030	Houston	339	Montgomery	18,053,145	6,309,922,296
1021	2030	Houston	473	Waller	3,404,707	1,190,010,646
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Region					208,207,006	72,772,363,107

------------------------------- Yr=2030 Region=LRGV -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
1022	2030	LRGV	61	Cameron	12,001,452	4,067,507,252

------------------------------- Yr=2030 Region=Laredo ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
1023	2030	Laredo	479	Webb	7,076,809	2,543,079,806

-------------------------------- Yr=2030 Region=SA --------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
1024	2030	SA	29	Bexar	53,809,174	18,262,089,380
1025	2030	SA	91	Comal	6,369,558	2,161,739,866
1026	2030	SA	187	Guadalupe	5,123,693	1,738,910,496
1027	2030	SA	493	Wilson	1,620,036	549,817,883
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Region					66,922,462	22,712,557,625

------------------------------- Yr=2030 Region=Tyler -------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
1028	2030	Tyler	183	Gregg	4,593,838	1,583,804,602
1029	2030	Tyler	203	Harrison	4,220,747	1,455,174,875
1030	2030	Tyler	401	Rusk	2,238,030	771,599,097
1031	2030	Tyler	423	Smith	8,486,373	2,925,822,834
1032	2030	Tyler	459	Upshur	1,630,932	562,291,855
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Region					21,169,920	7,298,693,264

------------------------------ Yr=2030 Region=Valley ------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
1033	2030	Valley	215	Hidalgo	23,169,612	8,139,296,118

----------------------------- Yr=2030 Region=Victoria -----------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
1034	2030	Victoria	469	Victoria	3,416,731	1,220,996,212

--------------------------------- Yr=2030 Region=Waco ---------------------------------

Obs	Yr	Region	Cty	County	Wk_VMT	Yr_VMT
1035	2030	Waco	309	McLennan	9,413,702	3,334,446,105
Yr					741,413,787	252,508,159,028
					14,394,348,807	4,902,368,908,648

APPENDIX B:
THROUGH HD SUMMER WEEKDAY EMISSIONS BY COUNTY, REGION AND YEAR

Pass-Through Diesel Category/SUT Definitions

Source Use Type Description	Source Use Type Abbreviation[1]
Single Unit Long-Haul Truck	SULH53D
Motor Home	MH54D
Combination Long-Haul Truck	CLH62D

[1] The SUT/fuel type labels are the SUT abbreviation, the MOVES numeric ID number, and fuel type designation, e.g., SULH53D, and MH54D are diesel-powered single unit long-haul trucks and diesel-powered motor homes.

Austin-Round Rock Area Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.594	3.130	10.519	1,751.220	0.055	0.023	0.547	822,920
2009	0.579	3.025	9.961	1,796.864	0.056	0.024	0.518	844,122
2010	0.582	3.017	9.531	1,842.351	0.015	0.025	0.504	865,307
2011	0.519	2.777	8.701	1,888.301	0.015	0.025	0.436	886,556
2012	0.462	2.531	7.809	1,934.606	0.015	0.026	0.378	907,993
2013	0.420	2.310	6.765	1,980.899	0.015	0.027	0.335	929,466
2014	0.385	2.117	5.993	2,027.253	0.015	0.027	0.303	950,992
2015	0.356	1.969	5.395	2,073.839	0.015	0.028	0.277	972,817
2016	0.323	1.827	4.907	2,120.407	0.015	0.028	0.245	994,485
2017	0.286	1.674	4.443	2,167.262	0.016	0.029	0.207	1,016,293
2018	0.252	1.526	3.993	2,214.240	0.016	0.030	0.170	1,038,167
2019	0.229	1.430	3.639	2,261.471	0.016	0.030	0.147	1,060,166
2020	0.211	1.353	3.307	2,308.891	0.016	0.031	0.131	1,082,261
2021	0.197	1.300	3.065	2,356.546	0.016	0.032	0.117	1,104,483
2022	0.181	1.239	2.840	2,404.520	0.017	0.032	0.101	1,126,850
2023	0.172	1.202	2.684	2,452.693	0.017	0.033	0.090	1,149,313
2024	0.165	1.178	2.565	2,501.200	0.017	0.034	0.082	1,171,936
2025	0.160	1.164	2.465	2,549.816	0.018	0.035	0.077	1,194,607
2026	0.156	1.155	2.400	2,598.835	0.018	0.036	0.071	1,217,471
2027	0.153	1.150	2.350	2,647.844	0.018	0.037	0.066	1,240,328
2028	0.151	1.149	2.314	2,697.202	0.019	0.038	0.062	1,263,349
2029	0.149	1.153	2.283	2,746.595	0.019	0.039	0.060	1,286,387
2030	0.149	1.162	2.284	2,796.210	0.019	0.039	0.058	1,309,528

