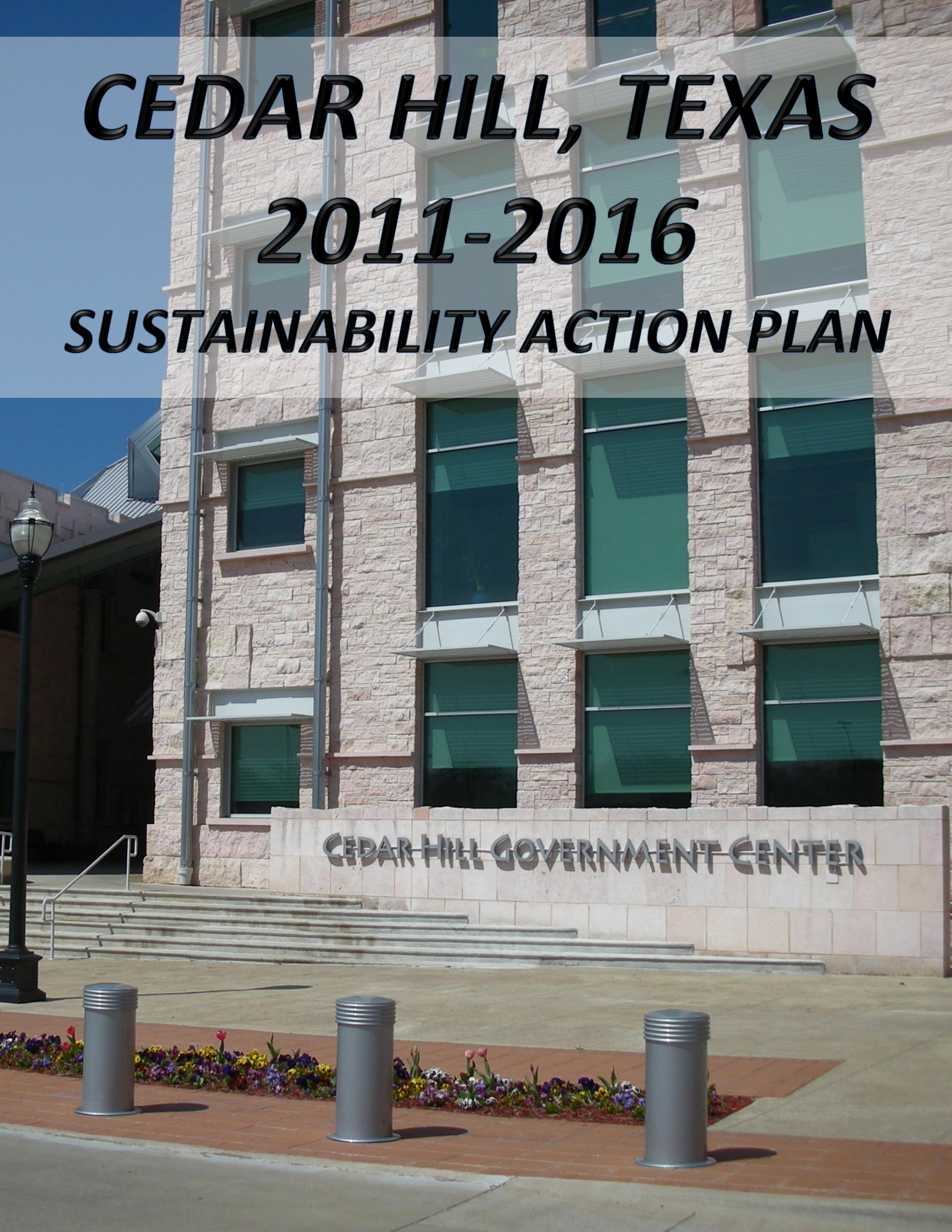
CEDAR HILL, TEXAS
2011-2016
SUSTAINABILITY ACTION PLAN



Sustainability Action Plan
City of Cedar Hill, Texas
2011-2016

ACKNOWLEDGEMENTS

SUSTAINABILITY ACTION PLAN MISSION STATEMENT

The City of Cedar Hill's Mission is to invest in practical planning today for a sustainable community tomorrow.

SUSTAINABILITY ACTION PLAN VISION STATEMENT

We envision Cedar Hill as a regionally engaged, sustainable community that manages resources wisely, conserves natural beauty, and promotes open space.

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THANK YOU

The Sustainability Action Plan Steering Committee would like to thank City Council for providing the vision, leadership, and support needed to undertake this important endeavor for our City, the community, and generations to come.

ACKNOWLEDGEMENTS

CHAPTER 1 INTRODUCTION

CHAPTER 2 INSTITUTIONAL CAPACITY

ACKNOWLEDGEMENTS

CHAPTER 3 MUNICIPAL SUSTAINABILITY

CHAPTER 4 COMMUNITY PLANNING AND DEVELOPMENT

ACKNOWLEDGEMENTS

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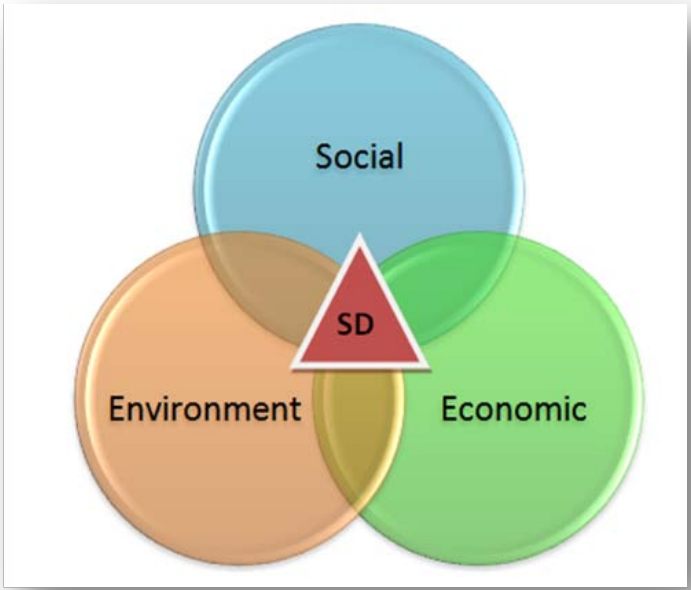
INTRODUCTION

The City of Cedar Hill, Texas (the "City"), is located within Dallas and Ellis counties. A suburb of the Dallas-Fort Worth metropolitan area, Cedar Hill has an estimated population of 45,600 (2009) and an overall land area of just over 35 square miles. Adjacent municipalities include Grand Prairie, Duncanville, DeSoto, Glenn Heights, Ovilla, and Midlothian. Cedar Hill is known for its unique geography and eastern Red Cedar trees. The City is currently experiencing rapid growth and has seen many changes in economic development since 2000. Despite this rapid growth, Cedar Hill maintains its small town charm and dedication to preserving natural and open spaces.

CEDAR HILL AND SUSTAINABLE DEVELOPMENT

Sustainable Development (SD) became prominent in 1987 after the World Commission on Environment and Development published "Our Common Future." The report highlighted the myriad of problems associated with resource depletion caused by development in the industrialized world. SD does not attempt to halt development. Instead it focuses on achieving a development model that "meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987)." The Triple Bottom Line represents a framework that is central to the concept of SD. It states that SD can only be achieved when social, economic, and environmental issues are fully considered and addressed in the context of development and growth.



Like most municipal governments around the country, the City of Cedar Hill has found itself at the forefront of the Sustainable Development (SD) movement as it strives to balance social, economic, and environmental issues. For example, the City has been working to manage rapid growth and the economic benefits it brings in a manner that does not compromise the City's small town charm, natural spaces, and environmental amenities that resident's enjoy. Given its prominent leadership role within the community, the City has developed this Sustainability Action Plan (SAP) which outlines the way the City plans to achieve responsible growth within municipal operations and within the surrounding community for years to come.

SUSTAINABILITY ACTION PLAN (SAP) PROCESS

This report is the first version of Cedar Hill's Sustainability Action Plan (SAP). It is intended to span a five year planning horizon that has been set into action under the directive of City Council Resolution. Please refer to **Appendix A** for a copy of the Resolution. The SAP represents the work of a strategic planning process carried out by an internal City Steering Committee composed of decision makers, department representatives, and consultants. During the strategic process, the Steering Committee followed a well known strategic planning process commonly referred to as "Situation, Target, and Path." As the City passed through each phase of the process, it answered three fundamental questions in the context of Sustainability.

- Where Are We Now?
- Where Do We Want to Go?
- How Do We Get There?

WHERE ARE WE NOW?

To answer this question, the City conducted an exercise to benchmark itself both qualitatively and quantitatively. This process enabled the City to develop broad areas of focus, measurable objectives and specific actions to be implemented over time. This benchmarking process will also help the City with future monitoring to evaluate the success of sustainability projects and programs as they are implemented. The qualitative analysis consisted of conducting informal interviews and workshops with City staff to consolidate sustainability related initiatives implemented prior to the development of this plan. The quantitative analysis entailed conducting an energy use and greenhouse gas emissions inventory.

QUALITATIVE ANALYSIS

As a result of the qualitative analysis, the City found that it had been planning and implementing more sustainability initiatives than it realized. This was because planning and implementation for sustainability had been initiated by City leaders as well as by City staff across various departments. Some well-known initiatives include maintaining an excellent track record working with ONCOR, the company responsible for operating the largest electricity and distribution line system in the state of Texas. More specifically, the City has been very involved in ONCOR's City Smart Program which has enabled the City to attract grant funding and receive free high level energy audits for select buildings. Other initiatives include the development of an Energy Management Plan, implementation of a tree ordinance, engagement in Transit Oriented Development (TOD) planning, and the award of an Energy Efficiency and Conservation Block Grant (EECBG) from the Department of Energy (DOE) in the amount of $176,600. Finally, one of the most notable of the City's past initiatives includes the recent procurement of competitive grants and rebates to install solar photovoltaic panels on Government center, the most energy intensive building in the City's portfolio.

While many of these high profile initiatives had been taking place, City staff had also been working to implement other lower profile initiatives such as departmental office paper and ink cartridge recycling programs, car pooling, and regular HVAC replacements and maintenance just to name a few.

QUICK FACTS

Based on the qualitative analysis, the City found that it had been planning and implementing more sustainability initiatives than it realized. Some of these initiatives include:

- ***Energy Planning***
- ***TOD Planning***
- ***Solar Grant for Government Center***
- ***Office Recycling Programs***
- ***Green Procurement Policies***
- ***Tree Ordinances***

QUANTITATIVE ANALYSIS

The quantitative analysis entailed a comprehensive inventory of energy used across municipal departments such as electricity, fuel, and natural gas. One of the first insights gained from the analysis was that, although the City tracked energy related units such as kilowatt hours (kWh), it did not historically track energy related expenditures in the same database. As a result of this finding, the City has made it a priority in this plan to make simple modifications to its energy data collection procedures to make better use of this information.

The next important insight gained from the energy inventory process was a detailed look into energy usage and greenhouse gas emissions across departments. In 2009, the City consumed 10,870,565 kilowatt hours (kWh) of electricity, 6,788,400 standard cubic feet (SCF) of natural gas, 151,095 gallons (Gal) of fuel, and emitted 8,289 Metric Tons of Carbon Dioxide Equivalent (MT CO2e) greenhouse gas emissions. The highest energy using sectors in the City included Water and Sewer Operations, the Government Center, Streets and Drainage, Police, the Recreation Center, the Fire Department, and Parks. Please refer to the following pages for graphics depicting the City of Cedar Hill's 2009 Energy Use by Department. Page 5 illustrates a bar graph depicting aggregate energy use across departments. Page 6 illustrates a pie graph depicting electricity use across departments. Please also refer to **Appendix B**, for a complete discussion and results summary for the 2009 Greenhouse Gas and Energy Use Inventory for the City of Cedar Hill which features the City's comprehensive energy use dashboard. This dashboard provides a very detailed perspective of energy use across City departments.

QUICK FACTS

The energy use and greenhouse gas inventory provides a comprehensive look at energy use across departments for baseline year 2009. For example, in 2009 the City consumed:

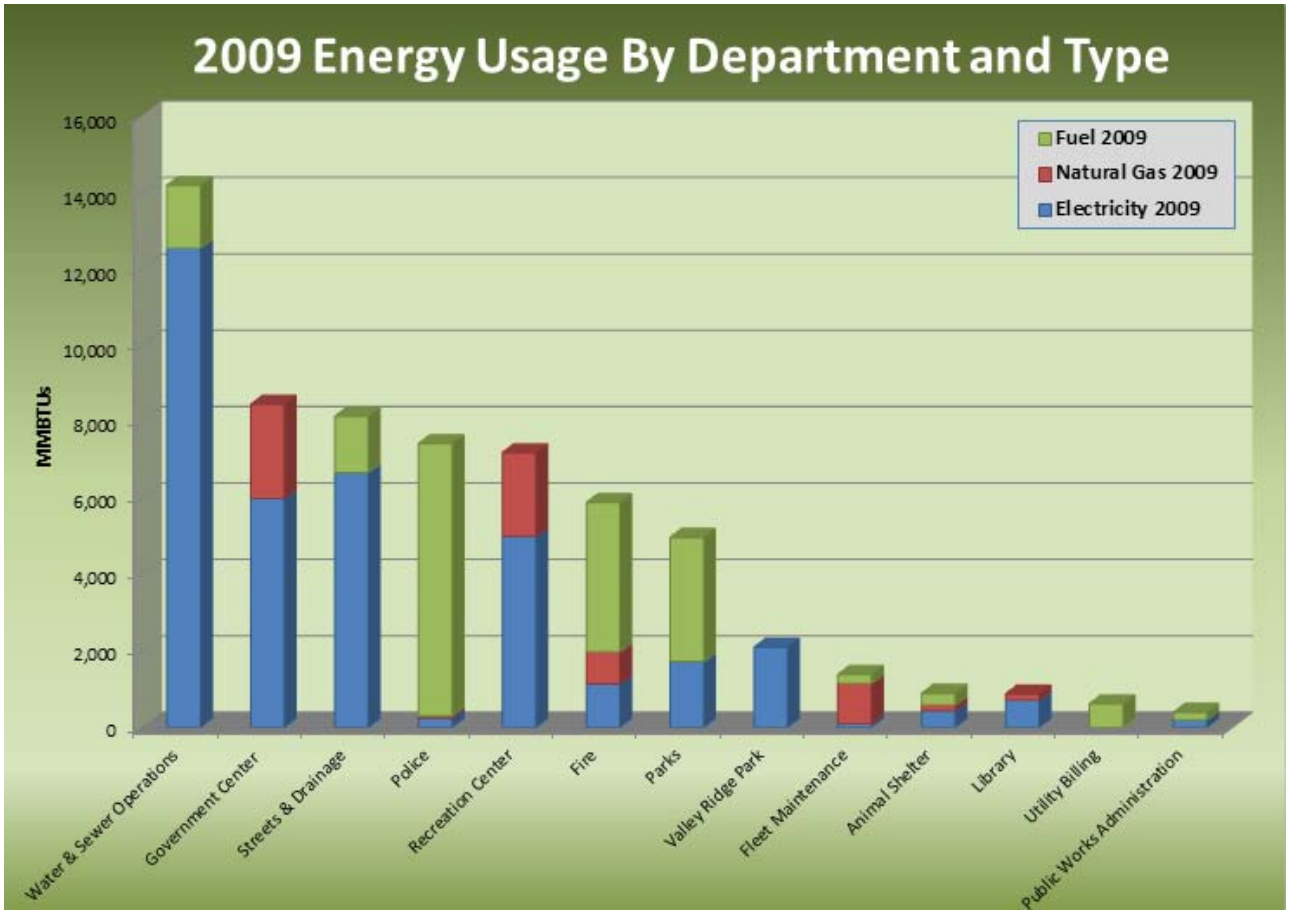
- ***10,870,565 kWh of Electricity***
- ***6,788,400 SCF of Natural Gas***
- ***151,095 Gallons of Fuel***

The energy use and greenhouse gas inventory also provides a look at how emissions from energy use are distributed across City departments. For example the City's energy use in 2009 resulted in the emission of 8,289 metric tons of carbon dioxide equivalent into the atmosphere. This is equivalent to carbon dioxide emissions from:

- ***1,585 Passenger Vehicles***
- ***kWh use in 1,006 homes/ 1yr.***
- ***19,272 Barrels of Oil***

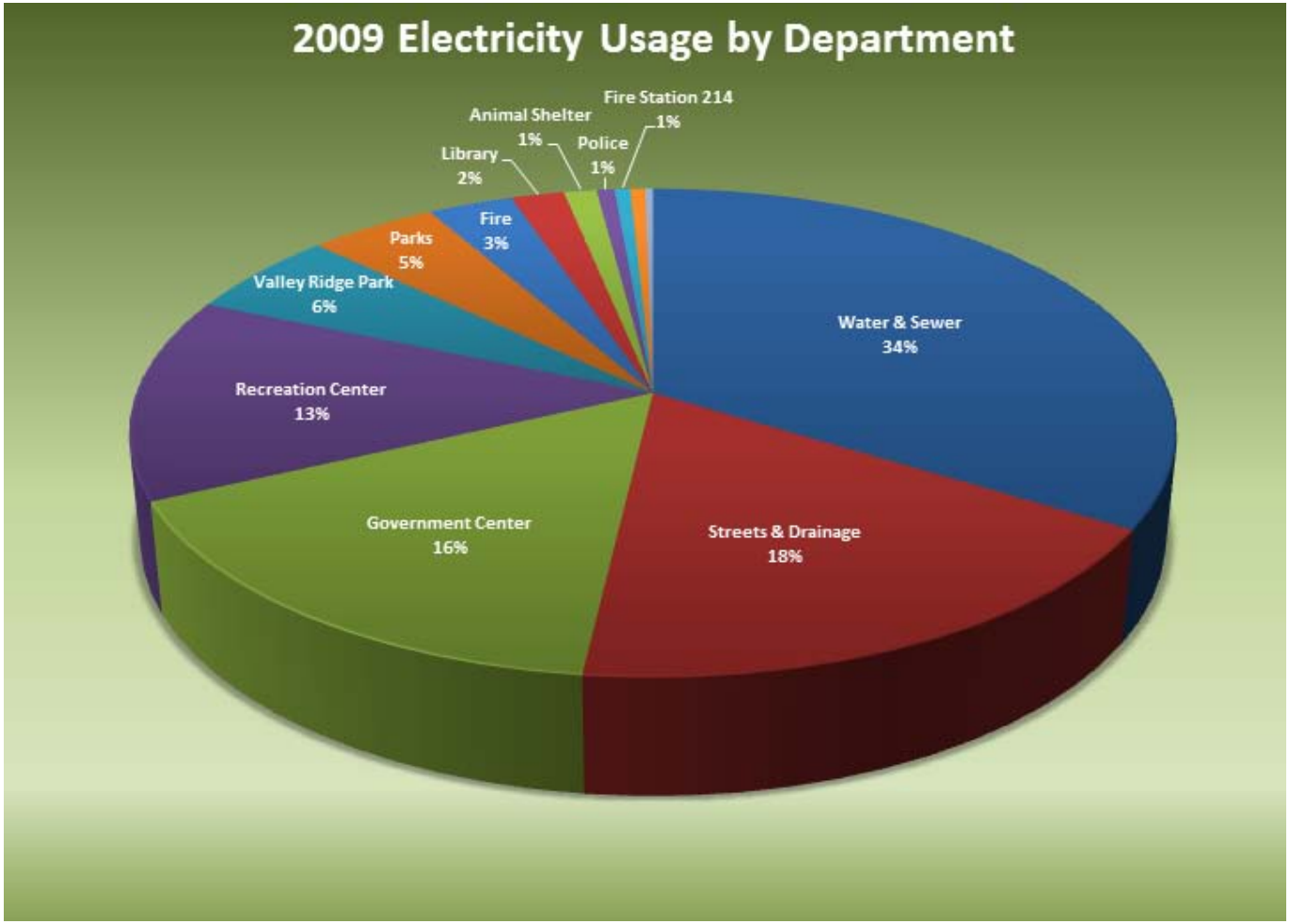
2009 CEDAR HILL AGGREGATE ENERGY USE BY DEPARTMENT

The bar graph below presents aggregate energy use for fuel, natural gas, and electricity expressed in millions of British thermal units (MMBTUs). This unit allows all energy sources (fuel, natural gas, and electricity) to be standardized into onto common measurement for simplicity and comparison.



