

2014  
**SUSTAINABILITY REPORT**

*Energy Efficiency and Resource Conservation Measures*



*Think Sustainability*



# *Thank You*

*City departments providing information toward this document*

*Building Services*

*Citylink*

*Edmond Electric*

*Engineering*

*Information Technology*

*Marketing*

*Parks, Events, and Recreation*

*Planning Department*

*Public Works*

*Solid Waste*

*Urban Forestry*

*Utility Customer Service*

*Vehicle Maintenance*

*Water Resources*

# Table of Contents

INTRODUCTION.....	1
STRATEGIES .....	2
<b>Energy Efficiency, Conservation, and Renewable Energy: City Facilities</b> .....	3
Measure 1 – Total Energy Usage for City Facilities (FY '10 to FY '13).....	3
Measure 2 – Breakdown of Total Energy Usage for City Facilities And Baseline .....	4
Measure 3 – City Facilities Equivalent Co <sub>2</sub> Production Comparison – Pure and Simple .....	10
<b>Energy Efficiency, Conservation, and Renewable Energy: Community Services</b> .....	12
Measure 4 – Percentage of Customers by Sector - Pure and Simple (FY '09 – FY '13) .....	12
Measure 5 – Reduced Customer Equivalent Co <sub>2</sub> for all Revenue Classes – Pure and Simple .....	13
Measure 6 – Number of Energy Audits.....	15
Measure 7 – Number of Energy Saving Equipment Rebates.....	17
<b>Landuse and Transportation</b> .....	18
Measure 8 – Percentage Change in Population using YR 2000 and 2010 Census.....	19
Measure 9 – Total Building Permits by 2000 Census Tract (2002 – 2013) .....	20
Measure 10 – Total Building Permits by Type (2002 – 2013).....	21
Measure 11 – Snapshot Vacancies (Dec 2013) for Residential and Commercial .....	22
Measure 12 – Percentages in Undeveloped Acres of Land: Categorized by Zoning .....	24
Measure 13 – Percentages in Undeveloped Acres of Land That is Urbanized Infill.....	24
Measure 14 – Large Land Holders, Estimated Acreages, and Conservation .....	25
Measure 15 – Average Daily Traffic Counts – CY 2013.....	27
Measure 16 – Planned Traffic Projects.....	28
Measure 17 – Bicycle Master Plan.....	29
Measure 18 – Existing Trails and Trail Lengths.....	29
Measure 19 – Sales & Use Tax Revenue Effect on Budget.....	32
<b>Alternative Fuels and Public Transportation</b> .....	33
Measure 20 – City of Edmond Fleet – Alternative Fuel Percentages.....	33
Measure 21 – City of Edmond Fleet - Fuel Costs.....	34
Measure 22 – City of Edmond Fleet - Total Equivalent Co <sub>2</sub> .....	34
Measure 23 – City of Edmond Fleet Vehicle Counts and Equivalent CO <sub>2</sub> by Department.....	35
Measure 24 – Citylink Yearly Ridership Comparison (FY '09 – FY '13) .....	36
Measure 25 – Citylink Total Wheelchair and Bicycle Boardings (FY '13) .....	36
Measure 26 – Citylink Survey (FY '11) – Those Riding 20 or more days a month .....	37

## Table of Contents

<b>Solid Waste and Recycling</b> .....	38
Measure 27 – Total Volume of Recycled Material in Tons (CY 2009 – 2013) .....	38
Measure 28 – Curbside Recycling Average Percent Participation Rate (CY 2009 – 2013) .....	39
Measure 29 – Curbside Recycling Participation Rate by Month (CY 2013).....	39
Measure 30 – Recycled Percent of Residential and All Waste Generated (CY 2009 – 2013) .....	40
Measure 31 – Household Hazardous Waste (Tons) .....	40
<b>Urban Forestry</b> .....	42
Measure 32 – Cumulative Number of Trees Planted and Removed .....	42
Measure 33 – Edmond Tree Mail & Facebook Forestry Page .....	43
<b>Park and Recreation Facilities</b> .....	44
Measure 34 – City Parks Acreage and Attributes .....	44
<b>Water and Wastewater Resources</b> .....	45
Measure 35 – Water Usage by Areas (January, 2013) Figure A .....	46
Measure 36 – Water Usage by Areas (June, 2013) Figure B .....	47
Measure 37 – Utility Water Consumption by Sector ( FY 2009 – 2013).....	48
Measure 38 – Total Water Production MG/YR and Population .....	48
Measure 39 – Breakdown of Total Water Costs for City Facilities .....	49
Measure 40 – Total lbs of Biosolids .....	52
Measure 41 – Total Number of Acres where Biosolids are Applied.....	53
<b>Appendix - City Actions toward Better Efficiency and Conservation</b> .....	54

## **INTRODUCTION**

Private and public stakeholders, elected officials, and city staff have worked together to make this community what it is today. The City of Edmond has grown from a population of 68,315 to 81,405 from the year 2000 to 2010. This reflects a 19.2% increase from the year 2000. As with any growing community, it's necessary to make plans for accommodating urban growth, and to understand the consequences of our action, or inaction, for future residents. On the whole the City of Edmond has proven to be a good place to do business, has shown to be environmentally sensitive, and has been consistent as one of the most desirable place to live in the US. In 2010 Edmond ranked number 35 in CNN's Money Magazine as one of the top places to live, and in 2011 gained the honor of CNBC's top suburb. Today, the City of Edmond continues the same conversation that has built this City, incorporating ideas and concepts that will make the community stronger.

***Perhaps the greatest challenge for any generation is to leave a world for our children that is better than it was before.***

### ***The Edmond Greenprint***

A Report to the City Council and the Residents of Edmond  
Green City Task Force, July 2003

## **PURPOSE OF THE SUSTAINABILITY REPORT**

This report, or assessment, provides the structure for measuring selected sustainable practices in Edmond. It provides a current picture, and serves as a roadmap to potential future investment with regard to these issues. Sustainable practices are derived from the following bulleted **Priorities**. As practices for better stewardship evolve, and new **strategies** are identified, they will fall under one of these priorities:

- Protecting our natural resources
- Enhancing energy management
- Improving the built environment
- Maximizing waste reduction
- Balancing land use and transportation
- Promotion of economic development
- Improving City partnerships and outreach efforts

Within these pages are strategies that illustrate the City's commitment to providing sensible approaches for City operations and continued community growth. This report is a biennial assessment, and will serve as a tool for those practices that promote energy efficiency, fiscal responsibility, natural resource conservation, public health and welfare, and the outdoor recreational culture that are cornerstones for the City. We will continue to seek those practices that make us better stewards, while valuing the diversity of opinions, beliefs and cultures that exist within our community.

*For each of the Strategies on the following pages, we will define the **Value** behind the Strategy, offer a quantitative or qualitative **Goal** for the Strategy, provide a **Measure** for that program or initiative, **Analyze** what that measurement is telling us, and then list specific **Actions** that the City is taking to improve our operations, and the City as a whole.*

## **STRATEGIES**

While strategies reflect the duty of city government to provide for the health, safety, and welfare, of the community, they also maintain the quality of life expected in Edmond. A description of the types of subject matter contained in this report is shown below.

maintaining good air and water quality • providing options to conserve our water supply • using alternative sources of energy to reduce greenhouse gases and to reduce dependence on fossil fuels • offering building options and services so that residents and businesses can save more on utility costs • providing public transportation options and other alternative modes for travel • offering options for recycling and waste management to divert waste away from the landfill and back into the economy • offering parks, trails and recreational facilities that promote health and wellness • working with developers and landowners to conserve and protect open space and other natural resources

In this report **Strategies** are listed in the following order:

1. Energy Efficiency, Conservation and Renewable Energy
2. Landuse and Transportation
3. Alternative Fuels and Public Transportation
4. Solid Waste and Recycling
5. Urban Forestry
6. Park and Recreation Facilities
7. Water and Wastewater Resources

## **GREEN TASK FORCE**

Currently, the City of Edmond has organized an informal Green Task Force, made up of City staff from multiple departments, who will review and provide new suggestions and/or input for our City organization. This input will be documented in the biennial sustainability assessment. The Task Force will evolve as new players become involved, and it will be supplemented by the City of Edmond Green Team, made up of City staff volunteers.

The responsibilities of the Green Task Force are to:

- Gather and analyze data for the annual assessment
- Analyze existing City programs and initiatives
- Research best practices from other cities
- Interact with the Edmond Energy Conservation Committee
- Manage implementation of relevant initiatives

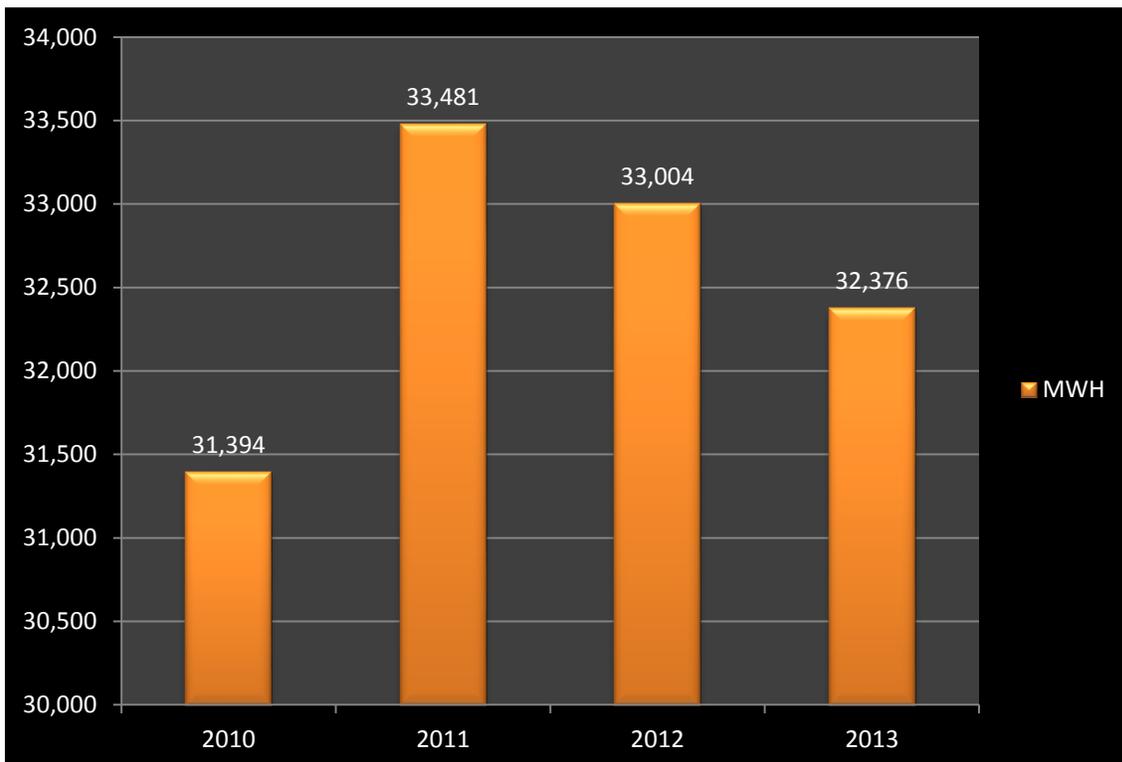
## Energy Efficiency, Conservation, and Renewable Energy City Facilities

**Value:** We strive to save money on heating, cooling, and other energy costs for City operations while reducing a dependence on fossil fuels. We hope to set an example through our own actions, while providing opportunities and incentives for residents to make their own homes and businesses more energy efficient, and consequently reduce the City's overall carbon footprint. In December, 2011 the City became an EPA Green Power Partner, a voluntary program that encourages the use of renewable energy sources, such as solar, wind, geothermal, biomass, and low-impact hydro. **In August, 2013 the City became the State's 1st EPA Green Power Community, meaning that the community exceeds the EPA guidelines for buying renewable energy.**

**Goal:** The goal is to improve energy efficiency in City facilities and in the community by utilizing new and existing technologies that can reduce overall costs, while mitigating harmful effects to the environment. The qualitative goal is to have a downward trend in City energy operational costs, and to have an upward trend in residents taking advantage of the energy conscious programs offered through the City.

**Measure 1 & 2:** Measurements are based on the fiscal year for all City facilities. These measurements are **Total Energy Usage for all City facilities<sup>1</sup> (including Natural Gas)** and **Breakdown of Total Energy Usage for City Facilities**

Measure 1 – Total Energy Usage for City Facilities (FY 09-10 to FY 12-13)



<sup>1</sup> The Energy Usage metric is used in place of the 2012 Sustainability Report *Total Energy Cost*. This is a more applicable metric, due to fluctuating energy costs.

**Measure 2 – Breakdown of Total Energy Usage for City Facilities  
And Baseline (FY 08-10 to FY 12-13)**

**BASELINE**

DEPARTMENT	Avg KWH 08-10	2011 COST	2011 KWH	2012 COST	2012 KWH	2013 COST	2013 KWH	2013 % KWH DIFF FROM BASELINE	KWH DIRECTION FROM BASELINE
Animal Welfare	665,377	\$24,340.93	732,866	\$28,733.49	887,749	\$24,829.72	788,616	18.5%	UP
Arcadia Lake Project Office	67,600	\$5,606.42	69,600	\$6,099.61	73,200	\$5,835.82	70,800	4.7%	UP
City First Building	246,220	\$13,070.30	219,102	\$14,018.80	205,753	\$12,935.24	211,267	-14.2%	DOWN
Convention & Visitors Bureau	53,547	\$3,493.14	46,480	\$3,944.11	46,960	\$3,583.18	42,400	-20.8%	DOWN
Downtown Administration	419,467	\$23,010.90	387,900	\$24,913.72	382,900	\$26,731.69	421,241	0.4%	UP
Downtown Community Center	442,890	\$29,570.65	457,045	\$29,499.69	415,285	\$26,395.01	445,200	0.5%	UP
Downtown Municipal Building	796,484	\$40,679.64	725,410	\$44,100.50	713,313	\$38,279.93	629,313	-21.0%	DOWN
Edmond Historical Museum	399,120	\$30,105.39	408,400	\$26,836.11	369,360	\$27,402.73	355,920	-10.8%	DOWN
Fire	1,548,140	\$93,351.00	1,382,968	\$96,105.52	1,357,636	\$89,109.87	1,318,192	-14.9%	DOWN
IT Building (NEW BUILDING)	0	\$0.00	0	\$0.00	0	\$1,241.24	15,537	0.0%	UP
Gracelawn Cemetery	40,472	\$2,714.19	36,575	\$2,826.62	35,515	\$2,764.59	38,066	-5.9%	DOWN
Kickingbird Golf and Tennis	1,135,342	\$87,904.49	1,216,756	\$91,432.18	1,124,298	\$90,703.75	1,106,565	-2.5%	DOWN
Miscellaneous Other	143,375	\$15,188.60	91,905	\$15,807.72	92,622	\$17,023.54	107,524	-25.0%	DOWN
Mobile Meals	46,757	\$5,885.27	75,430	\$8,449.51	101,884	\$6,938.88	84,476	80.7%	UP
Multi-Activity Center (MAC) Building	825,455	\$52,240.05	855,196	\$51,067.66	746,729	\$48,965.47	774,380	-6.2%	DOWN
Old Electric and Vehicle Maintenance	4,635	\$912.87	8,259	\$805.34	6,693	\$999.36	9,412	103.0%	UP
Parks	1,285,935	\$94,023.06	1,247,339	\$97,180.63	1,197,495	\$125,077.52	1,659,389	29.0%	UP
Pelican Bay Aquatic Center	234,427	\$23,219.26	254,560	\$27,797.15	301,280	\$25,171.75	259,200	10.6%	UP
Planning/Public Works Building	255,240	\$16,968.13	239,520	\$18,265.68	212,400	\$17,382.21	190,680	-25.3%	DOWN
Police Facilities	843,497	\$54,302.76	890,158	\$57,606.49	860,283	\$55,943.87	844,145	0.1%	UP
Radio Towers	102,385	\$8,815.11	107,408	\$9,520.11	112,222	\$8,548.16	102,030	-0.3%	DOWN
Street Lights and Traffic Control	652,593	\$57,727.40	717,179	\$60,522.89	697,537	\$62,972.80	746,297	14.4%	UP
Vehicle Maintenance	912,846	\$37,321.85	840,411	\$35,221.88	731,742	\$36,099.26	993,404	8.8%	UP
Water/Wastewater	19,032,554	\$1,217,062.63	20,483,471	\$1,215,263.97	20,299,655	\$1,154,282.45	19,353,265	1.7%	UP
Xtimb Admin Building	309,173	\$33,531.93	452,400	\$30,906.61	414,400	\$28,273.80	383,680	24.1%	UP
Xtimb Operations Building	1,576,587	\$106,178.81	1,534,960	\$116,289.65	1,617,200	\$101,358.59	1,425,280	-9.6%	DOWN
<b>TOTAL</b>	<b>32,040,117</b>	<b>\$2,077,224.78</b>	<b>33,481,299</b>	<b>\$2,113,215.64</b>	<b>33,004,111</b>	<b>\$2,038,850.43</b>	<b>32,376,278</b>	<b>1.0%</b>	<b>UP</b>

**Analysis:** In three years (FY 2008 – 2010), the average energy usage for all City Facilities was **32,040,117 kWh**. This is the baseline value. This is for the usage of electricity, and natural gas for heating (dekatherms have been converted to kwh). Total energy costs are largely dependent on the weather for heating and cooling, but are also affected by a facility’s building envelope, the every day practices of City employees, and the application of advanced energy saving technologies. In FY 2013 the City was able to maintain its usage at only **1.0% more than the Baseline** value.

In the table above, the far right column reveals the direction of energy usage when comparing FY 2013 with the baseline value. There can be several factors in a department or building’s performance, some of which will be explained under Actions, but these facilities will be monitored closely to demonstrate the effectiveness of new technology, changes in policy, and/or retrofits. Starting in FY 10 the City has helped keep its costs lower for facilities through programs like Edmond Electric’s “Turn It Off” campaign, as well as several implementations of energy-saving technologies.

**Action(s):** Technology has allowed the City of Edmond to explore new ways for Energy savings. Five activities described here are (1) LED lighting replacements for signal lights, (2) Energy Management Systems, (3) Geothermal Energy, (4) T-12 Lighting Retrofits for existing buildings, and (5) the use of Variable Frequency Drives and Soft Starts for some of our large motors in Water and Wastewater facility operations.

### Action 1: LED Lighting Replacements for Traffic Signals and Street Lamps



Practices in Edmond to manage energy consumption have been underway for some time. Though this project took place some time ago, we still mention it today to demonstrate the forward thinking mindset of Edmond residents and leadership. The agreement in 1997 between Edmond's Traffic Control department and Edmond Electric resulted in replacing the incandescent bulbs at signalized intersections with LEDs (light emitting diodes). Pricing was adjusted based upon LED cost savings.

With 93 signalized intersections, using current cost per kWh, the City has saved approximately **\$129,043** per year on traffic lights. All lights were changed out to LED by the year 2002. Using the same cost per kWh, we can estimate that since YR 2002 the City has saved approximately **\$1,677,559** on Traffic Signals alone.

## Action 2: Energy Management Systems for Municipal Buildings

Office buildings are large consumers of energy. Whether it is heating up the office before staff arrives, or the lights in offices, parking lots, hallways, or data centers where numerous racks of servers run constantly, buildings are constantly consuming energy. **Energy Management Systems (EMS)** are a combination of building management and advanced software solutions that assist in managing building functions in a more energy efficient way, to provide demand response controls when situations within the power grid demand it.

During construction in **2005**, the Crosstimbers Municipal Complex, Animal Welfare, and Fire Station V at I-35 and Covell Rd, were put on energy management systems. In 2006 dollars, savings were determined to be \$21,900 per year for the Crosstimbers Administration building. Projecting these savings onto the rest of the buildings within the Crosstimbers Complex brings the total savings to **\$65,000 per year** for EMS installations on those buildings.

In addition, in calendar years **2007** and **2008** two buildings were converted to energy management systems with heating, ventilation, and air conditioning (HVAC) controls. They were the old Downtown Administration Building and the Edmond Historical Museum. Cost savings in a 3 year period were an average **\$10,803 per year**.

Again, in **2009** another opportunity presented itself. Using **US Department of Energy EECBG** (Energy Efficiency and Conservation Block Grant) money through the American Recovery and Reinvestment Act (ARRA), eleven additional City facilities were fit with HVAC and/or Lighting Controls.

City Facilities	Avg kWh 08-10	Avg Cost 08-10	Total kWh Usage 11	Total Cost 11	Total kWh Usage 12	Total Cost 12	Total kWh Usage 13	Total Cost 13	% kWh Change from EMS Install YR	% Change Cost
<b>Main - City Hall</b>	796,484	\$48,608.60	725,410	\$40,679.64	713,313	\$44,100.50	629,313	\$38,279.93	-20.99%	-21.25%
<b>Main - Crosstimbers Administration</b>	309,173	\$23,341.56	452,400	\$33,531.93	414,400	\$30,906.61	383,680	\$28,273.80	24.10%	21.13%
<b>Main - Crosstimbers Operations</b>	1,576,587	\$109,922.79	1,534,960	\$106,178.81	1,617,200	\$116,289.65	1,425,280	\$101,358.59	-9.60%	-7.79%
<b>Main - Fire Station #1</b>	286,567	\$20,967.45	233,671	\$16,252.99	241,174	\$17,755.13	233,842	\$15,652.33	-18.40%	-25.35%
<b>Main - Fire Station #2</b>	129,212	\$9,719.71	122,407	\$8,621.47	103,565	\$8,113.45	91,460	\$6,953.72	-29.22%	-28.46%
<b>Main - Fire Station #3</b>	120,721	\$8,883.11	115,645	\$8,012.94	106,414	\$7,925.55	99,494	\$6,808.77	-17.58%	-23.35%
<b>Main - Fire Station #4</b>	292,347	\$20,632.26	227,051	\$14,957.50	200,538	\$14,282.55	217,787	\$15,006.03	-25.50%	-27.27%
<b>Main - Planning and Public Works</b>	255,240	\$18,617.64	239,520	\$16,968.13	212,400	\$18,265.68	190,680	\$17,382.21	-25.29%	-6.64%
<b>Main - Downtown Community Center</b>	442,890	\$30,883.96	457,045	\$29,570.65	415,285	\$29,499.69	445,200	\$26,395.01	0.52%	-14.53%
<b>Main - City First Building</b>	246,220	\$15,310.86	219,102	\$13,070.30	205,753	\$14,018.80	211,267	\$12,935.24	-14.20%	-15.52%
<b>Main - Mitch Park Multi-Activity Center (MAC)</b>	825,455	\$57,806.27	855,196	\$52,240.05	746,729	\$51,067.66	774,380	\$48,965.47	-6.19%	-15.29%
<b>Sum Energy Management Systems</b>			5,182,408	<b>\$340,084.41</b>	4,976,771	<b>\$352,225.27</b>	4,702,382	<b>\$318,011.10</b>		

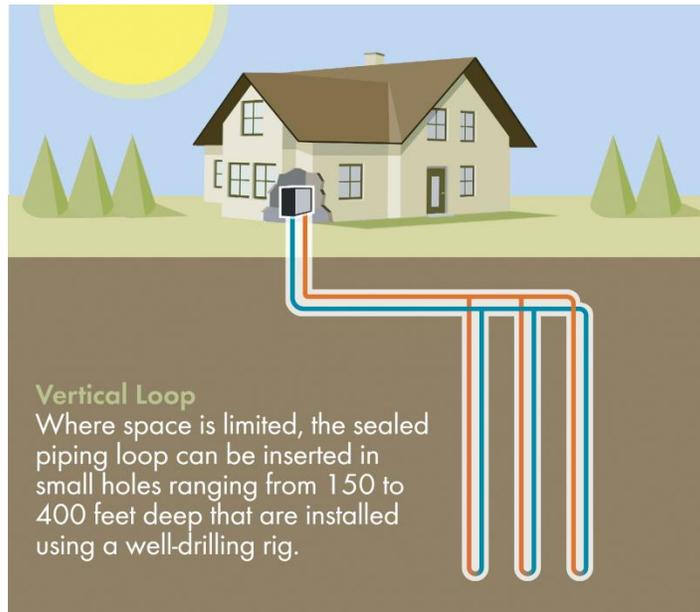
The table above demonstrates savings that have been achieved from installing 11 additional Energy Management Systems on City Facilities in May and June, 2011. The columns on the right describe the kWh percent change from the average baseline, and the percent change in cost for fiscal year **2013**. Again, dekatherms for natural gas heating have been converted to kwh, and summed with electricity usage for easier comparisons. Most buildings showed a dramatic increase in energy savings, particularly Fire Station #2 at **29.22%**.

Two buildings, the *Planning and Public Works* Building and the *Downtown Community Center*, were also retrofitted with T-8 Lights, which contributed to these energy savings. The T-8 Lights were also purchased with **EECBG** funds. *Planning and Public Works* achieved a **25.29%** improvement in energy performance, while the *Downtown Community Center* **actually** decreased in energy efficiency performance.

Where there is a total energy increase from the baseline, those causes are assessed by City staff.

### Action 3: Geothermal Energy for Municipal Buildings

**Geothermal energy** is another way in which the City is saving on energy costs, and using renewable sources to benefit the environment. Geothermal energy is heat from the ground. It's clean and sustainable. When the Crosstimbers Municipal Complex was completed in **2006**, approximately **230 tons** of ground-source geothermal wells were installed. A "ton" refers to the amount of cooling a ton of ice provides per hour. The energy unit, ton, can be used as a measure for both heating and cooling, because cooling is simply the removal of heat from a space.



