UTA

Environmental Improvement Project Results

Project #1: UTA Air Emission Reduction Project

Measurements:

1) Reduction of UTA's bus fleet NOx and particulate matter (PM) emission rate through the acquisition of 24 new CNG buses in 2013 to replace older existing buses manufactured in 1997 and previous years.

UTA has developed a 6 year plan, beginning in 2009, to acquire new buses as replacements for older buses that will reduce Particulate Matter (PM) and Nitrogen Oxides (NOx) emissions.

Particulate Matter (PM)

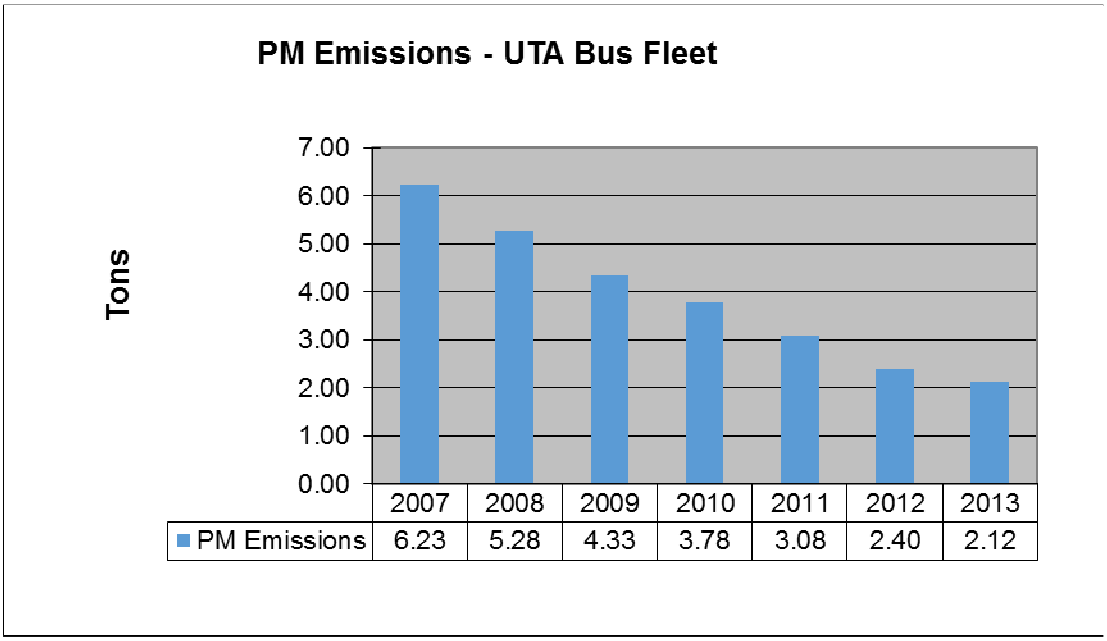
The following table lists the federal emission standards for particulate matter (PM) from heavy-duty diesel engine exhaust in urban buses.

Federal PM Emission Standard			
Model Year	g/bhp-hr	CF bhp-hr/mi	g/mi
1991 – 1992	0.25	4.68	1.17
1993	0.1	4.68	0.468
1994 – 1995	0.07	4.68	0.3276
1996 – 2006	$0.05_{(1)}$	4.68	0.234
2007 –	0.01	4.68	0.0468

UTA's fixed route and express route bus fleet travels 17 million miles annually. Scheduling newer more efficient buses to accumulate more miles than older buses reduces the emissions of PM from UTA's bus fleet. UTA has set a goal of a 10% reduction for the total pounds of PM emitted each year.

	2012		2013	
Model Year	Miles	PM (lbs)	Miles	PM (lbs)
1991 – 1992	0	0	0	0
1993	0	0	0	0
1994 – 1995	6640	5	6640	5
1996 – 2006	7,263,851	3,744	6,141,830	3,166
2007 –	10,277,094	1,059	10,376,913	1,070
CNG Bus	-	-	177,475	1
Total	17,547,585	4,808	16,696,218	4,235

Based on the annual miles and the age of UTA's fleet in 2007, the estimated PM emissions were 6.23 tons. By acquiring new buses that meet the 2007 Federal PM standards to replace older buses, PM emissions were reduced to 2.40 tons in 2012 and 2.12 tons in 2013. UTA reduced its PM emissions from 2012 to 2013 by 13.4%, exceeding the goal of 10% reduction for PM emissions per year.



Nitrogen Oxides (NO_x)