Beaumont-Port Arthur Area Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.741	3.212	10.565	1,691.383	0.053	0.021	0.553	727,764
2009	0.708	3.072	9.872	1,705.563	0.053	0.021	0.515	733,655
2010	0.692	3.010	9.318	1,718.571	0.014	0.021	0.492	739,490
2011	0.615	2.754	8.427	1,732.682	0.013	0.021	0.420	745,362
2012	0.549	2.499	7.525	1,746.666	0.013	0.022	0.359	751,211
2013	0.500	2.272	6.500	1,760.382	0.013	0.022	0.314	756,981
2014	0.461	2.076	5.747	1,774.074	0.013	0.022	0.280	762,766
2015	0.428	1.923	5.165	1,787.235	0.013	0.022	0.253	768,246
2016	0.390	1.781	4.692	1,800.964	0.013	0.022	0.221	774,080
2017	0.349	1.634	4.248	1,814.422	0.013	0.022	0.184	779,802
2018	0.313	1.494	3.827	1,827.750	0.013	0.022	0.149	785,474
2019	0.287	1.399	3.496	1,840.956	0.013	0.023	0.127	791,108
2020	0.268	1.324	3.193	1,854.059	0.013	0.023	0.112	796,705
2021	0.252	1.269	2.969	1,866.925	0.013	0.023	0.098	802,215
2022	0.235	1.208	2.763	1,879.985	0.013	0.024	0.083	807,800
2023	0.225	1.168	2.616	1,892.548	0.013	0.024	0.074	813,179
2024	0.217	1.139	2.501	1,905.472	0.013	0.025	0.066	818,720
2025	0.211	1.118	2.405	1,918.158	0.013	0.026	0.061	824,153
2026	0.206	1.101	2.336	1,930.716	0.013	0.026	0.056	829,540
2027	0.202	1.088	2.280	1,943.160	0.013	0.027	0.052	834,877
2028	0.199	1.078	2.236	1,955.567	0.013	0.027	0.048	840,201
2029	0.197	1.073	2.197	1,967.982	0.014	0.027	0.046	845,534
2030	0.196	1.071	2.181	1,980.034	0.014	0.028	0.044	850,709

Corpus Christi Area Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.314	1.453	4.510	765.866	0.024	0.010	0.265	350,833
2009	0.304	1.403	4.254	780.206	0.024	0.010	0.249	357,293
2010	0.303	1.395	4.053	794.746	0.006	0.010	0.241	363,878
2011	0.269	1.279	3.690	809.451	0.006	0.010	0.207	370,479
2012	0.240	1.163	3.305	823.977	0.006	0.010	0.179	377,009
2013	0.219	1.061	2.869	838.477	0.006	0.011	0.158	383,549
2014	0.202	0.972	2.548	852.920	0.006	0.011	0.142	390,072
2015	0.187	0.903	2.299	867.421	0.006	0.011	0.129	396,667
2016	0.170	0.837	2.095	881.693	0.006	0.011	0.114	403,133
2017	0.152	0.767	1.903	895.927	0.006	0.011	0.096	409,583
2018	0.135	0.700	1.719	910.113	0.006	0.012	0.079	416,018
2019	0.124	0.656	1.575	924.180	0.007	0.012	0.068	422,402
2020	0.115	0.620	1.440	938.115	0.007	0.012	0.061	428,730
2021	0.108	0.594	1.340	952.035	0.007	0.012	0.054	435,060
2022	0.100	0.565	1.249	965.788	0.007	0.012	0.047	441,308
2023	0.095	0.547	1.184	979.600	0.007	0.013	0.042	447,586
2024	0.092	0.535	1.134	993.319	0.007	0.013	0.038	453,822
2025	0.089	0.526	1.092	1,006.927	0.007	0.013	0.035	460,009
2026	0.087	0.520	1.064	1,020.570	0.007	0.014	0.033	466,212
2027	0.085	0.515	1.041	1,034.091	0.007	0.014	0.031	472,362
2028	0.084	0.512	1.024	1,047.626	0.007	0.014	0.029	478,519
2029	0.083	0.511	1.009	1,061.063	0.007	0.015	0.028	484,631
2030	0.082	0.512	1.005	1,074.484	0.007	0.015	0.027	490,736

Dallas-Fort Worth Area Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	5.558	25.718	87.445	13,493.299	0.425	0.166	4.601	5,857,883
2009	5.364	24.800	82.677	13,784.562	0.429	0.170	4.338	5,984,551
2010	5.327	24.580	79.012	14,074.831	0.111	0.173	4.207	6,112,156
2011	4.775	22.691	72.269	14,374.563	0.111	0.177	3.636	6,240,041
2012	4.294	20.761	65.202	14,676.000	0.111	0.180	3.153	6,368,912
2013	3.951	19.029	56.877	14,977.543	0.111	0.184	2.793	6,498,067
2014	3.670	17.522	50.783	15,280.573	0.113	0.188	2.521	6,628,037
2015	3.433	16.359	46.082	15,584.005	0.114	0.191	2.308	6,758,377
2016	3.151	15.256	42.239	15,888.991	0.115	0.195	2.039	6,889,550
2017	2.828	14.071	38.574	16,195.275	0.116	0.199	1.713	7,021,245
2018	2.546	12.929	35.046	16,503.038	0.117	0.203	1.412	7,153,633
2019	2.348	12.182	32.273	16,812.026	0.119	0.206	1.220	7,286,614
2020	2.204	11.599	29.702	17,122.531	0.120	0.210	1.082	7,420,317
2021	2.086	11.191	27.830	17,434.945	0.122	0.215	0.966	7,555,006
2022	1.952	10.720	26.092	17,749.197	0.124	0.221	0.830	7,690,410
2023	1.877	10.440	24.916	18,065.797	0.125	0.228	0.745	7,826,932
2024	1.819	10.259	24.016	18,383.375	0.127	0.237	0.676	7,963,855
2025	1.787	10.158	23.280	18,703.604	0.129	0.245	0.632	8,101,954
2026	1.755	10.085	22.815	19,024.517	0.131	0.253	0.586	8,240,409
2027	1.733	10.051	22.459	19,346.533	0.133	0.259	0.548	8,379,315
2028	1.721	10.052	22.222	19,670.911	0.135	0.265	0.513	8,519,302
2029	1.717	10.090	22.033	19,995.932	0.137	0.270	0.496	8,659,592
2030	1.720	10.167	22.077	20,322.907	0.139	0.277	0.484	8,800,719