Again, with the construction of the **Crosstimbers Municipal Complex** at I-35 and Covell Rd, several buildings were put on geothermal systems. From the 70 tons that were installed for the Crosstimbers Administration building, it is estimated that the City should save 74,373 kWh per year, or \$6,112 per year. Projecting these cost savings on the rest of the geothermal buildings, within the Crosstimbers Complex, estimated total savings are **\$20,000 per year**.



The new **Public Safety Center** currently being built, which will house the Edmond Police Department, Public Safety Communications, and Emergency Management functions, is also having 140 wells installed, and by conservative estimates is expected to save the Police Department **\$12 - \$15,000 per year**. Reduced peak demand should save Edmond Electric an estimated **\$8-\$10,000**.

The new **Edmond Recreation and Aquatic Center (ERAC)**, also has installed **300** geothermal wells. Savings at the ERAC are expected to be an **estimated 50% on energy operating costs**. Also, to help increase energy efficiency, the pool dehumidification units are connected to the pool water heating system to provide pool pre-heating, rather than using the boilers for the entire pool heating load. This facility houses a competitive Natatorium with an olympic-size pool, seating for 800 spectators, indoor running track, and numerous spaces for indoor sports.



#### Action 4: T12 Lighting Retrofit for Municipal Buildings

The City of Edmond Public Works department obtained a cost/benefit analysis from Orion Southwest for two buildings to do a **T12 Lighting Retrofit**. T12 fluorescent lights are what people are accustomed to seeing in most office buildings across the United States. Replacing T12 bulbs with T8 bulbs reduces the office’s energy consumption and reduces air conditioning costs. It may also increase employee productivity since newer bulbs generally provide more natural light.

The analysis was completed for the **Planning and Public Works** building, and the **Downtown Community Center** in August, 2011. It projected annual savings to be a total of **\$9, 484 per year** for both buildings. Converting T12 light fixtures to T8s requires replacing the entire existing fixture, so it is initially costly. It is necessary, however, as manufacturers officially phased T12’s out of production in July, 2012.

Using **2009 US Department of Energy funds (EECBG)**, the City installed new fixtures, purchased through Basset Electric, LLC in October, 2012. Following is a table representing the energy usage for those two buildings.

Due to cost increases for electricity, savings haven’t been as dramatic as was expected in the initial Cost/Benefit analysis, but there is still a very significant drop in 2013 when comparing FY 2013 energy usage with the average baseline values. These values are for electricity usage alone, and do not include gas.

**Energy Management Systems were also installed for these buildings in 2011, so it was difficult to gauge how much savings can be attributed to the light fixtures alone.**

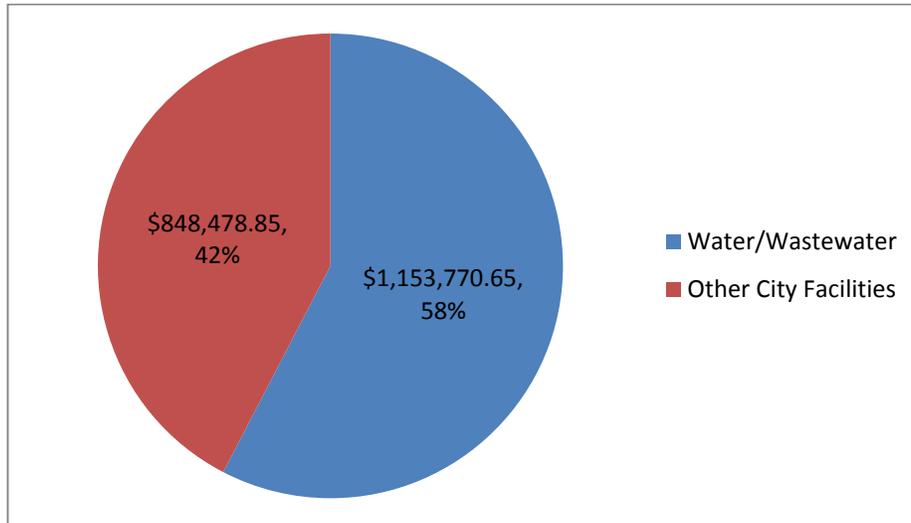
City Facilities	Avg KWH 08-10	KwH_Usage _11	KwH_Usage _12	KwH_Usage _13	% kWh Change from EMS Install YR
Main - Planning and Public Works	255,240	239,520	212,400	190,680	-25.29%
Main - Downtown Community Center	320,400	350,460	334,600	280,700	-12.39%
<b>Sum T8 Bulbs - Replacing T12s</b>		589,980	547,000	471,380	

#### Action 5: Variable Frequency Drives and Soft Starts for Water Resources

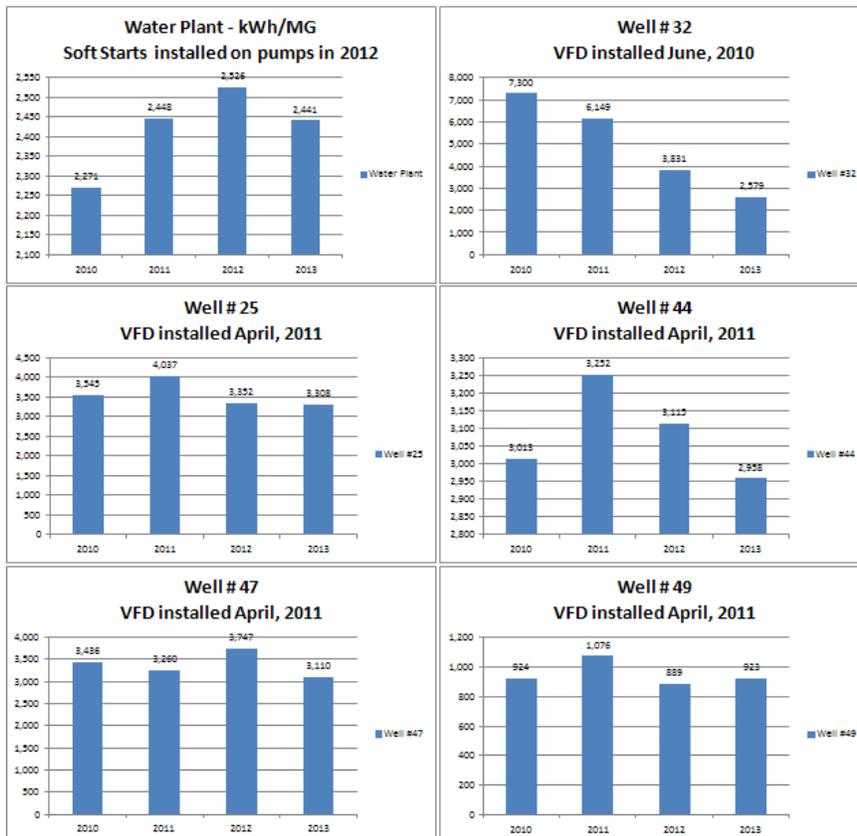
**Variable Frequency Drives and Soft Starts** are other ways the City is improving overall energy efficiency. This technology is being implemented on large, 75 horse power or greater, motors utilized within the City’s Water and Wastewater processes. With a soft starter, the motor uses reduced voltage to start, and when the motor is at full speed, or a timing circuit has timed out, a running by-pass contactor pulls in and the motor continues to run at full base speed. With a variable frequency drive (VFD) the motor will soft start, and you can vary the speed of the motor, by varying the output frequency. So, if you don’t need to vary the speed of the motor, once the motor is up to speed, then the correct solution is a soft start starter.

In 2009 an analysis was done on these large motors to determine where to begin applying the technology. As shown on the graph below, the relative cost of electricity for Water and Wastewater is by far the largest consumer of electricity for City operations. The strategic application of variable frequency drives and soft starts is having an immediate effect on those areas of energy consumption.

## City of Edmond – FY 2013 Cost of Electricity

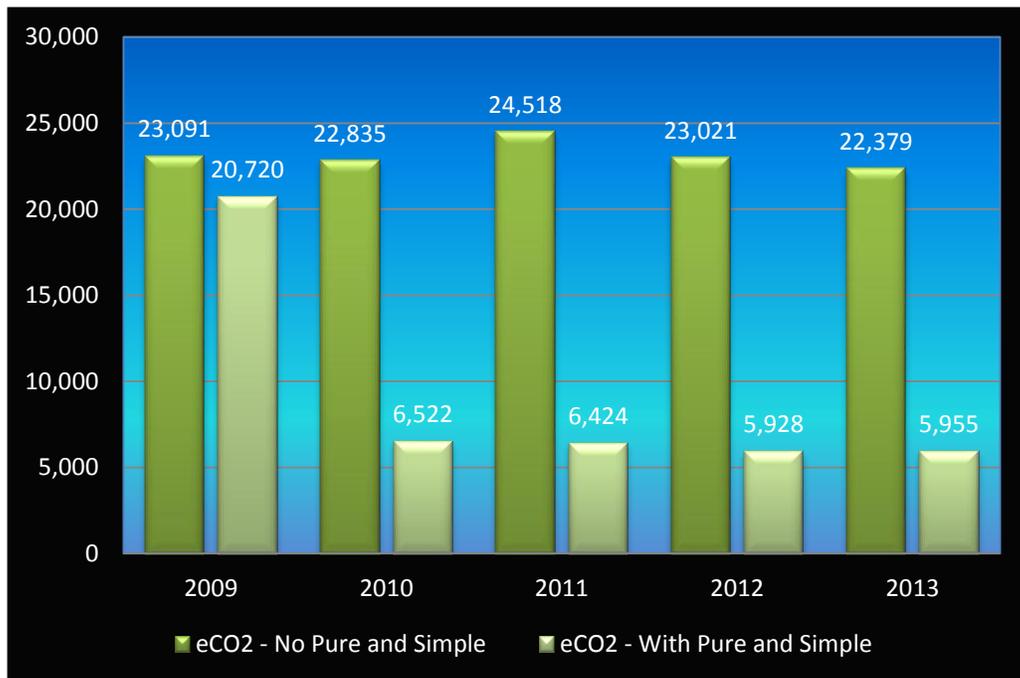


Using VFD technology, **US Department of Energy EECBG** money through the American Recovery and Reinvestment Act (ARRA) was used to retrofit five well pumps and two large motors at the Water Resources Plant. To observe the differences in energy output, these pumps were compared on a yearly basis, using the annual average **kWh/MG** of water production. Beginning in 2011 and 2012, this method of measuring efficiency shows a marked improvement in performance for most of these facilities. Those that didn't show an immediate improvement may have some other underlying problems, such as age of the well.



**Measure 3:** The use of renewable resources, such as wind, hydro, and geothermal are a priority for Edmond. The 2010 Annual Assessment for the U.S. Department of Energy’s National Renewable Energy Laboratory (NREL) recognized the “**Top Ten**” in Green Power Sales as a Percentage of Total Retail Electricity Sales, on which **Edmond Electric was #2, at 9.9% of electrical load**. Currently, that percentage is **11% of electrical load**. The following graph is a measure for greenhouse gases (GHG) for City Facilities, based on fiscal year. The dark green indicates what GHG would have been without the Wind Power Program, and the light green indicates what it actually is with Pure and Simple Wind Power.

**Measure 3 – City Facilities  
Equivalent CO<sub>2</sub> (metric tons) Production Comparison  
Pure and Simple<sup>2</sup>**



**Analysis:** In FY 10 – FY 11 Edmond’s Water Resources division converted all of its facilities over to the Pure & Simple program. Water and Wastewater costs represent roughly 58% of the City’s total cost for electricity and gas, and represent roughly 63% of electricity usage alone. **74% of all City of Edmond Facilities energy usage is currently under the Pure and Simple Wind Program.** In January, 2012, this allowed Edmond to become a member of the EPA Green Leadership Club through EPA’s Green Power Partnership, and in 2013 Edmond became the first Green Power Community in Oklahoma.

While total costs have been relatively stable, City Facilities have also been able to achieve an average **74%** reduction in greenhouse gases in FY 2012 and FY 2013, **over 2009 levels**. For 2012 and 2013, the two-year average equivalent CO<sub>2</sub> reduction has been **16,759 metric tons per year** for all City facilities. According to the EPA’s equivalency table <http://www.epa.gov/cleanenergy/energy-resources/calculator.html> on the next page, these are the equivalent benefits to the averaged reduction of years FY 2012 and FY 2013.

<sup>2</sup> Pure & Simple is Edmond Electric’s program to support clean, renewable wind energy. It is generated from the Oklahoma Municipal Power Authority (OMPA) wind farm. It’s an affordable and easy way to help our environment.



The two year Average  $eCO_2$  Reductions for City Facilities utilizing Edmond Electric's Wind Power Program reduced GHG in Edmond by 16,759 metric tons  $eCO_2$  per year, which is equivalent to:

Annual greenhouse gas emissions from 3,491 passenger vehicles.

Annual greenhouse gas emissions avoided by recycling 6,277 tons of waste.

$CO_2$  emissions from 1,878,812 gallons of gasoline consumed.

$CO_2$  emissions from 221 tanker trucks' worth of gasoline.

$CO_2$  emissions from the energy use of 837 homes for one year.

$CO_2$  emissions from the electricity use of 2,306 homes for one year.

$CO_2$  emissions from burning 72 railcars' worth of coal.

$CO_2$  emissions from 38,974 barrels of oil consumed.

$CO_2$  emissions from 698,292 propane cylinders used from home barbeques.

Annual  $CO_2$  emissions of .005 coal fired power plants.

Carbon sequestered by 429,718 tree seedlings grown for 10 years.

Carbon sequestered annually by 13,737 acres of U.S. forests.

Carbon sequestered annually by 129 acres of U.S. forests preserved from conversion to cropland.

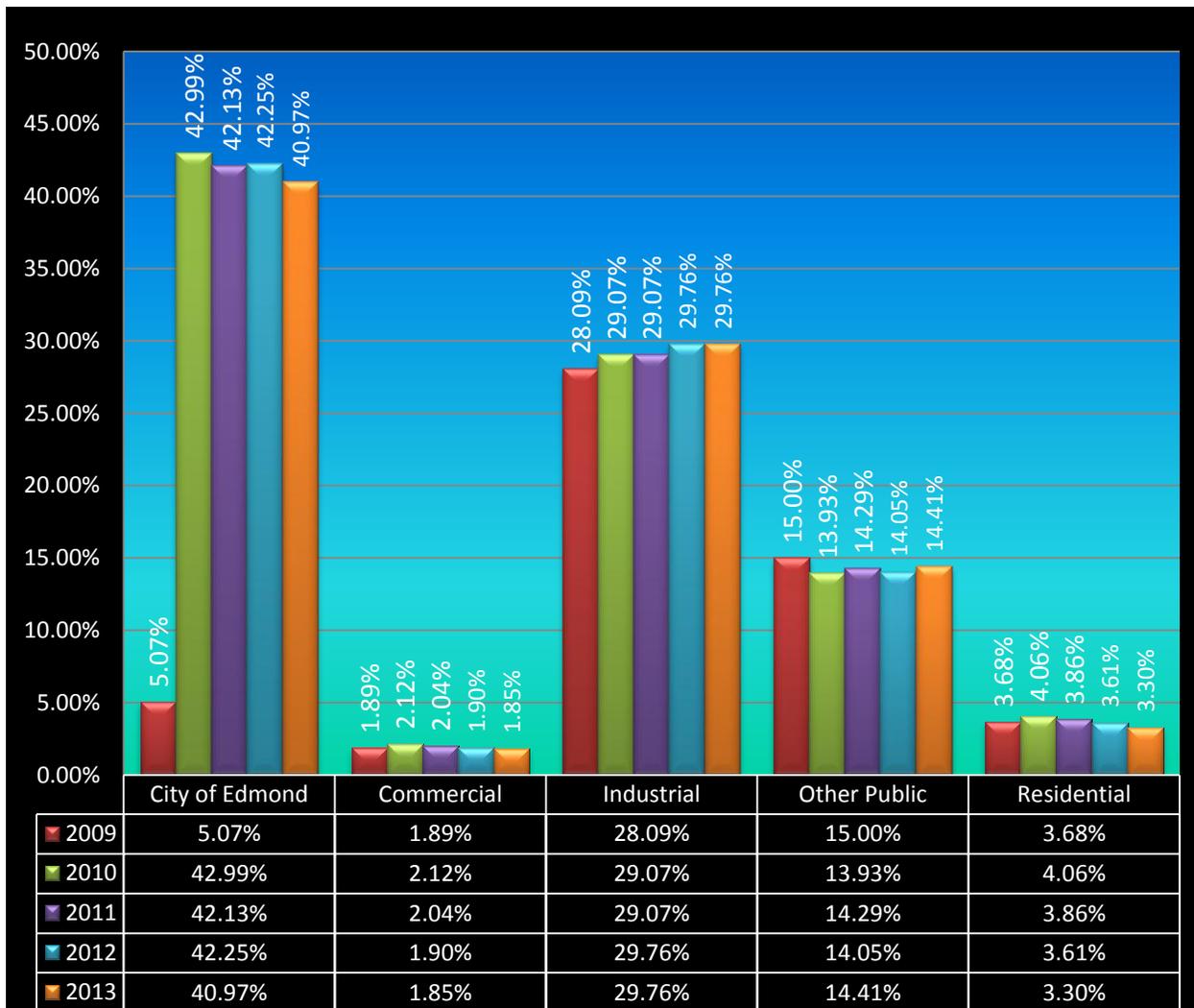
**Action:** Research the feasibility of converting other Municipal Facilities to the Pure and Simple Wind Power Program.

## Energy Efficiency, Conservation, and Renewable Energy (cont'd)

### Community Services

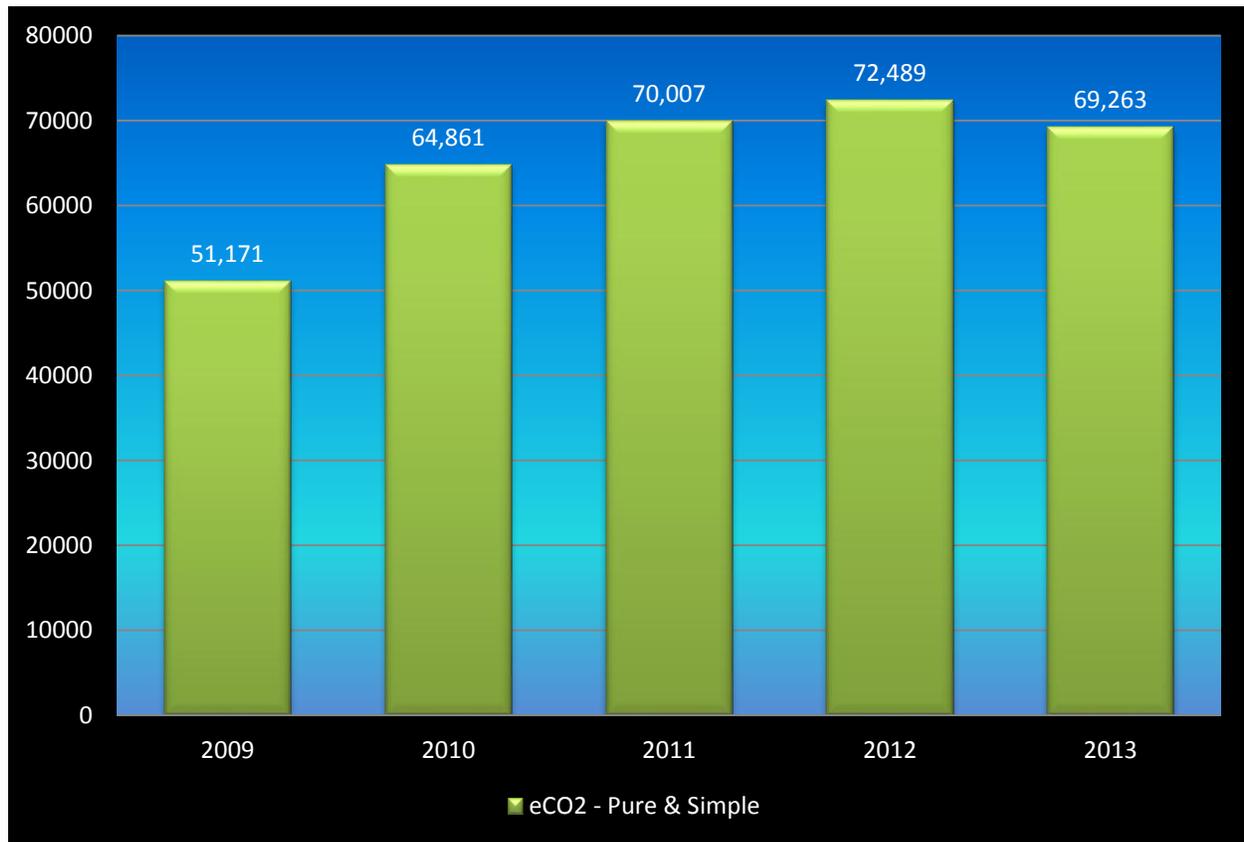
**Measure 4 & 5:** Measurements 4 and 5 reflect customer participation in the Pure and Simple Program. They are based on FY 2009 to 2013, and are **measured by utility customer sector**, rather than by customer. Respectively, the measurements show the **Percentage of Pure & Simple Customers by Sector**, and **Avoided Customer Total Equivalent CO<sub>2</sub> (metric tons)** through the Pure and Simple Program. These will be used to gauge customer participation in the Pure & Simple Program and to monitor greenhouse gases. The revenue classes (sectors) include City of Edmond, Commercial Business, Industrial, Other Public<sup>3</sup>, and the Residential Sector.

**Measure 4 – Percentage of Customers by Sector  
Pure and Simple (FY '09 – FY '13)**



<sup>3</sup> The "Other Public" Sector includes accounts for the City of Oklahoma City, US Post Office, Edmond Library, US Corp of Engineers, Edmond Public Schools, University of Central Oklahoma, the OK Dept of Wildlife, and the non-profit Edmond Community Action Agency.

Measure 5 – Reduction in Customer  
Equivalent CO<sub>2</sub> (metric tons) for all Revenue Classes  
Pure and Simple<sup>4</sup>



**Analysis:** These measurements show a community-wide effort. Overall, participation has held steady for the last three years. Still, a relatively small amount of customers are taking advantage of the program in the Commercial and Residential Sectors. **The average cost for Pure and Simple in 2013 for residential customers averaged less than \$1 more per month than traditional electricity.**

Averaging the last two years 2012 and 2013, there is an **average 70, 876 metric tons of equivalent CO<sub>2</sub> avoided per year**. This average amount demonstrates a **38.5% increase** in greenhouse gases (GHG) avoided from the 2009 level.

The following page represents the greenhouse gas equivalencies for **70,876 metric tons** of equivalent CO<sub>2</sub>, using the EPA’s equivalency table <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>.

---

<sup>4</sup> Pure & Simple is Edmond Electric’s program to support clean, renewable wind energy. It is generated from the Oklahoma Municipal Power Authority (OMPA) wind farm. It’s an affordable and easy way to help our environment.

For 2012 and 2013, customers utilizing Edmond Electric's Wind Power Program reduced GHG in Edmond by an average 70,876 metric tons eCO<sub>2</sub>, which is equivalent to:

Annual greenhouse gas emissions from 14,766 passenger vehicles.

Annual greenhouse gas emissions avoided by recycling 26,545 tons of waste.

CO<sub>2</sub> emissions from 7,945,740 gallons of gasoline consumed.

CO<sub>2</sub> emissions from 935 tanker trucks' worth of gasoline.

CO<sub>2</sub> emissions from the energy use of 3,540 homes for one year.

CO<sub>2</sub> emissions from the electricity use of 9,752 homes for one year.

CO<sub>2</sub> emissions from burning 305 railcars' worth of coal.

CO<sub>2</sub> emissions from 164,828 barrels of oil consumed.

CO<sub>2</sub> emissions from 2,953,167 propane cylinders used from home barbeques.

Annual CO<sub>2</sub> emissions of .002 coal fired power plants.

Carbon sequestered by 1,817,333 tree seedlings grown for 10 years.

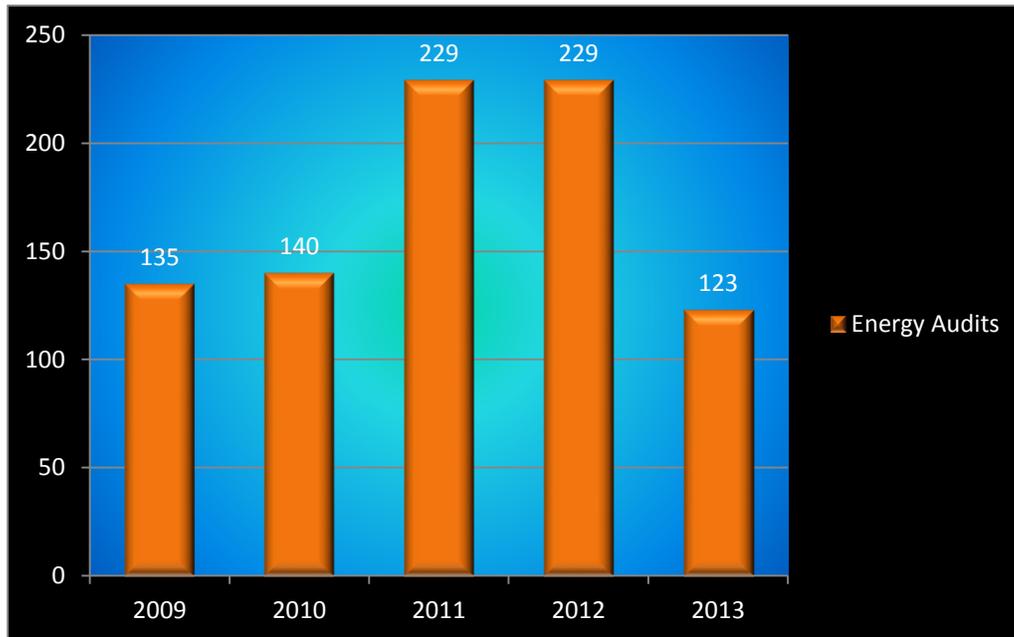
Carbon sequestered annually by 58,095 acres of U.S. forests.

