

# 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 39 new buses in 2012 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)

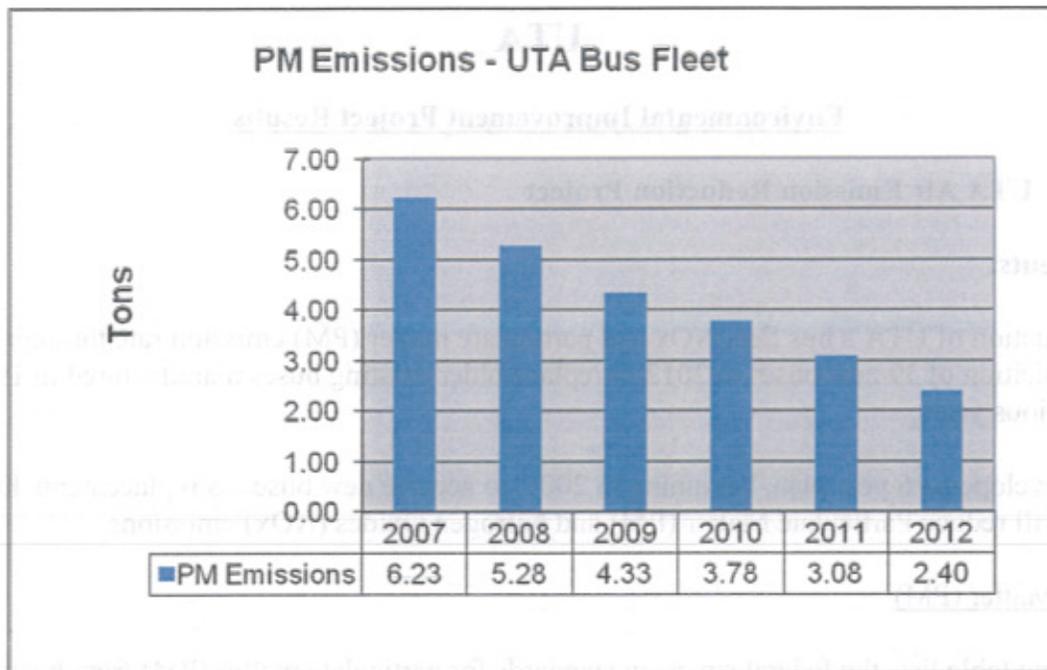
The following table lists the federal emission standards for particulate matter (PM) from heavy-duty diesel engine exhaust in urban buses.

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 <sub>(1)</sub>	4.68	0.234
2007 –	0.01	4.68	0.0468

UTA's fixed route and express route bus fleet travels 19 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.

Model Year	2011		2012	
	Miles	PM (lbs)	Miles	PM (lbs)
1991 – 1992	0	0	0	0
1993	0	0	0	0
1994 – 1995	55,410	40	6640	5
1996 – 2006	10,289,181	5,303	7,263,851	3,744
2007 –	7,918,677	816	10,277,094	1,059
<b>Total</b>	<b>18,263,268</b>	<b>6,160</b>	<b>17,547,585</b>	<b>4,808</b>

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 3.08 tons in 2011 and 2.40 tons in 2012. UTA reduced its PM emissions from 2011 to 2012 by 22.1%, exceeding the goal of 10% reduction for PM emissions per year.