El Paso Area Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.751	2.596	9.563	1,144.321	0.036	0.013	0.399	469,438
2009	0.724	2.525	9.094	1,163.222	0.036	0.014	0.375	477,163
2010	0.716	2.517	8.741	1,182.629	0.009	0.014	0.361	485,102
2011	0.648	2.365	8.085	1,201.840	0.009	0.014	0.311	492,937
2012	0.591	2.211	7.409	1,220.966	0.009	0.014	0.269	500,742
2013	0.552	2.073	6.627	1,240.123	0.009	0.014	0.237	508,582
2014	0.522	1.954	6.059	1,259.057	0.009	0.015	0.214	516,333
2015	0.496	1.865	5.625	1,278.205	0.009	0.015	0.195	524,180
2016	0.463	1.781	5.269	1,296.980	0.009	0.015	0.171	531,864
2017	0.426	1.692	4.930	1,315.746	0.009	0.015	0.144	539,554
2018	0.394	1.606	4.609	1,334.700	0.010	0.015	0.118	547,316
2019	0.372	1.552	4.361	1,353.148	0.010	0.016	0.102	554,877
2020	0.357	1.511	4.134	1,371.602	0.010	0.016	0.090	562,440
2021	0.343	1.483	3.973	1,389.804	0.010	0.016	0.080	569,915
2022	0.329	1.452	3.824	1,408.207	0.010	0.017	0.069	577,454
2023	0.321	1.435	3.726	1,426.438	0.010	0.018	0.062	584,932
2024	0.315	1.425	3.654	1,444.696	0.010	0.019	0.056	592,416
2025	0.312	1.422	3.598	1,462.780	0.010	0.020	0.052	599,828
2026	0.309	1.421	3.565	1,481.051	0.010	0.021	0.048	607,321
2027	0.307	1.423	3.543	1,499.126	0.010	0.022	0.045	614,730
2028	0.307	1.428	3.532	1,517.402	0.010	0.022	0.042	622,225
2029	0.307	1.435	3.525	1,535.393	0.011	0.023	0.040	629,606
2030	0.308	1.446	3.539	1,553.529	0.011	0.024	0.039	637,043

Houston-Galveston-Brazoria Area Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	3.364	13.379	39.500	6,312.779	0.199	0.078	2.203	2,821,033
2009	3.261	13.026	37.498	6,438.599	0.200	0.080	2.075	2,876,756
2010	3.241	12.981	35.916	6,563.670	0.052	0.081	2.008	2,932,703
2011	2.916	12.093	32.999	6,691.232	0.051	0.083	1.731	2,988,820
2012	2.638	11.196	29.900	6,819.003	0.051	0.084	1.496	3,045,088
2013	2.446	10.413	26.395	6,947.393	0.052	0.086	1.323	3,101,787
2014	2.292	9.735	23.826	7,075.647	0.052	0.087	1.192	3,158,480
2015	2.163	9.218	21.847	7,204.263	0.053	0.089	1.089	3,215,592
2016	2.007	8.731	20.237	7,333.167	0.053	0.091	0.962	3,272,651
2017	1.829	8.212	18.711	7,462.293	0.054	0.092	0.810	3,329,846
2018	1.675	7.714	17.259	7,591.598	0.054	0.094	0.670	3,387,124
2019	1.569	7.402	16.128	7,721.193	0.054	0.095	0.582	3,444,569
2020	1.492	7.157	15.080	7,851.114	0.055	0.097	0.517	3,502,171
2021	1.428	6.997	14.330	7,981.674	0.056	0.099	0.463	3,560,126
2022	1.359	6.812	13.640	8,113.001	0.056	0.103	0.400	3,618,361
2023	1.321	6.711	13.177	8,244.482	0.057	0.107	0.360	3,676,720
2024	1.293	6.657	12.835	8,376.739	0.058	0.113	0.328	3,735,397
2025	1.278	6.639	12.560	8,508.784	0.059	0.118	0.308	3,793,975
2026	1.265	6.634	12.397	8,641.240	0.060	0.122	0.286	3,852,777
2027	1.256	6.645	12.282	8,774.521	0.060	0.125	0.269	3,911,925
2028	1.251	6.668	12.213	8,906.789	0.061	0.129	0.252	3,970,644
2029	1.252	6.709	12.168	9,040.319	0.062	0.132	0.244	4,029,951
2030	1.256	6.765	12.214	9,173.574	0.063	0.135	0.238	4,089,118