Carbon sequestered annually by 547 acres of U.S. forests preserved from conversion to cropland.

**Action:** Promote the use of the Pure and Simple Wind Power program through Edmond's Utility Office and Marketing Departments.

**Measure 6:** The City of Edmond also offers FREE home energy audits. **Edmond Electric’s Home Energy Audit Program** helps make qualifying energy efficiency improvements to homes 10 years or older. Trained technicians perform a review of your home, rating its energy efficiency and offering helpful advice to lower your energy costs. This measurement is based on fiscal year<sup>5</sup> for 2009 to 2013. Following the number of energy audits will help us to gauge how well we are reaching out to our customers.

Measure 6 – Number of Energy Audits



**Analysis:** Using 2009 as a base year, 2011 and 2012 saw a **70% increase** in requests for energy audits performed by Utility Customer Service. However, there was a drop in 2013 in the number of customers taking advantage of this program.

**Action(s)**

**Action 1: Edmond Electric’s Home Energy Audit Program**

Edmond Electric’s Home Energy Audit Program is a voluntary program, and the City will continue to seek out residents and businesses interested in discovering how to make their structures more energy efficient.

**Action 2: Smart Meters for Edmond Electric Customers**

Edmond Electric is also investigating the use of **smart metering** technology. This technology would enable Edmond Electric customers to become better managers of their energy usage, and allow them to control their costs, which becomes particularly useful during the hot months. This also benefits Edmond Electric by reducing the amount of energy it must purchase and helps delay the building of new generation plants. In 2011 West Monroe Partners did a consultation for the City of Edmond by providing the **Smart Grid Business Case and Technology Road Map**.

<sup>5</sup> The 2012 Sustainability Report used calendar year for this measure. This year, we changed this to a fiscal year metric (July through June).

### Action 3: Energy Efficiency Building Codes, Training and Equipment

**Municipal Building Codes** are another way the City strives to help improve the overall efficiency of new residential and commercial structures, while reducing the City’s overall carbon footprint. Building codes that would require builders to provide more energy efficient structures are being reviewed by staff in the City’s **Building Services** department.

Included in that review are alternatives for framing houses, which are practices the City encourages builders to adopt. Optimum Value Engineering (OVE)<sup>6</sup>, developed thirty years ago by the National Home Builders (NAHB) Research Center, cuts the cost of constructing houses by omitting unnecessary lumber. As an example, such requirements would expect the builder to switch from 2x4 studs at 16 in. spacing to 2x6 studs at 24 in. spacing. Coupled with better insulation detailing, these framing strategies can also reduce the cost of heating and cooling houses, while providing significant savings for the home builders.

<ul style="list-style-type: none"> <li>• Materials in 40-ft. wall: 35 studs, 10 cripples, 28 insulation pieces</li> <li>• Amount of wall that can be insulated: 68%</li> <li>• R-value: 13</li> <li>• Cost of wall framing, sheathing, and housewrap for entire house: \$4,039</li> <li>• Annual heating and cooling costs: \$1,003</li> </ul>	<p style="color: red; font-weight: bold;">Standard wall framing</p>	
<ul style="list-style-type: none"> <li>• Materials in 40-ft. wall: 21 studs, 2 cripples, 20 insulation pieces</li> <li>• Amount of wall that can be insulated: 75%</li> <li>• R-value: 24 (R-19 fiberglass batts, plus R-5 foam sheathing)</li> <li>• Cost of wall framing and sheathing for entire house: \$1,927</li> <li>• Annual heating and cooling costs: \$710</li> </ul>	<p style="color: red; font-weight: bold;">Smart wall framing</p>	

Last year the City adopted the State approved 2009 IRC (International Residential Code). However, these amended energy codes are less stringent than the 2009 IECC (see [DOE analysis of the 2009 IRC](#)).

In 2015 the City will be working toward adopting the current IECC codes to match the pending state adoption, and in 2016 the City will most likely hire additional staff to accommodate the additional residential inspections.

According to BCAP (Building Codes Assistance Project), if Oklahoma were to adopt and achieve full compliance with the 2009 edition of the IECC and the 2007 edition of ASHRAE Standard 90.1 by the year 2015, by 2040 Oklahoma would allow businesses and households to keep about \$116 million annually via reduced energy bills (about \$1.6 billion cumulatively through 2040).

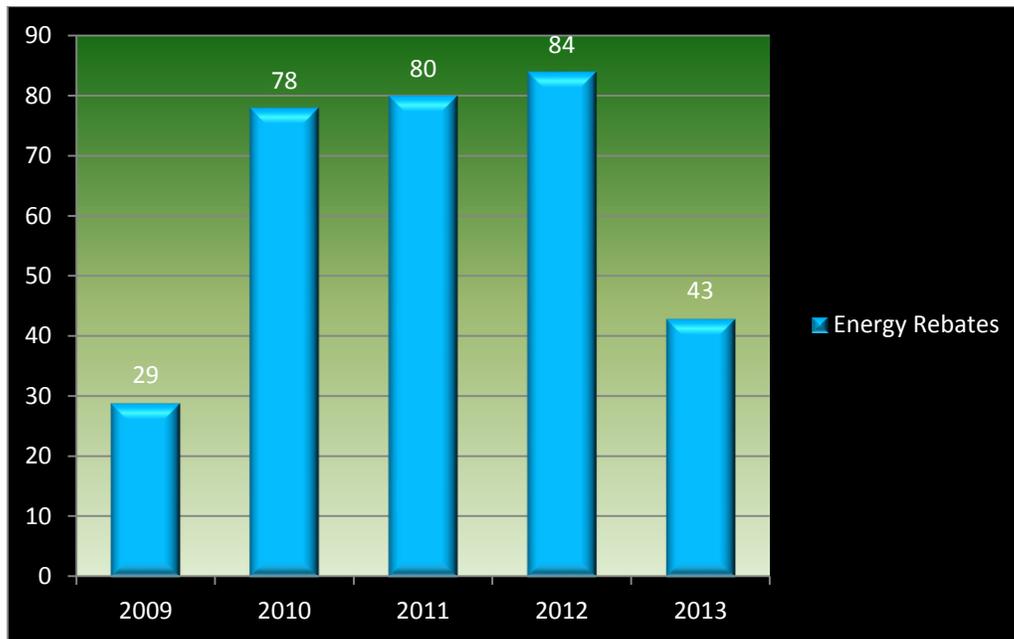
Through 2009 US Department of Energy money (EECBG), the City received \$75,000 for training and equipping the City’s building inspectors for the new energy codes. Six inspectors and their supervisors received that training in 2012. This initiative supported **Goal #3** in **Edmond’s Energy Efficiency and Conservation Strategy**, which is to “Reduce total primary energy use for the City’s residential and commercial sectors.”

In a cooperative effort, the equipment purchased through the DOE in 2009 is currently being used by Utility Customer Service (UCS) representatives to perform voluntary energy audits for residential and commercial customers. This is a free service to see how customers might save energy in their homes or businesses. This UCS crew will continue to be instrumental in the effort between Building Services and Utility Customer Service when additional energy efficiency inspections are eventually required through passage of the IECC.

<sup>6</sup> **Optimum Value Engineering** is the process of comparing alternative materials and methods to determine the least costly combination that will result in the desired end product., NAHB Research Foundation, Inc. *Reducing Home Building Costs with Optimum Value Engineered Design and Construction.* (NAHB Research Center, Inc., 1977 )

**Measure 7:** Edmond’s **Rebate Program on Heat Pumps and new Air-Conditioning units** allows customers to receive significant discounts, from \$100 per ton on new air conditioning units with a SEER<sup>7</sup> rating of 16.0 or higher, to \$250 per ton on 15.0 SEER air-source heat pumps, to \$800 per ton on 17.1 EER<sup>8</sup> ground-source (geothermal) heat pumps. Measure 7 is based on fiscal year<sup>9</sup> for 2009 to 2013. Measuring the number of rebates will help us to gauge how well we are reaching out to our customers, encouraging the kind of energy efficiency we would like to promote as a City.

Measure 7 – Number of Energy Saving Equipment Rebates



**Analysis:** Measure 7 shows that the number of rebates from 2009 to 2012 **increased 189%**. However, there is a significant drop in 2013 for these energy saving rebates.

Savings for these installations can be substantial for property owners. According to the **Oklahoma Municipal Power Authority (OMPA)**, if you replaced your old gas furnace and air-conditioning unit with an air-source or dual-fuel heat pump you could potentially cut your heating and cooling in half.

Possible savings are dependent on a number of factors, however: type of heat pump installed, the age, insulation, and size of your home, as well as the owner’s living habits. Go to Edmond’s Heat Pump Rebate page to find out more <http://edmondok.com/index.aspx?NID=678>.

**Action:** **Edmond Electric’s Energy Saving Equipment Rebates Program** is a voluntary program, and the City will continue to seek out residents and businesses interested in rebates for new air conditioning units, air-source, or ground-source heat pumps.

<sup>7</sup> SEER – Seasonal Energy Efficiency Ratio

<sup>8</sup> EER – Energy Efficiency Ratio

<sup>9</sup> The 2012 Sustainability Report used calendar year. This year, we have changed this to a fiscal year metric (July through June).

## Landuse and Transportation

**Value:** Landuse and Transportation are integral to one another. Strategies for managing the costs and impacts of traffic congestion and helping to determine the best use and function for land have been established through the City's local development regulations and Council resolutions, beginning with a foundation in the **Edmond Plan IV**<sup>10</sup> and the **Edmond Transportation Plan**, and continuing today with a recent resolution for **Complete Streets**<sup>11</sup>, the adoption of the **Edmond Bicycle Master Plan in 2012**, and the **Parks and Recreation Master Plan in 2013**. A number of community dialogues, studies, and community surveys, including Tomorrow's Edmond (1996), the Edmond Greenprint (2003), Sensitive Area Studies ('03 and '04), Citizen Satisfaction Surveys ('06, '08, '11), and the Green Infrastructure Initiative (2011) have also supported the enhancement of outdoor recreational amenities and the preservation of natural resources. These activities are balanced with the necessary growth and development that enables the City to serve the community through a variety of housing choices, commercial opportunity, and City services and amenities provided through sales tax revenues.

**Goal 1:** Quantify community growth and regard sensitive land areas with care by encouraging a balanced approach to land development through techniques such as low impact development (LID)<sup>12</sup>, landscaping and preservation requirements, and the use of conservation easements. Quantifying undeveloped land will not only help provide a picture for development opportunities, but in terms of what has been defined in the Edmond Plan IV as "Sensitive Areas", it will also help policymakers quantify the value of the property based upon its pre-developed state. Conservation categories within the Edmond Plan IV include remnant forests and other forested areas, prime farmland, and the flood plain. Previous surveys have also identified potential archeological sites.

**Goal 2:** Improve transportation efficiency and decrease emissions through needed roadway capacity expansion, and a combination of additional bike and pedestrian facilities, intelligent transportation systems (ITS)<sup>13</sup>, and effective zoning<sup>14</sup> regulations to help facilitate the flow of traffic. Zoning regulations classify the use of land, buildings and structures within the City, and are based on the Edmond Plan IV.

**Goal 3:** Continue to promote awareness about the importance of commercial business in Edmond and how sales tax is the economic engine for services provided by our local government.

**Measures 8, 9, 10, 11:** As stated previously, population increased 19.2% from the year 2000 to 2010. The following map and graphs show where these increases have taken place, and help to determine how and where the community is growing. The **Percentage Change in Population (2000 – 2010)**, and **Building Permits** for the last ten years are shown. **Use the map in Measure 8 to follow permit growth by census tract in Measure 9.**

---

<sup>10</sup> The Edmond Plan IV is the City's official comprehensive landuse plan, a long-range vision for how the community should grow and develop. It establishes the foundation for local development regulations, while also providing a framework for decision-making. It was adopted by City Ordinance 3094, April 23, 2007.

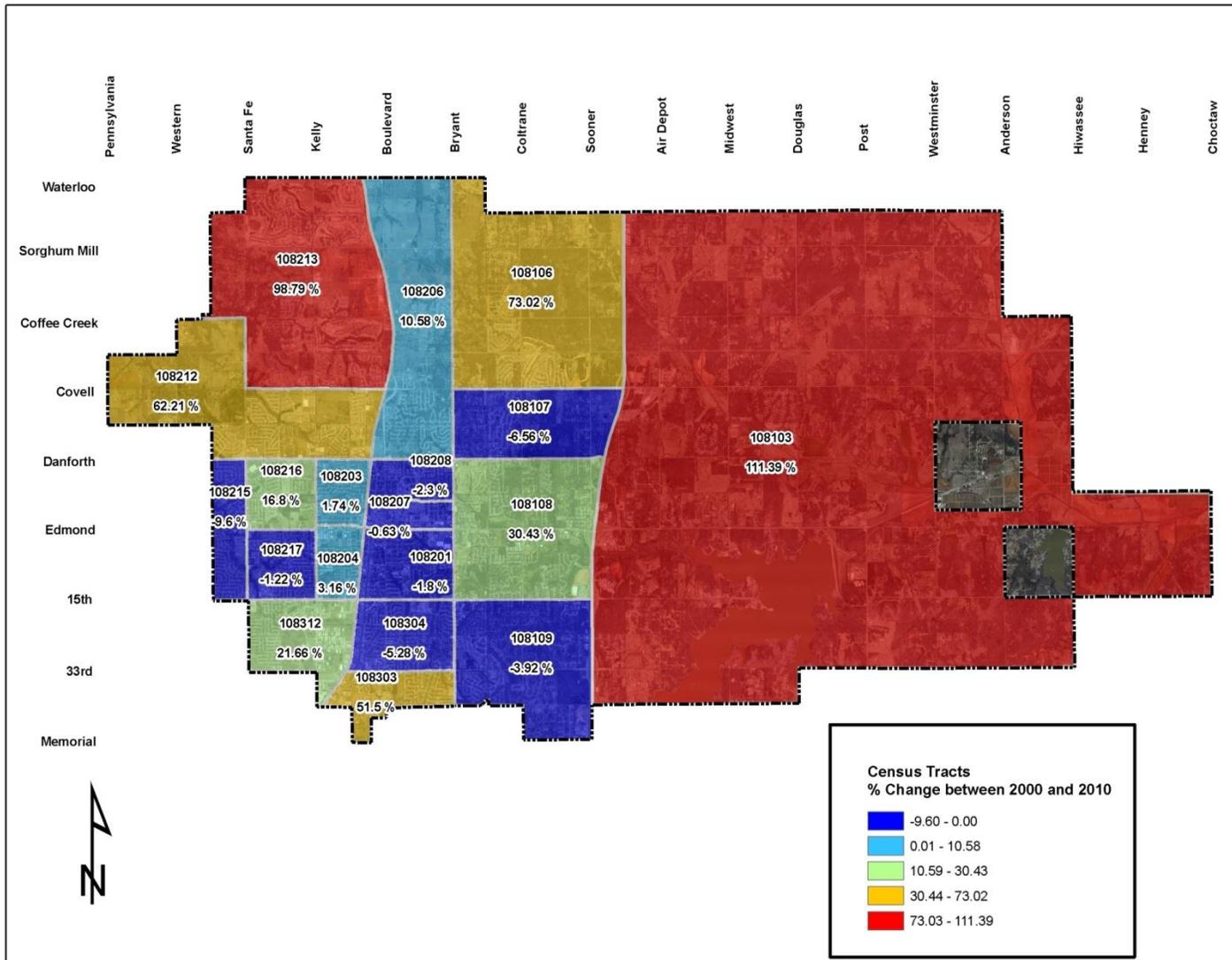
<sup>11</sup> Complete Streets are defined as those that provide safe and convenient transportation facilities for all modes of travel, including bicyclists, pedestrians, motorists, and transit riders that are accessible for users of all ages and all ability levels.

<sup>12</sup> Low Impact Development (LID) is an innovative stormwater management approach with a basic principle that is modeled after nature: manage rainfall at the source using uniformly distributed decentralized micro-scale controls. Examples include rainwater harvesting, permeable pavements, rain gardens and bioretention cells, green roofs, and riparian buffers.

<sup>13</sup> ITS is a fiber optic, wireless or hybrid communication system that would help monitor and predict traffic volumes.

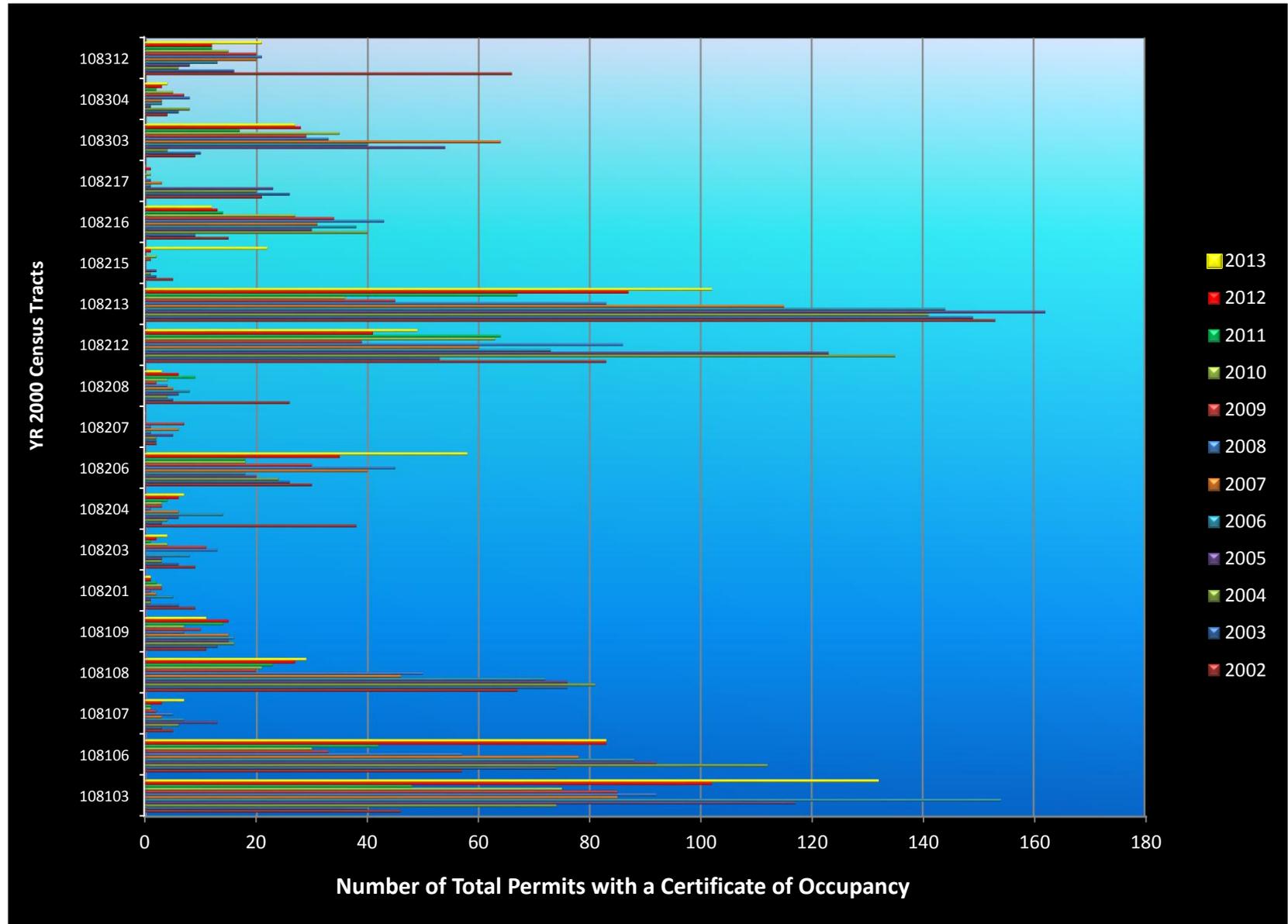
<sup>14</sup> The Zoning Ordinance (Title 22) classifies and regulates the use of land, buildings and structures within the city limits of the City of Edmond. This Title is adopted in pursuance of the authority granted by the Legislature of the State of Oklahoma in Title 11, Sections 43-101, et seq. of the Oklahoma Statutes.

## Measure 8 – Percentage Change in Population using YR 2000 Census Tract Boundaries CY 2000 to CY 2010



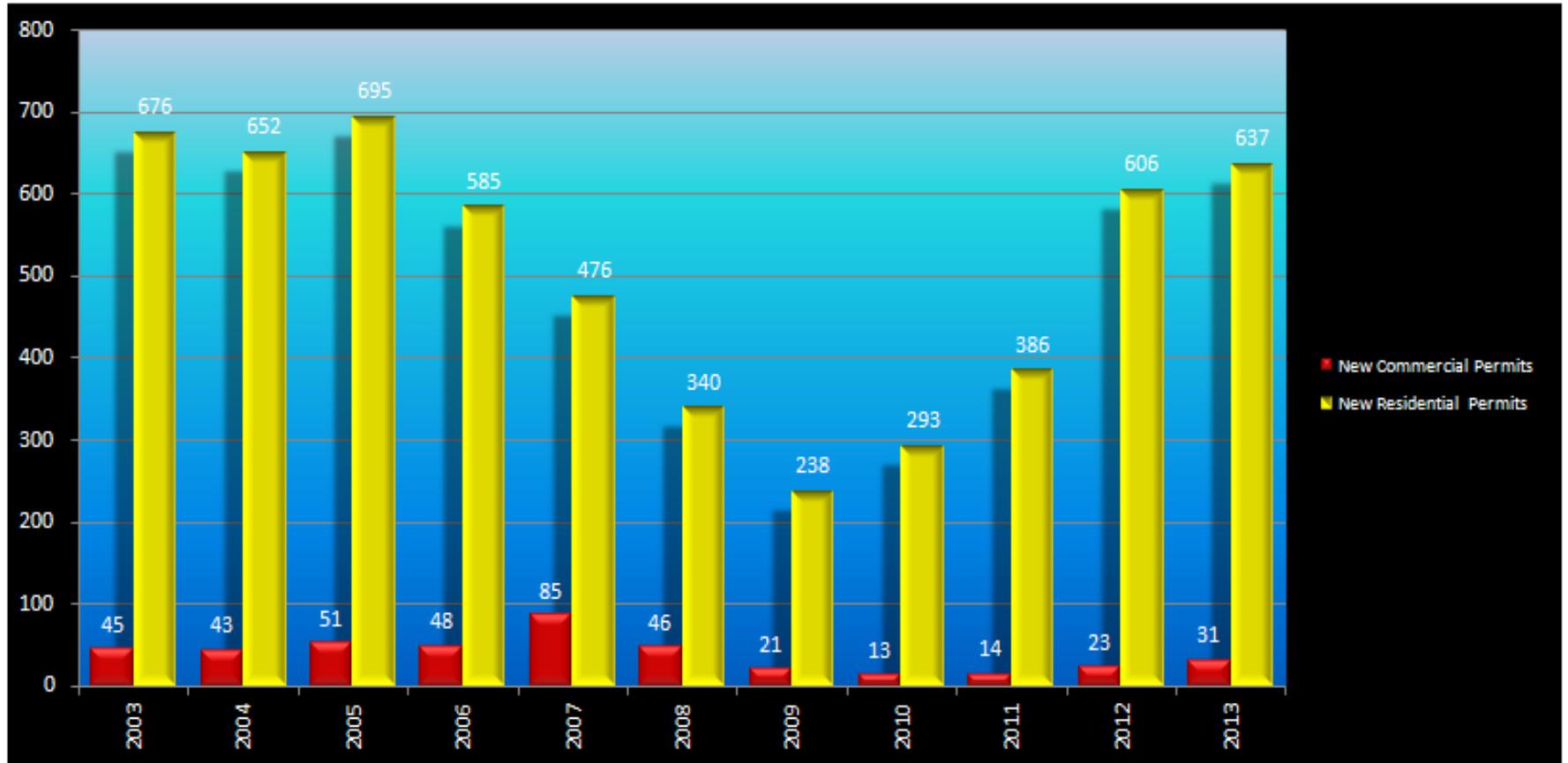
### Measure 9 – Total Building Permits by 2000 Census Tract (2002 – 2013)

Refer to the Map on the Previous Page to see Census Tract Numbers

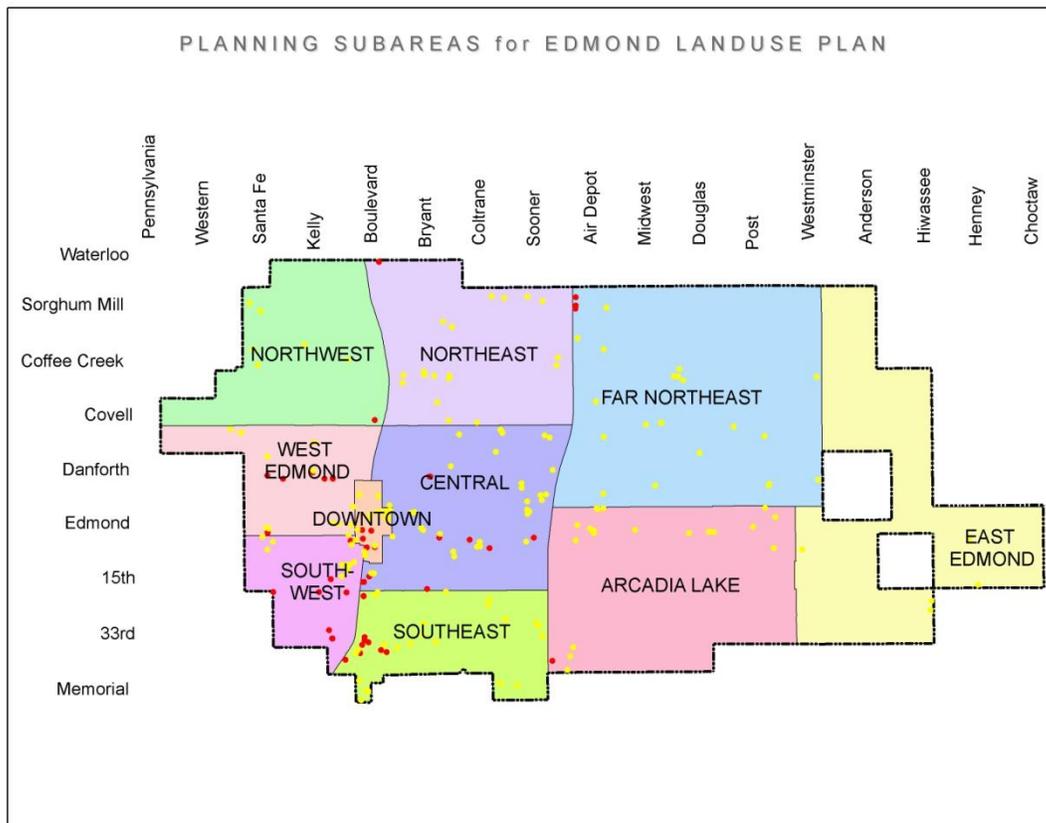


Measure 10 – Total Building Permits by Type (2002 – 2013)

Type of Permit	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Commercial Count	34	45	43	51	48	85	46	21	13	14	23	31
Residential Count	542	676	652	695	585	476	340	238	293	386	606	637



**Measure 11 – Snapshot Vacancies (Dec 2013) for Residential and Commercial**



Subarea	Residential	Commercial
Central	35	11
Southeast	24	10
West Edmond	12	9
Southwest	11	8
Downtown	19	5
Far Northeast	21	3
Northwest	6	2
Arcadia Lake	19	1
Northeast	18	1
East Edmond	5	0
<b>TOTALS</b>	<b>170</b>	<b>50</b>

**Analysis: For Measures 8, 9, 10 and 11:** Measures 8, 9, and 10 show a significant amount of residential growth has occurred east of I-35 and in northern parts of the City, north of Covell Rd. There were also population decreases in some of the older parts of Edmond (dark blue on the map), which may be indicative of increased commercialization and/or changing family residence dynamics in some of these areas. From 2000 to 2010 there was a **111%** increase on the east side of Interstate 35. That growth continues today, as shown in **Measure 9** in tract number **108103**.