2009 CEDAR HILL ELECTRICITY USE BY DEPARTMENT

The pie graph below isolates electricity use in kilowatt hours (kWh) and outlines how it is used across major City departments.



WHERE DO WE WANT TO GO?

To answer this question, the City developed mission and vision statements that reflect its social, economic, and environmental goals for Sustainability. These statements, although brief, provide a generalized direction for the SAP.

VISION

We envision Cedar Hill as a regionally engaged sustainable community that manages resources wisely, conserves natural beauty, and promotes open space.

MISSION

The City of Cedar Hill's Mission is to invest in practical planning today for a sustainable community tomorrow.

Drawing from the results of the qualitative and quantitative analysis, the City identified three areas it plans to focus its sustainability efforts over the next five years that will help the City achieve its mission and overall vision. These areas include:

- Institutional Capacity
- City Operations
- Planning and Community Development

Within each focus area, the City outlined a series of objectives shown as bullet points in the figure. Objectives within the Institutional Capacity focus area are intended to help the City attract funding to the program and build the capacity needed to handle the additional workload that will come from the SAP.

Objectives within the City Operations focus area will help the City become more sustainable within operations it directly controls and manages. Finally, objectives within the Planning and Community Development focus area will help the City integrate sustainability into the way it plans for open space, transit oriented development (TOD), planning, and community engagement.

HOW DO WE GET THERE?

After defining where the City currently stands and where the City wants to go in the context of Sustainability, the City Steering Committee used remaining planning workshops to develop a series of action items designed to achieve the objectives defined within each focus area. The resulting strategy consisting of objectives and specific actions is outlined in subsequent chapters of this SAP as follows: Chapter 2 (Institutional Capacity), Chapter 3 (Municipal Sustainability), Chapter 4 (Planning and Community Development).

Year	Action ID	Action Item Description	Planning Horizon
Year 1	Action 1.1	Develop Organizational Structure and Work Groups	Short
	Action 2.1	System for Sustainabilty Grant Procurement	Short
	Action 3.1	Secure Strategic Partners	Short
	Action 6.2	Create Sustainability Website	Short
	Action 15.4	Improve Community Recycling	Short
Year 2-3	Action 4.1	Employee Sustainability Training Program	Mid
	Action 5.1	Develop Data Management Procedures	Mid
	Action 7.1	Building Energy Audit & Retrofit Program	Mid
	Action 7.2	EPA Energy Star Building Tracking Program	Mid
	Action 8.1	Infrastructure Audit and Retrofit Program	Mid
	Action 9.1	Renewable Energy Pilot Program	Mid
	Action 10.1	Green Fleet Optimization and Procurement Program	Mid
	Action 11.1	Assess Water Rate Structure	Mid
	Action 11.2	Evaluate Radial Read Meters To Improve Water Use Tracking	Mid
	Action 12.1	Municipal Recycling Program	Mid
	Action 15.1	Community Web Portal	Mid
	Action 15.2	Strategic Planning Workshops	Mid
Year 3-5	Action 6.1	Secure EPA Energy Star Rating for Government Center	Long
	Action 13.1	Secure Tree City USA Growth Award	Long
	Action 14.1	Hold Planning Workshops to Introduce TOD as Energy HUB	Long
	Action 15.1	Develop Framework for Community Education & Extension Program	Long
	Action 15.3	Conduct Community Surveys and Studies	Long
	Action 15.4	Community Garden Program	Long

Each chapter will begin with an executive summary of objectives and actions. Subsequent pages discuss the rational and background data used to develop strategic objectives followed by a brief description of action items that will be implemented. In total, the City's Sustainability Strategy contains 15 measurable objectives across each focus area.

To achieve each objective, the City Steering Committee identified 22 actions to be accomplished over a period of five years. All 22 actions were prioritized by the City Steering Committee based on their respective planning horizons. For example, actions will be prioritized as having planning horizons that include: short (0-1 Years), mid (2-3 Years), or long (4-5 Years) as shown in the table below.

SAP Implementation & Updating Process

City staff members were assigned responsibility for implementing individual action items within each focus area during the strategic planning process. City staff will work to complete each action throughout the life of the plan and collaborate to provide annual updates to the City Council documenting progress made to fulfill plan objectives. Updates will be provided for City Council review and appended to this document upon City Council approval. At the conclusion of the five year planning horizon, City staff will re-evaluate goals and objectives and prepare a new plan addressing the next five years.

Looking Forward

This 2011-2016 SAP represents the City of Cedar Hill's first major effort to consolidate all of its Sustainability related initiatives into one unified framework. This SAP was designed to serve as more than just a document. First and foremost, it represents a system comprised of research, analysis, policy, procedures, actions, and monitoring protocols that will help institutionalize Sustainability into the fabric of the City's operational process. This will facilitate City Council and Staff's ability to achieve its Sustainability Mission and Vision which will bring a range of social, economic, and environmental benefits. Finally, this SAP should be viewed as a living document that will be regularly revisited and updated based on new data and lessons learned as SAP actions are implemented. Doing so will allow the City to adapt its strategy to change along with technology and advances in Sustainability Science and Planning.

STRATEGY INTENT

Institutional Capacity refers to the ability of an organization to produce results required to meet goals and objectives. The City of Cedar Hill conducted a self assessment of its existing institutional capacity as it relates to sustainability. Six areas were identified where improvements can be made: strengthening existing leadership, financing, strategic partnerships, training, data management, recognition, and communication. Improvement in these areas will help the City manage the additional workload the SAP will generate and ensure that the plan does more than just "sit on the shelf."

STRATEGY AT A GLANCE

OBJECTIVE 1: **STRENGTHEN INSTITUTIONAL CAPACITY TO IMPLEMENT SAP ACTIONS**
ACTION 1.1: DEVELOP ORGANIZATIONAL STRUCTURE AND WORK GROUPS

OBJECTIVE 2: **SECURE AT LEAST $250,000 TO FUND SAP ACTIONS BY 2013**
ACTION 2.1: SYSTEM FOR SUSTAINABILITY GRANT ACTION PROCUREMENT

OBJECTIVE 3: **ENGAGE AT LEAST 2 STRATEGIC SUSTAINABILITY PARTNERS BY 2012**
ACTION 3.1: SECURE STRATEGIC SUSTAINABILITY PARTNERS

OBJECTIVE 4: **ATTEND 1 TRAINING OPPORTUNITY ANNUALLY FOR SUSTAINABILITY**
ACTION 4.1: EMPLOYEE SUSTAINABILITY TRAINING PROGRAM

OBJECTIVE 5: **DEVELOP PERFORMANCE TRACKING SYSTEM BY 2012**
ACTION 5.1: DEVELOP DATA MANAGEMENT PROCEDURES

OBJECTIVE 6: **INCREASE RECOGNITION AND COMMUNICATION FOR SUSTAINABILITY**
ACTION 6.1: SECURE EPA ENERGY STAR RATING FOR GOVERNMENT CENTER
ACTION 6.2: CREATE SUSTAINABILITY WEBSITE

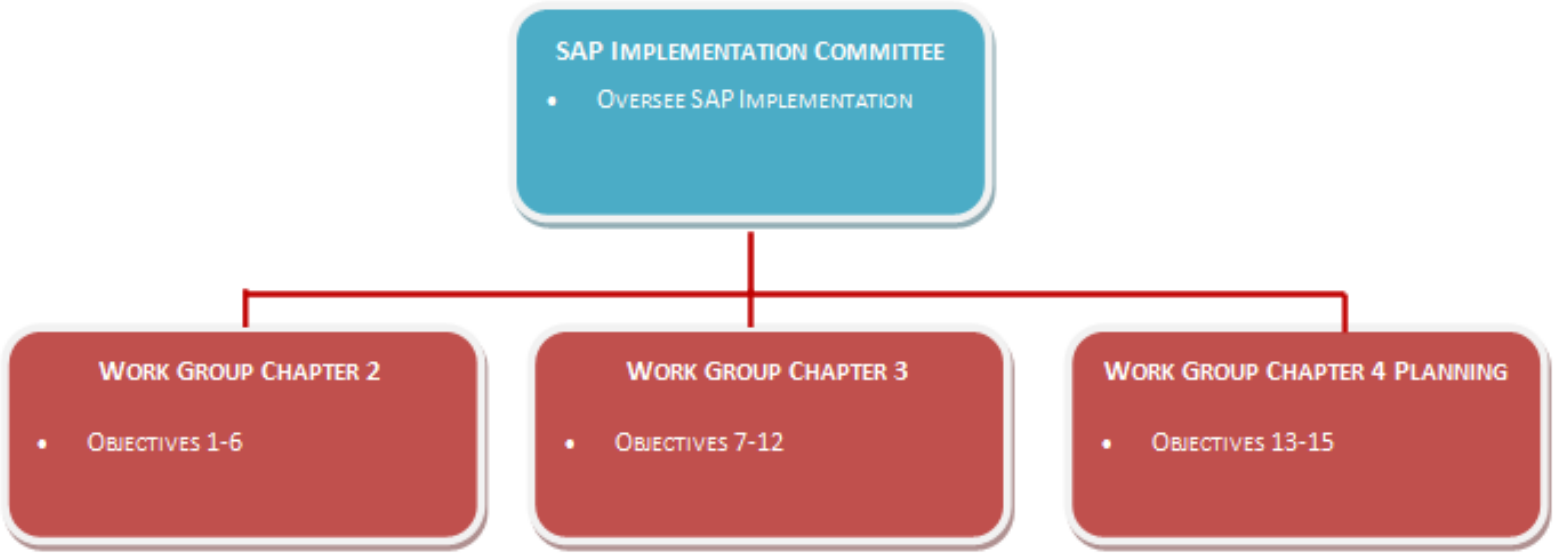
OBJECTIVE 1: STRENGTHEN CAPACITY TO IMPLEMENT SAP ACTIONS

As referenced in Chapter 1, the report publised by the World Commission on Environment and Development called "Our Common Future" gave the the topic of Sustainable Development (SD) global prominence. Among many things, this report cited the need to help localities develop institutional capacity to address Sustainability. Institutional Capacity can be generally defined as the set of rules, norms, procedures, protocols, and adminstrative processes that enable an organization to think collectively and achieve shared goals (Heslop, 2006). The development of this SAP will create additional workload for the City staff, require additional funds to implement actions, and require continual monitoring and performance tracking. In order for the City staff to undertake this additional responsibility, it is critical that Institutional Capacity be developed around the plan to ensure that it does more than just "site on the shelf." During the strategic planning process, it became clear that Sustainability leaders had already emerged throughout the City. The purpose of this objective is to establish the norms, procedures, and processes needed for these leaders to manage the overall implementation of this plan.

"SHORT TERM" ACTION 1.1: DEVELOP ORGANIZATIONAL PROCEDURES AND WORK GROUPS

The Steering Committee will develop procedures and work groups to help key City staff implement action items outlined in this SAP. The framework will define staff assignments, responsibilities, and describes the process in which action items will be presented and approved by City Council for adoption. This framework will form the foundation for the SAP because it will ensure that actions can be implemented. The figure on the following pages illustrates the recommended organizational structure for work groups.

This graphic illustrates the recommended work group structure that City staff and sustainability leaders will utilize to implement the SAP.



OBJECTIVE 2: SECURE AT LEAST $250,000 TO FUND SAP ACTIONS BY 2013

The City does not currently have enough funding to finance all of the recommendations of this SAP. Therefore it is critical to the long term viability of this plan to secured additional funding. There are a variety of organizations that have a track record of funding municipalities that have well articulated sustainability and energy management plans such as the Department of Energy (DOE), the Department of Housing and Urban Development (HUD) the Environmental Protection Agency (EPA), the state of Texas' State Energy Conservation Office (SECO), ONCOR the largest electricity and distribution line system in the state of Texas, and the regional planning body; the North Central Texas Council of Governments (NCTCOG). The purpose of this objective is to facilitate the procurement of funding to build the City's sustainability program into the future.

"SHORT TERM" ACTION 2.1: SYSTEM FOR SUSTAINABILITY GRANT PROCUREMENT

Securing funding for this plan is arguable the single most important action that can be accomplished by the City. This is because without funding, many of the actions in this plan cannot be realized. Fortunately, the City received a grant from the Department of Energy (DOE) under the Energy Efficiency and Conservation Block Grant Program (EECBG) in the amount of $176,600. This money was used to develop this SAP and to fund Transit Oriented Development Studies (TOD) for the City. The City will develop a system that will build upon its existing track record of procuring sustainability and energy related funding. It will do this by outlining procedures for grant identification, competition screening, and application development, and forming critical partnerships as needed.

OBJECTIVE 3: ENGAGE AT LEAST 2 STRATEGIC SUSTAINABILITY PARTNERS BY 2012

Sustainability is multidisciplinary because it encompasses energy, water, waste and recycling, community planning, economic development a myriad of other components. It also impacts almost every aspect of municipal operations and the community. Given the multidisciplinary and broad reaching scope of Sustainability, implementing actions can be technically complex, expensive, and require significant planning. The City should have greater success when implementing actions in this plan if it can develop key strategic partnerships with neighboring jurisdictions, educational institutions, and the business sector. Forming strategic partnerships and working together regionally is an effective way to overcome implementation hurdles because it will allow the City to pool resources, share important information, from alliances.

"SHORT TERM" ACTION 3.1: SECURE STRATEGIC PARTNERS

The first step the City should take to secure strategic partners will be to develop a comprehensive list of partners that the City could engage in the future to develop joint projects and programs. The City is familiar with this process because it has worked closely with the local chapter of the Audubon Society to develop the Audubon Dogwood Canyon in Cedar Hill Educational Center Project. The City has also established a relationship and entered into preliminary discussions regarding a cooperative purchasing agreement with Best Southwest to procure hydrogen fueling stations. Using these past partnerships as models, the City outlined a preliminary list of strategic partners that it may wish to engage including: the Independent School District, the Cedar Hill State Park, the County, the Audubon Society, Northwood University, the North Central Texas Council of Governments, Take Care of Texas, and ONCOR. After this list has been developed, the City should categorize each partnership based on nature of the future relationship. Examples of future relationships could include: 1) Public Private Partnerships, 2) Cross Jurisdictional Partnerships, 3) Non-Profit Partnerships, and 4) Institutional Partnerships.

OBJECTIVE 4: ATTEND 1 TRAINING OPPORTUNITY ANNUALLY FOR SUSTAINABILITY

As mentioned in Objective 3, Sustainability is a multidisciplinary field. In this context, the field represents an overabundance of information. Most sustainability projects, whether they be green building related or intended to encourage environmentally green purchases, requires an understanding of social, economic, and environmental components of a given project. During the strategic planning process, it was determined that staff involved with implementing the SAP will enhance their technical skills. Doing so will help staff be less dependent on outside assistance and become more capable of identifying technologies, products, and practices that offer the best return on investment to the City.

"SHORT TERM" ACTION 4.1: EMPLOYEE SUSTAINABILITY TRAINING

Employee Sustainability Program does not need to be a costly venture to the City. Instead, it will focus on identifying low cost to no cost training programs such as webinars, workshops, and certification courses. It will also be structured so that training is received in the major focal areas of this SAP. The following provides a framework for how future training programs will be structured for different parts of this plan. Training Area 1 (Institutional Capacity) will help staff become more up to date with the various funding programs available to them. Agencies often hold grant webinars. Other training opportunities in Training Area 1 include webinars and presentations on innovative financing mechanism used by governments to fund Sustainability related projects such as Property Assess Clean Energy Financing (PACE) and Energy Service Company Contracts (ESCOs) just to name a few. Training Area 2 will help staff involved in the technical day to day operations of running the City. An excellent opportunity for training in this area is to encourage staff to become a Certified Energy Manager (CEM). CEMs are trained to do energy audits of buildings which will be a very useful skill to have on staff. Finally, Training Area 3 (Community Development and Planning) will help staff learn how to best develop community sustainability programs. The best way to develop skills in this area is to attend conferences where peer exchanges take place where staff can learn about models used by other governments.

OBJECTIVE 5: DEVELOP PERFORMANCE TRACKING SYSTEM BY 2012

Sound data management and reporting will be the foundation for any sustainability or energy plan. This is because as sustainability related actions are implemented; their overall success in meeting target goals and objectives will be measured and reported to key decision makers. The City of Cedar Hill's Energy Master Plan published in 2005 identified a need to evaluate and eventually purchase energy management software. However, based on a review of the current process in which the City tracks and manages energy data (electricity, fuel, and natural gas); it is not recommended that the City invest in expensive software programs at this time. This is because the City currently has a strong system for collecting energy related expenditures along with energy consumption units such as kilowatt hours. The purpose of this objective is to outline some basic procedures that the City can use to modify its already strong energy data collection process so that it can be effectively analyzed and reported. Doing so will not only help sustainability managers determine if specific action items successful fulfill their objectives, but it will also help the City communicate the success of its sustainability program to the community.

"SHORT TERM" ACTION 5.1: DEVELOP DATA MANAGEMENT PROCEDURES

An interview was conducted with finance staff to learn how the City collected, organized, and reported energy related expenditures and associated consumption. Based on the interview, the City it was determined that the City has a standardized process where digital excel files are exported from the electricity utility provider's website. This digital information is then updated into a master spreadsheet that tracks individual electricity accounts. This information is then sent to departmental heads that approve expenditures each month. Based on this information, the first step in this action will be to formalize additional procedures where utility data can be forwarded to project managers for different actions. This action also outlines procedures where utility data for electricity, natural gas, and fuel is updated in the existing energy use database to recalculate the City's annual energy use. This action shares a synergy with action 7.2 EPA Energy Star Building Tracking Program in Chapter 3.

OBJECTIVE 6: IMPROVE RECOGNITION AND COMMUNICATION FOR SUSTAINABILITY

The City does not currently have one centralize platform to share Sustainability related information and communicate the progress of Sustainability initiatives. As the SAP is implemented and monitoring results become available, the City should have the ability to communicate its Sustainability results to the surrounding community. Communicating results will be important because it will help the City to gain recognition that will further bring attention and exposure to the plan. The purpose of this objective is to establish a platform to enable the City to increase recognition and communicate important information and metrics as actions are implemented overtime.

"SHORT TERM" ACTION 6.1: CREATE SUSTAINABILITY WEBSITE OR WEB PORTAL

The City should dedicate a space on its website to Sustainability. At a minimum, the website will contain a link to the SAP and a brief summary of the most important goals and objectives in the plan. As monitoring data becomes available for action items significant results such as energy savings, greenhouse gas reductions, and jobs created will be publicized via the website. The website will also be designed to be used as a tool to facilitate community feedback and interaction in support of the community outreach program outlined in Chapter 3.