### Nitrogen Oxides (NO<sub>x</sub>)

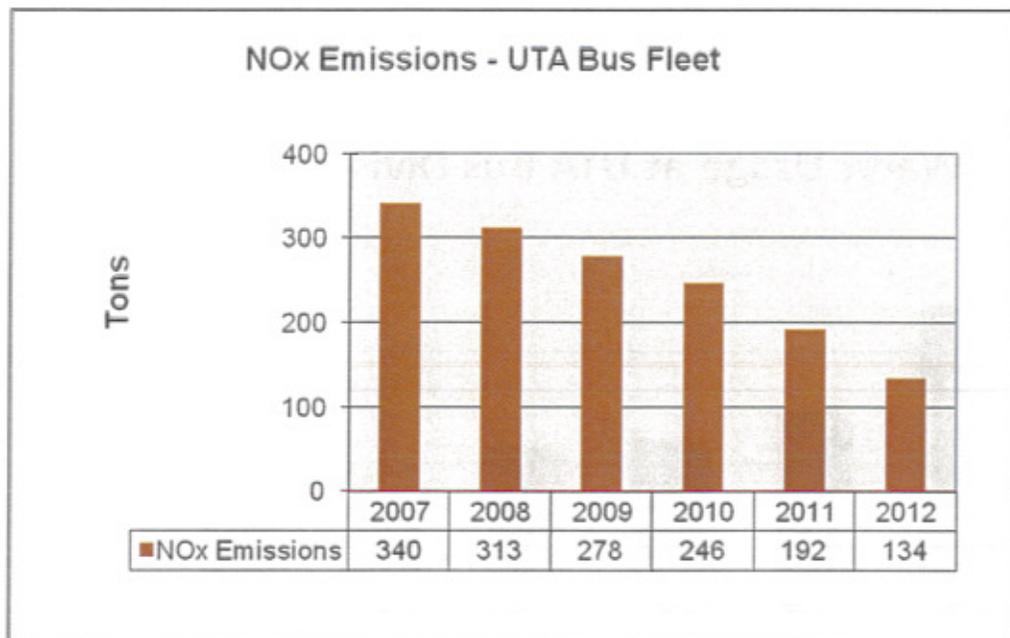
For NO<sub>x</sub> emission calculations EPA sites an 8% compliance margin from manufacturers based on historical certification data. Therefore, for a NO<sub>x</sub> standard of 5.0 g/bhp-hr, a level of 4.6 g/bhp-hr is used as the emission level. The following table illustrates the differing emission standards of NO<sub>x</sub> for diesel engine exhaust from urban buses.

Federal NO <sub>x</sub> 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 NO<sub>x</sub> emissions were 340 tons. By acquiring new buses that meet the 2010 Federal NO<sub>x</sub> standards to replace older buses, UTA estimates that NO<sub>x</sub> emissions by 2015 will be 69 tons. This will reduce NO<sub>x</sub> emissions from UTA's bus fleet by over 79%.

Model Year	2011		2012	
	Miles	NO <sub>x</sub> tons	Miles	NO <sub>x</sub> tons
1992 – 1997	660,666	16	85,144	2
1998 – 2001	5,290,805	100	3,361,896	64
2002 – 2006	4,393,120	46	3,823,451	40
2007 - 2009	5,315,071	30	5,064,055	29
2010 –	2,603,606	2	5,213,039	5
Total	18,263,268	192	17,547,585	134

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 2011 to 2012 by 30.2%, exceeding 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 %