**Measure 10** shows that while new residential building permits **declined by 66% from '05 to '09**, new residential permits **increased by 168% from '09 to '13**. In 2012 the housing market came back to life. Real Estate experts say that the strongest housing markets in the country have strong job growth, low vacancy rates and a low foreclosure inventory.

Vacancies in **Measure 11** are a new measure for the 2013 report. Vacancies are recovered through the city's utility data. The map and table on Pg. 21 uses the Planning Subareas to show where these were located as of December, 2013. These same Planning Subareas will be used in the evaluation period for updating the current landuse plan (**Edmond Plan IV**). Vacancies can be an important measure for potential revitalization efforts, whether it is sidewalks, parks, housing rehab, or even additional infill<sup>15</sup> development. While the City has been fortunate to have continued new growth, we are mindful of the quality of older neighborhoods as well.

### **Action(s)**

**Action1: Maintain Vacancy Report** and evaluate opportunities for revitalization efforts, whether it is sidewalks, parks, or other City facilities.

**Action2: Share Landuse Data with the Edmond Economic Development Authority**

As part of Edmond's landuse analysis, it will benefit the Edmond Economic Development Authority (EEDA) and local realtors to provide them with updated landuse data on an annual basis.

**Measures 12, 13:** The following tables show the **percentage of land types by category that are considered undeveloped**<sup>16</sup> (at the time of this report), as well as the **percentages of sensitive land types** within those categories. Measure 12 and measure 13 are a reflection of current zoning landuse categories. Percentages that have increased from the 2012 Sustainability Report may indicate that the zoning has changed. For these measures flood plains are not included because development is prohibited within the FEMA 100 year flood plain, in which case it is protected. The water surface area of Arcadia Lake is also not included in these measures.

**Measure 14** demonstrates a selected set of large developed landholdings to offer perspective and opportunity in areas that may hold **potential for preservation efforts**. These particular land categories have an "exempt" status, or in the case of the flood plains, cannot be developed due to flood plain regulations.

---

<sup>15</sup> Urbanized Infill is undeveloped land area within the "urbanized area", as defined by the US Census Bureau. The urbanized area constitutes the largest and most dense area of settlement, and is sometimes used as a guide to determine the best use for external funding.

<sup>16</sup> Criteria for undeveloped land depended on where it lay within the City. There are undeveloped, platted lots that were counted in the analysis in the urbanized area. Other areas may be working farms or ranch – style homes that have not been platted, and there is the likelihood that they may be redeveloped at some point in the future. Other lots that were included are simply not developed according to the current Zoning map, and may develop as a higher use in future years.

## Measure 12 – Percentages in Undeveloped Acres of Land Categorized from Zoning Ordinance (Title 22)

**Total Area within City of Edmond**                      **54,430**                      acres

	Total Acres	Percentage of Total Area of the City		Acres Covered in Forest	Acres in Prime Farmland	Acres in Potential Remnant Forest	Acres in Potential Archeological Site
Undeveloped Commercial	<b>1,248.38</b>	2.29%		37%	41%	21%	1.70%
Undeveloped Industrial	<b>486.32</b>	0.89%		24%	60%	10%	0.00%
Undeveloped Office	<b>140.05</b>	0.26%		39%	43%	7%	0.00%
Undeveloped Residential	<b>7,210.99</b>	13.25%		51%	37%	21%	1.16%
Undeveloped Agriculture Land	<b>11,554.07</b>	21.23%		54%	33%	29%	6.04%
<b>Totals</b>	<b>20,639.81</b>	<b>37.92%</b>					

## Measure 13 – Percentages in Undeveloped Acres of Land That is Urbanized Infill<sup>17</sup>

	Total Acres	Urbanized Infill Acreage	Urbanized Infill Percentage	Acres Covered in Forest	Acres in Prime Farmland	Acres in Potential Remnant Forest	Acres in Potential Archeological
Undeveloped Commercial	1248.38	<b>816.41</b>	65.40%	17.40%	28.83%	6.12%	0.81%
Undeveloped Industrial	486.32	<b>390.71</b>	80.34%	13.20%	54.71%	5.41%	0.00%
Undeveloped Office	140.05	<b>100.95</b>	72.08%	25.71%	31.98%	7.05%	0.00%
Undeveloped Residential	7210.99	<b>2303.51</b>	31.94%	13.62%	15.10%	6.06%	0.02%
Undeveloped Agriculture Land	11554.07	<b>1296.29</b>	11.22%	6.92%	5.21%	4.12%	0.26%
<b>Totals</b>	<b>20,639.81</b>	<b>4,907.87</b>					

<sup>17</sup> Urbanized Infill is undeveloped land area within the “urbanized area”, as defined by the US Census Bureau. The urbanized area constitutes the largest and most dense area of settlement, and is sometimes used as a guide to determine the best use for external funding. **Since the 2012 Sustainability Report, the urbanized area has increased for the City of Edmond.**

**Measure 14 – Large Land Holders, Estimated Acreages, and Conservation**

Categories	Total Acres	Acres of Impervious Building	Acres of Parking Lots	Acres of Roads and/or Sidewalks	Acres of Surface Water	Acres of Tree and Vegetative Cover	Acres of Open Space and/or Driveways*
<b>Total Land Area</b>	<b>54,430</b>						
FEMA 100 Year Flood Plain (minus Corps Land)	4,902.34	0.27%	0.09%	1.47%	3.66%	23.98%	70.54%
City of Edmond (minus Corps leased land)	1,541.96	1.44%	4.08%	1.95%	1.97%	25.22%	65.34%
Corps of Engineers	3,589.30	0.05%	0.33%	0.93%	43.77%	32.71%	22.21%
Edmond Public Schools	559.55	11.24%	13.02%	2.43%	0.24%	13.14%	59.93%
Religious Institutions	451.26	7.73%	19.76%	2.44%	0.50%	17.81%	51.78%
University of Central Oklahoma	204.21	11.92%	23.82%	4.13%	0.72%	3.17%	56.24%
Edmond Land Conservancy	95.30	NA	NA	NA	NA	2.28%	97.72%
<b>Total Percentage of Land Area</b>	<b>20.84%</b>						

This table offers another perspective, and opportunities for preservation efforts, whether it is planting trees, preserving open space, considering the use of permeable pavement, or other practices that demonstrate environmental stewardship. The table breaks down each landuse category by percentage into the six categories (impervious building, parking lots, roads and sidewalks, surface water, tree and vegetative cover, and open space/drive ways). Landuse Categories were chosen based on their large landholding capacity and “exempt” status, or in the case of flood plains, that which cannot be developed with large impervious structures. These were the acreages as of the end of YR 2013.

Recreational landuses such as the City’s Kickingbird Golf Course, Edmond Service Blake Soccer Complex, and the many other sports fields among the schools and university are included in the “Open Space” calculation. **Note: Driveways are also included along with “Open Space.” Currently, the degree of difficulty in differentiating those two landuse types within the City’s datasets is too great.** Common areas, detention and retention ponds, greenbelts, trails, and walking easements are also included. The percentage of surface water may also include irrigation structures in some instances.

**Analysis:** Undeveloped properties zoned for commercial, industrial, office, residential, and agricultural comprised approximately **38% (20,640 acres)** of the land area in Edmond at the end of 2013. There is a considerable amount of land in Edmond to be developed, but also considered for preservation efforts. Development is currently occurring at a rapid pace, so this percentage is expected to drop significantly in the coming two years. The opportunity for preservation efforts are determined by market factors, and public, private, and non-profit investment in those activities, plus the collective importance that is placed on sensitive areas with each new development. Identification of sensitive areas, consideration about their relative value, and determining how they are integrated into the City's system of busy streets and urbanized areas is a critical component of how the City will continue to develop.

Of the 20,640 acres of undeveloped land in Edmond, approximately **4,907.87 acres**, or **23.78%** is in the **urbanized area**. Here also lies an opportunity for infill development.

**Action(s):**

**Action 1: Keep Inventory of Undeveloped Land and Sensitive Areas**

The City will inventory **undeveloped land acreages and sensitive areas**, and continue to find ways of protecting or restoring relevant areas where possible, incorporating them into a network of parks, open space, trails, and other natural corridors.

**Action 2: Green Infrastructure Initiative**

The **Green Infrastructure Initiative** began in 2008 with a grant from the Oklahoma Department of Agriculture, Forestry Services. Through this initiative a committee was formed among local stakeholders and City staff to analyze and mitigate the impacts of development across Edmond in regard to its ecological systems. An informal partnership was created between the City of Edmond and the Edmond Land Conservancy<sup>18</sup> – a nonprofit land trust organization committed to preserving, creating, and improving Edmond's natural, scenic and outdoor recreational environment. Many of the ideas that came forth in the initiative were inspired by an earlier document, The Edmond Greenprint (2003).

The 2012 Green Infrastructure Report can be found online at <http://www.edmondok.com/DocumentCenter/Home/View/1629>



**Low Impact Development** is defined as an ecosystem-based approach to land development and stormwater management. LID practices can help protect the natural hydrology of watersheds.



One **activity** that Edmond's Stormwater Engineering department spearheaded in 2013 was a demonstration project for permeable pavement. This parking lot is located just east of the Planning and Public Works building at 10 S Littler.

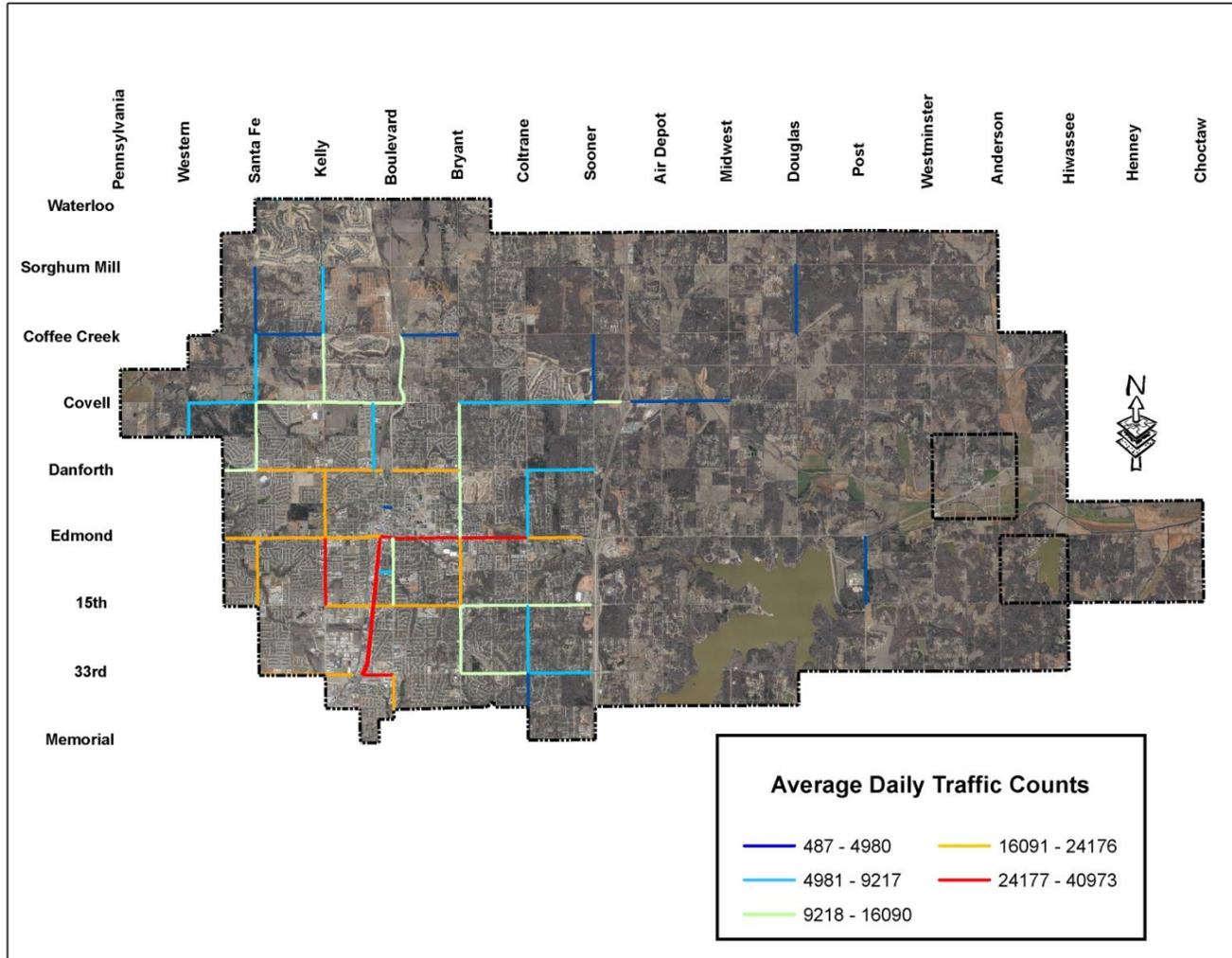


Logo for the Edmond Land Conservancy

<sup>18</sup> [Edmond Land Conservancy Home Page](#)

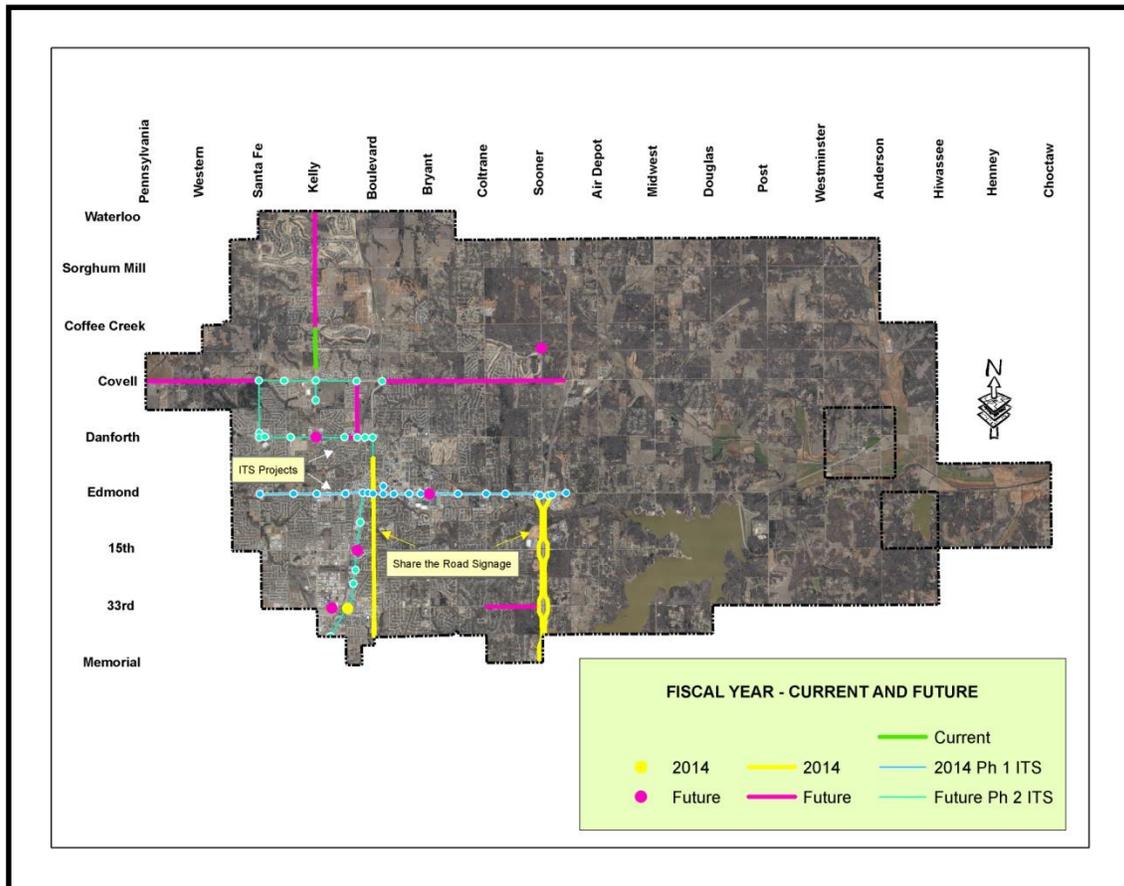
**Measure 15:** Traffic Counts largely determine where improvements to the City’s transportation network are needed. The map below is generally reflective of where the heaviest average daily counts were in the City for CY 2013. The City also takes into account where the City is continuing to grow and where it will be in need of future facilities.

Measure 15 – Average Daily Traffic Counts – CY 2013



**Measure 16:** The City’s Traffic Planners are addressing today’s traffic concerns through roadway improvement projects and new traffic management technologies. Keeping traffic moving is important for a number of reasons; one being that increased congestion contributes to increased levels of greenhouse gas emissions. Poor air quality can also result in respiratory diseases such as asthma, chronic bronchitis, and emphysema. In addition, a status of “non-attainment” in the National Ambient Air Quality Standard would require our region to undertake several federally mandated actions that would result in an increased financial burden for local residents, businesses, and government. Below is a map reflecting the current improvement projects that the City has planned, or will soon be underway.

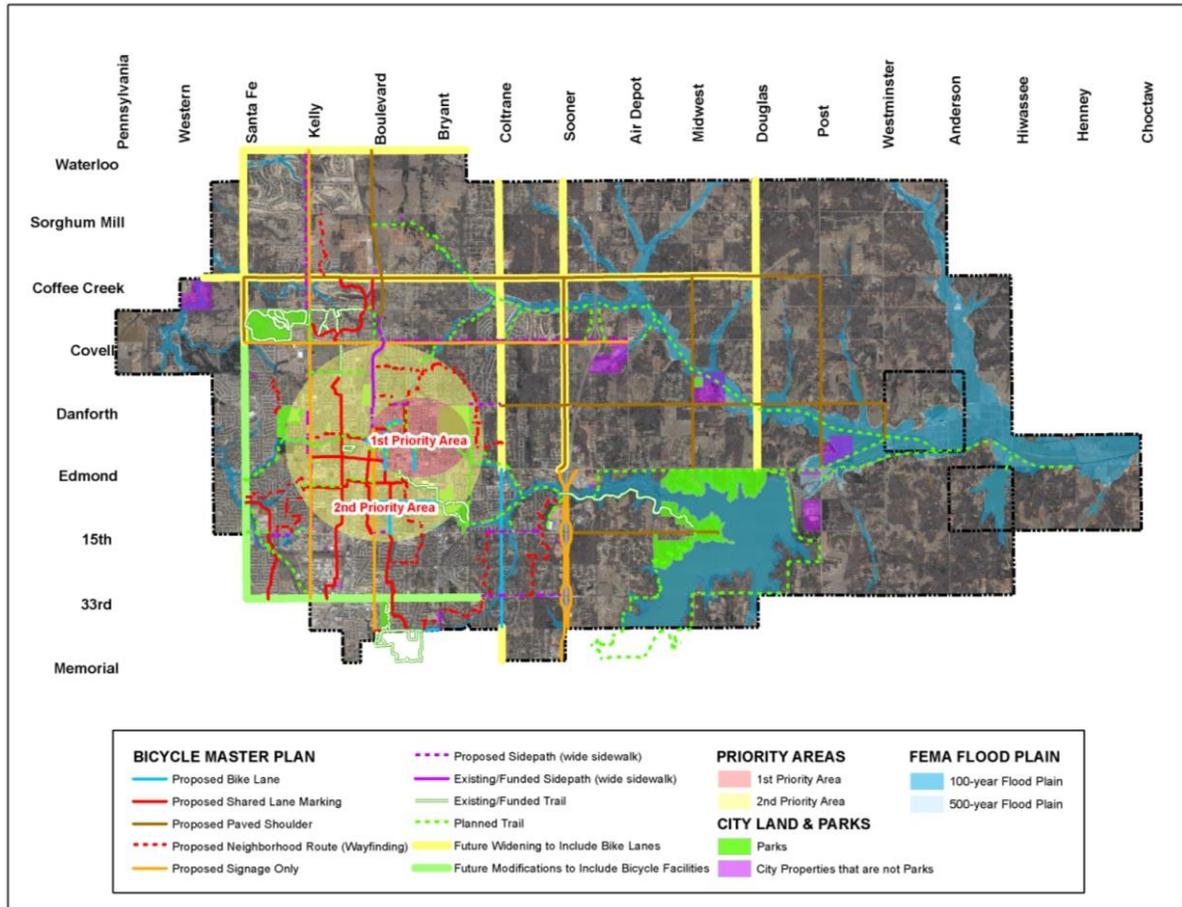
### Measure 16 – Planned Traffic Projects



Street Improvements and Widening				
FY	Name	Estimated Cost	Edmond Share	Multi-modal
2013	Kelly Ave Widening, N of Covell to S of Coffee Crk	\$5,934,304.00	\$1,186,860.80	5 ft Sidewalks
2014	"Share the Road" Signage Project - Bicycles	\$86,700.00		
Future	Danforth Widening, Thomas to Fretz	\$4,890,628.85	\$978,125.77	5 ft Sidewalks
Future	Thomas Widening, Danforth to Covell			
Future	33rd St Widening, Coltrane to Interstate 35	\$3,911,046.00	\$782,209.20	10 ft Multi-use Trails
Future	Covell Widening, Fairfax to I-35 Southbound On/Off Ramps	\$10,455,267.77	\$2,091,053.55	
Future	Covell Widening, Santa Fe Ave to West City Limits	\$5,500,000.00	\$1,100,000.00	10 ft Multi-use Trails
Future	Covell Widening, Broadway to Fairfax			10 ft Multi-use Trails
Future	Kelly Ave Widening, Coffee Creek to Waterloo	\$7,000,000.00	\$1,400,000.00	5 ft Sidewalks
Intersection Improvements and Bridge Replacements				
FY	Name	Estimated Cost	Edmond Share	Multi-modal
2014	Phase I Intelligent Transportation System	\$2,992,679.00	\$598,535.80	
2014	33rd Street and Broadway	\$4,936,296.62	\$1,974,518.65	5 ft Sidewalks
Future	Phase II Intelligent Transportation System	\$2,947,625.00	\$589,525.00	
Future	Sooner Rd Bridge Replacement, .6 Miles N of Covell	\$2,158,434.38	\$431,686.88	5 ft Sidewalks and Trail
Future	Danforth Rd and Kelly Avenue	\$4,613,253.79	\$922,650.76	5 ft Sidewalks
Future	15th Street and Broadway	\$495,939.00	\$138,862.92	5 ft Sidewalks
Future	2nd Street and Bryant	\$3,811,731.86	Unknown	5 ft Sidewalks
Future	33rd Street and Technology Drive	\$2,250,000.00	\$450,000.00	5 ft Sidewalks

**Measure 17, 18:** The **Bicycle Master Plan**<sup>19</sup> describes a planned network of trails and on-street bicycle/pedestrian corridors to promote bicycling as a viable form of transportation throughout the City. This enhances the 1999 Edmond Trails and Sidewalk Master Plan to include on-street bicycle facilities. Below is a map of the Bicycle Master Plan, with overlays for City properties, parks, and FEMA flood plains. A copy of this plan can be found online at <http://edmondok.com/DocumentCenter/View/1725>. A measure of **existing total trails and bicycle lane/path lengths** will tell us how well we are implementing this plan.