"LONG TERM" ACTION 6.2: SECURE EPA ENERGY STAR RECOGNITION (CERTIFIED FACILITY AND/OR PORTFOLIO)

Action 7.1 outlined in Chapter 3 states that the City should utilize the free EPA Energy Star Portfolio Manger Program to measure energy use in existing facilities. The EPA has two recognition programs that the City may be eligible to receive if it can use this program to demonstrate energy savings. The first form of recognition requires a single building to meet energy performance guidelines set by the EPA. If a building can earn a score of 75 on the Energy Star Performance scale, it can be recognized as an Energy Star Certified Building. Ideal candidates for the certification include the Recreation Center and the Government Center; soon be retrofitted with solar rooftop arrays. The second form of recognition is more ambitious. It applies to an entire portfolio of buildings. If "portfolio wide "energy improvement can be made that exceed 10%, 20%, or 30% above normalized energy baselines and achieve a score of 75 on the Energy Star Performance scale, then the City would be recognized as a Top Performer in the nation (EPA Portfolio Manger Website).

STRATEGY INTENT

Municipal Sustainability will be implemented within the operations in which the City has direct control. A baseline energy use and greenhouse gas emissions inventory was conducted to assess how much energy is used across various departments. Based on this information, the City identified areas where it plans to make reductions to reduce operational costs and environmental impacts. These areas include buildings and infrastructure, increased use of renewable energy, improved fleet fuel economy, improved water conservation, and reductions in solid waste.

STRATEGY AT A GLANCE

OBJECTIVE 7:	**REDUCE ELECTRICITY USED IN MUNICIPAL BUILDINGS TO 5% AND NATURAL GAS TO 2% BELOW 2009 BASELINE LEVELS BY 2012.**
ACTION 7.1:	EPA ENERGY STAR BUILDING TRACKING PROGRAM
ACTION 7.2:	BUILDING ENERGY AUDIT & RETROFIT PROGRAM
OBJECTIVE 8:	**REDUCE ELECTRICITY & NATURAL GAS USED IN INFRASTRUCTURE TO 3% BELOW 2009 BASELINE LEVELS BY 2012.**
ACTION 8.1:	INFRASTRUCTURE AUDIT AND RETROFIT PROGRAM
OBJECTIVE 9:	**UTILIZE RENEWABLE ENERGY ON MUNICIPAL PROPERTY**
ACTION 9.1:	RENEWABLE ENERGY PILOT PROGRAM
OBJECTIVE 10:	**TO IMPROVE AVERAGE FLEET FUEL ECONOMY BY 2% BY 2015**
ACTION 10.1:	GREEN FLEET OPTIMIZATION AND PROCUREMENT PROGRAM
OBJECTIVE 11:	**IMPROVE WATER CONSERVATION IN MUNICIPAL OPERATIONS**
ACTION 11.1:	ASSESS WATER RATE STRUCTURE
ACTION 11.2:	EVALUATE RADIAL READ METERS TO IMPROVE WATER USE TRACKING
OBJECTIVE 12:	**REDUCE SOLID WASTE AND INCREASE RECYCLING RATES IN MUNICIPAL OPERATIONS**
ACTION 12.1:	MUNICIPAL RECYCLING PROGRAM

OBJECTIVE 7: REDUCE ELECTRICITY USED IN MUNICIPAL BUILDING TO 5% AND NATURAL GAS TO 2% BELOW 2009 BASELINE LEVELS BY 2012

The City owns and operates a portfolio of thirteen (13) buildings that consume electricity and/or natural gas. The City's building portfolio varies in size and age. Given the variety of the City's building portfolio it is important to actively manage them to control energy use and greenhouse gas emissions taking a building by building approach. The City has developed a series of action items that will help to meet this objective that will results in financial savings and reduced carbon emissions. It will also help the City meet the State of Texas' voluntary initiative to reduce electricity consumption by 5% each year as outlined in Senate Bill 12 (SB 12) for "non attainment" counties.

"MID TERM" ACTION 7.1: BUILDING ENERGY AUDIT AND RETROFIT PROGRAM

During the strategic planning process, the City expressed a desire to develop a list of energy efficiency retrofits that are prioritized based on their overall payback period or return on investment. The most effective way to develop such a list is to conduct energy audits of high energy using building. Audits are generally performed by a Certified Energy Manager (CEM) or other type of experienced professional such as an engineer. The professionals begin the process by conducting walkthroughs of various facilities. During walkthroughs the auditor will evaluate energy systems such as HVAC units, evaluate lighting, building envelope and insulation, and a variety of building components to identify areas where retrofits can be made to reduce building energy consumption. At the conclusion of the building walkthrough, the auditor will prepare a report that outlines a list of Energy Conservation Measures (ECMS) that can be implemented. Each ECM is typically accompanied by an analysis that outlines proposed energy savings and the overall period in which a potential retrofit can be paid back. ECMs are typically categorized as requiring low to not cost to implement or as having high costs to implement. They can also consist of behavior modification programs and recommend the purchase of items such as building energy management systems. It is important to note, that although energy audits do provide a list of ECMs, the City should still need to develop designs and specifications for proposed retrofits. Finally, the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system provides detailed information regarding the energy audit process. Among other things it outlines the different levels of audits that are defined by the American Society for Heating Refrigerating, and Air Conditioning Engineers (ASHRAE).

Under the ASHRAE standard there are different levels of audits ranging from level I to level II. Each audit level brings with it additional protocols and increasing level of effort auditors are required to invest into energy audit reports and site visits (USGBC, LEED Rating System for New Construction).

In late 2008, the ONCOR conducted an "Energy Benchmarking Report." The report contains an excellent summary of each building's energy profile with the exception of the new Government Center. The data in the report is primarily based on simple utility & fuel use data. In addition, the report provides good insight into generic areas for targeting potential energy efficiency issues and obtaining additional support to accomplish efficiency upgrades and possible financing. However, the report offers no specific recommendations for the City nor does it target any specific buildings or energy use equipment for ECM (energy conservation measure) upgrades. In summary, the report is only a utility & fuel benchmark with a generic set of recommendations for improving energy use. It is not an 'energy efficiency' or 'sustainability' plan. It is also not an energy audit because it does not offer any specifics for targeting problematic energy use sites & equipment, or anything targeting specific energy savings. Please refer to **Appendix D** for a copy of the ONCOR Report.

"SHORT TERM" ACTION 7.2: EPA ENERGY STAR BUILDING TRACKING PROGRAM

Developing this action item will be critical to monitoring the success of objective (Action 7.1 Building Energy Audit and Retrofit Program) and it has a synergy with Action 5.1 (Develop Data Management Procedures). Case studies show that improvements in the way an entity manages and tracks energy use data can result in costs saving of up to 15% to 20% of total energy costs. The City is committed to reducing building energy use (EPA, 2008). As a result of this action, the City will soon register with the EPA Portfolio Manger Program and use utility data to realize energy savings to the fullest extent possible. This program will enable the City to benchmark its buildings against other buildings of similar characteristics in the nation. The program does this by developing an energy use index which takes into account seasonal variations in temperature along with the buildings square footage and size. Using the benchmarking and energy index, the City will have a means to determine if retrofits and behavior modification programs implemented in to buildings actually achieve real energy savings. This action shares a synergy with Action 5.1.

OBJECTIVE 8: REDUCE ELECTRICITY & NATURAL GAS IN INFRASTRUCTURE TO 3% BY 2012

In addition to its building portfolio, the City owns and maintains a variety of infrastructure equipment that consumes electricity and natural gas. Examples of infrastructure and equipment include pumps, lift stations, water towers, recreational and sport lighting to name a few. The action items in this objective are designed to inventory and develop a planned approach to retrofit and replace aging infrastructure and lighting with more energy efficient technologies. The action items in this objective are also designed to help the City evaluate the lighting schedules and controls it uses for recreational lighting to determine if simple programmatic changes can positively impact energy consumption.

"MID TERM" ACTION 8.1: INFRASTRUCTURE AUDIT AND RETROFITS PROGRAM

During the strategic planning process, the City also worked to identify energy retrofits for infrastructure that are ready to be implemented throughout the City. However, few infrastructural energy retrofits were identified. This action will initiate the process to inventory end of life cycle retrofits for items such as lift stations, pumping equipment, and signage that can be replaced over time. The retrofit opportunities outlined in this action will be combined with the building retrofits outlined in Action 7.1 and compiled into one retrofit matrix that contains reasonable paybacks so the City can prioritize which retrofits will be completed over others. Having such a list will help the City be ready when grants become available and avoid having to create last minute projects.

OBJECTIVE 9: UTILIZE RENEWABLE ENERGY ON MUNICIPAL PROPERTY

The City recently received a grant in the amount of $952,058 from SECO Energy to install solar photovoltaic panels on government center, the largest and most energy intensive buildings within the municipal building portfolio. The City also received $164,478 in rebates from the Take a Load off Texas program and contributed $25,933 dollars from City funding. This match of more than $190,411 helped to improve the City's overall return on investment for the project. The panels are estimated to offset approximately 8.32% of the buildings total electricity demand and avoid approximately $21,000 annually. The purpose of this objective and subsequent actions are to study the impacts that this project has on the City to understand the strengths and weaknesses of solar installations for the future.

"MID TERM" ACTION 9.1: RENEWABLE ENERGY PILOT PROGRAM

This action will tie into Actions 5.1 and 7.1 which are designed to track energy savings created as SAP actions are implemented into the future. Solar technology still remains in developmental phases as cost still lags behind overall returns for many projects. However, the Government center solar energy project will provide the City with an ideal study environment to learn more about solar energy and how it can be applied on existing buildings and new construction projects. The data gathered during this project will also help the Town prepare for future scenarios when grant funding will not be needed to achieve attractive paybacks on solar technology.

OBJECTIVE 10: TO IMPROVE AVERAGE FLEET FUEL ECONOMY BY 2% BY 2015

There are many benefits associated with operating a "Greener Fleet." However, there are many hurdles to overcome to build such a fleet. A Green Fleet is comprised of Green Vehicles. A Green vehicle can be classified as any motor vehicle that operates producing less harmful impacts to the environment when compared to a standard internal combustion vehicle utilizing gasoline or diesel fuel. The benefits of a operating a Green Fleet includes better overall energy efficiency, less greenhouse gas emissions, as well as other pollutants. Green vehicles technology is still actively developing and costs are usually quite high. However there are certain steps that the City should take to mitigate costs, and even produce potential savings on energy consumption over the long term.

"MID TERM" ACTION 10.1: GREEN FLEET OPTIMIZATION & PROCUREMENT PROGRAM

Developing a "Green Fleet Optimization Program" can bring a variety of benefits to the City. However, developing such a program will take due diligence and careful planning to overcome hurdles that fleet managers face when implementing such programs. For example, the current state of "green" vehicular technology can be overwhelming. As a result, it can be difficult to identify vehicle replacements and technologies that produce amendable return on investment due to inherent asset depreciation, large capital expenditure, and risk involved with new technologies. Other hurdles include identifying the most appropriate way to maintain high technology vehicles and ensuring that vehicle replacements do not interfere with the ability of staff to complete their day to day duties. When considering the potential risks and rewards of a green fleet, the City plans to continue to take a deliberate approach to "Green Fleet Optimization" that follows guidelines established under a widely accepted program such as the Department of Energy's Clean Cities Program. The program is designed to reduce the use of petroleum in the transportation sector. The following outlines a series of important components that all "Green Fleet Programs" should possess.

Step 1: Get Involved with a U.S. DOE Clean Cities Coalition – The U.S. Department of Energy maintains the Clean Cities Program designed to help reduced petroleum consumption. A major component of the program deals with fleet. The Clean Cities

Program recommends that local governments get involved with geographically based coalitions composed of local fleet leaders, fuel providers, and other stakeholders that share the goal to reduce petroleum consumption. There is a Dallas-Fort Worth Clean Cities Coalition. It is highly recommended that the City of Cedar Hill reach out to representatives for this area. Representatives are Pamela Burns (817-704-2510) and Mindy Mize (817-608-2346). Both work with the North Central Texas Council of Governments (NCTCOG). Additional information can be found at http://www.nctcog.org/trans/clean/cities/Participation in the Coalition will likely open doors for fleet planning activities, create opportunities for data sharing, and be useful in securing funding for programs.

Step 2: Identify Financing Opportunities **-** The first and one of the most fundamental steps in developing a "Green Fleet Optimization" program begins with identifying funding sources to advance the intent of the program. This can be done using a combination of grants, City funds, tax credits, and low interest loans. It is ideal to have a plan in place before pursuing funding. However, sometimes identification of a funding opportunity can help to shape future planning efforts. At this point in time, the City has identified some short term funding opportunities that may be pursued. Details of these funding opportunities can be found at:

- http://www.nctcog.org/trans/air/vehicles/investments/funding/index.asp
- https://www.fbo.gov/spg/DOE/NREL/NR/020311PS/listing.html
- School Bus Emission Reduction Program (NCTCOG)
- Heavy Duty Vehicle and Equipment Grant (NCTCOG)
- Diesel Idling Reduction Program (NCTCOG)

Step 3: Conduct Necessary Due Diligence & Develop a Plan – Before making investments into fleet programs and technologies, it is important to conduct the due diligence necessary to make sound decisions and articulate clear goals, objectives, and actions for future "Green Fleet Optimization Plans." The following outlines important components of a "Green Fleet Optimization Plan" and the type of due diligence and background information required for each.

- Fuel Consumption: One of the most important components of any Green Fleet Optimization Plan is to reduce fuel consumption. This can be done by attempting to reduce fuel consumption on an aggregate level or by attempting to set goals that strive to improve the overall average fuel economy of the existing vehicle fleet. Currently the City has established a goal to reduce the average fuel economy of the City's 2009 municipal fleet by at least 2% by 2015. The City has already developed an inventory of diesel and unleaded fuel use across departments for the year of 2009. This information should be used to track the progress of this goal into the future.

- Vehicle Utilization: Before investing funds into purchasing hybrid and other "green" vehicles, the City should conduct an analysis to determine if its existing fleet is being utilized as effectively as possible. This can be done by analyzing the intended use of a vehicle and its vehicle miles traveled (VMT) to determine if smaller more fuel efficient models can be used to do the job. For example, many cities use SUVs and small trucks to conduct planning and zoning visits. In many cases, these visits could be conducted in smaller more fuel efficient cars. Care should be taken to ensure that utility vehicles are not being replaced with vehicles that may make staff jobs more difficult.

- Vehicle Asset Replacement Policy: The key to achieving a greener fleet will be to develop a vehicle asset replacement policy that factors in variables such as fuel efficiency and emissions reductions along with cost. The most obvious way to optimize municipal fleet is to purchase hybrid vehicles to replace traditional vehicles. However, the major barrier to doing this is the generally unattractive return on investment required to purchase a hybrid model in comparison with its fuel savings and potential maintenance costs. The example provided below shows the cost to upgrade from a standard Honda Civic to a hybrid Honda Civic to be $8,145.00. When considering fuel cost savings alone, the payback in years to upgrade to a hybrid model

Vehicle	Cost of Upgrade	Fuel Savings (Gal)	Increase in Efficiency	Carbon Savings (MT)	Fuel Savings	Payback (yrs)	ROI
Honda - Civic Hybrid	$ 8,145.00	161.3	45%	1.42	489.09	16.65	6%

- amounts to approximately 16 years. Given that the City should likely never possess a car for such a long period of time this investment at first glance seems unattractive. Therefore, additional sources of funding will be required to reduce the City's overall payback. The first step in revising the City's policy is to examine the existing Asset Replacement Policy and identify areas where green purchases may be justified. Some cities have developed additional metrics to justify costs such as the value of demonstrating environmental leadership and the value of carbon emission reductions. Other cities have devised programs where grant funds are used to fund the difference between a convention car and a hybrid vehicle. Doing so improves the City's overall return on investment.

- Anti-Idling: Idling can lead to unnecessary fuel usage for a variety of vehicles within a municipal fleet. Many cities have implemented Anti-Idling policies, ordinances, and programs that target unnecessary idling. The first step in developing such a policy would be to assess if idling is actually an issue within the City of Cedar Hill. This can be done by asking vehicle operators to conduct self assessments, by monitoring public reports of idling, and random observations to detect unnecessary idling practices. If Idling is identified as a problem, then a policy should be developed to address it. Examples of how other municipalities have addressed idling include: posting anti-idling signs in vehicle yards, placing decal notifications on city vehicles, internal training and education programs. If idling is identified as being a significant problem there are also technological solutions that are more costly than policy and program development. Examples of such technologies include: automatic shut down devices, electronic vehicle monitoring systems, battery back-up systems for vehicles such as police cruisers that need to idle in order to power electronic equipment such as computers. The City has already adopted and anti-idling police that is designed to reduce gasoline consumption putting restrictions on the amount of time a vehicle can be left to idle. See **Appendix C** for a copy of the City's anti idling policy.

- Alternative Technologies and Pilot Programs: As previously stated, there are a variety of alternative technologies and alternative fuels available to fleet managers. However, most alternative technologies and fuels are developing causing their costs to be high and their overall effectiveness to be either unknown or risky. Unless a grant or other financing source can be secured, it is not recommended that the City begin to invest in alternative technologies and fuels until it can gather enough information to fully understand the investment it plans to undertake. However, this should not deter the City from learning more about alternative technologies and fuels and investing in those that may be promising in the future using the pilot or demonstration program model. Many cities choose to implement small scale pilot programs to evaluate a given technology for a given period of time to see if it fits into the City's overall operational framework and if it represents a good return on investment. In this context, it is recommended that the City begin the process of evaluating alternative technologies and fuels for potential pilot programs. Doing so will prepare the City for smoother transitions to new technologies, bring visibility to the fleet program, and demonstrate leadership and commitment to sustainability to the surrounding community. The following provides a list of some of the alternative fuels and technologies available today along with their strengths and weaknesses.

  - ✓ Hybrid Vehicles - Hybrid vehicles use a combination of electric motors and internal combustion. The best selling hybrid electric vehicle in the Toyota Prius. Its price ranges from about $24,000 and its average fuel economy is about 50 miles per gallon. Many municipalities have purchased hybrid vehicles. However, in many cases there increased cost over a standard model does not always justify the investment based on fuel savings alone. Other factors typically must be incorporated into the vehicle purchase to improve the overall payback such as greenhouse gas reductions and demonstrated community leadership.

  - ✓ Plug In Hybrid Electric – A plug in hybrid electric vehicle utilizes electricity supplied from an outlet and it can run using fuel. An example of a Plug-In Hybrid Electric Car is the Chevy Volt. The Volt cost approximately $32,000 after tax credits. It has a range of approximately 25 – 50 miles when using its battery. To overcome the short range, the vehicle can run off of gasoline. Potential barriers include price, potential maintenance and battery warranties. However, further analysis needs to be done to evaluate this vehicle.

- ✓ Electric Vehicles – An electric vehicle does not have an internal combustion engine and only operates using electricity from an outlet. An example of an electric vehicle is the Nissan Leaf. The Leaf costs approximately $26,000 after tax credits. The Leaf has a range of approximately 100 miles from one charge and is termed a zero tailpipe emission vehicle. However, emissions are still generated from the vehicle from the use of electricity generated at a power plant. Potential barriers include potential battery warranties and range, and the need for charging stations. There are locations around the country including in Dallas and Austin Texas where retailers such as Whole Foods have installed charging stations to attract electric vehicle users. According to an article in USA today, charging stations can cost around $2,000 - $6,000 plus installation costs after tax credits. However, it many companies have yet to charge for electricity and are providing it for free. There may be future opportunities to charge for electricity which would allow owners to re-coup their investment. Further analysis needs to be done to evaluate this vehicle's suitability. However, such a program could serve as an innovative demonstration project for the community. Furthermore, the City could approach local businesses to develop joint projects.
  http://www.usatoday.com/money/autos/2011-01-14-electric-car-charging-stations_N.htm

- ✓ Hydrogen Fuel Cell Vehicles – Hydrogen fuel cell technology is still emerging and remains costly. The only emission from a vehicle using hydrogen fuel cell technology is water. The only commercially available vehicle that utilizes this technology is the Honda Clarity. Only 200 vehicles will be available for lease in Southern California. The clarity can drive approximately 240 miles before needed to be refueled. This vehicle and technology have various barriers such as cost, technology, and lack of infrastructure for re-fueling stations. However, its low environmental impact makes it a very promising alternative for the future.