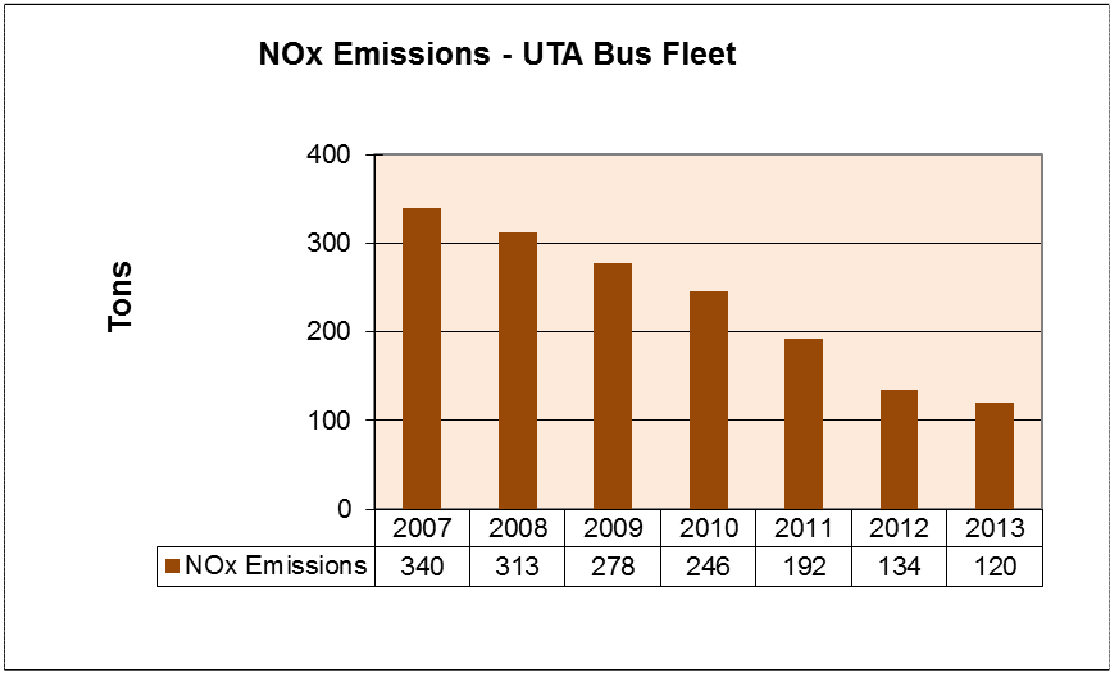
For NOx emission calculations EPA sites an 8% compliance margin from manufacturers based on historical certification data. Therefore, for a NO_x standard of 5.0 g/bhp-hr, a level of 4.6 g/bhp-hr is used as the emission level. The following table illustrates the differing emission standards of NO_x for diesel engine exhaust from urban buses.

Federal NO_x Emission Standard			
Model Year	g/bhp-hr	CF bhp-hr/mi	g/mi (8% margin)
1991 – 1997	5.0	4.68	21.53
1998 – 2001	4.0	4.68	17.22
2002 – 2006	2.2	4.68	9.47
2007 – 2009	1.2	4.68	5.17
2010 –	0.2	4.68	0.86

Based on the annual miles and the age of UTA's fleet in 2007, the estimated NOx emissions were 340 tons. By acquiring new buses that meet the 2010 Federal NOx standards to replace older buses, UTA estimates that NOx emissions by 2015 will be <100 tons. This will reduce NOx emissions from UTA's bus fleet by over 70%.

	2012		2013	
Model Year	Miles	NOx tons	Miles	NOx tons
1992 – 1997	85,144	2	84,721	2
1998 – 2001	3,361,896	64	2,506,026	47
2002 – 2006	3,823,451	40	3,551,083	37
2007 - 2009	5,064,055	29	5,426,893	28
2010 –	5,213,039	5	5,426,893	5
CNG Bus	-	-	177,475	<0.1
Total	17,547,585	134	16,696,218	120

By scheduling the more efficient buses on the longer routes, UTA has set a goal of a 10% reduction for the total tons of NOx emitted each year. UTA reduced its NOx emissions from 2012 to 2013 by 10.4%, meeting the goal of 10% reduction for NOx emissions per year.



Benefit to the environment for year:

Air Pollutant	Particulate Matter	% Reduction	Nitrogen Oxides	% Reduction
2007	6.23 tons	–	340 tons	–
2008	5.28 tons	15.2 %	313 tons	7.9 %
2009	4.33 tons	18.0 %	278 tons	11.2 %
2010	3.78 tons	12.7 %	246 tons	11.5 %
2011	3.08 tons	18.5 %	192 tons	21.9 %
2012	2.40 tons	22.1 %	134 tons	30.2 %
2013	2.12 tons	13.4%	120 tons	10.4%

Benefit or savings for company:

The acquisition of new buses as replacements for older models reduces UTA's investment per rider because of the improved fuel efficiency of the newer buses. In 2013 UTA added 24 CNG buses, as a part of our bus replacement 6 year plan. UTA now operates a fleet of over 500 buses that has 32 hybrid-electric buses and 24 CNG buses. Today's technology of hybrid-electric buses is 20% more fuel efficient than their diesel bus counterparts. CNG buses offer 10 times less particulate matter emissions and 4 times less NOx emissions per mile than the EPA mandated clean diesel buses.

Project #2: Energy Savings Program

In 2013, UTA proposed a project to study the use of temperature monitors for bus engines to be used on electrical block engine heaters with following objectives:

1. Baseline Measurement: UTA will use the study data in 2012 of the use of temperature sensors and electrical usage, as its baseline for estimated savings.
2. In 2013, UTA will set a goal to install temperature sensors at the Meadowbrook bus maintenance facility and its Riverside Paratransit (bus) maintenance facility.

Unfortunately, this project was not funded in 2013 and no replacement project was proposed.

Project #1: UTA Air Emission Reduction Project

UTA will continue monitor and report on the following parameters and monitor the progress towards the 2015 goal of reducing criteria air pollutant emissions of the bus fleet over the 2007 baseline:

- The number of new buses and the manufactured year of the bus replaced.
- The vehicle miles traveled for all buses within a manufactured year.

Project #2: Pending