### Measure 17 – Bicycle Master Plan



Existing Trails	Trail Type	Linear feet	Miles
Arcadia	Hiking Path	15,129.52	2.87
Arcadia	Equestrian Path	25,867.00	4.90
Arcadia	Mountain Bike Path	50,535.58	9.57
Covell Sidepath	Multi-Use Sidepath	10,530.88	1.99
Kelly Sidepath	Multi-Use Sidepath	5,892.89	1.12
Boulevard Sidepath	Multi-Use	5,609.27	1.06
University Bike Lanes	Bike Lanes	10,321.95	1.95
Bickham-Rudkin Park	Multi-Use	6,121.69	1.16
Fink to Hafer Trail	Multi-Use	6,196.27	1.17
Hafer Park Trail	Multi-Use	8,821.08	1.67
Mitch Park Trail	Multi-Use	24,821.14	4.70
Coffee Creek Trail	Multi-Use	11,381.21	2.16
Thomas Trail	Multi-Use	2,977.63	0.56
<b>Total</b>			<b>34.89</b>

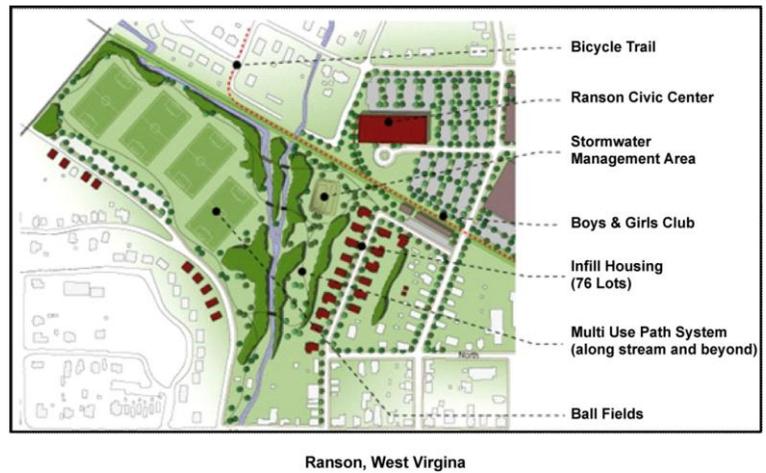
### Measure 18 – Existing Trails and Trail Lengths

For dual sidepaths, where they have been installed parallel on opposite sides of an arterial, only one length is counted in the total miles.

Bike lanes are one-way, so all lengths are included.

<sup>19</sup> The 2012 Edmond Bicycle Master Plan was created by Kimley-Horn and Associates, Inc., Toole Design Group, and CP&Y

**Analysis:** City traffic projects require a significant amount of federal funding, as do most communities in growing urban areas. These dollars, garnered through gasoline taxes, are allocated back to state agencies, based primarily on a region's population. Without them, it would be difficult to effectively manage the traffic in Edmond. Funding for capital projects such as trail extensions will continue to be a challenge, but recently has gained much support from federal funding agencies<sup>20</sup> with the recognition that there needs to be a focus not just on roadway widening, but the accommodation for all modes of travel. See example to the right.<sup>21</sup>



Since the 2012 Report, **5.12 miles** of trails have been added to the City transportation network. Sidepaths that were incorporated into the Covell and Kelly widening projects are 10 feet wide. The Bicycle Master Plan recommends that future sidepath facilities should be designed to meet the *AASHTO Guide for the Development of Bicycle Facilities*. Also, the City's first bike lanes were incorporated along University Drive, as recommended in the first priority area of the Bicycle Master Plan. These lanes total **1.95 miles**.

### Action(s)

**Action 1: Multi-modal transportation** means that the City of Edmond is taking every opportunity to encourage other modes of transportation, whether it is walking, riding a bike, taking a bus, or carpooling. On several roadway projects there is the incorporation of 10 foot multi-use sidepaths for bikes and pedestrians, as shown in the table for Measure 16. These are primarily aligned with the Edmond Trails and Sidewalk Master Plan, but will also begin to reflect the 2012 Bicycle Master Plan.

The City has also recently begun implementation on new trails and trail extensions. The extension of the Spring Creek trail east of I-35 to Arcadia Lake has been fully funded and is expected to be completed by the Fall of 2014. Another new trail near Fox Lake will extend from the Mercy Health Center south of 15<sup>th</sup>, head north behind the I-35 Wal-Mart and Sam's Club and meet up with the trail head for the Spring Creek Trail at a new planned Wellness Park.

**Perhaps the most exciting trail is the planned loop for Arcadia Lake.** A private/public coalition has been formed between the City, the Edmond Land Conservancy, and private stakeholders to fully fund a multi-use and/or bicycle trail around Arcadia Lake. The trail length, when completed, should be between 18 and 19 miles in length. The Spring Creek Trail extension will be the first phase of this trail. For more information about this exciting venture, visit the website at <http://arcadialaketrail.com/>. See the map on the next page.

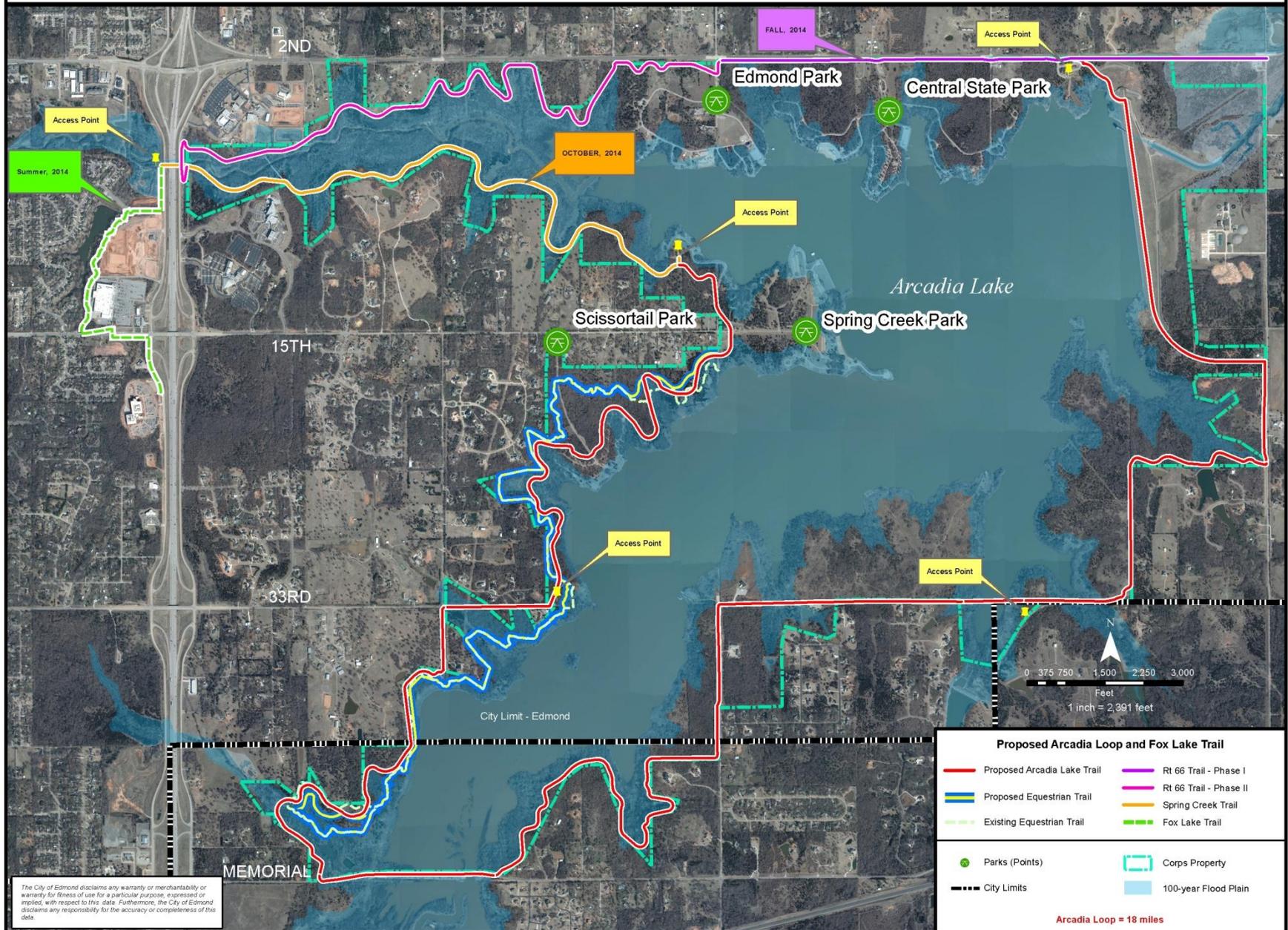
Bike and pedestrian facilities are needed enhancements, supported by the majority of residents, as shown through community surveys ('06, '08, '11).

As funding becomes available, whether it is from grants or private investment, or committed sales tax revenues, trail projects will continue to be reviewed and considered for implementation by City staff, the Edmond Bicycle Committee, and the Parks & Recreation Advisory Board.

<sup>20</sup> The US Department of Transportation (DOT), the US Department of Housing and Urban Development (HUD), and the Environmental Protection Agency (EPA) have joined in the common initiative to support sustainable communities. <http://www.sustainablecommunities.gov/>

<sup>21</sup> Ranson, West Virginia aligned planning grants and assistance from the DOT, HUD, and the EPA to integrate affordable housing, economic development, and transportation.

# CONCEPTUAL MAP ARCADIA LAKE TRAIL and FOX LAKE TRAIL



The City of Edmond disclaims any warranty or merchantability or warranty for fitness of use for a particular purpose, expressed or implied, with respect to this data. Furthermore, the City of Edmond disclaims any responsibility for the accuracy or completeness of this data.

## Action(s) Cont'd.

**Action2: Intelligent Transportation Systems (ITS)** uses modern communications, field devices, computers, and software to accomplish the following goals.

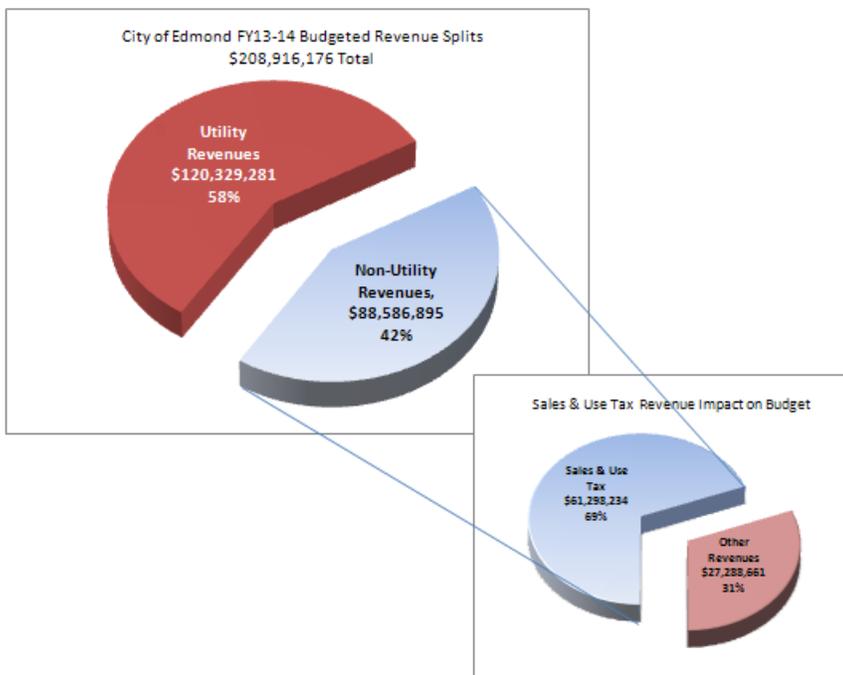
**Improve Safety and Mobility** – ITS should facilitate the management of traffic during congested periods, construction and maintenance activities, weather events, and incidents such as crashes and emergencies. ITS should reduce the number and severity of crashes and improve travel time. One estimate claims that \$16 would be saved by motorists for every ITS dollar spent on signal timing.

**Enhance Security** – The system should support the statewide goal of enhancing security by continuous monitoring of the roadway network and providing the tools to respond to emergency situations by quickly allowing the changing of traffic patterns.

**Increase Agency Efficiency** – ITS should assist staff in the overall monitoring of the roadway network for failures, and provide tools to reduce staff time for response to traffic disruptions, troubleshooting, general maintenance activities, and an overall reduction in system failures.

**Measure 19:** City of Edmond sales tax plays a vital role in providing the quality of services that give Edmond residents a higher quality of living. Shoppers in Edmond pay 8.25 percent sales tax on purchases; 4.5 percent of that goes to the State, and 3.75 percent of the money is returned to the city. Edmond has one of the **lowest** sales tax rates in the state for a city this size, and the City does not collect property tax. The following graph for **FY 13-14** is indicative of the yearly percentage that sales tax generates toward Edmond's Budget.

Measure 19 – Sales & Use Tax Revenue Effect on Budget<sup>22</sup>



**Analysis:** This measure is listed under **Landuse and Transportation** because there must be this consideration when there are discussions about landuse decisions in Edmond. Sales tax funds **69% of the City's General Operating Budget**. Other revenues are generated through intergovernmental grants (alcohol and cigarette taxes, vehicle and gas taxes), licenses and permits, fines and forfeitures, charges for services, and interest.

**Action: Promote shopping in Edmond through Marketing and other Public outreach efforts.**

<sup>22</sup> Graphic provided by City of Edmond Office of Finance

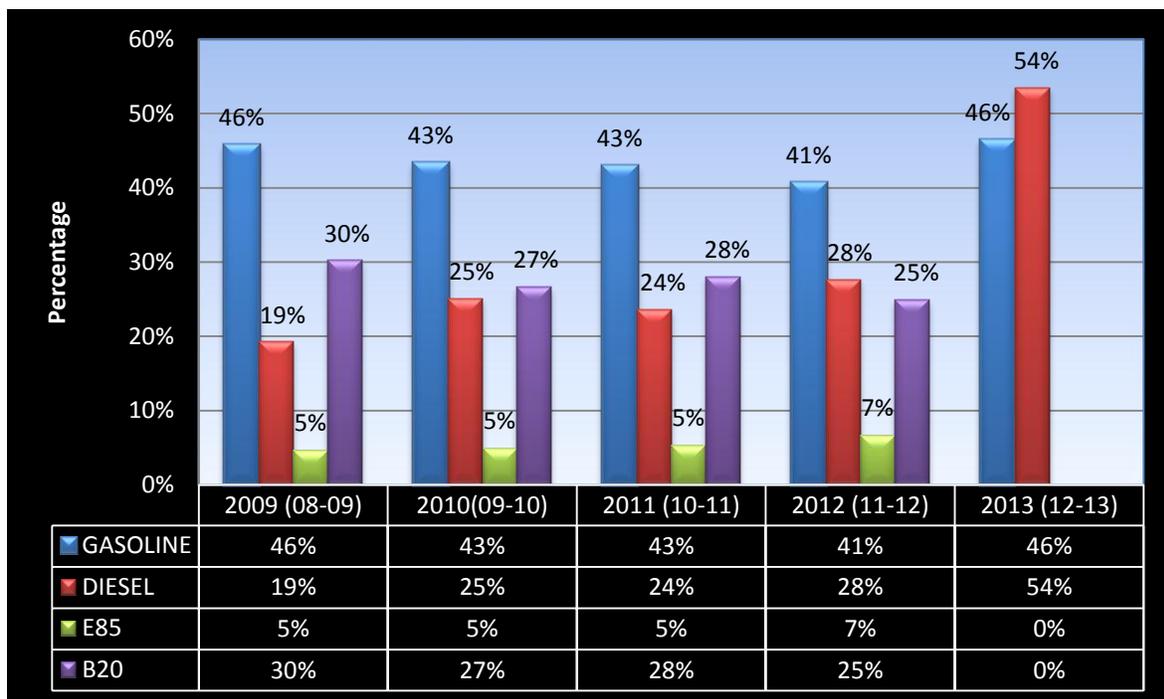
## Alternative Fuels and Public Transportation

**Value:** Transitioning to cleaner alternative fuels will reduce GHG emissions and dependence on fossil fuels, while reducing the costs associated with higher gasoline prices. Also, the City began operating its own public transportation service, Citylink, in FY 10. This service has the impact of reducing overall emissions, providing Edmond residents needed mobility, while lessening the number of cars on the road and aiding Central Oklahoma’s efforts towards keeping air quality within acceptable parameters.

**Goal:** Improve transportation efficiency and decrease emissions through the use of alternative fuels, and the availability of public transportation options. The qualitative goal for alternative fuels has been to transition to CNG, electric hybrids, and LPG<sup>23</sup> over the next 5 years. Citylink buses were the first to be converted to CNG and LPG, though LPG was used in the latter part of 2013 and so isn’t shown in this report.

**Measures 20, 21, 22, 23:** A large percentage of Edmond’s Total Vehicle Fleet is capable of using alternative fuels, such as E85. Alternative fuels are important to measure as we reduce our emissions, relative fuel costs, and dependence on fossil fuels. Percentages of alternative fuel for the City, fuel costs, equivalent CO<sub>2</sub>, and vehicle counts for each department with associated eCO<sub>2</sub> are shown in the following measures.

**Measure 20 – City of Edmond Fleet – Alternative Fuel Percentages<sup>24</sup>**



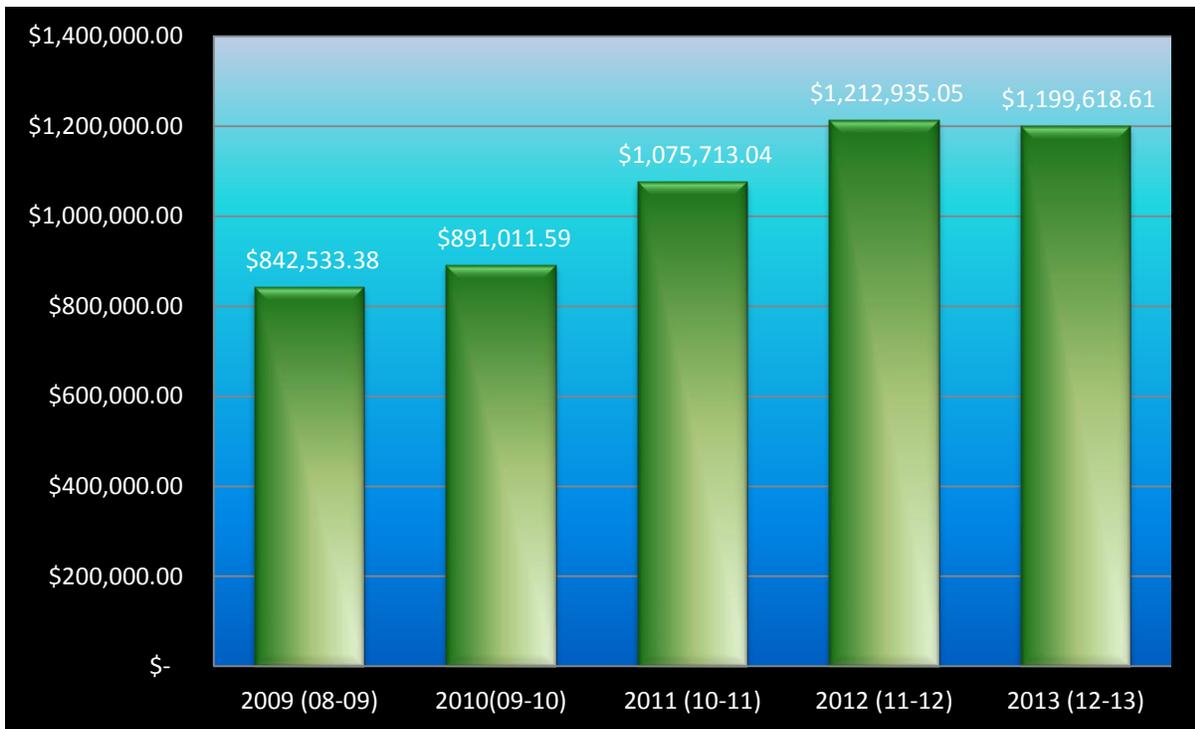
E85 and B20 blends, and ULSD<sup>25</sup> are favorable alternatives for the environment. Due to cost and associated maintenance issues with E85 and B20, however, the City is investigating other options for alternative fuels, such as LPG. ULSD and clean diesel technologies are being utilized to reduce emissions.

<sup>23</sup> **LPG** (Liquified Petroleum Gas) is stored as a liquid, primarily consisting of propane. It evaporates into gas in an internal combustion engine, and is also a cleaner burning fuel. It is also non-corrosive and non-toxic, which results in less maintenance costs for vehicles.

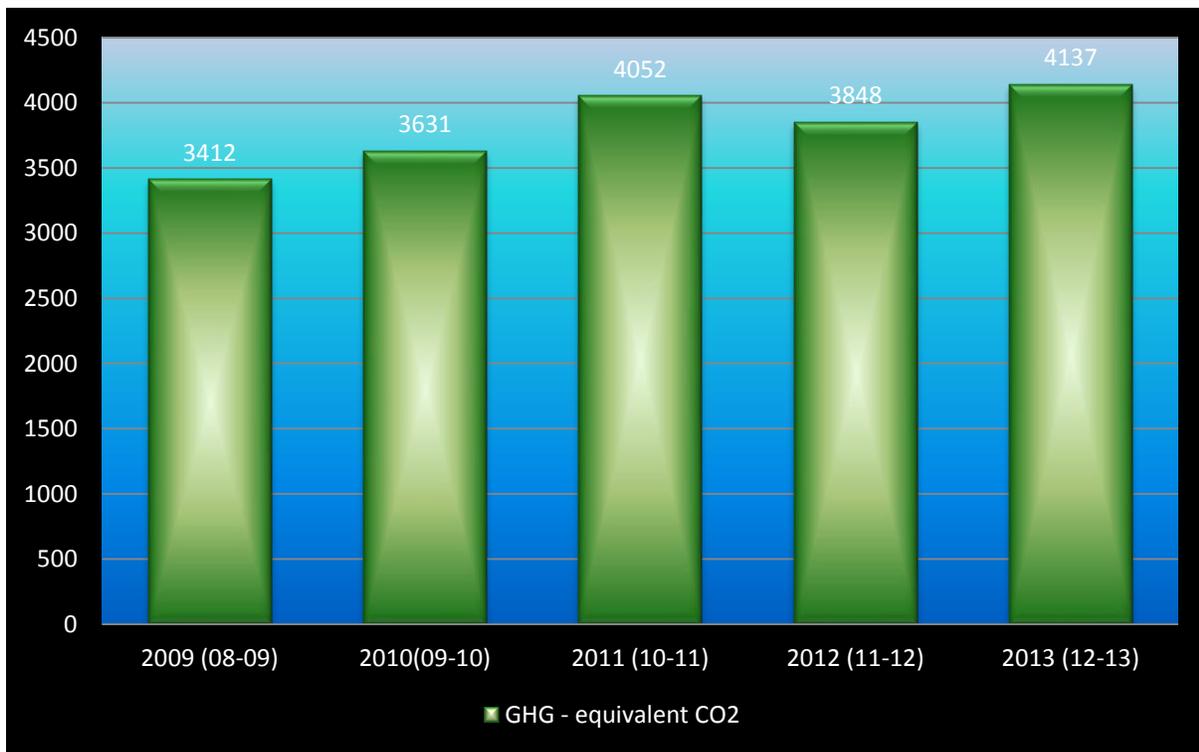
<sup>24</sup> Due to a clerical error in the 2012 Sustainability Report, percentages for diesel and E85 are different.

<sup>25</sup> **E85** is a fuel blend that is 85% ethanol and 15% gasoline. Ethanol fuel (ethyl alcohol) is made by fermenting and distilling starch crops, such as corn. **B20** is a fuel blend of 20% biodiesel and 80% petroleum diesel fuel. Biodiesel is a natural and renewable fuel alternative also made mostly from vegetable oils, soy and corn. **ULSD** (Ultra Low Sulfur Diesel), coupled with advanced emission control technology can decrease exhaust from these engines by more than 90%.