- ✓ Compressed Natural Gas (CNG) – Compressed Natural Gas (CNG) is a substitute for gasoline that is typically used in municipal fleet vehicles such as transit buses and garbage trucks. CNG has lower emissions than gasoline and can be mixed with landfill gas. Fueling stations would be required if vehicles were converted to CNG. Studies from the National Renewable Energy Laboratory indicated that CNG fleet conversions are best suited for larger fleets where fleets with fewer than 30 vehicles took approximately 7-8 years to recuperate initial investments. Light duty and heavy duty vehicles can be retrofitted to run on CNG. The Honda Civic GX Sedan is the only light purpose vehicle available on the market today. According to a study conducted by DOE's Clean Cities CNG prices in October of 2010 were $1.93 as compared to Gasoline ($2.78) and Diesel ($2.75). Many municipalities have found success retrofitting and purchasing CNG vehicles in achieving cost savings and emissions reduction goals (Clean Cities, 2010).

Table 2. October 2010 Overall Average Fuel Prices on Energy-Equivalent Basis

	Nationwide Average Price in Gasoline Gallon Equivalents	*Nationwide Average Price in Diesel Gallon Equivalents*	*Nationwide Average Price in Dollars per Million Btu*
Gasoline	$2.78	$3.10	$24.12
Diesel	$2.75	$3.07	$23.87
CNG	$1.93	$2.15	$16.68
Ethanol (E85)	$3.45	$3.84	$29.85
Propane	$3.93	$4.39	$34.10
Biodiesel (B20)	$2.86	$3.19	$24.82
Biodiesel (B99-B100)	$3.76	$4.19	$32.58

OBJECTIVE 11: IMPROVE WATER CONSERVATION IN MUNICIPAL OPERATIONS

In Texas, residents in the major metro areas use an average of 140 to 240 gallons a day in 2004, depending on the location. Texas uses about 711 million gallons each day, with about 60% going to agriculture, 15% to industry and 25% directly to the state's 23 million citizens (Texas Water Development Board, TWBD). With ever increasing population, this water demand may outpace supply. Compared to Dallas which has a water consumption of 236 gallons per capita and day (GPCD), the City of Cedar Hill consumed significantly less with 148 gallons per capita a day (Texas State Data Center 2007).

"MID TERM" ACTION 11.1: ASSESS WATER RATE STRUCTURE

Some cities have made significant headway in water conservation, albeit at the cost of sinking revenues for their utilities. As municipalities deal with fixed costs (system maintenance and staffing) and variable costs (water consumed), the revenue is not always balanced. Some assert that fixing water rate structures to be a solution. Others argue that fixing water rate structures only punishes low volume users for conserving water. The City should assess its current water rate structure. It will do this by analyzing examples of what other cities throughout the country have done. One example for reference comes from the Irvine Ranch Water District (IRWD) in Orange County, CA. IRWD has adopted a working water rate structure that finds the right balance between water conservation and decreased revenue volatility. In IRWD district, customers who use water efficiently are rewarded with low water fees. The district separated fixed and volumetric charges; the operational costs are distributed to all customers and remain the same. And even if water use decreases, the fixed costs are thus still covered. Furthermore, IRWD also separated its capital costs from its operations costs. Capital projects to build or maintain water infrastructure are paid for by property taxes and one-time connection fees charged to new users in the system. This keeps water bills in check, but transfers the costs of expansion and repair to a resident's tax bill.

"MID TERM" ACTION 11.2: EVALUATE AUTOMATED METER READING TECHNOLOGIES (AMR)

The City currently uses City vehicles and City staff to physically read residential and business water meters. Automatic water meter reading can help the City avoid unnecessary travel and time spent to read meters resulting in gasoline savings and reduced greenhouse gas emissions. Additionally, automatic meter reading has been documented to improve the overall accuracy of meter reading events and can provide real time data. Improving accuracy also helps to more effectively provide water managers with true consumption patterns for residential and business water users. The City should go through an analysis process of existing systems, travel routes, and meter reading processes to look at innovative ways to collect water data automatically. The analysis will evaluate various types of automated meter reading technology (AMR) such as:

- Touch Technology
- Radio Frequency
- Handheld
- Mobile
- Fixed Networks

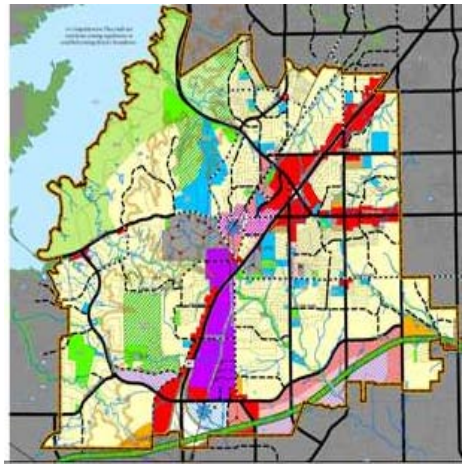
Other cities have used AMR technology to their advantage to realize cost, time, and energy efficiency savings. For example, the City of Wilsonville in Oregon spends approximately $30,000 annually on automatic meter reading which has allowed the City to read meters in one day, detect leaks almost instantly, identify backflow issues, improve billing, and reallocated key personal to more critical tasks. http://www.ci.wilsonville.or.us/Index.aspx?page=419

OBJECTIVE 12: REDUCE SOLID WASTE AND RECYCLING RATES IN MUNICIPAL OPERATIONS

In 2006, the Environmental Protection Agency found that Americans produced 251 million tons of trash, equating to about 4.6 pounds per capita/day. EPA recommends recycling as the second preferred option in waste management after source reduction and reuse. Generally, the highest recycling rates are achieved by recycling metals, yard trimmings and paper/cardboard. The Waste Reduction Policy Act of 1991 was adopted by the Texas Legislature to prevent pollution in Texas. To help in these efforts, the State of Texas Alliance for Recycling (STAR) provides support for recycling programs by educating and informing entities including municipalities about recycling initiatives. The City of Cedar Hill has set in place city-wide weekly residential recyclables pickups and it provides a recycle bin to every home when connecting water service. Additional bins are also provided by the utility billing center at the Government Center for $6 each. The City employs a single-stream recycling system that facilitates collection of recyclable material where no pre-sorting is necessary. In order to encourage municipal recycling efforts, the City pursues efforts to provide more recycling bins in both governmental buildings and public places such as Valley Ridge Park, for example. There are many options for the City to consider that will help meet these goals. The City has also implemented an E-Waste recycling program where residents can drop off computers, CD/DVD players, cell phones, copy machines, fax machines, printers, and other equipment. Additionally the City offers residents the opportunities to shred up to 3 boxes of paper per household so that they may be shredded.

"MID TERM" ACTION 12.1: MUNICIPAL RECYCLING PROGRAM

The City should maintain its existing recycling initiatives and continue to innovate and expand upon them. Some areas where the City should consider innovating and expanding its existing recycling programs include: procurement policies for new products, creating a recycling task force, and continuing to provide adequate receptacle for residents. The City should continue to re-negotiate its existing contract for waste hauling. If negotiations are successful, the City plans to provide citizens with larger recycling bins transitioning from 19 gallon bins to 96 gallons. Also this re-negotiated contract will coordinate recycling and trash pick-up times so they occur on the same day. Doing so will reduce number of miles driven by waste collection vehicles and reduce overall carbon emissions resulting from the process. The City is working to obtain data to calculate carbon emissions reductions that would stem from this plan.



STRATEGY INTENT

The intent of this strategy is to begin the process of integrating the principles of sustainability into existing planning documents and outreach programs to give the community the information and means necessary to realize the benefits of Sustainability. This will be done by integrating Sustainability into City documents and developing an outreach program that will target businesses and residents.

STRATEGY AT A GLANCE

OBJECTIVE 13: **TO INCREASE VEGETATIVE COVER, OPEN SPACE, AND NATURAL BEAUTY**
ACTION 13.1: SECURE TREE CITY USA GROWTH AWARD

OBJECTIVE 14: **INTEGRATE ENERGY EFFICIENCY AND RENEWABLE ENERGY IN TOD PLANS**
ACTION 14.1: HOLD PLANNING WORKSHOPS TO INTRODUCE IDEA OF TOD AS AN ENERGY HUB

OBJECTIVE 15: **FACILITATE COMMUNITY SUSTAINABILITY EDUCATION & EXTENSION PROGRAM**
ACTION 15.1: DEVELOP FRAMEWORK FOR COMMUNITY EDUCATION & EXTENSION PROGRAM
ACTION 15.2: COMMUNITY GARDEN PROGRAM
ACTION 15.3: COMMUNITY NEWSLETTER
ACTION 15.4: IMPROVE COMMUNITY RECYCLING

OBJECTIVE 13: TO INCREASE VEGETATIVE COVER, OPEN SPACE, AND NATURAL BEAUTY

The City of Cedar Hill's distinctive character is connected to the unique natural heritage of the community. The City is well known for its unique rolling Hills and outstanding natural features that distinguish the City from others in the area. During the strategic planning process, the Steering Committee made it a priority to continue its existing efforts to increase vegetative cover, open space, and enhance the natural beauty of the City. Some of the initiatives the City has completed to promote this objective include the development of a Tree Ordinance that requires the preservation of trees during the land development process. The ordinance also outlines mitigation measures to be taken in situations where trees cannot be preserved. The City has also formed a partnership with the local Audubon chapter of Dallas, to develop the Audubon Dogwood Canyon in Cedar Hill Educational Center. The site surrounding the center provides conservation for critical wildlife habitat "just 15 miles southwest of downtown Dallas." The center will feature educational exhibits designed to "connect" people living in urban areas with nature (http://www.cedarHilltx.com/index.aspx?nid=861). Finally, the City is a "Tree City USA;" a program sponsored by the Arbor Day Foundations developed in cooperation with the USDA Forest Service and the National Association of State Foresters. The program is to provide technical assistance, public attention, and national recognition for local governmental urban and community forestry programs in the U.S. The purpose of the following action is to lay the framework for the City to strengthen its existing tree planting and forestry initiatives.

MID TERM ACTION 13.1: SECURE TREE CITY USA GROWTH AWARD

Given the City's existing involvement with Tree City USA, the most effective way to improve upon this objective is to continue working within the program's existing framework. The City should do this by applying for a Tree City USA Growth Award. For the City to receive this award it must receive at least 10 points for completing a variety of actions within the following categories 1) Education, 2) Partnerships, 3) Planning and Management, and 4) Tree Planting and Maintenance.

The Growth Award outlines a series of 49 actions that can be completed spanning all four categories. Each action was reviewed to answer two fundamental questions. Has the City already completed the action? Can the City reasonable complete the action? Based on this review it was determined that the City has completed a total of four actions that will result in 17 points which is sufficient to secure the Growth Award if the City can provide adequate documentation. Many of these points can come from activities undertaken as part of the Audubon Dogwood Canyon Project. Also based on the review, it was determined that the City can reasonably complete a total of 11 actions that can result in 59 points for subsequent years.

Category	Point Description	Points	Complete	Reccomended
Education	**A1. Publications**	2		x
Education	**A2. Literature Distribution**	2		x
Education	**A3. Interpretive Program**	3	x	
Education	**A6. Publicity**	5		x
Education	**A7. Youth Education**	4	x	
Education	**A13. Publicity Events**	3		x
Partnerships	**B1. New Project or Organization**	4	x	
Partnerships	**B5. External Funding**	6		x
Planning & Management	**C1. Tree-Maintenance Budget**	9		x
Planning & Management	**C2. Municipal Funding**	8		x
Planning & Management	**C4. Tree Inventory and Analysis**	7		x
Planning & Management	**C8. Improved Ordinance**	6		x
Tree Planting & Maintenance	**D1. Special Tree Planting Project**	4		x
Tree Planting & Maintenance	**D4. Street Tree Planting**	7		x
Tree Planting & Maintenance	**D11. Tree Preservation**	6	x	
Total Points			**17**	**59**

OBJECTIVE 14: INTEGRATE ENERGY EFFICIENCY & RENEWABLE ENERGY INTO TOD PLANS

The City utilized portions of its grant allocation from the Energy Efficiency and Conservation Block Grant (EECBG) award to fund the first phase of Transit Oriented Development (TOD) planning. Using grant funds the City developed a preliminary plan called the City Center Vision Plan (the Plan) that reinforces the City's commitment to Sustainable Development and provides a "catalyst for a shift in development patterns in and around the City Center area." The City has also received additional funding from NCTCOG to expand the study further. The plan will be used to prepare for a future extension for a regional commuter rail line that will connect the City with larger metropolitan areas such as Dallas. This future rail line gives the City a unique opportunity to plan rail stations and facilitate surrounding developments that achieve multiple sustainability related objectives within the community such as reduced vehicle miles traveled, more pedestrian friendly streets, compact development, and reduce greenhouse gas emissions. As stated in the City Center Vision Plan, ideas presented represent the starting point for future discussions regarding TOD since additional studies and analysis is required to evaluate the merits of the various proposals outlined the Plan. The following action was developed to tie into the City's existing planning efforts to ensure that energy efficiency, renewable energy, and other components of sustainability are integrated into future TOD planning exercises to the fullest extent possible.

"SHORT TERM ACTION" 14.1: PLANNING WORKSHOPS TO EVALUATE GREEN TOD

Transit Oriented Development (TOD) is a development model that strives to maximize mixed use residential development with public transportation that encourages transit ridership and high density development within core development zones. This type of development is very effective at combating urban sprawl and is a very powerful tool that can help Cities become more sustainable by reducing vehicle miles traveled, promoting "walkability," and reducing greenhouse gas emissions. Well planned TODs also create jobs and can help improve residential home values. The concept of TOD is currently evolving with other green developmental paradigms such as "green urbanism" to create Green TOD where green building and design, renewable energy, and energy efficiency are being integrated into traditional models of TOD. There are a growing number of cities in the U.S. that are beginning to implement concepts of Green TOD.

For example, the City of San Mateos California has implemented a sustainability checklist for future Developments that are to be part of the City's TOD plan (http://www.cityofsanmateo.org/index.aspx?NID=922). The City of Windsor in Sonoma County California has also developed a green development land use code that encourages mixed use buildings. The City plans to have additional planning workshops and commission additional studies to continue to develop the TOD over time (Great Communities). As these workshops and studies are implemented, the City should plan to make sustainability an important theme that will be integrated into future planning activities. Some topics of interest that the City should incorporate will include:

New Construction

- ✓ Use of LEED Standard for Neighborhood Developments for Future TOD Developments
- ✓ Development of Minimum Green Building Standards for New TOD Construction Projects

New Technologies & Incentive Programs

- ✓ Solar Powered Bus Stops and Pedestrian Sheds with free Wi-Fi, digital maps, LED Lighting, Arrival Notices
- ✓ Hydrogen Vehicle Infrastructure (Fueling Stations)
- ✓ Electric Vehicle Charging Stations
- ✓ Preferred Parking for Alternative Vehicles

Existing Buildings

- ✓ Guidelines for Historic Green Building Renovations

OBJECTIVE 15: FACILITATE COMMUNITY SUSTAINABILITY EDUCATION & EXTENSION PROGRAM

A Sustainability Action Plan (SAP) is not complete without a plan that will help the community become more sustainable. Although the City did not develop a comprehensive community sustainability program during the strategic planning process, the City is committed to begin the planning process to develop one during time frame of this plan (2011-2016). The resulting plan will be designed to generally engage the public in a way that provides education and outreach opportunities for businesses and residents so that they may address difficult problems such as energy conservation, waste and recycling, water conservation, and transportation. The following actions outline the steps the City plans to take to begin developing community sustainability programs.

"SHORT TERM" ACTION 15.1: COMMUNITY WEB PORTAL

The City should develop a website for the SAP that will also serve as the portal for the community. The website will be used to communicate success of municipal projects outlined in this SAP as well as to disseminate important information to the community. During the first year of the plan, the website will contain basic information regarding the SAP such as the results of the energy use inventory and the general goals and objectives outlined by the City. The website will contain a narrative of the SAP and begin to report on important performance measurements such as kilowatt hours saved and greenhouse gas emissions reduced as SAP actions are implemented. The website will also contain news and information sections as well as feedback sections. The news and information section will be used by the City to announce important events and achievements regarding sustainability. The feedback section will be used as the portal where the City can begin to interact with the community to obtain feedback regarding potential community programs. The City of Cedar Hill already uses Facebook and Twitter. Both applications can be expanded to be used to communicate sustainability as well.

"MID TERM" ACTION 15.2: STRATEGIC PLANNING WORKSHOPS

Most cities that have SAPs have developed community components. However, the frameworks for these components vary significantly given the unique social, economic, and environmental dimensions of the given community. For example, some cities focus their community programs on helping residents conserve electricity. Other cities have developed programs designed to improve transit ridership and promote community walkability, while others focus heavily on recycling and waste management. Additionally, some Cities have developed multiple programs that incorporate all of these elements into one. The City of Cedar Hill is committed to developing a community program for sustainability. However, additional planning and due diligence must be completed before defining exactly what the program will look like. To facilitate the development of the program, the City should hold strategic planning workshops designed to evaluate what other cities have done to promote community sustainability and develop a model that will best suite Cedar Hill. One of the most important topics to discuss during strategic planning workshops will be to define the scope and budget for the future community program. In this context, the City should strive to answer some of the following important questions. What topics does the City wish to address in the community (energy use, water conservation, waste and recycling, renewable energy)? What type of budget will be available for plan development and implementation? What community constituents in the community will the plan target (residents, businesses, or industrial)?

"MID TERM" ACTION 15.3: COMMUNITY SURVEYS AND STUDIES

Program development is best done using background information to inform the development of important goals and objectives. Just as the City conducted an energy use and greenhouse gas inventory and used the results to inform goals and objectives of this plan, the City should also conduct additional surveys and studies to inform the development of the future community program. Surveys can be used to help gauge the interest of the community in participating in particular programs. Studies can also be used to develop benchmarks and objectives that will guide the development of the plan. For example, if the City chooses to target energy use it will be important to conduct a survey to determine how much electricity is used throughout the residential and business community. Once this information is obtained the City can begin to develop targets and programs designed to help residents and business make reductions.

"MID TERM" ACTION 15.4: COMMUNITY GARDEN

City staff has expressed an interest in developing a community garden program. Community gardens are plots of land where members of the community can plant and grow produce on leased or donated plots of land. Community gardens are public spaces that provide access to residents of the community who may lack the land or resources to garden at their homes. The benefits of community gardens go beyond just gardening they offer opportunities for social networking, community building, and offer education and outreach to teach residents the fundamentals of agriculture and organic food production. In addition to these direct benefits, community gardens contribute to reducing carbon emissions by eliminating intensive farming practices and transportation to move produce to market. There are many examples of community gardens throughout Texas. One example comes from a group called "Sunshine Community Gardens" located in Austin, Texas. Sunshine Community Gardens operate as a non-profit organization that raises money through donations and plant sales. Sunshine Community Gardens partners with a local school to provide education and training to students as well as members of the community. The City of Coppell, Texas also maintains a community garden program. For more information regarding the Sunshine Community Garden and the City of Coppell Community Gardens please visit the website listed below. Currently, the City of Cedar Hill is working to host several community garden beds as a pilot program in plots located just west of the City Library. Beds are planned for construction by the Park and Recreation Staff under the guidance of the Public Works department. Neighborhood services will also be involved by encouraging residents to participate and by seeking out local business partners.