Laredo Area Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.469	1.768	5.536	821.156	0.026	0.009	0.321	320,983
2009	0.460	1.733	5.315	845.669	0.026	0.009	0.306	330,528
2010	0.462	1.743	5.150	870.082	0.007	0.009	0.299	340,089
2011	0.420	1.640	4.785	894.612	0.007	0.009	0.261	349,611
2012	0.383	1.528	4.388	919.108	0.007	0.010	0.228	359,373
2013	0.361	1.432	3.923	944.138	0.007	0.010	0.204	369,121
2014	0.344	1.349	3.589	969.343	0.007	0.010	0.186	378,945
2015	0.329	1.286	3.334	994.721	0.007	0.010	0.171	388,846
2016	0.306	1.221	3.114	1,019.534	0.007	0.011	0.152	398,770
2017	0.282	1.156	2.912	1,045.362	0.008	0.011	0.129	408,854
2018	0.262	1.092	2.717	1,071.066	0.008	0.011	0.108	418,891
2019	0.248	1.053	2.567	1,097.087	0.008	0.012	0.094	429,056
2020	0.238	1.024	2.427	1,123.258	0.008	0.012	0.085	439,285
2021	0.230	1.007	2.329	1,149.375	0.008	0.012	0.076	449,500
2022	0.221	0.985	2.239	1,175.948	0.008	0.013	0.066	459,885
2023	0.217	0.976	2.183	1,202.713	0.008	0.014	0.060	470,350
2024	0.214	0.973	2.145	1,229.707	0.009	0.015	0.055	480,902
2025	0.213	0.975	2.117	1,257.010	0.009	0.015	0.052	491,576
2026	0.213	0.980	2.106	1,284.715	0.009	0.016	0.049	502,409
2027	0.213	0.987	2.103	1,312.851	0.009	0.017	0.046	513,409
2028	0.214	0.997	2.107	1,341.244	0.009	0.017	0.044	524,513
2029	0.215	1.009	2.114	1,369.881	0.009	0.018	0.043	535,714
2030	0.218	1.024	2.137	1,398.712	0.010	0.019	0.042	546,989

Lower Rio Grande Valley Area Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.200	0.841	2.718	418.989	0.013	0.005	0.140	187,451
2009	0.194	0.818	2.582	429.075	0.013	0.005	0.133	191,928
2010	0.194	0.819	2.479	439.299	0.003	0.006	0.129	196,473
2011	0.175	0.762	2.278	449.622	0.003	0.006	0.112	201,038
2012	0.158	0.703	2.064	459.815	0.003	0.006	0.097	205,551
2013	0.147	0.651	1.814	470.086	0.003	0.006	0.086	210,110
2014	0.137	0.606	1.631	480.437	0.004	0.006	0.078	214,711
2015	0.129	0.571	1.490	490.648	0.004	0.006	0.071	219,261
2016	0.119	0.538	1.374	500.861	0.004	0.006	0.063	223,807
2017	0.108	0.502	1.264	511.078	0.004	0.006	0.053	228,359
2018	0.099	0.467	1.158	521.303	0.004	0.007	0.044	232,915
2019	0.092	0.445	1.075	531.530	0.004	0.007	0.038	237,476
2020	0.087	0.428	0.998	541.659	0.004	0.007	0.034	241,995
2021	0.083	0.416	0.943	551.926	0.004	0.007	0.030	246,580
2022	0.078	0.402	0.891	562.141	0.004	0.007	0.026	251,138
2023	0.076	0.395	0.857	572.384	0.004	0.008	0.023	255,712
2024	0.074	0.390	0.831	582.769	0.004	0.008	0.021	260,349
2025	0.073	0.388	0.810	593.190	0.004	0.008	0.020	265,002
2026	0.072	0.387	0.797	603.589	0.004	0.008	0.019	269,646
2027	0.072	0.387	0.788	614.079	0.004	0.009	0.017	274,331
2028	0.071	0.388	0.782	624.526	0.004	0.009	0.016	278,998
2029	0.071	0.391	0.778	634.927	0.004	0.009	0.016	283,645
2030	0.072	0.394	0.780	645.491	0.004	0.009	0.015	288,364

San Antonio Area Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	1.221	5.900	19.321	3,187.817	0.100	0.039	1.086	1,397,150
2009	1.178	5.662	18.168	3,240.761	0.101	0.040	1.019	1,420,067
2010	1.172	5.593	17.267	3,292.766	0.026	0.041	0.983	1,442,727
2011	1.041	5.123	15.678	3,345.936	0.026	0.041	0.845	1,465,648
2012	0.927	4.646	14.020	3,398.533	0.026	0.042	0.728	1,488,373
2013	0.844	4.221	12.121	3,451.138	0.026	0.042	0.641	1,511,171
2014	0.776	3.852	10.725	3,503.426	0.026	0.043	0.575	1,533,878
2015	0.719	3.565	9.641	3,554.604	0.026	0.044	0.524	1,556,224
2016	0.653	3.296	8.758	3,606.332	0.026	0.044	0.460	1,578,757
2017	0.580	3.013	7.922	3,657.917	0.026	0.045	0.385	1,601,237
2018	0.516	2.740	7.125	3,708.957	0.026	0.046	0.316	1,623,498
2019	0.470	2.560	6.496	3,759.895	0.027	0.046	0.272	1,645,728
2020	0.437	2.415	5.913	3,810.593	0.027	0.047	0.240	1,667,876
2021	0.409	2.311	5.483	3,860.652	0.027	0.048	0.213	1,689,766
2022	0.378	2.194	5.085	3,910.307	0.027	0.049	0.183	1,711,468
2023	0.360	2.119	4.807	3,960.122	0.027	0.050	0.163	1,733,250
2024	0.345	2.066	4.588	4,009.230	0.028	0.051	0.147	1,754,730
2025	0.336	2.031	4.405	4,058.222	0.028	0.053	0.137	1,776,159
2026	0.327	2.003	4.279	4,107.019	0.028	0.054	0.127	1,797,510
2027	0.320	1.982	4.176	4,155.018	0.029	0.055	0.118	1,818,509
2028	0.315	1.968	4.097	4,202.916	0.029	0.056	0.110	1,839,470
2029	0.311	1.962	4.029	4,250.457	0.029	0.057	0.106	1,860,279
2030	0.309	1.964	4.008	4,297.324	0.029	0.058	0.102	1,880,792