### Measure 21 - City of Edmond Fleet - Fuel Costs



### Measure 22 - City of Edmond Fleet - Total Equivalent CO<sub>2</sub> (metric tons)



**Measure 23 - City of Edmond Fleet  
Vehicle Counts and Total Equivalent Co<sub>2</sub> (metric tons)**

DEPARTMENT	2009 Count	GHG (eCO <sub>2</sub> )	2010 Count	GHG (eCO <sub>2</sub> )	2011 Count	GHG (eCO <sub>2</sub> )	2012 Count	GHG (eCO <sub>2</sub> )	2013 Count	GHG (eCO <sub>2</sub> )
City Clerk*	1	5	1	5	1	7	1	12	2	3
Animal Control	6	41	6	45	6	59	5	35	5	40
Arcadia Lake	9	26	7	45	9	55	7	35	8	57
Building	10	48	10	43	9	60	13	42	11	50
Cemetery	4	6	4	7	4	8	4	10	4	6
Citylink	1	0	17	218	9	520	12	379	12	407
Community Image	4	17	5	17	5	29	5	17	7	24
Drainage Utility	2	4	2	5	2	2	2	2	2	2
Electric	39	279	40	274	40	424	42	311	41	353
Electric Warehouse	2	2	2	4	2	6	2	6	2	4
Emergency Management	2	11	1	1	1	1	3	8	2	7
Engineering Admin*	1	6	1	6	1	8	1	6	1	6
Engineering Inspections	4	21	4	19	5	22	5	8	4	17
Facility Maintenance	8	24	7	29	8	41	6	27	6	40
Fire	41	251	38	331	40	200	43	258	45	253
Fleet Management*	0	0	0	0	0	0	5	13	7	15
IT	1	1	1	0	1	2	1	2	1	2
Kickingbird Golf*	0	0	0	0	0	0	1	0	0	0
Meter Utility*	17	108	19	102	18	98	7	19	4	11
Mitch Park	3	14	2	14	3	20	2	35	3	13
Parks*	10	36	8	42	7	61	7	40	7	40
Park Recreation*	1	1	1	1	1	1	1	1	1	0
Police	135	894	158	767	156	535	155	896	165	966
Risk Management	1	0	1	1	1	1	1	1	1	7
Senior Center	2	13	2	12	3	18	3	14	3	17
Solid Waste Commercial	8	242	8	235	9	387	7	205	9	273
Solid Waste Residential	22	538	18	490	18	460	18	467	20	558
Solid Waste Roll Off	2	54	2	54	2	104	2	72	2	76
Street	42	320	46	374	42	344	44	318	44	283
Traffic Control Signs	1	25	2	26	1	38	1	17	1	16
Traffic Control Signals	4	34	4	39	3	40	3	45	3	41
Urban Forestry	1	1	1	1	2	5	3	11	4	11
Utility Services*	0	0	0	0	0	0	14	47	14	131
Vehicle Maintenance	0	0	0	0	1	2	1	2	1	3
Wastewater Line Maintenance	18	131	20	154	17	145	16	137	17	127
Wastewater Plant	4	24	5	29	7	35	4	23	5	22
Water Line Maintenance	19	156	19	160	21	165	19	163	22	164
Water Plant	6	22	5	24	8	61	8	22	8	37
Water Wells	3	57	4	57	3	88	4	142	5	55
<b>Totals: Vehicle Counts and eCO<sub>2</sub></b>	<b>434</b>	<b>3412</b>	<b>471</b>	<b>3631</b>	<b>466</b>	<b>4052</b>	<b>478</b>	<b>3848</b>	<b>499</b>	<b>4137</b>

**Analysis:** As part of the Strategic Operating Plan for the City of Edmond, all departments are encouraged to include sustainable practices as a regular part of their processes. Just a couple of notables for consistent vehicle emissions reductions from 2011 to 2013 are the Wastewater Division and Traffic Signs departments. Overall, between FY 2011 and 2013, **GHG emissions increased by only 2% with the addition of 33 vehicles to the fleet.**

**Note:** Departments with an (\*) are either new additions or have changed names from the 2012 Sustainability Report.

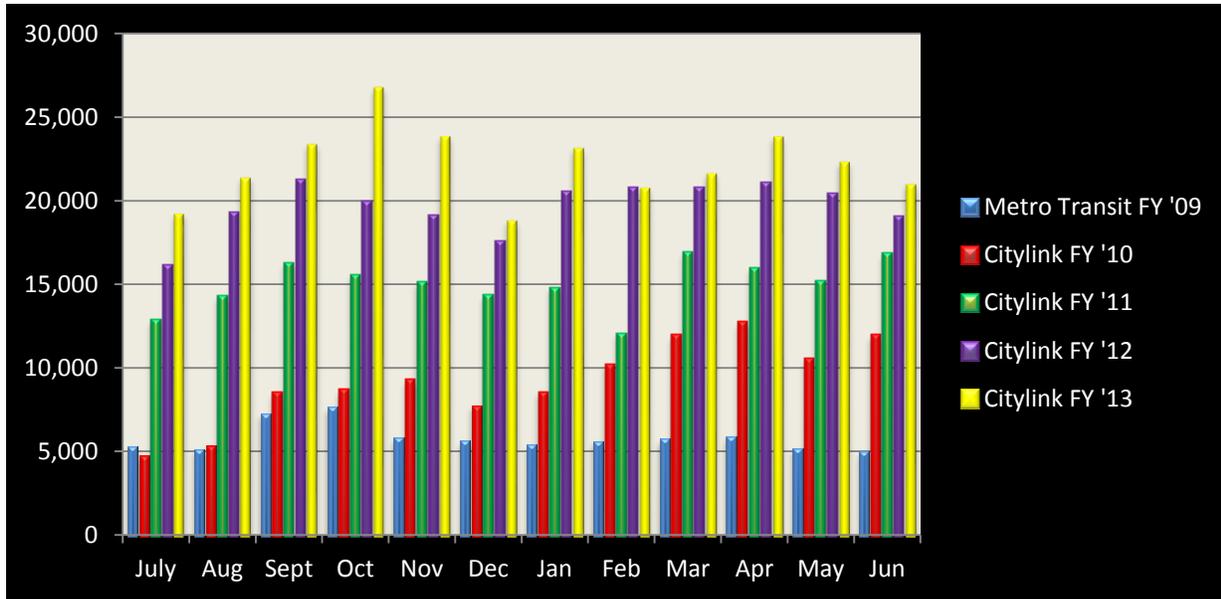
**Action(s): Add additional alternative fuel vehicles to the fleet, such as PHEV, CNG, and LPG**

**Action 1: Plug-In Hybrid Electric Vehicle (PHEV):** In 2006 the City approved Resolution 02-06, directing the City Manager to pursue plans supporting the utilization of plug-in hybrid electric vehicles. Through the US Department of Energy (ARRA), funding was received by Edmond Electric to convert a utility truck with this technology. This truck now serves as an alternative fuel vehicle due to the electricity being utilized, and the electrical power is provided by wind power, thereby making it a renewable alternative fuel vehicle.

**Action 2: Compressed Natural Gas (CNG) and Liquefied Petroleum Gas (LPG):** Through the US Department of Energy (ARRA), three buses have been converted to CNG. As of 2013, an additional five buses use LPG and a propane fueling station has been added to the facilities at Vehicle Maintenance, though those will not be shown in this report due to the time those were implemented. LPG is a mixture of propane (90%) and other gases.

**Measure 24, 25, 26:** Measuring **Citylink** passenger counts, as well as wheelchair and bicycle boardings by route helps determine potential infrastructure and accessibility investment required to serve all transportation users. Measures that are important to note are the **Citylink Yearly Ridership Comparison**, and the **Citylink Total Wheelchair and Bicycle Boardings**. In addition, one graph is shown from the **2011 Citylink Customer Survey**, which is useful for understanding why a transit service is important in Edmond.

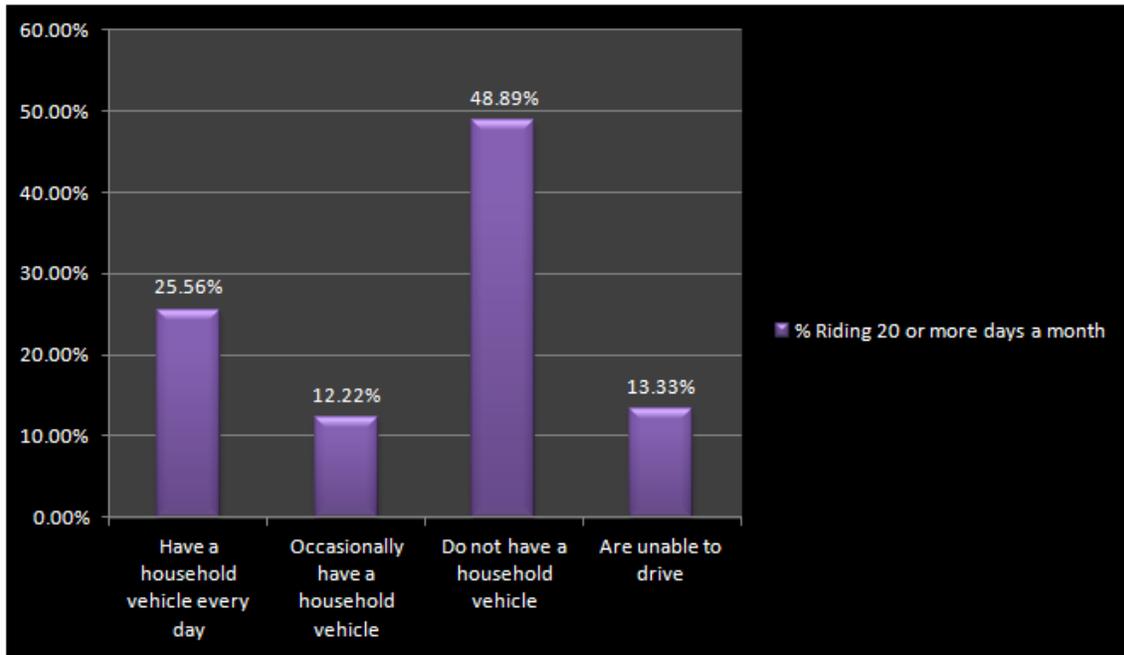
Measure 24 – Citylink Yearly Ridership Comparison (FY '09 – FY '13)



Measure 25 – Citylink Total Wheelchair and Bicycle Boardings (FY '13)

Route	Wheelchairs 2013	WC Pct Chg from 2011	Bikes 2013	Bike Pct Chg from 2011
Rt. 1	1391	64%	829	76%
Rt. 2	520	24%	639	31%
Rt. 3	156	875%	479	648%
Rt. 4	210	-14%	300	76%
100X	231	28%	1441	39%
CAPS	880	21%	0	0
<b>Total</b>	<b>3388</b>	<b>39%</b>	<b>3688</b>	<b>66%</b>

**Measure 26 – Citylink Survey (FY '11)**  
**From 90 respondents, or 41.7% of all respondents,**  
**Those Riding 20 or more days a month**



**Analysis: Ridership increased by 289%** from FY 08-09 to FY 12-13 (that is from 68,159 riders/year to 265,000 riders/year). The rising cost of fuel, the convenience of the bus service, the added benefit of accommodating bikes and wheelchairs, the quality of the buses, the efficiency and timeliness of the bus routes, courteous drivers, and the fact that the service is free, have all contributed to increased ridership.

As shown in **Measure 25**, all Citylink buses are equipped with wheelchair lifts and bike racks. The use of these racks has increased dramatically since 2011. The percentages shown in the table indicate the rising popularity of these intermodal transportation options. In **2013**, dramatic increases were seen when routes 3A and 3B were consolidated to create a more efficient and effective route, which is now shown as Route 3. Free Wi-Fi service is also available on the Expresslink buses as well as throughout Downtown Edmond, including the Citylink Transfer Center. In addition, the entire Citylink fleet is fueled with either Compressed Natural Gas, Propane, or Ultra Low Sulfur Diesel, which make them a cleaner alternative for the environment. Unleaded fuel is used only as a backup.

As shown in **Measure 26**, according to the Citylink Customer Survey (Fall, 2011), nearly 42% of passengers use Citylink more than 20 times per month. From those passengers, **more than 62% do not have a household vehicle or are unable to drive.**

**Action(s): The City of Edmond will consider expanding the Citylink service** as demand warrants and additional funding sources become available. The Edmond Public Transportation Committee may request funds annually for ADA, bicycle and pedestrian infrastructure improvements along transit routes. Also, a larger, permanent multi-modal transfer center is under consideration in the downtown area, which will serve as a hub not only for Citylink and other local services, but will accommodate space for commuter rail, should it be developed in Central Oklahoma. It will also include bicycle facilities and provide for greater pedestrian access to transit and overall connectivity to the downtown area. The buses also may be stored at this location, reducing the multiple daily ‘deadhead’ trips to and from Crosstimbers Vehicle Maintenance at I-35 and Covell Rd.

## Solid Waste and Recycling

**Value:** Recycling is an important way for residents and businesses to reduce the waste they generate and reduce the negative impact of that waste. Recycling conserves our natural resources, saves landfill space, conserves energy, and reduces water pollution, air pollution and greenhouse gas emissions. Recycling isn't just good for the environment; it is also good business, driving both employment and an innovative industry that re-uses the material for new recycled products. Together, reducing, reusing, recycling, and buying recycled products make up a comprehensive waste and resource reduction strategy that benefits the natural world and the economy. When businesses and residents recycle in Edmond, one hundred percent of the recycled material is taken to Republic Services, Allied Waste Division in west Oklahoma City, where it is processed and shipped to recycling markets.

**Goal:** The goal is to have an upward trend in the amount of material that is recycled.

**Measure 27 - 32:** The following graphs look at the City of Edmond's Solid Waste and Recycling Program.

**27** Total Volume of Recycled Material in Tons

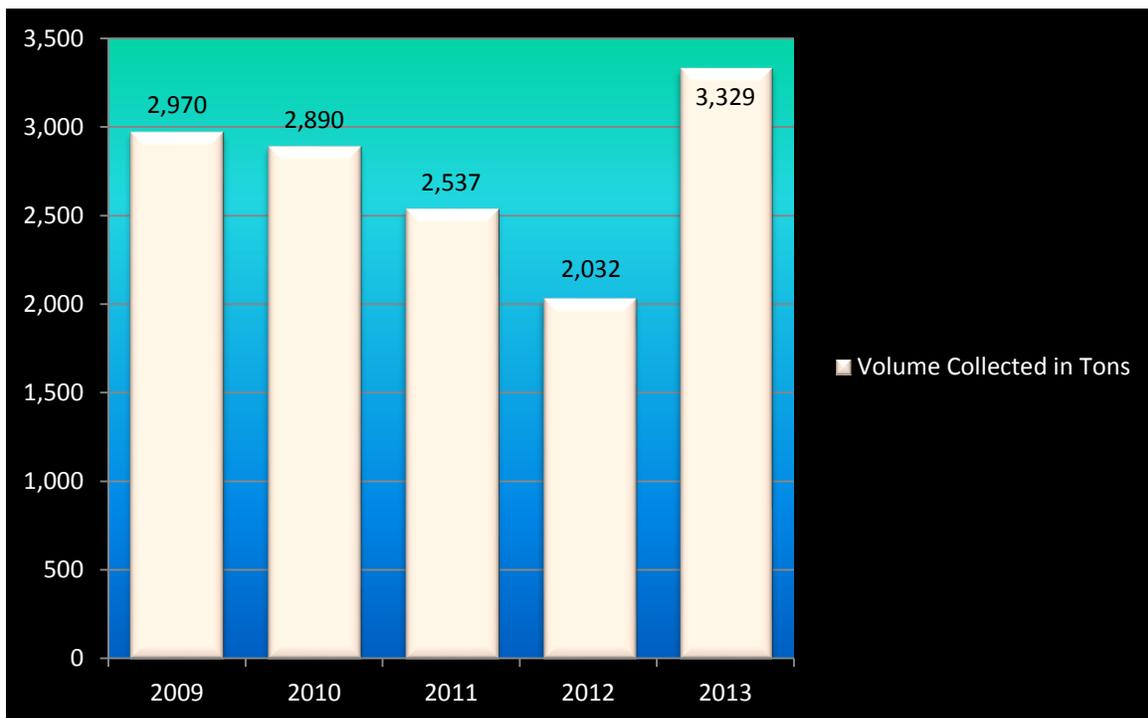
**30** Recycled % of Residential and All Waste Generated

**28** Curbside Average % Participation Rate

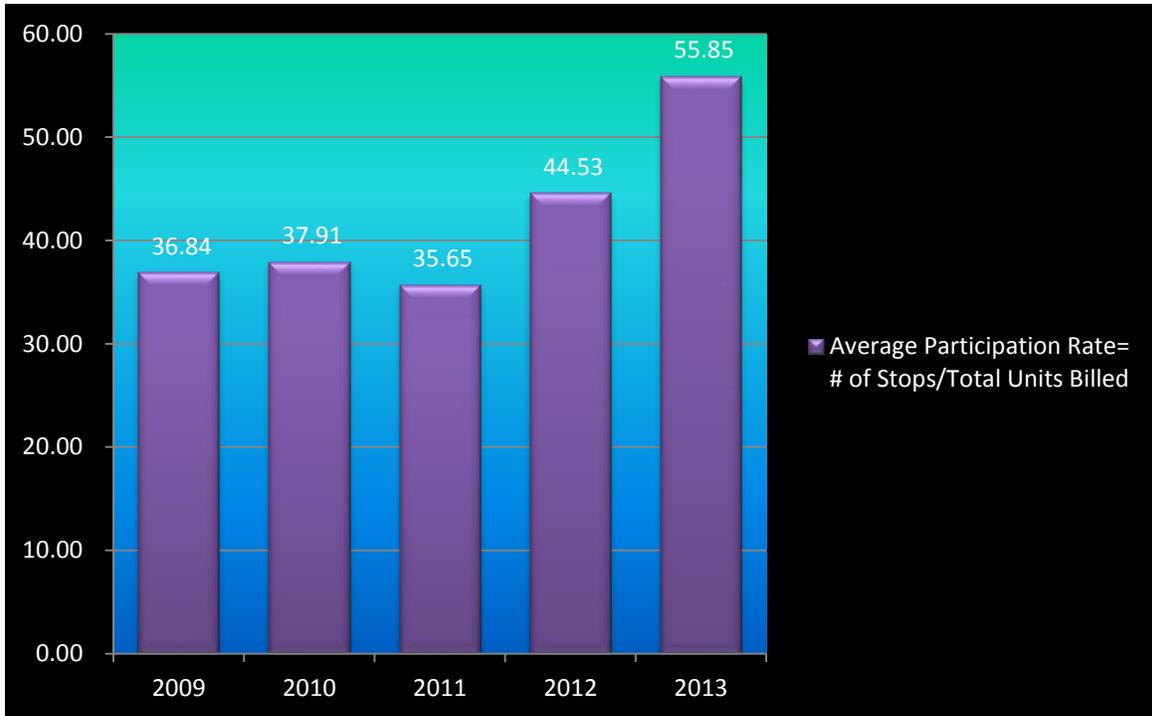
**31** Curbside Household Hazardous Waste Collection (Tons)

**29** Curbside Recycling Participation Rate by Month

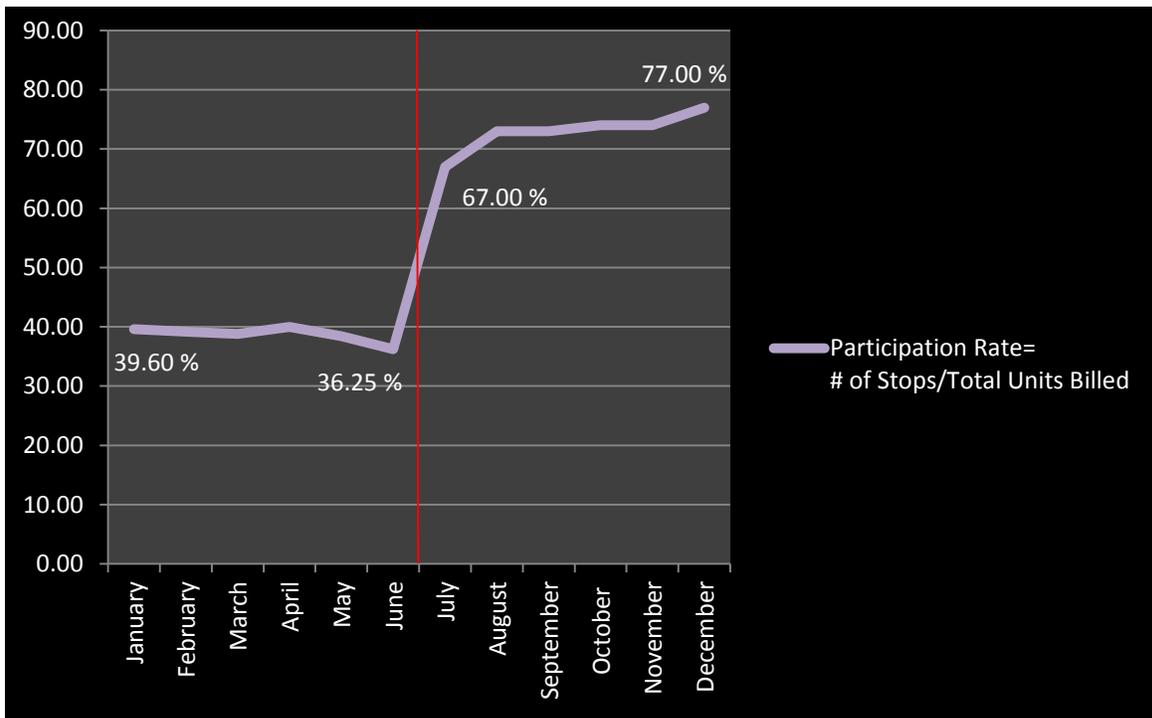
Measure 27 - **Total Volume of Recycled Material in Tons**  
(CY 2009 – 2013)



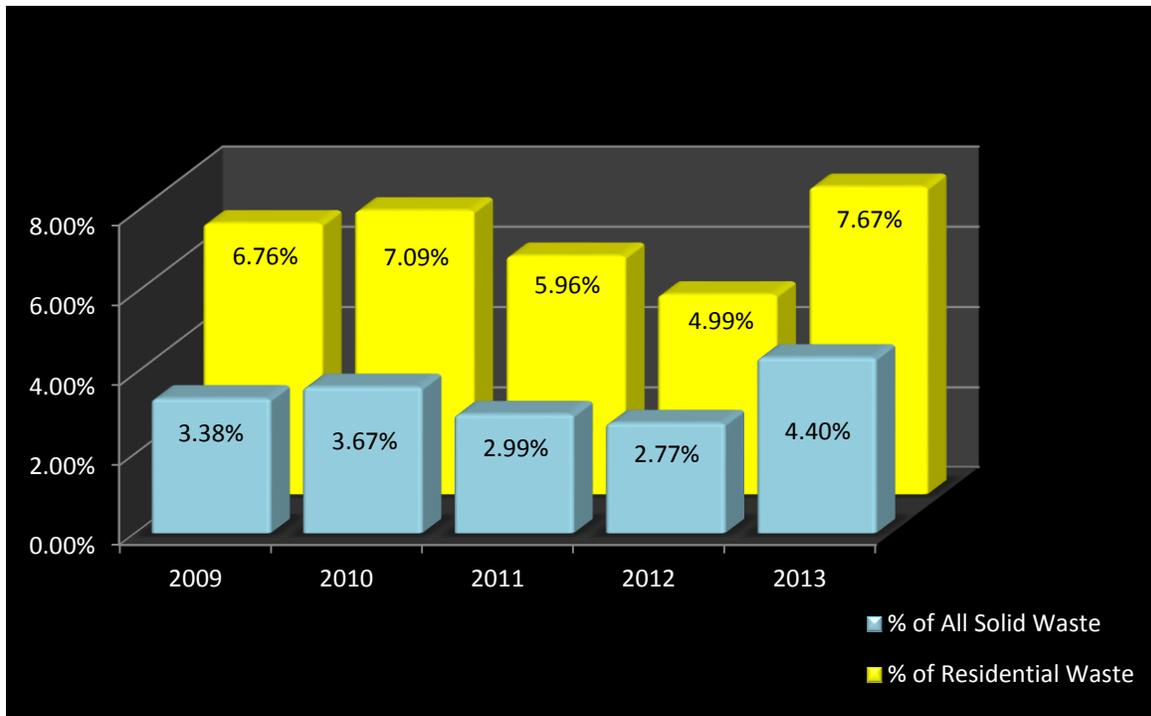
**Measure 28 - Curbside Recycling Average Percent Participation Rate  
(CY 2009 – 2013)**



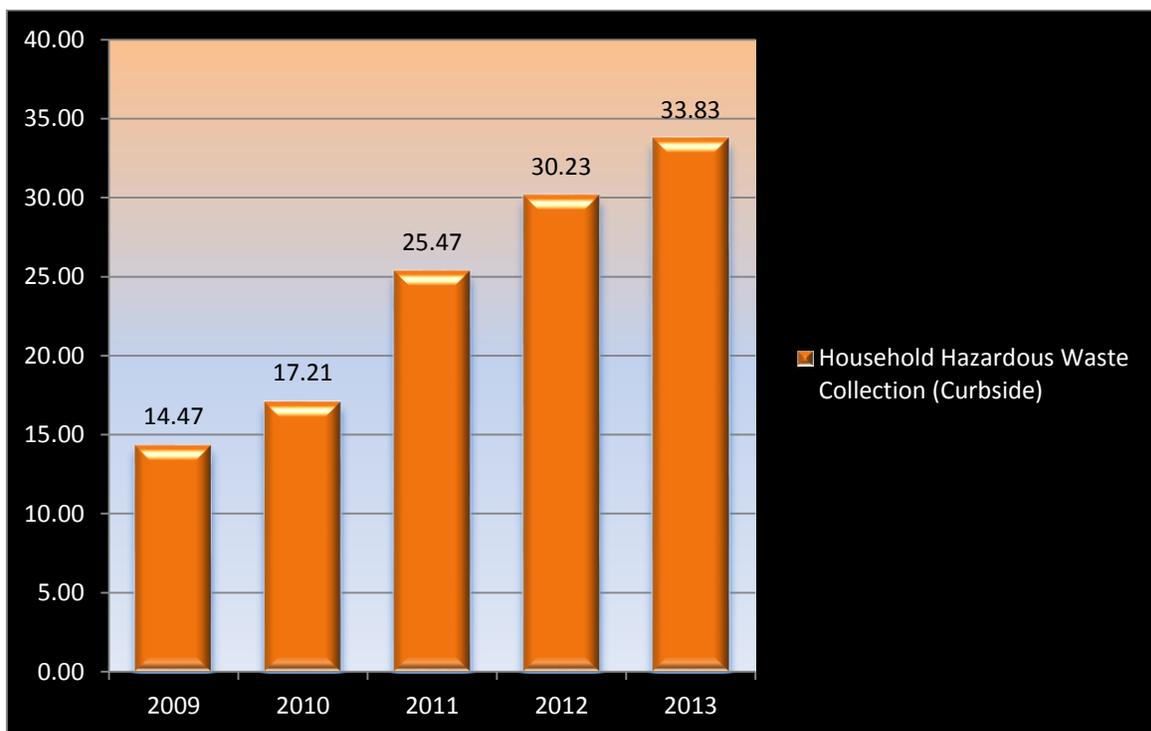
**Measure 29 - Curbside Recycling Participation Rate by Month  
CY 2013**



Measure 30 - Recycled Percentage of Residential and All Waste Generated  
(CY 2009 – 2013)



Measure 31 – Household Hazardous Waste (Tons)  
(CY 2009 – 2013)



**Analysis:** Shown in **Measure 27**, from 2012 to 2013 the total volume of recycled material has **increased by 63.83%**, and in the last six months the participation rate for curbside recycling has increased by **40.75%**. In mid-year 2013 changing our recycling containers to the large 96 gallon bins and allowing more recyclables, such as cardboard, has benefited the program greatly. From years 2009 – 2011 the average number of customers participating in the program averaged around 37% (**measure 28**). That participation rate is now around 77%, using data from 2013 (**measure 29**).