- http://www.sunshinecommunitygarden.org/
- http://www.coppellcommunitygarden.org/

CLOSING REMARKS

This Sustainability Action Plan (SAP) covers a five year planning horizon (2011-2016). It represents the City of Cedar Hill's first major effort to consolidate all of its Sustainability related initiatives into one unified framework. In doing this, the City has created more than just a planning document. It outlines a clear roadmap for Sustainability and it provides the foundation in which staff will build upon to create a larger management system that will facilitate future planning and implementation of projects and programs that have Sustainable outcomes. In this context, this plan should be considered a living document that will grow and change along with the City, technology, and Sustainability Science. This will be done by monitoring the success of projects over time and regularly updating this plan.

This plan was developed by the City Steering Committee comprised of key City staff and Sustainability consultants following a strategic planning process. During this process, the City Steering Committee developed Sustainability Mission and Visions Statements. The Steering Committee also identified where it currently stands, where it wants to go, and how it plans to achieve the Mission and Vision it defined. Also during the process, important data was collected and analyzed to form the scientific underpinning for the plan. One of the most significant studies conducted was the 2009 Energy Use and Greenhouse Gas Emissions Inventory. This inventory will provide the benchmark to measure the overall success of many components of this plan.

Based on the information gathered during the strategic planning process, the plan has been divided into three separate parts that address areas where the City plans to become more sustainable. These areas include: 1) Institutional Capacity, 2) Municipal Operations, and 3) Planning and Community Development. Within each of these three areas, 15 measureable goals and 19 specific actions were created. As each of these actions is implemented over time the City will move itself closer to achieving it stated Mission and Vision for Sustainability.

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2004. Department of Energy (DOE) National Renewable Energy Laboratory (NREL). A Case Study on In-House Retro-Commissioning at DOE National Laboratory.

2004. Texas Commission on Environmental Quality. Texas Clean Fleet Program. Guidelines for Private and Local Government Fleets.

2006. United States Green Building Council (USGBC). LEED Rating System for New Construction and Major Renovations Version 2.2

WEBSITES

EPA Portfolio Manger Website
http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager

Electric Charging Stations
http://www.usatoday.com/money/autos/2011-01-14-electric-car-charging-stations_N.htm

North Central Texas Council of Governments (NCTCOG)
http://www.nctcog.org/trans/air/vehicles/investments/funding/index.asp
https://www.fbo.gov/spg/DOE/NREL/NR/020311PS/listing.html

Automatic Meter Reading Technology
http://www.ci.wilsonville.or.us/Index.aspx?page=419

Audubon Dogwood Canyon in Cedar Hill Educational Center
http://www.cedarHilltx.com/index.aspx?nid=861

Tree City USA Growth Award
http://www.arborday.org/programs/treeCityUSA/eligibility.cfm

APPENDIX A

City Council Resolution Approving the 2011-2016 Sustainability Action Plan

APPENDIX B
2009 Baseline Energy Use / Greenhouse Gas Emissions Inventory


Cedar Hill - 2009
GHG Inventory

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TABLE OF CONTENTS

INTRODUCTION

The City of Cedar Hill (the "City"), Texas, is contained within Dallas and Ellis counties. A suburb of the Dallas-Fort Worth metropolitan area, Cedar Hill has an estimated population of 45,600[1] (2009) and an overall land area of just over 35 square miles. Adjacent municipalities include Grand Prairie, Duncanville, DeSoto, Glenn Heights, Ovilla, and Midlothian. Cedar Hill is known for its unique geography and eastern red cedar trees. The City is currently experiencing rapid growth and has seen many changes in economic development since 2000. During this time numerous retail and restaurant establishments have opened, most notably as the *Plaza at Cedar Hill* and the *Cedar Hill Crossing*. Despite this rapid growth Cedar Hill maintains its small town charm and dedication to preserving natural and open spaces.

The City received funding from the Department of Energy (DOE) through the Energy Efficiency and Conservation Block Grant (EECBG) program to develop the 2010-2015 Sustainability Action Plan (SAP). The purpose of the SAP is to provide a five year roadmap to help the City become more energy efficient within internal operations, and at a broader level, more sustainable. To do this the SAP establishes sustainability goals, objectives, and actions. The SAP also provides recommended action plans that outline the best way to implement recommended actions.

One of the first and most important tasks completed leading up to the development of the SAP was to develop an Energy Use and Greenhouse Gas Emissions Inventory (the "Inventory") for the City. The information obtained during the Inventory was used as a baseline to inform the development of goals, objectives, and actions in the SAP as they relate to energy use and greenhouse gas emissions within the City. Moving into the future, the Inventory will continue to be used as a baseline to measure and report the success of energy efficiency projects and programs as well as to communicate associated benefits (i.e. energy saved, costs reduced and greenhouse gas emissions reduced) to key decision makers and the community.

This EU&GHGi is focused on the City's operations solely, and is comprised of two major energy groups. The first group deals with *Buildings and Facilities*, there are two primary types of energy used in these operations, *Electricity* and *Natural Gas.* The second group is comprised of energy used in the *Vehicle Fleet;* the energy used here is primarily from *Diesel* and *Gasoline.*

The results presented in this Inventory represent output from a comprehensive database developed by the City's consultant that can be queried to allow for flexibility in the way energy data and emission results are displayed and reported. Based on strategic planning workshops and feedback from the City, data for this Inventory was queried and presented in two primary ways to provide different perspectives on how energy is used and greenhouse gases are emitted by the City. This was done by summarizing energy use and emissions by Department and subsequently by City owned and operated assets that include buildings, equipment and infrastructure, and vehicle fleet. Summarizing data by Department is advantageous because it provides a high level executive perspective of how each City Department ranks

[1] North Central Texas Council of Governments, 2009

in terms of energy use and greenhouse gas emissions. Data is also presented by summarizing energy used in three main types of City assets. These assets include buildings, equipment, and fleet.

This document is organized into five main sections:

Section 1: Background
Section 2: Methodology
Section 3: Energy Use and Emissions Dashboard by Department
Section 4: Energy Use and Emissions Dashboard by Asset
Section 5: Policies and Procedures Database Maintenance and Inventory Updating

SECTION 1: BACKGROUND

This section introduces the basic concepts behind both Energy Use and Greenhouse Gas Emissions Inventories. This section also outlines the data limitations of this inventory and how it should be used as a tool to support the SAP.

ENERGY USE AND GREENHOUSE GAS EMISSIONS INVENTORY

Conducting an *Energy Use and Greenhouse Gas Emissions Inventory (EU&GHGi)* is a systematic process to assess an entity's energy use from operations or facilities and the associated greenhouse gas emissions from the consumption of that energy. The common practice is to quantify energy in terms of the billable quantity, but also using British Thermal Units (BTUs) in order for an even comparison. The standard for quantifying greenhouse gases is in the units of metric tonnes of carbon dioxide equivalent (MT CO_2e). Equivalent means that any non-CO2 gases included in the total are weighted by their Global Warming Potential (GWP). Making such a comparison of differing energy sources allows for the measure efficiency in the overall usage of the energy, and through benchmarking a city can determine what areas to target for energy saving and emissions reduction projects and programs.

Energy Units			
Type	*Billed*	*Symbol*	*BTU Equivalent**
Electricity	Kilowatt Hours	kWh	3,412
Natural Gas	Standard Cubic Feet	SCF	1,028
Gasoline	Gallon	gal	124,000
Diesel	Gallon	gal	138,691
* US Energy Information Administration			

Table 1: Energy Units and Conversions

Global Warming Potentials		
gas	*symbol*	*GWP**
Carbon Dioxide	CO_2	1
Methane	CH_4	21
Nitrous Oxide	N_20	310
* TCR LGP, p. 187-188, table E.1 & E.2		

Table 1: Global Warming Potentials

Greenhouse gas emissions can be classified into three scopes, Scope 1, 2, and 3. Scope 1 emissions are "direct" emissions that occur as a result of direct user or operator controlled emissions of greenhouse gases to the atmosphere. In this inventory Scope 1 emissions stem from the combustion of fossil fuels in City controlled operations. Scope 2 emissions are considered "indirect" and come from the consumption of purchased or acquired electricity, steam, heating or cooling; for Cedar Hill the only Scope 2 emissions come from purchased electricity. Scope 3 emissions are considered "indirect" and can result from supply chain activities, consumer and post-consumer activities, waste, business travel, and employee commuting.

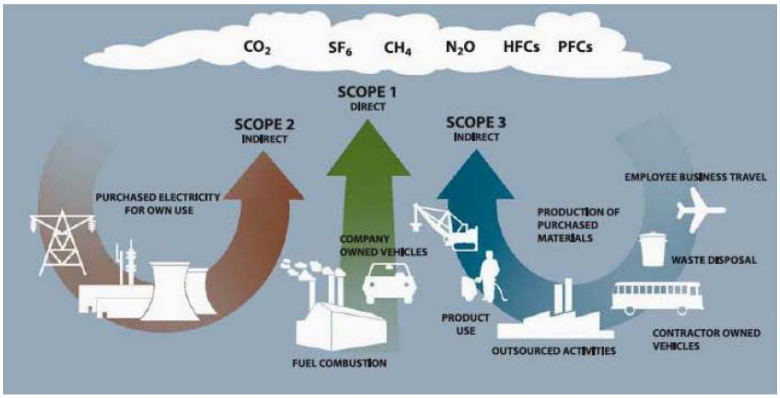


Figure 2: Emission scopes as defined by international protocols such as the World Resources Institute's Global Reporting Protocol which is also reflected in the The Climate Registry's Local Government Protocol.

Scope 3 emissions are considered "optional" in the reporting of a GHG inventory as they are often quite difficult to quantify and control, therefor they have been left out of this study.

USE OF THIS INVENTORY

The purpose of the Inventory is to create a baseline for future trend analyses for Cedar Hill's energy use and greenhouse gas emissions. By establishing a baseline now the City will be able to make informed policy decisions governing future development. This is not a tool adequate for developing regulation, and care should be exercised in comparing the results of this inventory to those done by other communities as these inventories are often created uniquely for each community. The Inventory is limited and should be used by the City for internal planning purposes only. First, it does not include energy use or GHG emissions for the community. Second, the Inventory only represents three years of historical data, making it difficult to predict energy use trends with a high degree of confidence. Third, as the GHG Inventory is derived from the Energy Use Inventory it based on but does not necessarily conform to all accepted protocols or guidelines.

SECTION 2: METHODOLOGY

This section outlines the methodology used to collect, organize, and analyze natural gas and electricity and fuel data for this inventory.

PROJECT SCOPING

The first step to an *EU&GHGi* is the creation of organizational and operational boundaries (scoping). Organizational boundaries are drawn to limit the what operations and facilities an inventory will include, Cedar Hill chose to limit the scope of the Inventory to include only municipal controlled operations and exclude for the present time an inventory of community energy use and greenhouse gas emissions. It was also determined that the City's prime intention for the Inventory was to first quantify energy use across various departments and second to quantify associated greenhouse gas emissions. Based on this directive, it was also determined that the Inventory would not include quantification of Scope 3 greenhouse gas emissions.

DATA COLLECTION

The largest hurdle in all of the data collection process was that there was no clear central repository for utility and energy information. Until this inventory was created the City had no means of tracking energy or its associated emissions, but only the costs associated with the purchase of the energy.

Electricity

As the City did not maintain any records outside of billing for electricity the data was collected from Direct Energy, the electricity provider to the municipality. The data was delivered in monthly format from the end of 2007 through the beginning of 2010 displaying electronic service identifier (ESI) numbers and details on the electrical usage. This information had to be cross referenced with a database created by the finance department in order to determine which ESIs belonged to addresses and departments within the City. As the utility data is not billed by the calendar month data was prorated into calendar years by extrapolating daily averages and only including days that occurred within the desired year. There were 159 accounts at the time of the inventory associated to 12 departments.

Natural Gas

Natural gas was handled similarly to electricity and the data was provided by the gas utility, Atmos Energy. The data was sent as 12 monthly bills per year, for each of the calendar years 2007, 2008 and 2009. The twelve bills were summed to obtain yearly gas usage figures. These usages came from 15 accounts associated with 8 departments.

Fuel

The City manages a complex and comprehensive fuel usage database for its entire fleet. This database is able to produce summary reports by department and fuel type (gasoline or diesel) on a per month basis. These monthly reports were aggregated into calendar years in order to determine yearly fuel usages by type and department. There are 14 departments utilizing fuel in the City.

ESTABLISHING A BASELINE YEAR

The calendar year of 2009 was chosen to be the baseline year for the EU&GHGi due to data availability and the relocation of most of the governmental services into the new Government Center building. However, the analysis was performed on the calendar years of 2007-2009 in order to develop the footing for future trend analysis. Throughout each of the three years adequate data was available for electricity, natural gas, and gasoline and diesel usage for all of the City operations. This baseline approach represents general conformity with other accepted guidelines such as Cities for Climate Protection Program that suggest to establish base years as far back as reliable data can be obtained.

In 2007, construction for the new Government Center located at 285 Uptown Boulevard began. The project was undertaken so that the City could consolidate existing operations by moving them into one building. In 2007, there was not a full calendar of electricity and natural gas use in the Government Center. In the beginning of calendar year 2008, electricity and natural gas use was higher than expected due to construction related testing and balancing of key systems such as chillers, lighting, and HVAC in the Government Center. This usage did not begin to normalize until summer of 2008 when full occupancy occurred and energy use began to become constant. Therefore, the most accurate and calendar year to utilize as the City baseline is 2009 because it contains a fully year of full occupancy of the government center, which is a major energy user within the City.

DATA ANALYSIS

With all of the data collected and aggregated by department and source, the next steps were to determine energy consumption and greenhouse gas emissions. To each unit of energy a conversion factor was applied to determine BTUs and greenhouse gas emissions on the same department and source sorting. The BTU energy quantities could then be aggregated regardless of fuel type to determine total energy usage by department and for the entire City. The same holds true also for aggregating of greenhouse gas emissions. The final process in the inventory is to examine intensities and efficiencies of energy usages as outlined in the introduction. To do this Energy Use Intensities (EUIs) were calculated for buildings to determine building efficiency. For operations that are not associated with a build simple data analysis and plotting was used to check for any trends that may show either increased or decreased usage patterns.

SECTION 3: CITY ENERGY AND EMISSIONS TRENDING

The first trend examined by the EU&GHGi is the whole City energy consumption and greenhouse gas emissions. This was created by summing all of the constituent energy types in terms of MMBTUs and also summing their greenhouse gases in terms of MT CO2e. Based on this analysis, and as illustrated in Figure 2, total energy use (electricity, natural gas, and fuel combined) within all City operations increased from 53,824 BTUs in 2007 to 64, 447 BTUs in 2008. In 2009, the total BTUs decreased slightly from 2008 levels to 63,487 BTUs. Metric Tons of Carbon Equivalent Emissions were also directly correlated with BTU consumption trends. The City emitted 6,752 MT CO2e in 2007, then in 2008 emissions increased to 8,337 MT CO2e before slightly declining to 8,287 MTCO2e in 2009. This graphic again illustrates why the City chose 2009 as the baseline year. Because the new Government Center came online in 2008, but was fully occupied in 2009 the City must use 2009 as their baseline. This way when the City begins to implement programs and projects the reductions can be measured against current standing buildings and facilities, rather than having to filter out the increase due to the construction of the new Government Center.

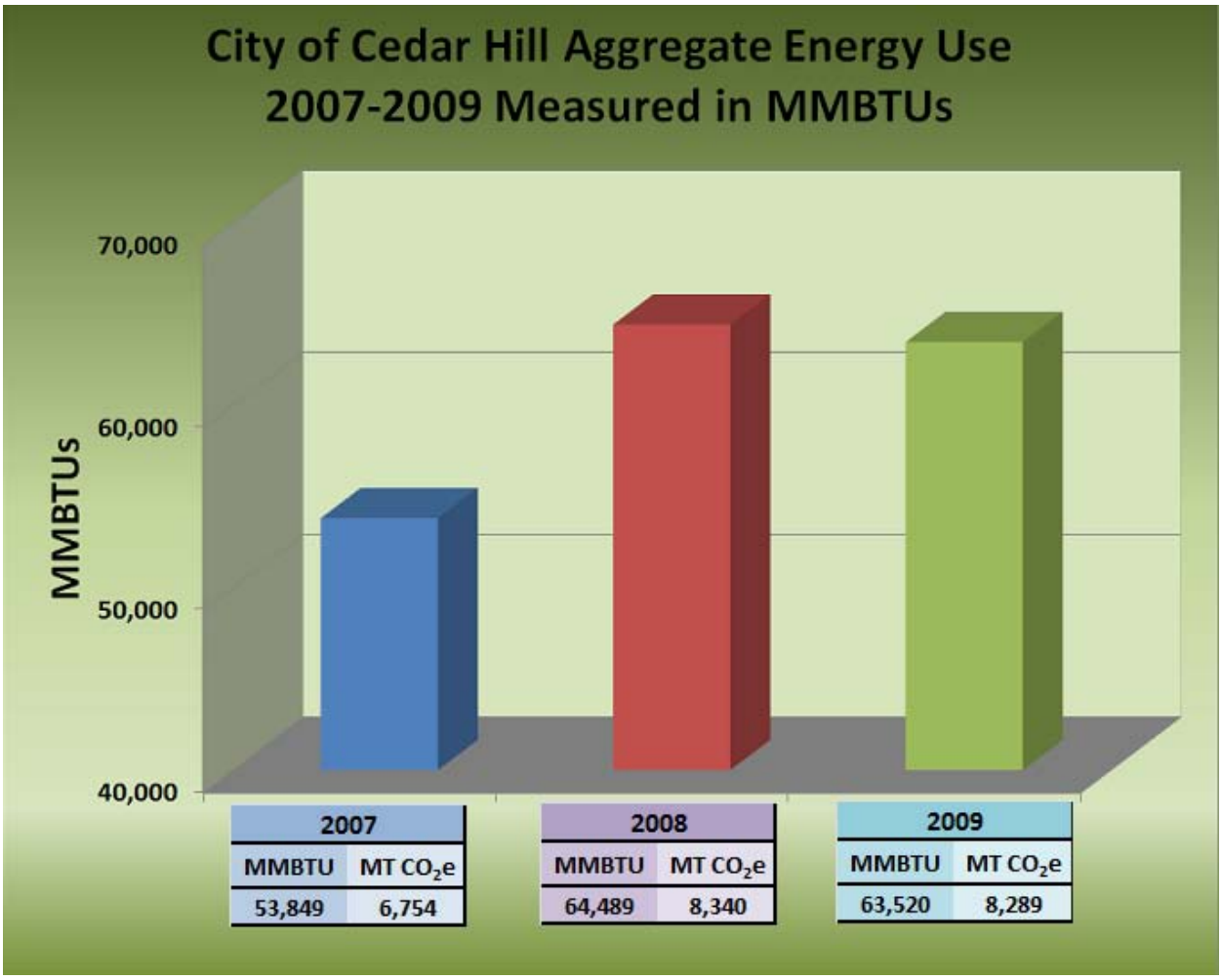


Figure 2: Aggregate Energy Use and Emissions

SECTION 4: ENERGY DASHBOARD BY DEPARTMENT

The executive dashboard (below, Figure 3) illustrates total energy used and greenhouse gas emissions on a per department basis. The dashboard is organized in a hierarchical fashion based on energy usage in the 2009 year. Water and Sewer Operations used the most energy, and produced the most greenhouse gas emissions in 2009, with Streets and Drainage coming in as the second highest infrastructure department. The Government Center, as a single facility ranks very high coming in as the 2nd overall consumer of energy in the City.