Northeast Texas Area Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.990	4.783	17.190	2,682.705	0.084	0.032	0.927	1,114,454
2009	0.953	4.572	16.114	2,719.046	0.085	0.032	0.866	1,129,099
2010	0.944	4.495	15.276	2,754.372	0.022	0.032	0.834	1,143,729
2011	0.838	4.097	13.833	2,790.390	0.021	0.033	0.715	1,158,466
2012	0.745	3.695	12.360	2,826.227	0.021	0.033	0.615	1,173,165
2013	0.678	3.332	10.652	2,861.846	0.021	0.034	0.540	1,187,845
2014	0.623	3.017	9.402	2,897.339	0.021	0.034	0.484	1,202,503
2015	0.576	2.771	8.433	2,932.326	0.021	0.034	0.440	1,216,823
2016	0.522	2.543	7.642	2,967.649	0.022	0.035	0.385	1,231,459
2017	0.462	2.303	6.894	3,002.885	0.022	0.035	0.321	1,246,076
2018	0.409	2.073	6.181	3,037.850	0.022	0.036	0.262	1,260,589
2019	0.372	1.917	5.617	3,072.607	0.022	0.036	0.225	1,275,028
2020	0.344	1.793	5.098	3,107.040	0.022	0.036	0.198	1,289,347
2021	0.321	1.702	4.713	3,141.691	0.022	0.037	0.175	1,303,779
2022	0.296	1.601	4.358	3,176.301	0.022	0.038	0.149	1,318,178
2023	0.281	1.535	4.109	3,210.808	0.022	0.039	0.132	1,332,547
2024	0.269	1.487	3.913	3,245.516	0.022	0.040	0.119	1,346,997
2025	0.261	1.453	3.749	3,280.330	0.023	0.041	0.111	1,361,487
2026	0.253	1.425	3.634	3,314.888	0.023	0.042	0.102	1,375,876
2027	0.247	1.404	3.541	3,349.618	0.023	0.042	0.094	1,390,335
2028	0.243	1.390	3.468	3,384.300	0.023	0.043	0.088	1,404,771
2029	0.240	1.382	3.407	3,419.132	0.023	0.044	0.084	1,419,282
2030	0.239	1.381	3.386	3,453.831	0.024	0.044	0.082	1,433,730

McAllen-Edinburg-Mission Area Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.494	2.093	6.401	999.659	0.031	0.011	0.394	397,757
2009	0.485	2.047	6.134	1,030.337	0.032	0.011	0.375	409,876
2010	0.489	2.057	5.934	1,060.830	0.008	0.011	0.368	421,964
2011	0.443	1.925	5.491	1,091.686	0.008	0.012	0.321	434,124
2012	0.404	1.788	5.020	1,122.895	0.008	0.012	0.281	446,438
2013	0.379	1.664	4.453	1,154.030	0.009	0.012	0.251	458,747
2014	0.359	1.557	4.045	1,185.674	0.009	0.013	0.229	471,269
2015	0.341	1.475	3.730	1,217.200	0.009	0.013	0.211	483,758
2016	0.318	1.397	3.472	1,249.023	0.009	0.013	0.188	496,368
2017	0.291	1.310	3.220	1,280.788	0.009	0.014	0.160	508,961
2018	0.267	1.226	2.979	1,312.860	0.009	0.014	0.134	521,678
2019	0.250	1.173	2.790	1,345.018	0.009	0.014	0.117	534,435
2020	0.239	1.133	2.614	1,377.281	0.010	0.015	0.105	547,240
2021	0.229	1.108	2.488	1,409.516	0.010	0.015	0.094	560,045
2022	0.218	1.076	2.370	1,442.029	0.010	0.016	0.082	572,951
2023	0.213	1.060	2.296	1,474.692	0.010	0.017	0.075	585,923
2024	0.209	1.052	2.241	1,507.462	0.010	0.018	0.069	598,939
2025	0.207	1.051	2.199	1,540.881	0.011	0.019	0.065	612,209
2026	0.205	1.052	2.177	1,574.071	0.011	0.019	0.061	625,394
2027	0.205	1.057	2.164	1,607.723	0.011	0.020	0.058	638,760
2028	0.205	1.064	2.159	1,641.437	0.011	0.021	0.055	652,154
2029	0.206	1.075	2.158	1,675.167	0.011	0.021	0.053	665,557
2030	0.208	1.089	2.176	1,709.172	0.012	0.022	0.052	679,067