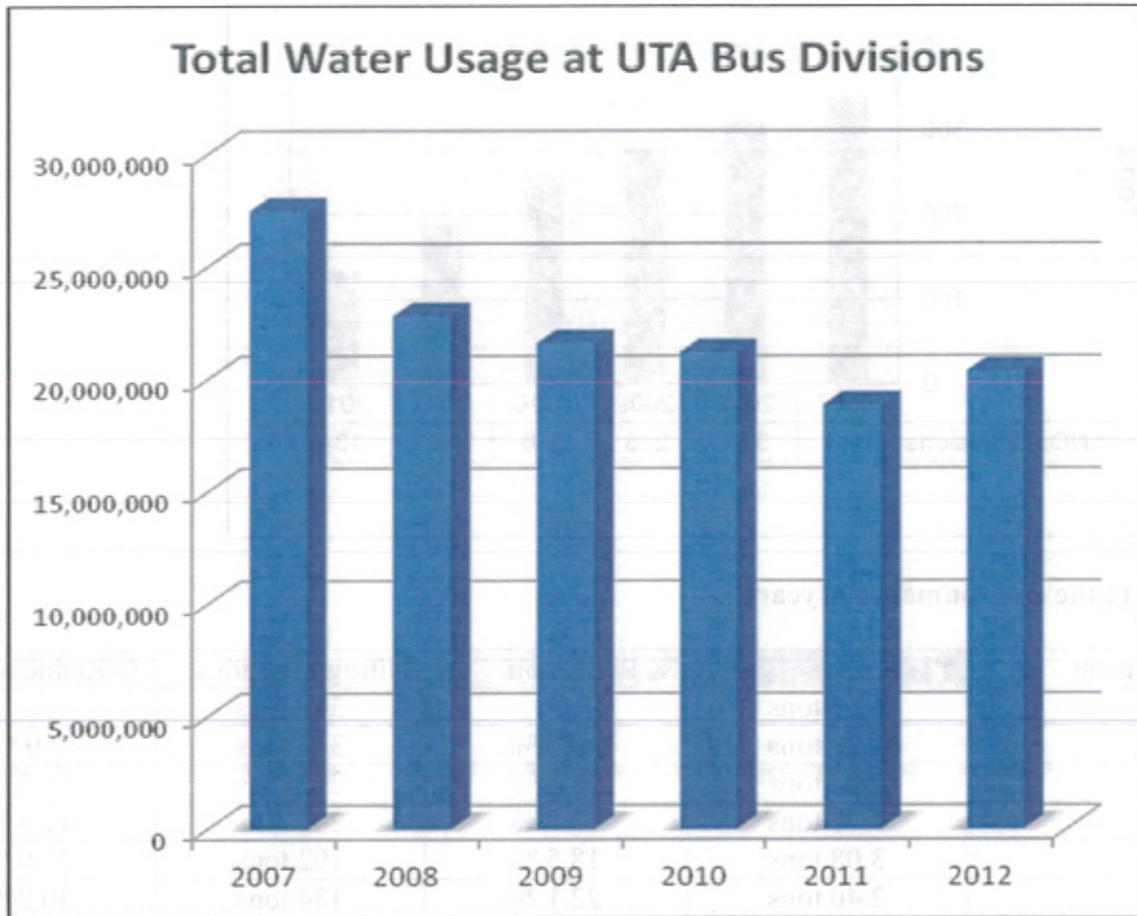
**Benefit or savings for company:**

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 2012 UTA added 8 hybrid-electric diesel buses, as a part of our bus replacement 6 year plan. UTA now operates a fleet of 31 hybrid-electric buses. Today’s technology of hybrid-electric buses is 20% more fuel efficient than their diesel bus counterparts.

**Project #2: Water Conservation Project**

**Measurements:**

- 1) Water usage by volume at UTA Bus Divisions.



**Benefit to the environment for year:**

Water Usage at UTA Bus Divisions		
	Total Gallons Used	Water Saved vs. 2007
2007	27,505,652	-
2008	22,837,824	4,667,828
2009	21,628,216	5,877,436
2010	21,212,380	6,293,272
2011	18,400,188	9,105,464
2012	20,377,296	7,128,356

**Benefit or savings for company:**

Water Usage: Savings at UTA Bus Divisions		
	Annual Cost	Savings Over 2007
2007	\$35,923.76	-
2008	\$29,306.93	\$6,616.83
2009	\$27,890.01	\$8,033.75
2010	\$28,549.84	\$7,373.91
2011	\$24,443.92	\$11,479.83
2012	\$27,670.42	\$8,253.34

Although the goal of 5% reduction in water usage at bus maintenance facilities was not achieved, UTA continues to save more than 25% in water consumption over its established baseline year of 2007.

- 2) Water usage at Park n' Rides, where landscaping changes have been instituted to reduce water consumption for irrigation.

There have been no new xeriscaping projects at park n' ride lots in 2012. Often the change to xeriscaping is prevented by local ordinances that require a set amount of landscaping for grass/vegetation.

**Targeted Goals for 2012 (include specific measurement)**

**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 80 % reduction of air pollutants over 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: Energy Savings Program**

In 2007, UTA installed digital energy monitors at its Meadowbrook Bus Maintenance facility. In addition, UTA's facilities maintenance group is studying the use of temperature monitors for bus engines to be used on electrical block engine heaters. This will enable UTA to reduce electrical usage during winter months to not have to continually heat bus engines at night.

**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.

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