Cedar Hill Texas - Energy Dashboard

Departments Key		2007		2008		2009	
Code	Name	MMBTU	MT CO_2e	MMBTU	MT CO_2e	MMBTU	MT CO_2e
760	Water & Sewer Operations	12,080	1,946	14,691	2,385	14,190	2,328
195	Government Center	65	11	6,204	931	8,456	1,186
710	Streets & Drainage	8,480	1,353	8,563	1,360	8,139	1,281
310	Police	9,063	741	9,336	738	7,430	550
435	Recreation Center	7,950	1,032	7,366	996	7,194	997
340	Fire	5,466	509	6,184	543	5,885	528
410	Parks	4,771	534	5,128	551	4,973	535
415	Valley Ridge Park	796	140	2,043	360	2,097	369
750	Fleet Maintenance	1,362	86	1,264	80	1,386	90
380	Animal Shelter	834	100	933	105	891	106
450	Library	888	131	843	130	877	134
190	Utility Billing	644	46	620	44	617	44
700	Public Works Administration	549	61	468	56	391	49
341	Fire Station 214	0	0	0	0	288	41
370	Code Enforcement	323	23	290	21	248	18
430	Recreation	367	26	298	21	229	16
360	Municipal Court	119	8	123	9	157	11
199	Non Departmental	68	5	88	6	37	3
130	Information Technology	25	1.7	43	3.0	33	2.3
350	Emergency Management	2	0	3	0	2	0

Totals	2007		2008		2009	
	MMBTU	MT CO_2e	MMBTU	MT CO_2e	MMBTU	MT CO_2e
	53,849	6,754	64,489	8,340	63,520	8,289

Figure 3: Energy Dashboard

The Police Department, Recreation Center, Fire, Parks, and the Valley Ridge Park round out the top energy users in the City. These top energy consuming departments need to be evaluated in a more detailed view in order to determine exactly where the energy is being utilized.

The graph below illustrates a similar picture as the dashboard; however the graph also shows what the sources of energy are that make up the total consumption. The Water and Sewer Operations consume mostly electricity, with some fuel usage and no natural gas. Government Center consumes mostly electricity but also a considerable amount of natural gas. The Police, Fire and Parks departments consume mostly fuel which is dedicated to all of their vehicles.

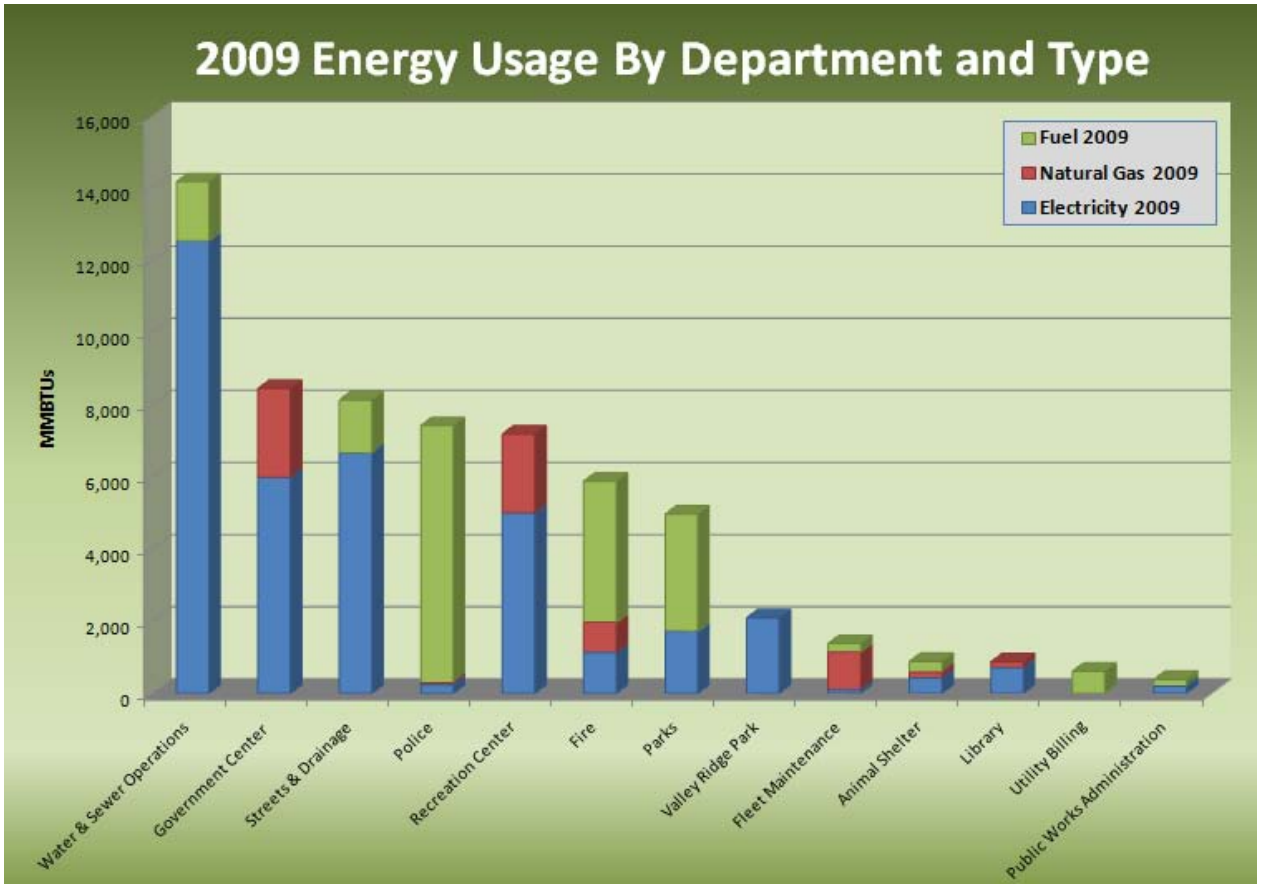


Figure 4: Energy Use by Department and Type

SECTION 5: ENERGY USE DASHBOARD BY CITY ASSET

The Executive Energy Dashboard view of by department is useful in seeing a big picture view of the City, however sometimes a more detailed view is necessary. This section will demonstrate energy consumption and greenhouse gas emissions by energy source type, and also aggregated into Buildings, *Equipment and Infrastructure* category, which is essentially the combination of electricity and natural gas.

BUILDING ENERGY USE: NATURAL GAS AND ELECTRICITY

The City owns and operates a portfolio of thirteen (13) buildings that consume electricity and/or natural gas. The City's building portfolio varies in size and age (Figure 5). Given the variety of the City's building portfolio it is important to actively manage them to control energy use and greenhouse gas emissions taking a building by building approach.

Building/Facility	Address	Square Footage	Year Built
Government Center	285 Uptown Blvd	115,000	2008
Recreation Center	310 E. Parkerville Rd	68,968	2004
Fire Station #4	1505 Lake Ridge Pkwy	11,779	2009
Fire Station #1	1212 W. Belt Line Rd	11,476	1987
Zula B. Wylie Library	225 Cedar ST.	10,700	1987
New Tri-City Animal Shelter	1150 E. Pleasant Run Rd.	8,394	2009
Public Works Office	1554 S. Clark Rd.	6,913	1978
Fire Station #3	1430 High Pointe Ln	6,900	1988
Fire Station #2	1098 W. Belt Line Rd	6,460	1979
Police Station	601 E. Belt Line Rd.	6,400	1986
PW Fleet Svc. Ctr.	1554 S. Clark Rd.	5,000	1978
Old Tri-City Animal Shelter	1154 E. Pleasant Run Rd.	4,900	1996
Senior Center	1740 Mansfield Rd.	3,200	1971
Total Square Footage		266,090	

Figure 5: Buildings Inventory

Historical Trends in Electricity and Natural Gas

To provide a historical context of how the City's building portfolio has consumed energy over the years, Figure 6 plots energy use in MMBTUs stemming from natural gas and electricity use over a three year period beginning in 2007 until 2009. As is typical amongst most municipalities energy use is rising as the City expands to offer additional services. Also, as noted previously much of the increase in natural gas and electricity consumption within municipal buildings can be attributed to the addition of the Government Center in 2008.

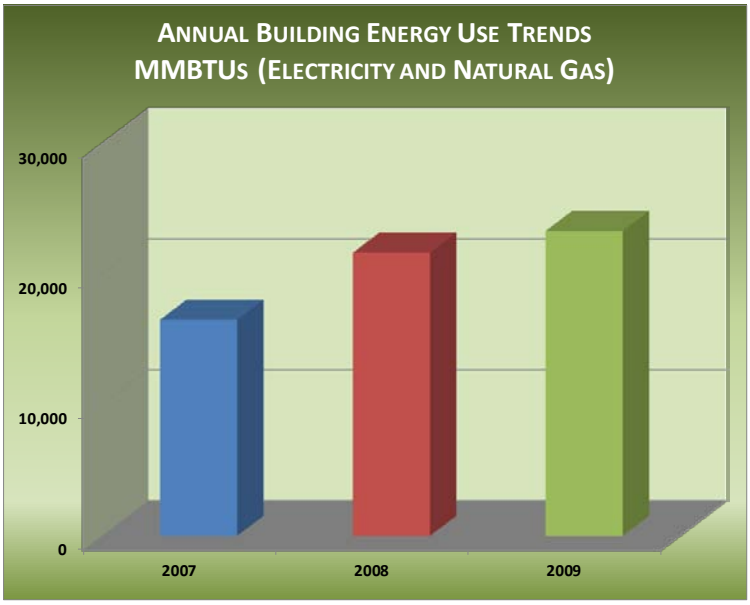


Figure 6: Building Energy Use Trends

Electricity and Natural Gas Building Dashboard Baseline Year 2009

Figure 7, provides a more detailed perspective energy use in City buildings for the 2009 baseline calendar year. Reading the Dashboard vertically provides primary rankings of each City Department by "Aggregate Energy Use," which in the case of buildings only accounts for electricity and natural gas. Fuel (gasoline and diesel) are not used in buildings. It also provides secondary rankings for each department's use of electricity, natural gas, individually. Reading the Dashboard horizontally summarizes each building's total electricity and natural gas, and fuel use as well as each building's carbon footprint. The Government Center and the Recreation Center ranks 1st and 2nd respectively in terms of Aggregate Energy Use, Natural Gas, and Electricity use. For the purpose of this Inventory, the top 5 ranked buildings under the Aggregate Energy Use Category are discussed in further detail in the subsequent sections below.

					Rank				Electricity			Natural Gas			Aggregate Energy Use	
	Description	Address	Square Footage	Year Built	Aggregate Energy Use	Electricity (kWh)	Natural Gas (SCF)	Fuel (Gallons)	kWh	MMBTU (Elec)	MT CO2e (Elec)	SCF	MMBTU (Nat Gas)	MT CO_2e (Nat Gas)	MMBTU (All)	MT CO2e (All)
BUILDINGS	Government Center	285 Uptown Blvd	115,000	2008	1	1	1		1,757,662	5,999	1,056	2,390,000	2,459	130	8,458	1,187
	Recreation Center	310 E. Parkerville Rd	68,968	2004	2	2	2		1,466,174	5,004	881	2,129,500	2,191	116	7,195	997
	PW Fleet Svc. Ctr.	1554 S. Clark Rd.	5,000	1978	3	13	3		29,271	100	18	1,019,700	1,049	56	1,149	73
	Fire Station #1	1212 W. Belt Line Rd	11,476	1987	4	4	4		173,684	593	104	357,600	368	20	961	124
	Zula B. Wylie Library	225 Cedar ST.	10,700	1987	5	3	7		208,990	713	126	159,200	164	9	877	134
	Fire Station #2	1098 W. Belt Line Rd	6,460	1979	6	5	5		79,562	272	48	283,600	292	15	563	63
	Fire Station #3	1430 High Pointe Ln	6,900	1988	7	6	6		77,896	266	47	169,900	175	9	441	56
	New Tri-City Animal Shelter	1150 E. Pleasant Run Rd.	8,394	2009	8	12	8		50,130	171	30	141,000	145	8	316	38
	Fire Station #4	1505 Lake Ridge Pkwy	11,779	2009	9	8	9		61,376	209	37	75,900	78	4	288	41
	Old Tri-City Animal Shelter	1154 E. Pleasant Run Rd.	4,900	1996	10	7	11		77,512	265	47	7,400	8	0	272	47
	Police Station	601 E. Belt Line Rd.	6,400	1986	11	11	10		53,472	182	32	56,000	58	3	240	35
	Public Works Office	1554 S. Clark Rd.	6,913	1978	12	9	12		58,790	201	35				201	35
	Senior Center	1740 Mansfield Rd.	3,200	1971	13	10	12		56,147	192	34				192	34
	Police Station*	108 Belt Line Rd.	-	-	14	14	12		13,299	45	8	0	0		45	8
Total									**4,163,967**	**14,211**	**2,502**	**6,789,800**	**6,987**	**371**	**21,198**	**2,873**

Figure 7: Building Electricity and Natural Gas Dashboard

The Government and Recreation Centers

The Government Center is the largest most recent addition to the City's building Inventory. It was constructed in 2008. It has a basement level and four floors consisting of 115,000 square feet. The building also houses non-municipal organizations such as the Independent School District. The Government center also houses the city Council Chamber. The Center utilizes electricity for cooling, lighting, to power equipment, and for other basic office applications and natural gas for heating. The Government Center is equipped with an Energy Management System (EMS) that enables building managers to track energy use and control energy using equipment via an electronic database platform. The EMS used in the Government Center is called an "EnviroMatic Building Management System." The EMS controls HVAC systems, chillers and boilers, lighting, and other energy using equipment.

The Recreation Center is the second largest and also the second most recent addition to the City's building inventory. It was constructed in 2004. It has two floors and consists of 68,968 square feet. The Recreation Center houses public presentation and gathering rooms, offices, fully equipped locker rooms, a gymnasium, game rooms, an indoor track, and a work-our room with equipment and televisions. The Recreation Center utilizes electricity for cooling, lighting, to power equipment, and for other basic office applications. It uses natural gas primarily for heating purposes. Like the Government Center, the Recreation Center also utilizes and EMS. The EMS was supplied by Andover Controls and is called "Continuum." As shown in the Electricity and Natural Gas Dashboard for City Buildings, the Government and Recreation Centers rank 1st and 2nd respectively in terms of the amount of electricity and natural gas they consume. Figure 8 below depicts electricity use measured in Kilowatt Hours in both the Government and Recreation Centers on a monthly basis ranging from September 2006 to May of 2010.

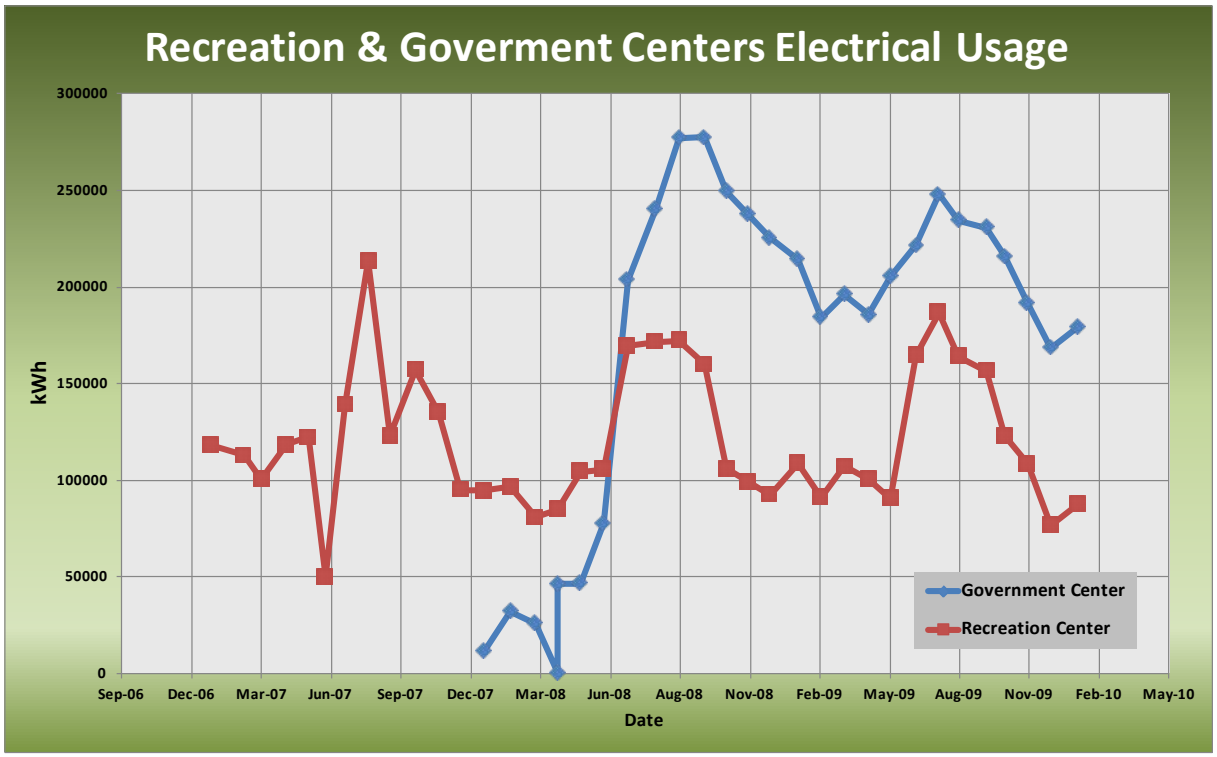


Figure 8: a Three Year perspective of energy usage in the Recreation and Government Centers

As Figure 8 demonstrates, there is a clear spike in the Government Center during its initial testing, but as soon as it reached full occupancy, and was functional (summer 2008), the electrical usage became fairly constant. The Recreation center was also evaluated, and it shows the same seasonally constant pattern. Both of these buildings do show a strong correlation between the summer cooling load and the electrical demand. The most effective way to begin to reduce electricity demand in both of these buildings will likely come from improved building energy system management and behavioral modification. Building energy systems management focuses less on retrofitting old equipment and purchasing new equipment and more on finding more effective ways to modify the behavior of occupants and by educating building managers to better manage and operate core building systems.

EQUIPMENT AND INFRASTRUCTURE ENERGY USE: ELECTRICITY

Equipment and Infrastructure are defined for the purposes of this Inventory and the SAP as different from buildings primarily because it is not occupied by people and because it is used to perform a very specific function. Examples of infrastructure include objects that draw energy such as ball field lighting, traffic signals, water pumps, motors, and other essential pieces of equipment and infrastructure that the City depends on. Equipment and Infrastructure does not include vehicles and fleet. Vehicles and Fleet are discussed in the subsequent section. Equipment and Infrastructure was separated from buildings because influencing energy use will have much less to do with occupancy issues and therefore prescribed energy savings initiatives will be much different.

After reviewing the database, the City maintains infrastructure and equipment throughout various Departments. For example, Emergency Management maintains lightning warning signals. Parks maintains an extensive system of ball field lights and infrastructure as well as irrigation systems, concession stands, and power towers. Streets and Drainage maintains pumps, lights, and traffic signals. The Water and Sewer Department maintains lift stations, water pumps, and wells. The City does not currently maintain a consolidated inventory of each type of infrastructure and equipment, however, the energy database does contain an inventory of many of these items organized by address and ESI.

Electricity Summary Baseline Year 2009

Based on the information gathered in the Energy Database, City Infrastructure and Equipment uses almost exclusively electricity. Therefore, the 2009 Energy Dashboard for Infrastructure and Equipment depicted below only shows electricity consumption.