Victoria Area Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.272	1.284	4.071	673.618	0.021	0.008	0.258	275,668
2009	0.262	1.230	3.824	683.081	0.021	0.008	0.242	279,459
2010	0.261	1.212	3.633	692.606	0.005	0.008	0.233	283,328
2011	0.232	1.107	3.296	702.100	0.005	0.008	0.200	287,137
2012	0.207	1.000	2.953	711.489	0.005	0.008	0.173	290,912
2013	0.189	0.905	2.554	720.933	0.005	0.008	0.152	294,725
2014	0.175	0.823	2.264	730.286	0.005	0.008	0.137	298,511
2015	0.163	0.759	2.040	739.867	0.005	0.008	0.124	302,354
2016	0.148	0.698	1.856	749.185	0.005	0.008	0.109	306,138
2017	0.132	0.634	1.680	758.309	0.005	0.009	0.091	309,847
2018	0.118	0.573	1.514	767.576	0.005	0.009	0.075	313,617
2019	0.107	0.532	1.382	776.569	0.005	0.009	0.065	317,278
2020	0.100	0.499	1.260	785.519	0.006	0.009	0.057	320,925
2021	0.094	0.475	1.169	794.267	0.006	0.009	0.051	324,495
2022	0.087	0.448	1.086	802.993	0.006	0.009	0.043	328,053
2023	0.082	0.430	1.028	811.715	0.006	0.009	0.039	331,613
2024	0.079	0.418	0.982	820.342	0.006	0.010	0.035	335,134
2025	0.077	0.409	0.943	828.907	0.006	0.010	0.033	338,629
2026	0.075	0.402	0.916	837.371	0.006	0.010	0.030	342,086
2027	0.073	0.396	0.895	845.853	0.006	0.010	0.028	345,550
2028	0.072	0.393	0.878	854.218	0.006	0.011	0.026	348,965
2029	0.072	0.391	0.864	862.551	0.006	0.011	0.025	352,371
2030	0.071	0.390	0.859	870.877	0.006	0.011	0.024	355,772

Waco Area Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	0.410	1.558	5.012	771.156	0.024	0.009	0.243	324,591
2009	0.394	1.503	4.728	782.255	0.024	0.010	0.227	329,215
2010	0.388	1.488	4.511	793.319	0.006	0.010	0.219	333,851
2011	0.350	1.385	4.129	804.499	0.006	0.010	0.188	338,494
2012	0.317	1.281	3.737	815.578	0.006	0.010	0.161	343,101
2013	0.293	1.187	3.282	826.572	0.006	0.010	0.142	347,692
2014	0.274	1.105	2.949	837.455	0.006	0.010	0.127	352,241
2015	0.258	1.043	2.693	848.319	0.006	0.010	0.116	356,801
2016	0.239	0.986	2.485	859.125	0.006	0.010	0.101	361,326
2017	0.218	0.925	2.287	869.904	0.006	0.011	0.084	365,845
2018	0.200	0.866	2.098	880.540	0.006	0.011	0.069	370,304
2019	0.187	0.828	1.951	891.163	0.006	0.011	0.059	374,762
2020	0.177	0.799	1.816	901.690	0.006	0.011	0.052	379,182
2021	0.170	0.778	1.719	912.206	0.006	0.011	0.046	383,605
2022	0.161	0.755	1.628	922.708	0.006	0.012	0.039	388,015
2023	0.156	0.740	1.566	933.115	0.006	0.012	0.035	392,390
2024	0.153	0.731	1.518	943.517	0.007	0.013	0.031	396,762
2025	0.150	0.726	1.479	953.906	0.007	0.013	0.029	401,127
2026	0.148	0.722	1.453	964.289	0.007	0.014	0.027	405,491
2027	0.147	0.721	1.433	974.664	0.007	0.014	0.025	409,853
2028	0.146	0.721	1.420	985.071	0.007	0.014	0.023	414,228
2029	0.146	0.722	1.408	995.451	0.007	0.015	0.022	418,595
2030	0.146	0.726	1.408	1,005.828	0.007	0.015	0.021	422,959

Statewide Pass-Through Diesel Category Summer Weekday Emissions (Tons/Day) and VMT

Year	VOC	CO	NO_x	CO_2	SO_2	NH_3	$PM_{2.5}$	VMT
2008	29.706	135.217	459.220	71,102.849	2.238	0.852	24.959	30,256,842
2009	28.698	130.178	433.067	72,409.570	2.255	0.868	23.459	30,806,397
2010	28.453	128.777	412.644	73,691.051	0.582	0.883	22.682	31,357,213
2011	25.439	118.499	376.220	75,010.219	0.577	0.898	19.543	31,909,384
2012	22.837	108.060	338.482	76,329.023	0.576	0.914	16.894	32,462,459
2013	20.986	98.695	294.481	77,646.112	0.577	0.929	14.922	33,016,226
2014	19.472	90.560	262.287	78,961.372	0.581	0.945	13.430	33,570,018
2015	18.188	84.255	237.394	80,263.760	0.587	0.960	12.256	34,115,464
2016	16.669	78.318	217.045	81,574.592	0.592	0.976	10.796	34,668,794
2017	14.939	71.991	197.695	82,883.352	0.596	0.991	9.044	35,221,266
2018	13.435	65.918	179.198	84,190.318	0.599	1.007	7.439	35,773,188
2019	12.375	61.896	164.625	85,496.889	0.604	1.022	6.410	36,325,301
2020	11.602	58.738	151.161	86,799.242	0.609	1.038	5.670	36,875,881
2021	10.959	56.483	141.283	88,101.707	0.616	1.059	5.046	37,427,167
2022	10.246	53.926	132.140	89,406.156	0.622	1.086	4.326	37,978,845
2023	9.834	52.341	125.861	90,708.979	0.629	1.117	3.869	38,530,185
2024	9.513	51.266	120.990	92,011.677	0.636	1.163	3.503	39,081,381
2025	9.322	50.599	116.969	93,314.125	0.644	1.199	3.268	39,632,448
2026	9.138	50.079	114.305	94,616.694	0.652	1.232	3.022	40,183,786
2027	8.999	49.757	112.206	95,918.444	0.660	1.260	2.820	40,734,640
2028	8.916	49.610	110.691	97,218.592	0.668	1.285	2.633	41,284,949
2029	8.874	49.648	109.443	98,518.678	0.676	1.310	2.537	41,835,417
2030	8.870	49.875	109.331	99,818.450	0.685	1.337	2.469	42,385,635