**Measure 30** shows the percentage recycled material for all solid waste, including commercial (light blue graph), and also the percentage of recycled material if just using the curbside residential numbers (yellow graph). The diversion rate is up in 2013 and is expected to rise higher when a full year is taken into account for the new 96 gallon bins.

**Measure 31** was treated as a separate measurement in this year’s report. Household Hazardous Waste is the program whereby customers can ensure that e-waste will be recycled and not disposed along with solid waste. The number of tons collected has steadily risen from ‘09 – ‘13. To learn more about this program: <http://edmondok.com/index.aspx?NID=863>.

**Potential Areas of Improvement:** The average percentages in solid waste by category (Yrs 2009 – 2013), show that there may be significant opportunity to capture recycled material from the Commercial sector, where they average 30% of total waste for the City.

Also, roughly 10% of all residential waste is yard waste, which we don’t currently have an effective way of removing from the waste stream. In 2013, approximately 40,052 tons of waste came from residential households. 10% of that would be 4,005 tons, which is greater than the entire amount of material recycled in 2013.

## Action(s)

**Action 1:** The City of Edmond changed contracts for recycling to Republic Services. Republic was able to offer single stream recycling, which refers to a system in which all recyclables are mixed in the collection truck, instead of being sorted into different compartments, which may result in reduced costs and increased flexibility for Edmond’s Recycling Program, also allowing for more material types to be recycled.

**Action 2:** In 2010 a Composting Feasibility Study was completed by **Coker Composting & Consulting**. The scope of services included the following:

- feedstocks characterization,
- preliminary manufacturing plan
- market evaluation
- permitting requirements
- public participation & outreach
- technology evaluation
- siting analysis
- facility plan
- a preliminary operations plan

Members on the project team had multiple years of composting experience and have worked all over the US. They were able to bring a realistic understanding of what has worked, and more importantly, what has not worked, elsewhere. The project boundaries that were established stated that it should be a City-owned and operated facility (i.e. not a privatized operation), that it needed to be a project that could be done for minimal capital costs, and that it provide enough flexibility so the City could expand it in the future if it chose to do so.

The estimated added user cost to finance the design, construction, and operation of a compost facility was **\$1.16/month**. To rent a 96 gallon container would be **\$3.80/month**. However, due primarily to the up-front costs of this facility, Edmond has decided to implement the project in phases. The first phase will be a small green waste drop-off site and “low tech” composting facility. The original Feasibility Study by Coker Composting & Consulting was thorough, and provided invaluable insight to proceed with a composting project.

**Update:** The City has put this project on hold due to a lack of funding. Due to EPA regulations concerning leachate and storm water runoff, the project design has grown in complexity. As a result, project design coordination has been turned over to the Engineering Department for completion of detailed design and cost estimates.

## Urban Forestry

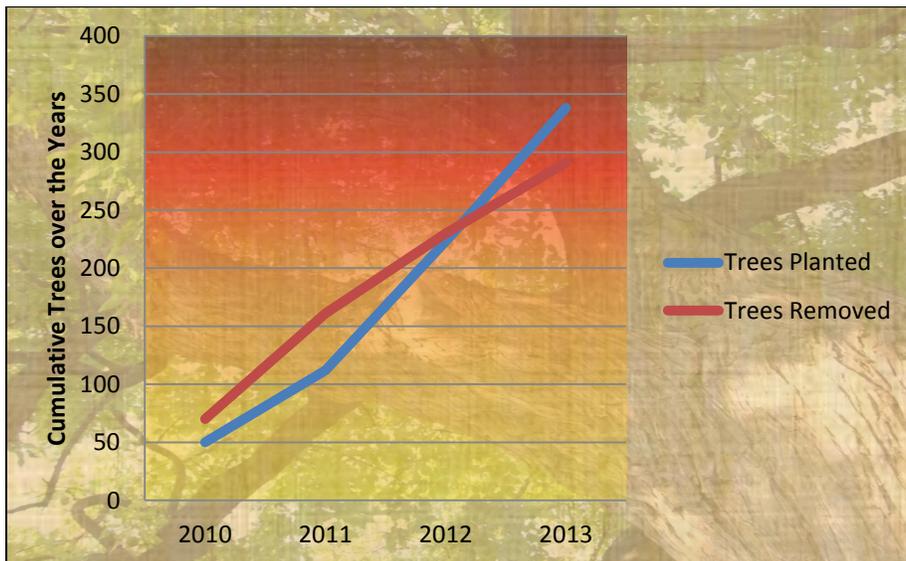
**Value:** The City’s Urban Forestry department seeks to promote, preserve, and enhance Edmond’s regional urban forest and overall environment through active forest resource management. Historically, Edmond’s landscape has been densely covered by cross-timber forests, with trees such as post oak, blackjack oak, red bud, elm, hackberry, and the eastern red cedar. Over time, this historic “remnant” forest has shrunk due to settlement and the effects of population growth. Trees improve air quality, protect water supply, provide stormwater management, preserve biodiversity and wildlife, provide outdoor recreational opportunities, promote health, provide aesthetics, and create value on property.

**Goal 1:** The goal is to plant more trees through the Foster-A-Tree Program than are removed from right-of-ways by Urban Forestry.

**Goal 2:** The goal is to engage a larger audience every year with information about trees and Urban Forestry programs and services.

**Measure 32:** Cumulative Total of Foster Trees Planted and Right-of-Way Trees Removed

Measure 32 – Cumulative Number of Trees Planted and Removed



Year	Trees Planted	Trees Removed
2010	50	70
2011	62	91
2012	111	69
2013	115	61

**Analysis (Goal 1)** - The Urban Forestry Department provides assistance to Edmond residents for removal of high risk trees originating from the public right-of-way. Tree canopy maintenance is a major initiative of the Department, and in 2010 the Foster-A-Tree program was created in order to replace trees removed through the hazard tree program throughout the City. In 2012, Urban Forestry surpassed the number of removals with trees planted through the Foster-A-Tree program. This is just one tree planting effort administered by the department – others include community tree plantings during Arbor Week and streetscape plantings, which are not counted toward these totals. A reduced number of trees removed over the past two years may have been due in part to more costly removals of large silver maples and other mature trees impacted by the drought.



Measure 33 - Number of People  
Subscribed to Edmond Tree Mail,  
who have “Liked” Edmond Forestry  
Facebook Page

Year	Edmond Tree Mail	Urban Forestry Facebook
2013	397	122

Analysis (Goal 2): In 2013, the Urban Forestry Department implemented a new quarterly email newsletter, entitled “Edmond Tree Mail”. The purpose of Tree Mail is to engage Edmond residents by providing information about Urban Forestry programs and services, unique experiences fellow citizens are having related to trees, information about tree species and planting and care, and ways that residents benefit from their local urban forest. An issue of the newsletter is sent out at the beginning of each season, and people can subscribe through the City web site. As a way to further engage this audience, Urban Forestry set up a Facebook page in the Fall of 2013. Through this medium, followers have access to information about tree distributions and volunteer events, stories about Edmond trees, interactions with the urban forest, and information about relevant and timely urban forestry topics.

Action(s) The Urban Forestry Department will continue **aggressive planting strategies**, including the promotion and enhancement of the Foster-A-Tree program, streetscape plantings, tree distributions, and partnership plantings.

Additional efforts include improving the health of existing trees through tree care by volunteer groups, and the City maintenance worker position.

## Park and Recreation Facilities

**Value:** City Parks provide the recreational and aesthetic value necessary for quality urban neighborhoods. They also play a larger role, such as job opportunities, youth development, public health, and community building. Studies show that parks are valued even by those who do not use them. A park's value to neighborhood quality is further reinforced by studies that find a statistically significant link between property values and the proximity to green space, including neighborhood parks and urban forested areas.<sup>26</sup>

**Goal:** The City Parks Department will continue seeking opportunities for green space and recreational activity.

**Measure 34:** This table shows the current total acreage for all public parks in Edmond, whether they are Community Parks, Recreational, or Local Neighborhood Parks. These acreages include not only accessible acreage, but all open space.

### Measure 34 – City Parks Acreage and Attributes

NAME	PARK TYPE	ATTRIBUTES	ACRES
CLERGEN PARK	MINI	SMALLEST PARK	0.21
SHANNON MILLER PARK	MINI	PASSIVE PARK NAMED FOR EDMOND GYMNAST	1.10
JOHNSON PARK	MINI	CLOSE TO UNIVERSITY OF CENTRAL OKLAHOMA	1.08
BROOKHAVEN PARK	NEIGHBORHOOD	HEAVILY WOODED. ADJACENT TO CREEK	2.28
CENTENNIAL PARK	NEIGHBORHOOD	NAMED FOR DEDICATION OF STATEHOOD	4.87
CHITWOOD PARK	NEIGHBORHOOD	OLDER, LARGER PARK WITH PAVILION	3.51
FINK PARK	NEIGHBORHOOD	OLDER, LARGER PARK WITH NATURAL BEAUTY	7.42
GOSSETT PARK	NEIGHBORHOOD	HAS BASKETBALL COURT AND PECAN TREES	2.22
KELLY PARK	NEIGHBORHOOD	PLAYGROUND	0.49
MATHIS SKATE PARK	NEIGHBORHOOD	SKATEBOARD COMPLEX	2.34
MEADOW LAKE PARK	NEIGHBORHOOD	HAS BASKETBALL, TENNIS, AND BACK STOP	5.39
DAVID PENICK PARK	NEIGHBORHOOD	NEWEST "MEMBER" OF THE PARKS	3.55
STEPHENSON PARK	NEIGHBORHOOD	OLDER, LARGER PARK WITH TENNIS, PAVILION	4.78
TED ANDERSON PARK	NEIGHBORHOOD	LARGE, OPEN SPACES WITH BACK STOP	3.21
WESTBOROUGH PARK	NEIGHBORHOOD	ADJACENT TO ELEMENTARY SCHOOL	3.16
WHISPERING HEIGHTS PARK	NEIGHBORHOOD	SOUTHERN MOST PARK, HAS PAVILION	1.58
BICKHAM-RUDKIN PARK & DOG PARK	CITY PARK	CONTAINS LAKE, DOG PARK, GRASSY FIELDS, AND TREES ALONG THE	49.41
E.C. HAFFER PARK	CITY PARK	MULTI-PURPOSE FACILITIES, JOGGING TRAILS	87.08
MITCH PARK	CITY PARK	MULTI-PURPOSE FACILITIES, JOGGING TRAILS	237.85
CENTRAL STATE PARK	REGIONAL	MULTI-PURPOSE FACILITIES, JOGGING TRAILS	249.03
EDMOND PARK	REGIONAL	MULTI-PURPOSE FACILITIES, JOGGING TRAILS	131.44
SCISSOR TAIL PARK	REGIONAL	CAMPING-ELECTRICAL HOOK-UPS	140.99
SPRING CREEK PARK	REGIONAL	DAY USE, BOAT RAMP, BEACH, DISC GOLF	194.40
BICKHAM SOFTBALL COMPLEX	SPECIAL USE	LOCATED OFF MIDWEST BLVD	14.29
KICKINGBIRD GOLF COURSE	SPECIAL USE	18 HOLES, DRIVING RANGE, 2 CHIPPING GREENS, PUTTING GREENS,	148.06
KICKINGBIRD TENNIS CENTER	SPECIAL USE	12 LIGHTED TENNIS COURTS, INCLUDING A STADIUM COURT, PRO	5.60
PELICAN BAY AQUATIC CENTER	SPECIAL USE	SWIMMING, LOCATED IMMEDIATELY WEST OF E C HAFFER PARK	3.82
SERVICE-BLAKE SOCCER COMPLEX	SPECIAL USE	SPORTS-SOCCER, NUMEROUS SOCCER FIELDS	58.31
A.C. CAPLINGER SPORTS COMPLEX	SPECIAL USE	NUMEROUS BASEBALL FIELDS	33.52
J.L. MITCH PARK SPORTS FIELD	SPECIAL USE	BASEBALL FIELDS, SOFTBALL FIELDS, AND BASKETBALL COURTS	39.00
<b>TOTAL PARK AREA</b>			<b>1444.47</b>

**Analysis:** In 2012 among the nation's 100 most populous cities, the median for **park acres as a percent of city land area was 7.9%.**<sup>27</sup> There are many criteria that make quality parks, rather than just acreage, but it provides an effective scale. Edmond's land area is approximately **54,430 acres**. Including all of the facilities listed above, the City of Edmond comes in at about **2.7%** of total land area for parks. Parks are a continuing consideration as Edmond's population grows and more land is developed.

**Action: New Parks and Park Expansions** include a new park and softball complex at the northeast corner of Hwy 66 and Post Rd, called the Edmond 66 Park. Also, the Service Blake Soccer Complex has been expanded to accommodate additional fields, and a Master Parks Plan was completed in May, 2013. The Carl Reheman Park at Arcadia Lake will be, yet, another addition.

<sup>26</sup> Correll, Mark R., Jane H. Lillydahl, and Larry D. Singell. 1978. "The Effects of Greenbelts on Residential Property Values: Some Findings on the Political Economy of Open Space." *Land Economics* 54(2): 207-17

<sup>27</sup> The Trust for Public Land, Center for City Park Excellence, "2012 City Park Facts"

## Water and Wastewater Resources

### Water Resources

**Value:** As Edmond’s population grows, Edmond’s water usage also increases. This is a common thread throughout most cities in the United States. To help ensure that our water supply is utilized properly, while recognizing the value of water conservation, it has become the goal of Edmond’s Water Resources Department to examine ways to reduce water demand.

Edmond’s 50 year water supply plan<sup>28</sup> calls for “Level 1” and “Level 2” conservation options. Other similar options in the plan call for “stormwater beneficial reuse” and “non-potable” reuse. The average annual yield for Level 1 and Level 2 conservation options comes to 2,240 acre feet per year, and 4,480 acre feet per year. That translates to 2,190,000,000 gallons per year that are called on to be conserved as part of the overall strategy. To put that number into perspective, the 2012 annual production for Edmond’s Water Resources was 4,195,457,230 gallons. **Conservation measures call for roughly 50% of the current annual production.** The breakout of that water production in gallons is: Water Plant – 2,163,483,074; and Water Wells – 2,031,974,156.

For Edmond’s Water Resources Department, landscape irrigation is the number one target for conservation measures due to the very high increase in summer time water demand. Edmond’s water demand is approximately 8.0 million gallons per day (MGD) in winter months. Water usage increases to nearly 20.0 MGD on average summer months.

**Goal 1:** Reduce potable water demand, targeting landscape irrigation in summer time use.

**Goal 2:** Increase community involvement in water conservation measures.

**Measure 35, 36, 37, 38, 39:** Following are two maps illustrating how **landscape irrigation** dramatically increases the amount of water demand. Leaving out unplatted neighborhoods and those with zero increases in usage, these maps demonstrate the increase in kilogallons for the individual months of January and June, 2013. Measure 37 is a graph showing Edmond’s water consumption by Sector (City of Edmond, Public<sup>29</sup>, Commercial, Industrial, Residential), and measures 38 and 39 show, respectively, total water production and population growth (measure 38), and the water utility usage for City operations (measure 39).

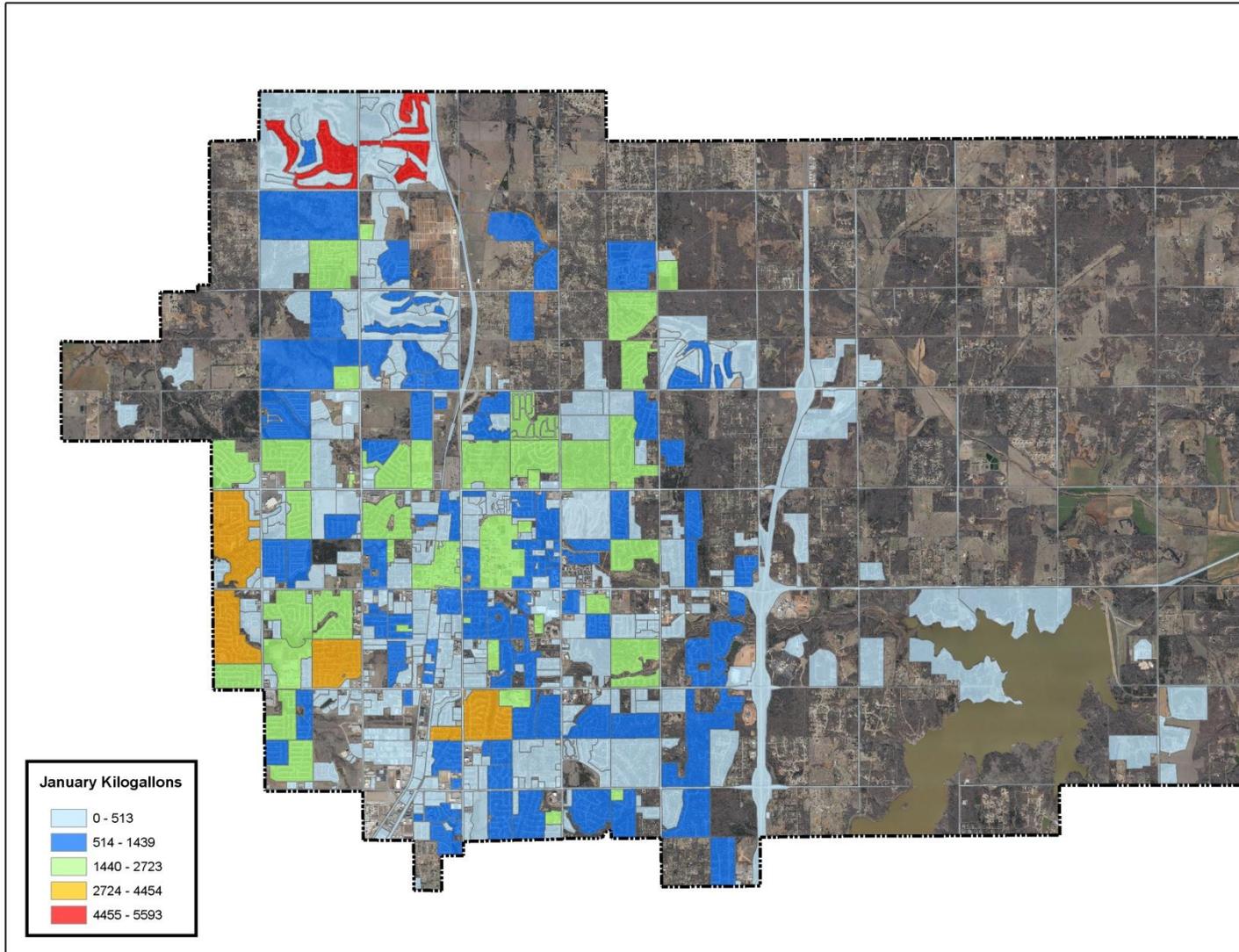
### Measures for Water Resources

Water Usage Increases by Areas and by Sector
<b>35</b> Water Usage (Jan, 2013) Figure A
<b>36</b> Water Usage (June, 2013) Figure B
<b>37</b> Utility Water Consumption by Sector (2009 – 2013)
Water Usage Sector and City Costs
<b>38</b> Total Water Production MG/YR and Population
<b>39</b> Breakdown of Total Water Costs for City Facilities

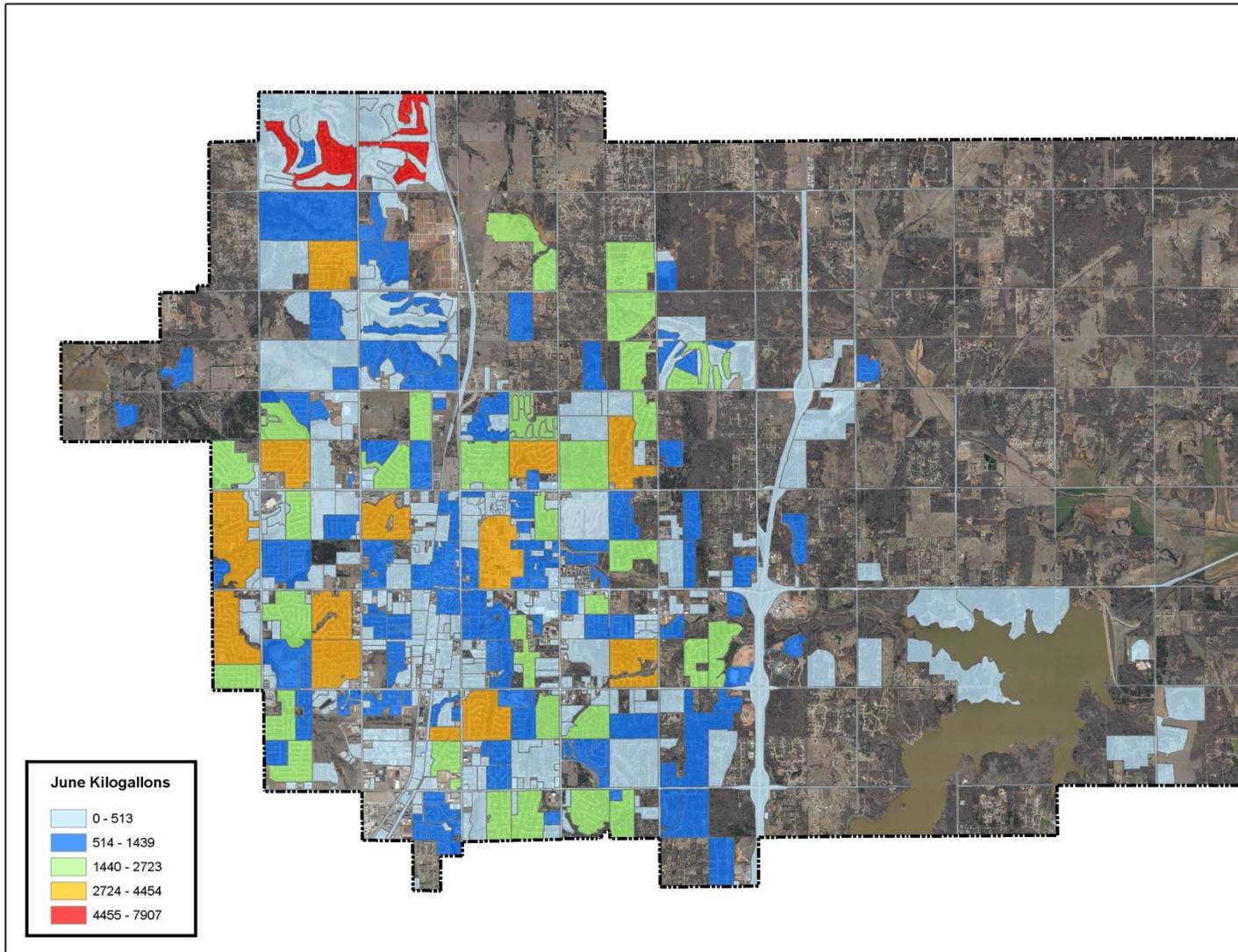
<sup>28</sup> 50 Year Water Supply Plan, Camp Dresser & McKee, May, 2009

<sup>29</sup> The “Public” Sector includes accounts for the City of Oklahoma City, US Post Office, Edmond Library, US Corp of Engineers, Edmond Public Schools, University of Central Oklahoma, the OK Dept of Wildlife, and the non-profit Edmond Community Action Agency.