		Rank		Electricity			Aggregate Energy Use	
INFRASTRUCTURE & EQUIPMENT	Department	Aggregate Energy Use	Electricity (kWh)	kWh	MMBTU (Elec)	MT CO2e (Elec)	MMBTU (All)	MT CO2e (All)
	Water and Sewer Operations	1	1	3,678,660	12,555	2,211	12,555	2,211
	Streets and Drainage	2	2	1,955,541	6,674	1,175	6,674	1,175
	Parks	4	4	505,632	1,726	304	1,726	304
	Valley Ridge Park	3	3	614,673	2,098	369	2,098	369
	Emergy Management	7	7	704	2	0	2	0
	Non Departmental	8	8	226	1	0	1	0
	Police	5	5	3,871	13	2	13	2
	Fire	6	6	3,438	12	2	12	2
Total				6,762,745	23,081	4,064	23,081	4,064

Figure 9: Infrastructure and Equipment Energy Dashboard

As shown in Figure 9, Water and Sewer Operations rank 1st in terms of the amount of electricity consumed in 2009 (3,678,660 kWh). Streets and Drainage ranks 2nd consuming 1,955,541 kWh followed by Parks and Valley Ridge Park consuming 505,632 kWh and 614,673 kWh respectively. Since Parks and Valley Ridge Park are within the Parks and Recreation Department both categories could be combined. By doing so, the Parks and Recreation Department consumed 1,120,305 kWh in 2009.

Water and Sewer Operations

Water and Sewer Operations consumed 3,678,660 kWh of electricity in baseline year 2009. It is not uncommon for municipal water and sewer operations to consume the most energy throughout the entire City. This is primarily due to the significant amount of energy required to move and distribute water to citizens. The City's Water and Sewer Operations generally provides drinking water to the community and is responsible for providing wastewater collection as well. The most significant types of equipment and infrastructure maintained by Water and Sewer Operations includes a series of more than 15 lift stations and 11 water pumps located at two different locations called the Meadowcrest and Flameleaf locations.

A quick analysis (Figure 10) shows that there are three major energy users in the infrastructure section. Two are water pumps, and one is a water well.

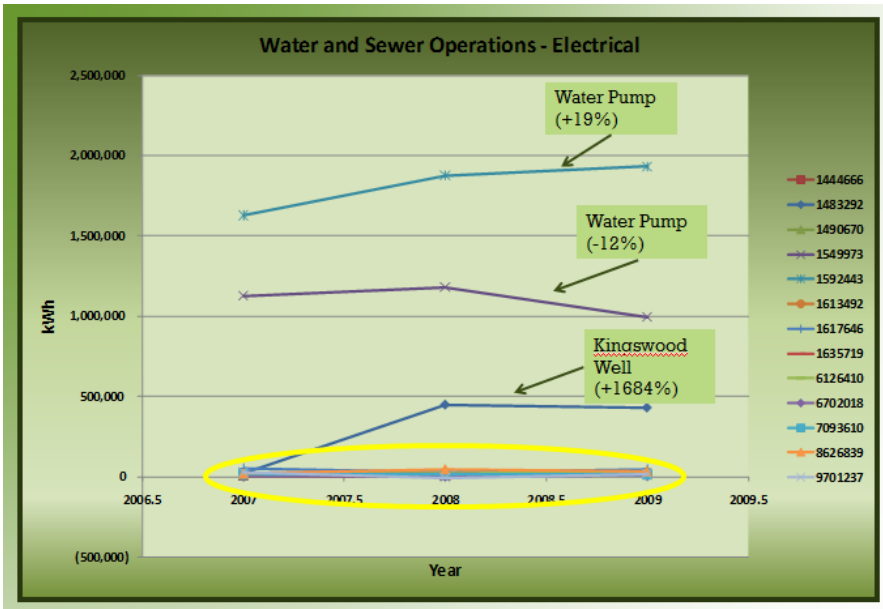


Figure 10: High Energy Use ESIs in Infrastructure

FLEET ENERGY USE: DIESEL AND PETROLEUM

The City has built an extensive vehicle fleet which runs on gasoline and diesel fuel. Unlike the buildings and facilities fuel usage has remained fairly consistent over the monitoring period. Some departments, such as the Police, have shown considerable reduction during the monitoring period (12%), while others, such as the Fire department, have risen slightly.

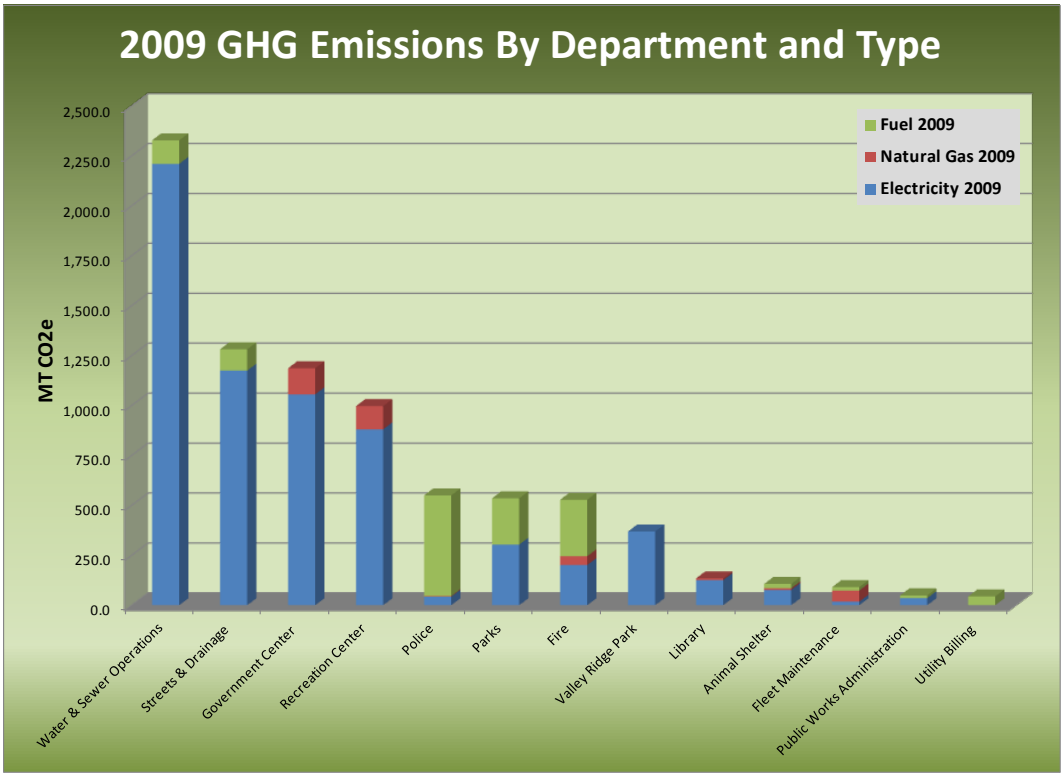
Cedar Hill Texas - Fuel Dashboard

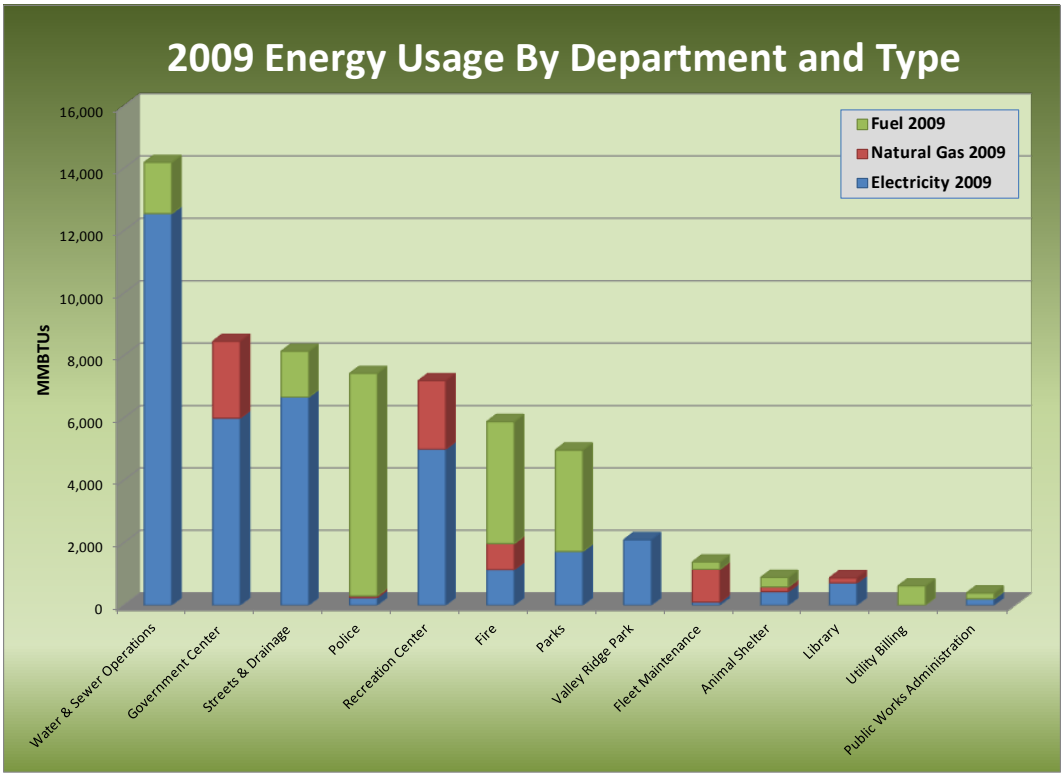
Departments Key		2007				2008				2009			
Code	Name	Gasoline	Diesel	MMBTU	MT CO_2e	Gasoline	Diesel	MMBTU	MT CO_2e	Gasoline	Diesel	MMBTU	MT CO_2e
310	Police	64,953	166	8,094	572.5	69,035	162	8,601	608.3	57,289	90	7,131	504.4
340	Fire	5,128	18,380	3,186	230.4	5,252	23,821	3,956	286.4	6,452	22,409	3,910	282.7
410	Parks	15,806	6,921	2,924	208.7	18,350	7,781	3,359	239.7	19,014	6,381	3,248	231.4
760	Water & Sewer	5,794	7,318	1,735	124.7	5,478	9,059	1,937	139.5	5,707	6,698	1,638	117.7
710	Streets & Drainage	833	8,981	1,349	97.9	1,104	9,298	1,427	103.5	1,071	9,614	1,467	106.4
190	Utility Billing	5,179	0	644	45.5	4,988	0	620	43.8	4,964	0	617	43.6
380	Animal Shelter	2,218	0	276	19.5	2,704	317	380	27.0	2,444	0	304	21.5
370	Code Enforcement	2,603	0	323	22.9	2,333	0	290	20.5	1,997	0	248	17.6
750	Fleet Maintenance	672	45	90	6.4	423	55	60	4.3	596	1,172	237	17.1
430	Recreation	2,665	257	367	26.0	1,854	492	298	21.2	1,847	0	229	16.2
700	Public Works Admin.	2,755	0	342	24.2	2,018	0	251	17.7	1,533	0	190	13.5
360	Municipal Court	955	0	119	8.4	992	0	123	8.7	1,264	0	157	11.1
199	Non Departmental	536	0	67	4.7	700	0	87	6.2	291	0	36	2.6
130	Information Tech.	198	0	25	1.7	345	0	43	3.0	262	0	33	2.3
Totals		2007				2008				2009			
		Gasoline	Diesel	MMBTU	MT CO_2e	Gasoline	Diesel	MMBTU	MT CO_2e	Gasoline	Diesel	MMBTU	MT CO_2e
		110,293	42,068	19,540	1,393	115,575	50,985	21,433	1,530	104,731	46,364	19,444	1,388

Currently most of the vehicle fleet is made up of conventional combustion engine vehicles. The city owns and operates primarily domestic automobiles and mostly light trucks, SUVs and heavy trucks, with some mid and full sized cars. A full vehicle fleet inventory analysis should be undertaken in order to quantify the relative fuel efficiencies of departments and groupings of vehicles. This will allow for a more thorough vehicle replacement program in the future.

APPENDIX

Please find additional graphics and tables for a more detailed look at the City's energy usage.





Cedar Hill Texas - Energy Dashboard (Sorted by GHG Emissions)

Departments Key		2007							
Code	Name	MMBTU (Elec)	MT CO_2e (Elec)	MMBTU (Nat Gas)	MT CO_2e (Nat Gas)	MMBTU (Fuel)	MT CO_2e (Fuel)	MMBTU (All)	MT CO_2e (All)
760	Water & Sewer Operations	10,345	1,821.4			1,734.9	124.7	12,079.8	1,946.1
710	Streets & Drainage	7,131	1,255.5			1,349.1	97.9	8,480.1	1,353.4
195	Government Center	65	11.4					64.7	11.4
435	Recreation Center	4,958	872.8	2,992.2	158.8			7,949.8	1,031.6
310	Police	952	167.7	16.3	0.9	8,094.0	572.5	9,062.6	741.0
410	Parks	1,847	325.1			2,924.0	208.7	4,770.6	533.8
340	Fire	1,282	225.7	291.6	15.5	3,186.4	230.4	4,760.1	471.6
415	Valley Ridge Park	796	140.2					796.2	140.2
450	Library	682	120.0	206.0	10.9			887.6	130.9
380	Animal Shelter	413	72.8	144.8	7.7	275.6	19.5	833.8	100.0
750	Fleet Maintenance	98	17.2	1,174.5	62.3	89.8	6.4	1,362.1	85.9
700	Public Works Administration	206	36.3			342.3	24.2	548.8	60.6
190	Utility Billing					643.5	45.5	643.5	45.5
341	Fire Station 214	0	0.0						
370	Code Enforcement					323.4	22.9	323.4	22.9
430	Recreation					366.9	26.0	366.9	26.0
360	Municipal Court					118.6	8.4	118.6	8.4
199	Non Departmental	1	0.2			66.6	4.7	67.7	4.9
130	Information Technology					24.5	1.7	24.5	1.7
350	Emergency Management	2	0.4					2.3	0.4

Totals	Electricity		Natural Gas		Fuel		All	
	MMBTU	MT CO_2e	MMBTU	MT CO_2e	MMBTU	MT CO_2e	MMBTU	MT CO_2e
	28,778	**5,067**	**4,825**	**256**	**19,540**	**1,393**	**53,143**	**6,716**

Cedar Hill Texas - Energy Dashboard (Sorted by GHG Emissions)

Departments Key		2008							
Code	Name	MMBTU (Elec)	MT CO2e (Elec)	MMBTU (Nat Gas)	MT CO_2e (Nat Gas)	MMBTU (Fuel)	MT CO2e (Fuel)	MMBTU (All)	MT CO2e (All)
760	Water & Sewer Operations	12,754	2,245.5			1,937.1	139.5	14,690.7	2,384.9
710	Streets & Drainage	7,137	1,256.5			1,426.7	103.5	8,563.3	1,360.0
195	Government Center	4,891	861.1	1,313.3	69.7			6,204.3	930.8
435	Recreation Center	4,923	866.8	2,442.7	129.6			7,366.1	996.4
310	Police	735	129.4			8,600.9	608.3	9,335.7	737.7
410	Parks	1,768	311.4			3,359.4	239.7	5,127.9	551.1
340	Fire	1,129	198.7	1,099.3	58.3	3,956.5	286.4	6,184.4	543.4
415	Valley Ridge Park	2,043	359.7					2,043.1	359.7
450	Library	693	122.1	149.6	7.9			843.1	130.0
380	Animal Shelter	396	69.7	157.0	8.3	380.0	27.0	932.9	105.0
750	Fleet Maintenance	98	17.3	1,105.8	58.7	60.1	4.3	1,264.2	80.2
700	Public Works Administration	218	38.3			250.7	17.7	468.2	56.0
190	Utility Billing					619.8	43.8	619.8	43.8
341	Fire Station 214	0	0.0						
370	Code Enforcement					289.9	20.5	289.9	20.5
430	Recreation					298.5	21.2	298.5	21.2
360	Municipal Court					123.2	8.7	123.2	8.7
199	Non Departmental	1	0.2			87.0	6.2	88.0	6.3
130	Information Technology					42.9	3.0	42.9	3.0
350	Emergency Management	3	0.5					2.6	0.5

Totals	Electricity		Natural Gas		Fuel		All	
	MMBTU	MT CO_2e	MMBTU	MT CO_2e	MMBTU	MT CO_2e	MMBTU	MT CO_2e
	36,788	**6,477**	**6,268**	**333**	**21,433**	**1,530**	**64,489**	**8,339**

Cedar Hill Texas - Energy Dashboard (Sorted by GHG Emissions)

Departments Key		2009							
Code	Name	MMBTU (Elec)	MT CO2e (Elec)	MMBTU (Nat Gas)	MT CO_2e (Nat Gas)	MMBTU (Fuel)	MT CO_2e (Fuel)	MMBTU (All)	MT CO2e (All)
760	Water & Sewer Operations	12,552	2,209.9			1638.1	117.7	14189.7	2327.6
710	Streets & Drainage	6,672	1,174.8			1466.5	106.4	8138.8	1281.1
195	Government Center	5,997	1,055.9	2459.3	130.5			8456.5	1186.4
435	Recreation Center	5,003	880.8	2191.3	116.3			7193.8	997.0
310	Police	241	42.4	57.6	3.1	7131.3	504.4	7429.9	549.9
410	Parks	1,725	303.7			3247.8	231.4	4973.0	535.2
340	Fire	1,142	201.0	833.7	44.2	3909.6	282.7	5884.9	527.9
415	Valley Ridge Park	2,097	369.3					2097.3	369.3
450	Library	713	125.5	163.8	8.7			876.9	134.2
380	Animal Shelter	436	76.7	152.2	8.1	303.6	21.5	891.3	106.2
750	Fleet Maintenance	100	17.6	1049.3	55.7	236.7	17.1	1385.8	90.3
700	Public Works Administration	201	35.3			190.5	13.5	391.1	48.8
190	Utility Billing					616.8	43.6	616.8	43.6
341	Fire Station 214	209	36.9	78.1	4.1			287.5	41.0
370	Code Enforcement					248.2	17.6	248.2	17.6
430	Recreation					229.5	16.2	229.5	16.2
360	Municipal Court					157.1	11.1	157.1	11.1
199	Non Departmental	1	0.1			36.1	2.6	36.9	2.7
130	Information Technology					32.6	2.3	32.6	2.3
350	Emergency Management	2	0.4					2.4	0.4

Totals	Electricity		Natural Gas		Fuel		All	
	MMBTU	MT CO_2e	MMBTU	MT CO_2e	MMBTU	MT CO_2e	MMBTU	MT CO_2e
	37,090	**6,530**	**6,985**	**371**	**19,444**	**1,388**	**63,520**	**8,289**

APPENDIX C

City of Cedar Hill, TX; Anti-Idling Policy

ORDINANCE NO. 2009-382

AN ORDINANCE OF THE CITY OF CEDAR HILL, TEXAS TO IMPLEMENT AND ENFORCE THE TEXAS STATE RULE ON LOCALLY ENFORCED MOTOR VEHICLE IDLING LIMITATIONS; PROVIDING A PENALTY PROVISION; PROVIDING A SAVINGS CLAUSE; PROVIDING A SEVERANCE CLAUSE; PROVIDING AN EFFECTIVE DATE; AND PROVIDING FOR PUBLICATION

WHEREAS, the Dallas-Fort Worth area is a federally designated non-attainment area for the pollutant ozone; and

WHEREAS, air quality impacts the public and economic health of the entire region; and

WHEREAS, the U.S. Environmental Protection Agency ("EPA") and the Texas Commission on Environmental Quality ("TCEQ") jointly have considered emission reductions to control air pollution from motor vehicles, and the Texas Legislature has created the Texas Clean Air Act ("Act"), which addresses that purpose; and

WHEREAS, Section 382.113 of the Act provides authority for municipalities to enact and enforce local laws and ordinances for the control and abatement of air pollution; and

WHEREAS, Locally Enforced Idling Restrictions is a Voluntary Mobile Source Emissions Reduction Program commitment in the Dallas-Fort Worth 8-Hour Ozone Attainment Demonstration State Implementation Plan (SIP); and

WHEREAS, the City of Cedar Hill desires to actively participate in improving the air quality of the region; and

WHEREAS, the City Council finds that the adoption of this ordinance serves a public purpose, and protects the health, safety, and welfare of the citizens of the City of Cedar Hill, by limiting the pollution created by motor vehicles unnecessarily idling within the city's jurisdiction;

NOW, THEREFORE, be it ordained by the City Council of the City of Cedar Hill, Texas, that:

SECTION 1. ADOPTION OF TCEQ IDLING LIMITATIONS RULE

The City Council endorses and adopts by reference the TCEQ Idling Limitations Rule as published in the Texas Administration Code, Title 30, Part 1, Chapter 114, Subchapter J, Operational Controls for Motor Vehicles, Division 2, Locally Enforced Motor Vehicle Idling Limitation.