APPENDIX C:
QUALITY ASSURANCE

QUALITY ASSURANCE

Development of detailed, time-of-day, on-road mobile source emissions estimates/inventories is a multi-staged process that involves many data sets and data processing steps. In the interest of product quality and process efficiency, thorough quality assurance checks were performed during emissions estimation/inventory development. The checks were performed on each major inventory input component (i.e., estimates of source activity, activity distributions, and emissions factors) as well as on the resulting emissions estimates. These QA guidelines were used to assure the development of emissions estimation/inventory estimates that are as accurate as possible.

Verified that the overall scope of the emissions analysis has been met as prescribed in the inventory preparation plan, including:

- Purpose of the emissions analysis (e.g., photochemical modeling, reasonable further progress, transportation conformity, model comparison);
- Extent of the modeling domain (e.g., analysis years, geographic coverage, seasonal periods, days, sources, pollutants);
- Methods, models, and data used (e.g., list of default and local input data, with sources and dates); and
- Particular procedures and tools used and required emissions output data sets.

Performed checks on input data preparation, model or utility execution instructions (e.g., run specifications, scripts, JCFs, command files), and output, to varying degrees, depending on the particular inventory component:

- Input data preparation checks:
  - Verified the basis of input data sets against the plan: Actual historical or latest available data, validated model, expected values or regulated limits, regulatory program design, model defaults, surrogates, professional judgment; checked aggregation levels.
  - Data development: Depending on the procedure and particular input data set, calculations were verified (e.g., recalculated independently and compared with originally prepared values – if spot-checking a series of results, included extremes and intermediate values).
  - Completeness: Verified that input data sets are within the required dimensions, and all required fields are populated and properly coded or labeled.
  - Format: Verified that formats are within required specifications (e.g., field positions, data types and formats, and file formats), if any, for the particular application, per applicable utility or model user guide.
  - Reasonability checks: Discussed later.

- Ensured that any inputs provided from external sources are quality assured.

- Checked the model and utility execution instructions:
  - Verified the correct number of utility or model run specifications were prepared for each application (e.g., by year, county, season, day type).
  - Verified that each utility or model run script included the correct modeling specifications (e.g., commands, input values, input and output file paths, output options) for the application.