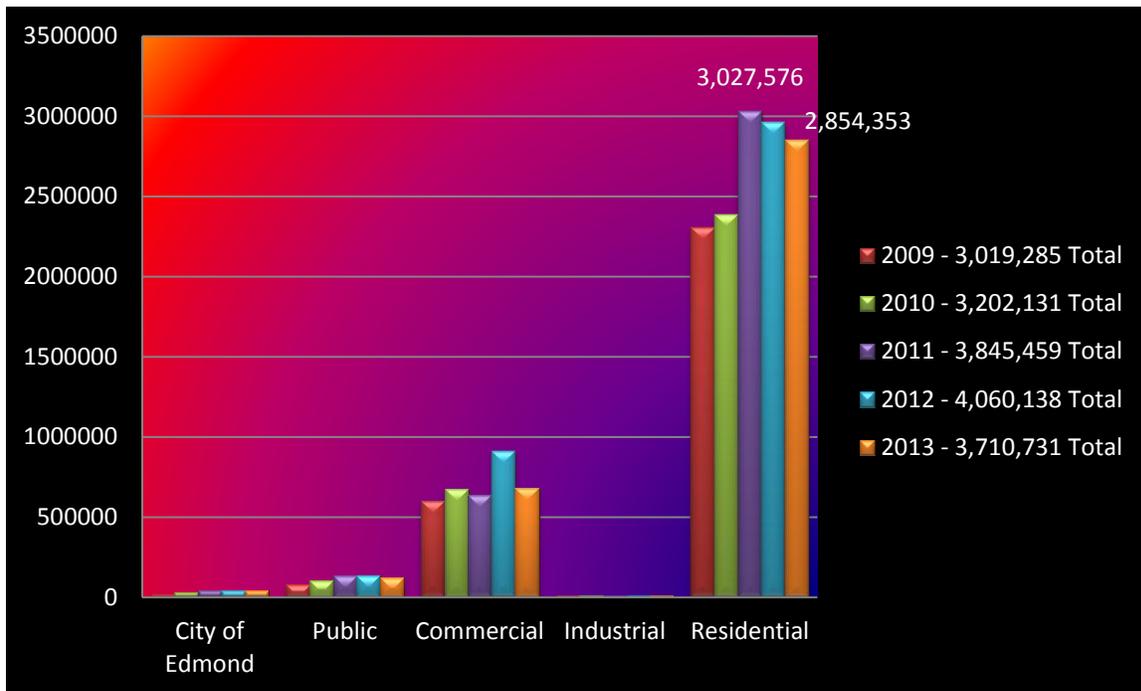
Measure 35 – Water Usage by Areas (January, 2013) Figure A



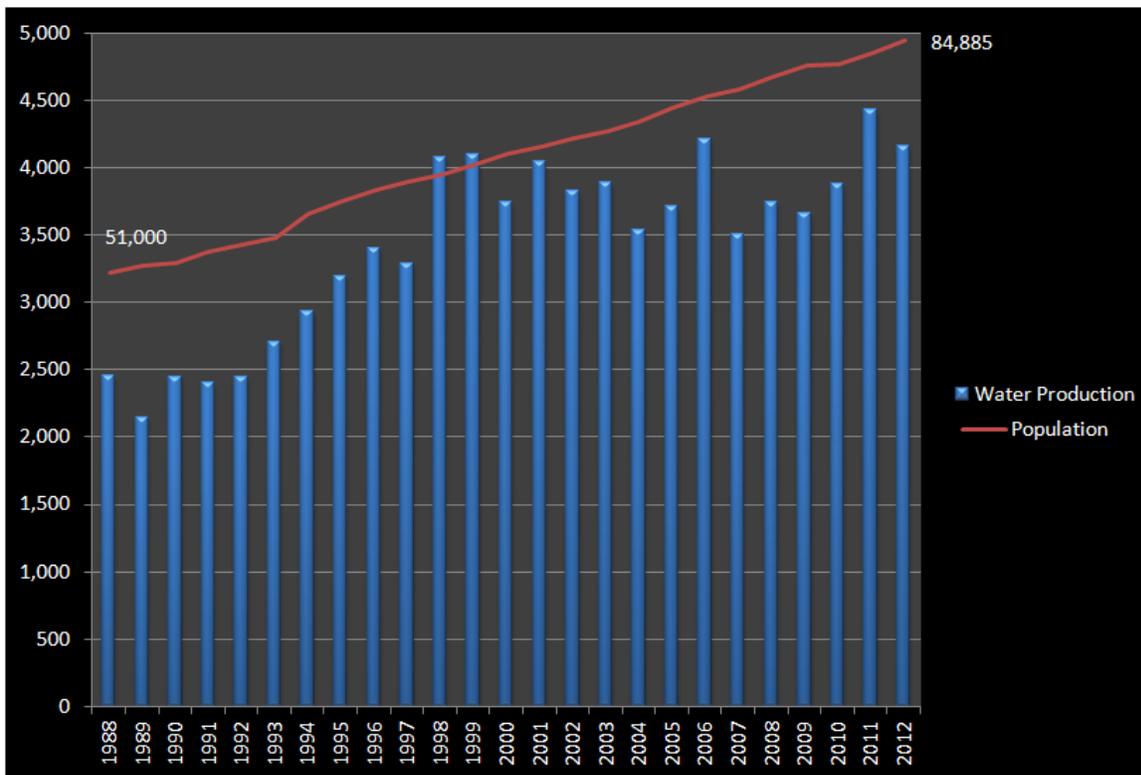
Measure 36 – Water Usage by Areas (June, 2013) Figure B



Measure 37 – Utility<sup>30</sup> Water Consumption by Sector ( FY 2009 – 2013)  
Quantities in Kilogallons



Measure 38 – Total Water Production MG/YR and Population



<sup>30</sup> These sums do not include those property owners with a private well.

## Measure 39 – Breakdown of Total Water Costs for City Facilities

	AVG 08-10 Cost	AVG 08-10 Usage	2011 COST	2011 KGAL	2012 COST	2012 KGAL	2013 COST	2013 KGAL	2011 - 2013 % USAGE DIFF
Animal Welfare	\$5,013.26	1,074	\$6,654.04	1,319	\$6,452.52	1,135	\$6,018.62	994	-25%
Arcadia Lake Project Office	\$236.51	51	\$595.26	118	\$441.39	77	\$369.37	61	-48%
City First Building	\$310.33	26	\$390.77	41	\$454.89	44	\$470.75	50	22%
Community Image	\$9,760.93	2,284	\$17,253.89	3,241	\$18,114.77	2,902	\$18,119.55	2,743	-15%
Convention & Visitors Bureau	\$236.64	53	\$626.27	134	\$442.58	86	\$963.43	172	28%
Downtown Administration	\$710.24	136	\$652.26	110	\$854.48	136	\$639.22	157	43%
Downtown Community Center	\$645.43	113	\$1,060.07	181	\$1,142.59	177	\$2,288.71	376	108%
Downtown Municipal Building	\$620.16	142	\$705.70	146	\$863.35	161	\$608.81	115	-21%
Edmond Historical Museum	\$306.25	44	\$329.95	49	\$397.20	58	\$336.57	45	-8%
Electric Substations	\$450.74	40	\$445.71	34	\$486.60	25	\$430.08	10	-71%
Fire	\$9,823.33	1,899	\$11,946.55	2,158	\$12,014.53	1,950	\$13,896.23	2,177	1%
Gracelawn Cemetery	\$578.59	118	\$1,339.67	273	\$1,102.21	201	\$922.19	152	-44%
IT Building	\$0.00	0	\$0.00	0	\$0.00	66	\$44.97	26	--
Kickingbird Golf and Tennis	\$2,565.12	545	\$6,440.73	1,280	\$801.37	1,291	\$2,600.76	1,298	1%
Miscellaneous Other	\$901.83	154	\$1,062.02	177	\$890.42	207	\$1,611.77	330	86%
Mobile Meals	\$159.12	38	\$124.10	28	\$153.74	31	\$154.04	32	14%
Multi-Activity Center (MAC) Building	\$2,671.24	520	\$5,768.88	1,103	\$4,893.29	856	\$3,659.46	559	-49%
Parks	\$52,092.52	9,918	\$106,265.48	19,858	\$115,237.97	22,802	\$126,358.18	23,622	19%
Pelican Bay Aquatic Center	\$16,339.11	3,254	\$19,807.42	3,714	\$19,829.22	3,319	\$28,731.91	4,618	24%
Planning/Public Works Building	\$587.63	99	\$679.79	106	\$788.63	111	\$704.25	100	-6%
Police Facilities	\$900.84	170	\$926.68	150	\$1,176.46	175	\$1,390.66	219	46%
PD (Police) South	\$188.36	18	\$118.80	2	\$133.60	8	\$1,545.05	257	12750%
Vehicle Maintenance	\$6,557.05	1,397	\$3,998.34	798	\$2,425.25	417	\$1,640.11	247	-69%
Water/Wastewater	\$2,526.56	495	\$8,357.35	1,505	\$2,094.68	266	\$2,540.09	328	-78%
Xtimb Admin Building	\$360.07	60	\$414.10	64	\$528.66	77	\$508.38	66	3%
Xtimb Operations Building	\$18,726.84	4,053	\$23,642.09	4,771	\$18,763.17	3,442	\$13,372.08	2,298	-52%
Xtimb Storage	\$197.52	16	\$216.30	18	\$304.72	29	\$434.81	51	183%
<b>TOTAL</b>	<b>\$133,466.24</b>	<b>26,718</b>	<b>\$219,822.22</b>	<b>41,378</b>	<b>\$210,788.29</b>	<b>40,049</b>	<b>\$230,360.05</b>	<b>41,103</b>	<b>-1%</b>

**Analysis:** In 2011 a statewide analysis by the Oklahoma Water Resources Board, titled the Oklahoma Comprehensive Water Plan (OCWP), which considered all factors impacting Oklahoma’s water use throughout the next 50 years, predicted that future consumptive demands will put a strain on surface and groundwater supplies in most areas of the state.<sup>31</sup> While water supply on a scale for the whole state is a complex issue, and in the OCWP a primary conclusion was the need to adequately fund new infrastructure, the City of Edmond can use its own resources to promote water conservation, and reach out to customers at the local level. **For 2013 residential customers**, Measure 37 shows a **6% decrease in consumption** from 2011 to 2013. The City government shows a **1% decrease from 2011 to 2013**, as opposed to a 47% increase from 2009 through 2011.

Heavy volumes of rainfall in 2013 helped to offset some of the need for landscape irrigation, but the City overall, has also done an excellent job in reducing usage, including departments where landscaping isn’t an issue. Even with the large increase in usage due to some facilities like the new PD South facility, overall usage when compared to 2011 has decreased.

Also notable, is a report that has been completed by the US Geological Survey (USGS), Association of Central Oklahoma Governments (ACOG), and the Oklahoma Water Resources Board (OWRB). This is a study on the Garber-Wellington aquifer. The Garber-Wellington underlies about 3,000 square miles in central Oklahoma, where the aquifer is used for municipal, domestic, industrial, and agricultural water supplies. In addition to municipalities, more than 20,000 homeowners use well water from the aquifer for household or yard use. The OWRB will use the study to determine the amount that may be allocated to permitted water users (known as equal proportionate share, or EPS). Currently, we can withdraw 2.0 acre feet, roughly 652,000 gallons, of water for each acre of land permitted by Edmond through OWRB. This maximum yield will very likely be reduced when the EPS determination is complete.

<sup>31</sup> Oklahoma Water Resources Board, *Oklahoma Comprehensive Water Plan Executive Report*, (August 2011)

## Action(s)

**Action 1: Edmond’s Mandatory Water Conservation Plan** is aimed at conserving and controlling summer water use. Edmond participates in the regional water conservation plan in an agreement with Oklahoma City. According to the agreement, all customer cities must implement a water conservation program at least as stringent as Oklahoma City’s water conservation program. Along with the City of Edmond, other customer cities include Norman, Moore, Piedmont, El Reno, Yukon, Mustang, Blanchard, and the Deer Creek water district.

The City of Edmond implemented this plan on May 6, 2013. The following table indicates the stages now followed by the City of Edmond, with Stage 1 being the least restrictive.

Stage	Type of Residency	Last Number of Address	Calendar Date/Day
1. Mandatory Odd/Even Lawn Watering (default stage)	All Types	Odd Even	Odd Even
2. 2-Day a Week Lawn Watering	Single – Family  All other Types	Odd Even --	Saturday & Wednesday Sunday & Thursday Tuesday & Friday
3. 1-Day a Week Lawn Watering	Single Family  Multi-Family Commercial or Gov’t	1 or 3 5, 7, or 9 0 or 2 4, 6 or 8	Saturday Wednesday Sunday Thursday Tuesday Friday
4. Hand Water Gardens & Flower Beds Only and Commercial Car Washes with Water Recycling Operations Only			
5. Ban on All Outdoor Watering & Washing Vehicles			

**Action 2: Edmond’s Water Conservation Program (EWCP)** is still in Draft, though the Water Resources Department is moving forward with dedicated funds for this program for the next 5 years of that department’s budget. The Water and Wastewater Master Plan will give some guidance as to the most effective measures to implement first. The program may consist of the following:

- Distribution of water conservation education and awareness material for adults, schools and group organizations
- Providing outdoor water guidelines
- Sponsoring irrigation sensor and controller rebates
- Providing in-home water saving devices
- Sponsoring water efficiency rebates for installation of water efficient appliances
- Sponsoring a retrofit rebate program
- Performing home and business water audits

**Measures** will include the number of customers taking advantage of rebates and water audits, as well as the number of water saving devices and rain harvesting materials distributed by the City.

**Action 3: Rain Harvesting and Xeriscape Demonstration Garden at Bickham-Rudkin Park**



At **Bickham-Rudkin Park** rainfall is collected via downspouts and stored for reuse in two large cisterns. Rain barrels and cisterns are typically used to store water for landscaping. Today’s rain barrels (e.g. the 40 gallon terra cotta barrel to the left) come in all shapes and sizes, decorative and plain.

The demonstration garden at the park uses signs placed around the garden area to describe the xeriscaping technique and provides several tips on water conservation and irrigation.

In **2012** the Water Resources Department funded the Edmond Rain Barrel Program, where **380 barrels were distributed through a random selection process**. Those barrels are pictured below. The message was that while methodologies for water conservation may vary, we primarily want more people to start thinking and talking more about this important topic.

		
<b>60 Gal.</b>	<b>50 Gal.</b>	<b>40 Gal.</b>
<b>Terra Cotta WaterUrn with Integrated Planter</b>	<b>Authentic Oak Appearance With Brass Spigot</b>	<b>Waterstone Rain Barrel</b>

## Wastewater

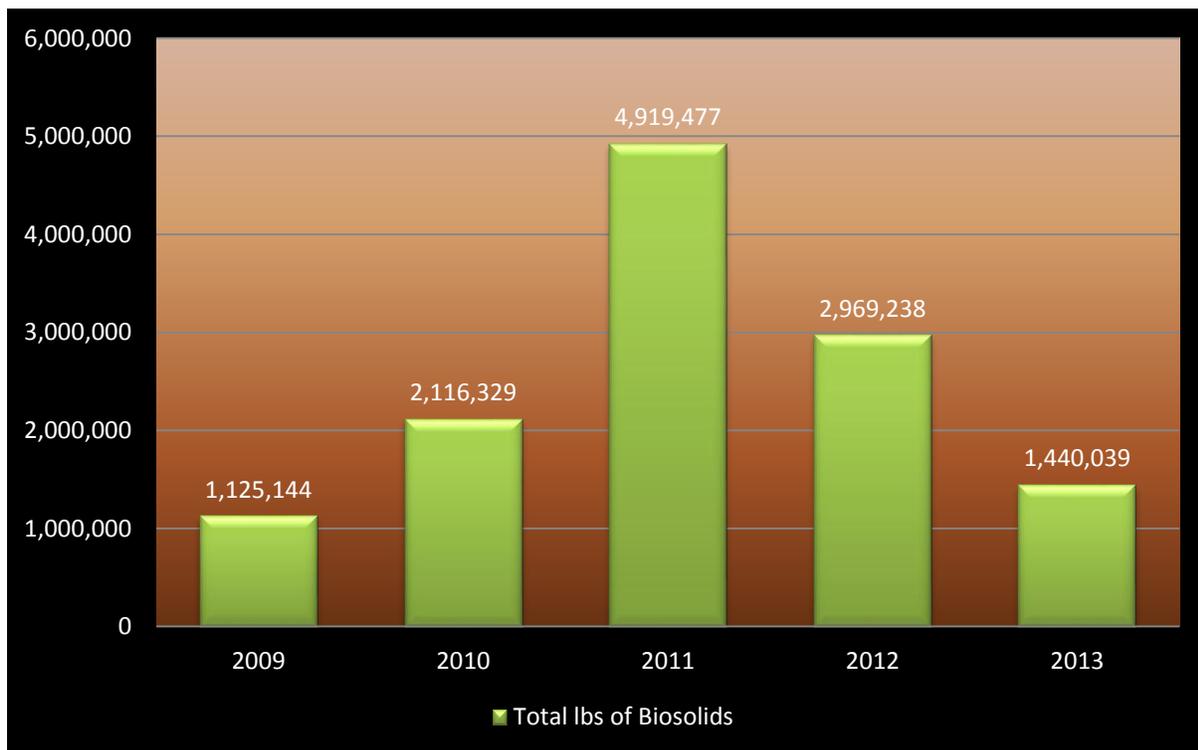
**Value:** Edmond’s Water Resource Department has also engaged for several years in the reuse of sludge from the Coffee Creek Wastewater Treatment Plant. The terms “sludge”, or biosolids, may be used interchangeably. Sludge is the bi-product of the wastewater treatment process. It is produced via an extended aeration process and is further treated in Facultative Treatment Lagoons. The City utilizes **agricultural reuse via land application** for the biosolids disposal. Five points must be made:

1. This methodology meets or exceeds all Federal, State and local requirements for biosolids disposal;
2. Suitable land application sites are available in the near vicinity of the Treatment Plant;
3. Local farmers are amenable to agronomic biosolids reuse as a nutrient source and soil conditioner;
4. Biosolids reuse has proven to be an environmentally sound practice; and
5. The agronomic reuse of biosolids is a cost effective methodology resulting in increased efficiency for the Treatment Plant, while providing a beneficial use for the biosolids.

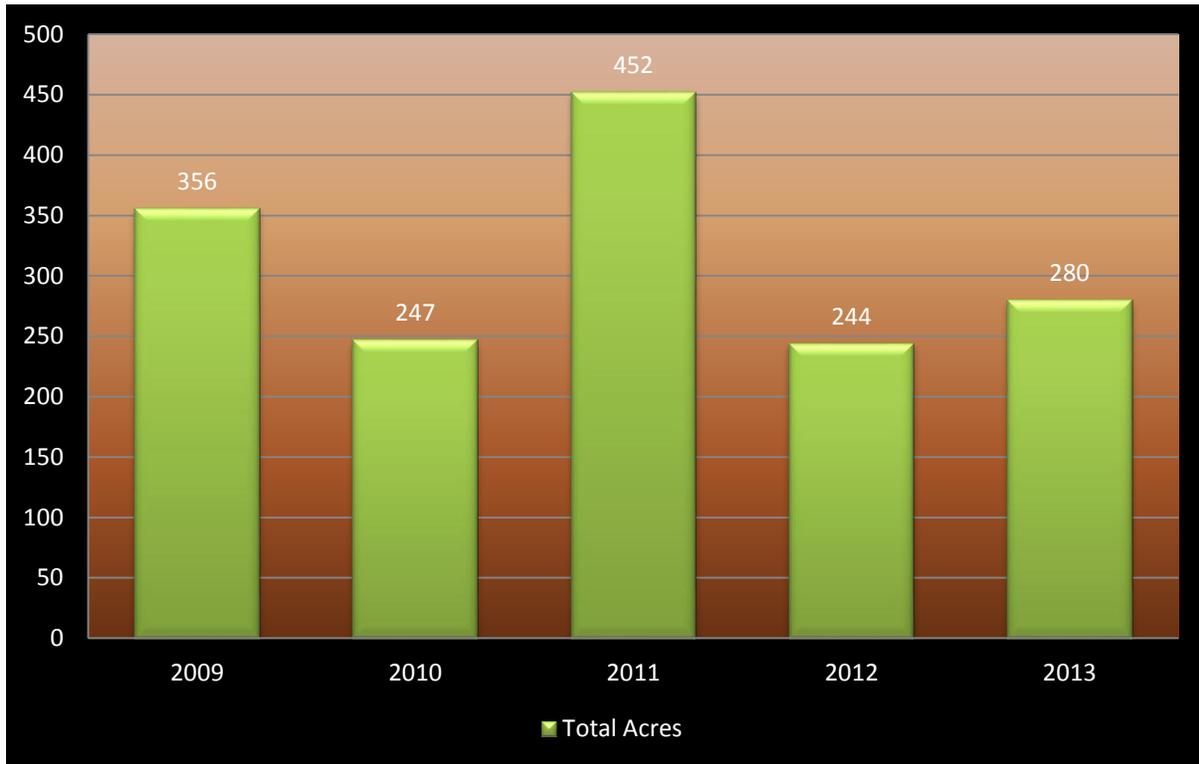
**Goal:** Continue this practice, benefiting the City’s operations and local farmers.

**Measure 40, 41:** Two measures demonstrate how this program is being utilized. The first measure shows the **total lbs of biosolids used per year** from the wastewater treatment plant. Measure 41 shows the **total number of acres where the biosolids have been applied**.

Measure 40 – Total lbs of Biosolids



### Measure 41 – Total Number of Acres where Biosolids are Applied



**Analysis:** The total lbs of biosolids used for agriculture reuse has been up and down, but 2013 was still an **increase of 28%** over 2009 volumes. The number of acres where it has been applied **has decreased from the high in 2011 by 38%**. The Water/Wastewater department will continue to monitor the effectiveness of this program and evaluate alternatives.

**Action:** The City will continue the reuse of biosolids from the Coffee Creek Wastewater Treatment Plant, applying the technique where and whenever possible.

## APPENDIX

### City Actions toward Better Efficiency and Conservation

<b>Action:</b> LED Lighting Replacements for Traffic Signals and Street Lamps .....	5
<b>Action:</b> Energy Management Systems for Municipal Buildings .....	6
<b>Action:</b> Geothermal Energy for Municipal Buildings .....	7
<b>Action:</b> T12 Lighting Retrofit for Municipal Buildings .....	8
<b>Action:</b> Variable Frequency Drives and Soft Starts for Water Resources .....	8
<b>Action:</b> Research Converting Other Municipal Facilities to Pure and Simple Wind Power.....	11
<b>Action:</b> Promote the use of the Pure and Simple Wind Power program .....	14
<b>Action:</b> Edmond Electric’s Home Energy Audit Program.....	15
<b>Action:</b> Smart Meters for Edmond Electric Customers .....	15
<b>Action:</b> Energy Efficiency Building Codes, Training and Equipment.....	16
<b>Action:</b> Edmond Electric’s Energy Saving Equipment Rebates.....	17
<b>Action:</b> Create a Vacancy Report to see opportunity for revitalization efforts .....	23
<b>Action:</b> Share Landuse Data with the Edmond Economic Development Authority .....	23
<b>Action:</b> Keep Inventory of Undeveloped Land and Sensitive Areas .....	26
<b>Action:</b> Green Infrastructure Initiative .....	26
<b>Action:</b> Multi-modal Transportation .....	30
<b>Action:</b> Intelligent Transportation Systems .....	32
<b>Action:</b> Promote shopping in Edmond through Marketing and other Public outreach efforts. ....	32
<b>Action:</b> Plug-In Hybrid Electric Vehicles (PHEV) .....	35
<b>Action:</b> Compressed Natural Gas (CNG) and Liquefied Petroleum Gas (LPG).....	35
<b>Action:</b> Citylink Bus Service. ....	37
<b>Action:</b> New Recycling Contract with larger curbside bins and single stream.....	41
<b>Action:</b> Composting Study for Citywide Operations.....	41
<b>Action:</b> Urban Forestry continues Aggressive Planting Strategies .....	43
<b>Action:</b> New Parks and Park Expansions .....	44
<b>Action:</b> Edmond Water Conservation Plan .....	50
<b>Action:</b> Edmond Water Conservation Program.....	51
<b>Action:</b> Rain Harvesting and Xeriscape Demonstration Garden at Bickham-Rudkin Park.....	51
<b>Action:</b> Reuse of Biosolids from the Coffee Creek Wastewater Treatment Plant for land application .....	53





NATURAL RESOURCES

ENERGY MANAGEMENT

BUILT ENVIRONMENT

WASTE REDUCATION

LAND USE

TRANSPORTATION

ECONOMIC DEVELOPMENT

OUTREACH

*Think Sustainability*