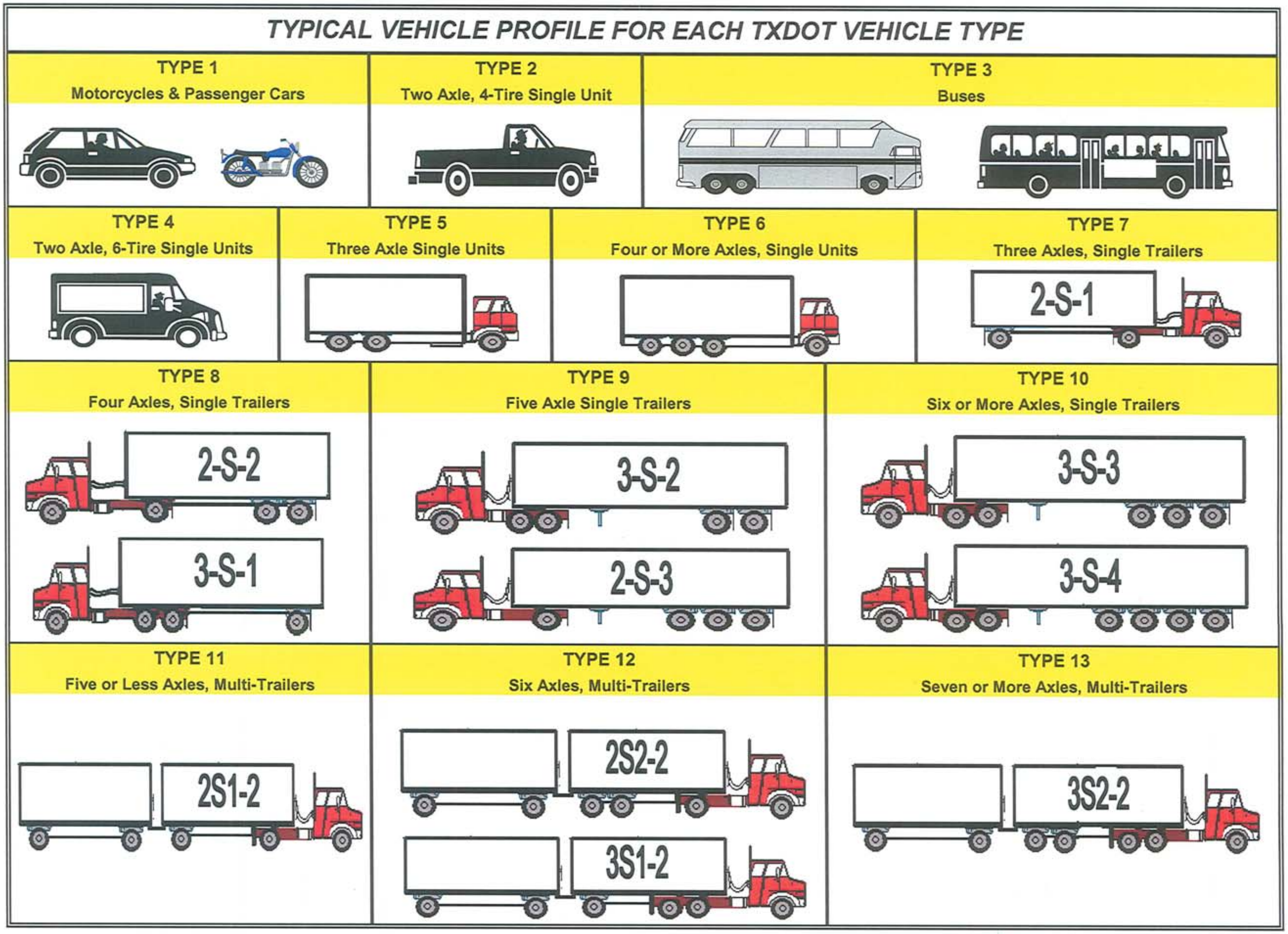
- Checked for the successful completion of model and utility executions:
  - Verified that the correct number of each type of output file was produced.
  - Checked for any unusual output file sizes.
  - Searched output (e.g., utility listing files or model execution logs that contain error and warning records) for warnings/errors.
  - Checked the summary information provided in output listing files for any unusual results.
- Performed further checks for consistency, completeness, and reasonability of data output from the model or utility applications:
  - Verified that the data distributions and allocation factors produced or used sum to 1.0, as appropriate (e.g., hourly travel factors within a given time period, proportion of travel by vehicle categories on a given roadway category).
  - Verified that the required data fields are present, populated, and properly coded or labeled; verified that data and file formats are within specifications.
  - Verified that any activity, emissions rate, or emissions adjustments were performed as intended (e.g., seasonal activity factor, emissions control program adjustment).
  - For data sets prepared with temporal or geographic variation (e.g., activity distributions between weekends/weekdays, vehicle mix or average speeds between road types or time periods), compared and noted whether directional differences are as expected.
  - Checked for consistency between data sets (e.g., compared detailed spatially and temporally disaggregated activity estimates [e.g., virtual link VMT] to original aggregate totals, activity total summaries between utility applications [e.g., link-VMT producer and emissions calculator], input hourly distributions versus hourly summaries from the activity output data).
  - Calculated county, 24-hour, aggregate emissions rates (from aggregate VMT and emissions output) and compared the rates between counties examining the results for outliers while assessing the reasonability of any relative and directional differences (e.g., qualify based on activity distributions by road type and speed, mix of vehicles by road type, meteorological variation, control program coverage). Compared the rates to results from previous emissions analyses if available.

   - Calculated the county, 24-hour aggregate rates by vehicle class and compared the results between vehicle classes. Examined the results for consistent patterns. Note any outliers or differences that may not fit the typical or expected patterns. Checked to verify whether any atypical results are legitimate.
   - Verified summed link emissions output against tabular emissions output summaries - differences were within rounding error.
- Any additional data products that were required in the emissions analysis plan were subjected to the appropriate QA checks previously listed.
- Any issues found needing resolution have been corrected and the pertinent QA checks have been performed until satisfied.
- QA cross checks have been performed by staff independent of the data developer.
- QA ensured that an archive was made including, in addition to the project data development files, run scripts, and input/output files and/or model databases, the executable utilities and/or models that were applied in the analysis.

APPENDIX D:
SUMMER WEEKDAY AND ANNUAL VMT LISTING BY YEAR AND COUNTY

This appendix is being transmitted electronically.

APPENDIX E:
FHWA VEHICLE CLASSIFICATIONS


TYPICAL VEHICLE PROFILE FOR EACH TXDOT VEHICLE TYPE
TYPE 1
Motorcycles & Passenger Cars
TYPE 2
Two Axle, 4-Tire Single Unit
TYPE 3
Buses
TYPE 4
Two Axle, 6-Tire Single Units
TYPE 5
Three Axle Single Units
TYPE 6
Four or More Axles, Single Units
TYPE 7
Three Axles, Single Trailers
2-S-1
TYPE 8
Four Axles, Single Trailers
2-S-2
3-S-1
TYPE 9
Five Axle Single Trailers
3-S-2
2-S-3
TYPE 10
Six or More Axles, Single Trailers
3-S-3
3-S-4
TYPE 11
Five or Less Axles, Multi-Trailers
2S1-2
TYPE 12
Six Axles, Multi-Trailers
2S2-2
3S1-2
TYPE 13
Seven or More Axles, Multi-Trailers
3S2-2