SECTION 2. PENALTY

An offense of this ordinance shall be punishable in accordance with any and all penalty provisions of the TCEQ as set forth in the Texas Administration Code, Title 30, Part 1, Chapter 114, Subchapter J, Operational Controls for Motor Vehicles, Division 2, Locally Enforced Motor Vehicle Idling Limitation

SECTION 3. SAVINGS CLAUSE

In the event that any other Ordinance of the City of Cedar Hill, Texas, heretofore enacted is found to conflict with the provisions of the Ordinance, this Ordinance shall prevail.

SECTION 4. SEVERANCE CLAUSE

If any section, subsection, sentence, clause, phrase or portion of this Ordinance is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such shall be deemed a separate, distinct and independent provision and such holding shall not affect the validity of the remaining portions thereof.

SECTION 5. INCORPORATION INTO CODE OF ORDINANCES

The provisions of this ordinance shall be included and incorporated in the Code of Ordinances, City of Cedar Hill, Texas, as an addition, amendment thereto, and shall be appropriately renumbered to conform to the uniform numbering system of the Code.

SECTION 6. EFFECTIVE DATE

Because of the nature of interest and safeguard sought to be protected by this Ordinance and in the interest of health, safety and welfare of the citizens of the City of Cedar Hill, Texas, this Ordinance shall take effect immediately after passage, approval and publication, as required by law.

SECTION 7. PUBLICATION

The City Secretary is hereby authorized and directed to cause publication of the descriptive caption and penalty clause hereof as an alternative method of publication provided by law.

PASSED, ADOPTED AND APPROVED by the City Council of Cedar Hill, Texas on this the 12th day of May, 2009.

Rob Franke, Mayor

ATTEST:

Lyn Hill, City Secretary

APPROVED AS TO FORM:

Ron G. MacFarlane, Jr., City Attorney

ATTACHMENT D

2008 Energy Benchmark Report (Provided By ONCOR)

Energy Benchmarking Report
City of Cedar Hill

Sponsored by Oncor
Provided by CLEAResult Consulting, Inc.
www.CLEAResult.com

Benchmarking Report for Building Energy Performance

City of Cedar Hill

November 21st, 2008

Introduction

Benchmarking the energy performance of your buildings is the first step in determining where and how to implement energy improvements within your city. This CitySmart Benchmarking Report for Building Energy Performance compares your buildings' energy performance against each other and against regional and national databases. This comparison will help you identify which of your buildings have the greatest opportunities for energy and cost savings. This report:

1. Provides an introduction and overview of the benchmarking process.
2. Presents and analyzes your city's overall energy performance as well as the performance of each of your buildings.
3. Addresses financial issues including how to finance energy efficiency projects.
4. Summarizes recognition opportunities available for energy efficient buildings and cities.

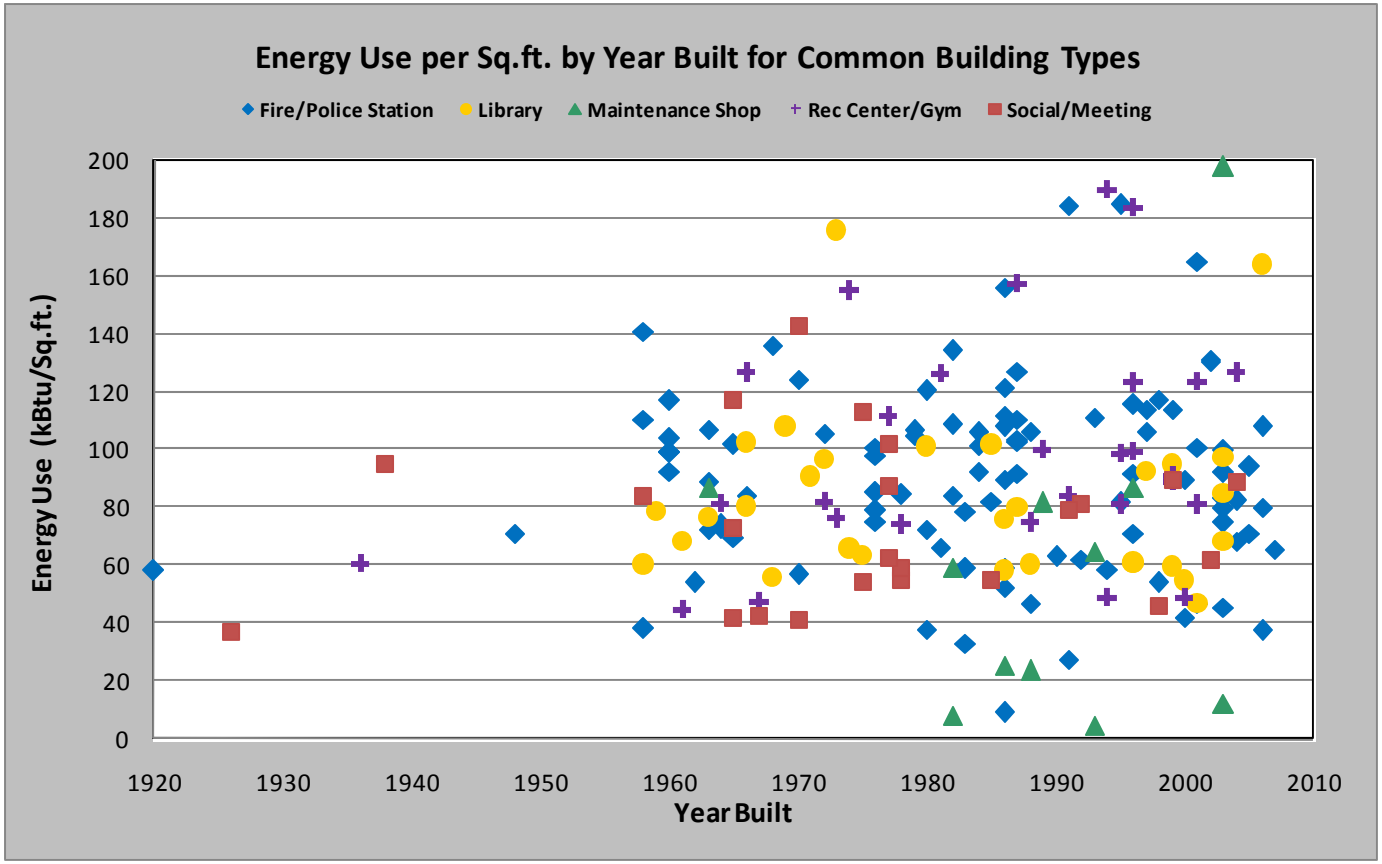
The Benchmarking Process

The energy and building data you provided – e.g. twelve months of utility bills, building square footages, and number of occupants – is entered into the program database. This database calculates energy benchmarks such as annual building energy use per square foot, annual energy cost per square foot, and annual energy cost per occupant. Your buildings' data is then compared to national building energy use averages published by the Department of Energy's (DOE) Energy Information Administration (EIA). These comparisons are made based on building type. In other words, your offices will only be compared to the national office energy use average; your fire stations will only be compared to the national fire station energy use average; etc.

A second benchmarking database available for certain building types is the U.S. Environmental Protection Agency's (EPA) ENERGY STAR® Portfolio Manager. This online tool ranks building energy performance on a scale of 1 to 100 based on a database of thousands of buildings across the nation. Eligible municipal building types include: courthouses, hospitals, medical offices, offices, and warehouses. If you submitted information on these types of buildings in your city, they will also receive a Portfolio Manager score.

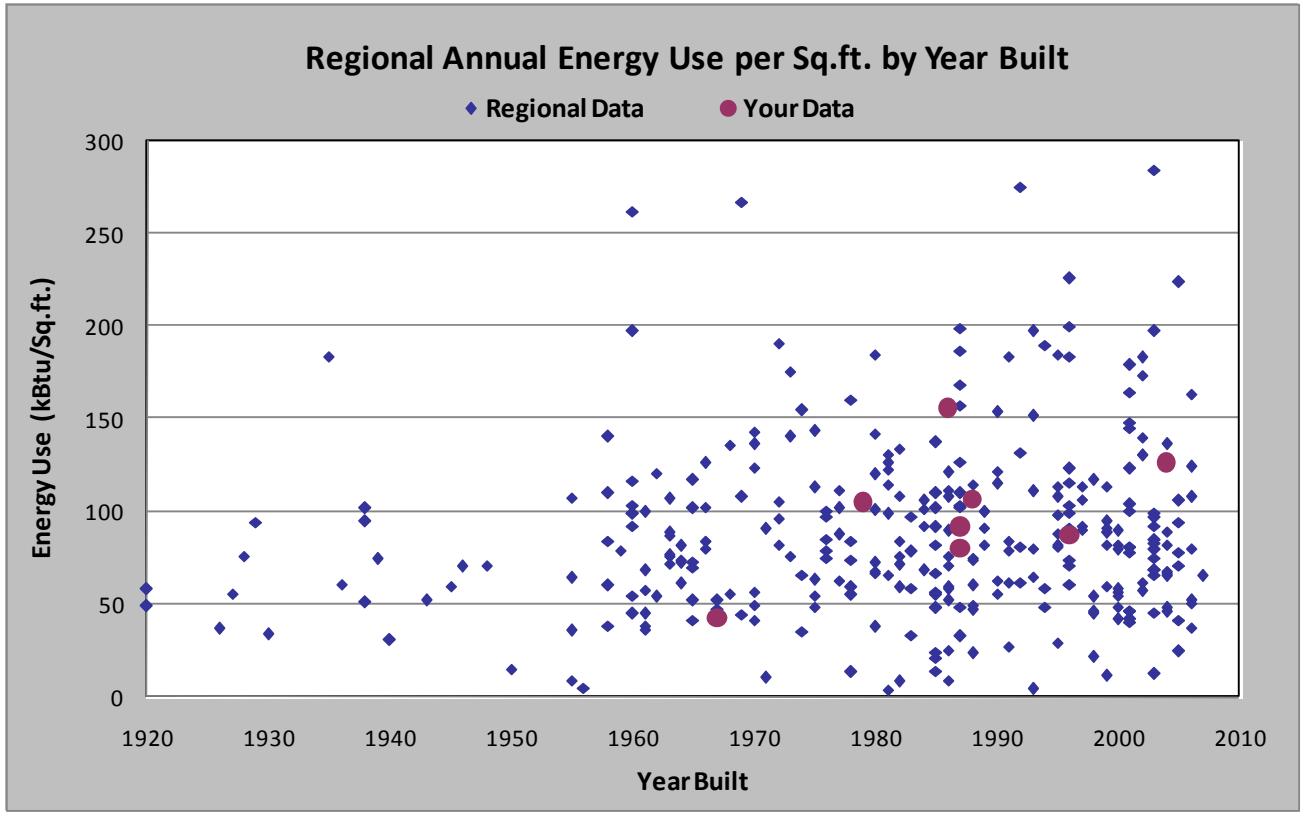
Common Building Types and Energy Use

A common misconception about energy performance is that newer buildings—built under newer codes—are less energy intensive. As the graph below shows, however, newer buildings do not generally consume any less energy per square foot than older buildings. The wide range of energy intensities found below indicates the magnitude of the effect that good energy managers and operating procedures can have on building energy consumption and costs.



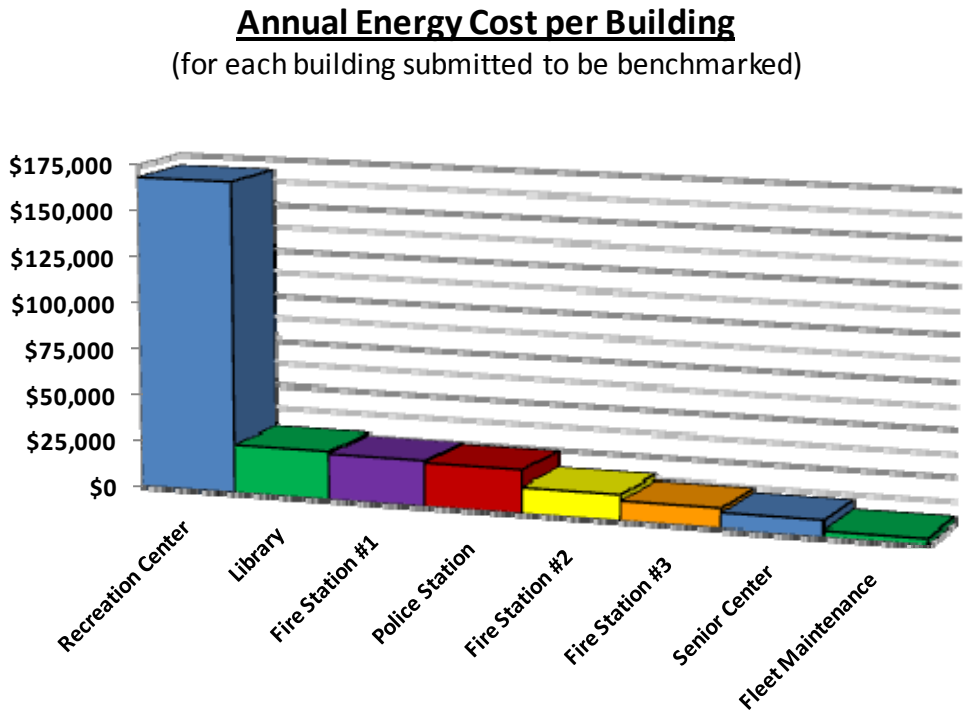
Your City's Energy Usage

Annual energy use per square foot, also known as site energy use, is one of the most common measures of energy efficiency in buildings. This parameter is all inclusive – it incorporates the energy used for heating, cooling, dehumidification, lighting, cooking, computers, etc. – and it also normalizes the data based on building size. The scatter plot below illustrates where your buildings' energy usage appears in our database of building energy usage for your region. Note that none of the buildings below are identified by building type. Specific information on your buildings can be found in the tables on page 6.



Where Your Energy Dollars are Going

The chart below shows where your city's energy dollars are going. Although it is important to think in terms of energy *efficiency* (normalized consumption per square foot), annual energy cost is another valuable way to decide on which buildings to focus your energy efficiency efforts.



Energy Performance Benchmarking Analysis[1]

This section provides a more detailed analysis of your individual buildings' annual performance. The four energy benchmarks used in the analysis are described below.

From the program regional database:

Annual Energy Use per Square Foot - This includes twelve months of all of the utility data you provided in units of kBtu, divided by the total square footage of the building.

Annual Energy Cost per Square Foot - Potential to reduce energy costs is a prime motivator for investment in energy efficiency upgrades. Annual Energy Cost per Square Foot is a simple way to compare how much it costs to operate each of your buildings.

Annual Energy Cost per Occupant - Another useful way to compare the cost of operations and maintenance at a building is by occupant. The lower the cost per occupant and cost per square foot, the more efficient the building.

From the U.S. EPA's Portfolio Manager Database:

U.S. EPA Portfolio Manager Score - Portfolio Manager is an online benchmarking tool provided by the U.S. EPA's ENERGY STAR® Program. Portfolio Manager uses a mathematical algorithm to rate buildings on a scale from 1 to 100. A score of 50 represents the national average, and 100 is the highest possible score. The algorithm was created based on actual building and utility data from thousands of buildings nationwide. The specific building characteristics you provided at the beginning of this benchmarking process – such as number of computers, hours of operation, and location (for weather adjustments) – are all incorporated into Portfolio Manager's calculations.

Note that the Portfolio Manager score is only available for certain building types at this time. Buildings that are not eligible to receive a score will be marked 'N/A' in that part of the analysis.

Detailed analysis for each of your major buildings can be found in the Energy Performance Benchmarking Analysis Charts located in the Appendix at the end of this report. Each chart consists of a bar graph of the energy performance metrics described above, along with a summary table of the building and utility data used. The upper left corner of the chart contains two columns of data. The first column contains the DOE's national average for each energy performance metric, and the second column contains your building's calculated benchmark. The bars to the right illustrate how you compare to the DOE national average and EPA's Portfolio Manager Database. Higher percentiles in the bar graph indicate lower energy use or costs than the national average. Excellent rankings are highlighted in green, above average rankings in yellow, below average rankings in orange and poor rankings in red.

[1] NOTE: This report compares energy use based on utility bills and is not the result of an engineering assessment. The analysis is purely mathematical and is not meant to provide an assessment of how buildings are managed or operated. Most of the indicators do not adjust for individual building conditions (such as extended hours of building use, thermal storage systems, or kitchens), and therefore should be used only as a tool in combination with knowledge of facility operations.

The following two tables summarize the Energy Performance Benchmarking Analysis data for each of your buildings. The first table shows the results sorted alphabetically by building type. The second table shows your buildings' results from lowest (best) to highest (worst) annual energy use per square foot. Even if your city performs well overall, below average buildings can present a great opportunity for savings.

Energy Performance Benchmarks Sorted by Building Type

Building Name	Annual Energy Use (kBtu/Sq.ft.)	Annual Energy Cost ($/Sq.ft.)	Annual Energy Cost ($/Occupant)	U.S. EPA Portfolio Manager Score
FIRE / POLICE				
Fire Station #1	91.6	$2.22	$1,896	N/A
Fire Station #2	104.9	$2.27	$2,885	N/A
Fire Station #3	106.3	$2.39	$2,198	N/A
Police Station	155.9	$4.69	$837	N/A
LIBRARY				
Library	79.8	$2.41	$1,629	N/A
MAINTENANCE				
Fleet Maintenance	86.9	$3.08	$575	N/A
REC CENTER / GYM				
Recreation Center	126.4	$3.11	$473	N/A
SOCIAL / MEETING				
Senior Center	42.5	$1.89	$340	N/A

Energy Performance Benchmarks Ranked by Annual Energy Use (kBtu/Sq.ft.)

Building Name	Annual Energy Use (kBtu/Sq.ft.)	Annual Energy Cost ($/Sq.ft.)	Annual Energy Cost ($/Occupant)	U.S. EPA Portfolio Manager Score
Senior Center	42.5	$1.89	$340	N/A
Library	79.8	$2.41	$1,629	N/A
Fleet Maintenance	86.9	$3.08	$575	N/A
Fire Station #1	91.6	$2.22	$1,896	N/A
Fire Station #2	104.9	$2.27	$2,885	N/A
Fire Station #3	106.3	$2.39	$2,198	N/A
Recreation Center	126.4	$3.11	$473	N/A
Police Station	155.9	$4.69	$837	N/A

Translating the Numbers into Savings

Although benchmarking does not tell you what specific equipment or building features need to be improved, or how much it will cost to make the improvements, it can help you determine the general magnitude of the opportunities available and on which buildings to focus. Comparing the energy performance of your buildings is the first step toward improving performance and saving money. The 'Energy Performance Benchmarks Ranked by Annual Energy Use' table helps you determine which buildings should have the highest priority for improvement projects. Buildings in the bottom half of the table should be assessed first, since those buildings have both the most potential and likely some of the easiest and most cost effective savings to capture. Buildings in the top half of the table should also be assessed, but doing so is not as urgent as for the lower-performing buildings.

Energy efficiency equipment upgrades and operations and maintenance improvements can have a dramatic financial impact on a city. The table below illustrates how many budget dollars your city would save if energy expenses were reduced by 10, 20, or 30 percent at the buildings you submitted to be benchmarked.

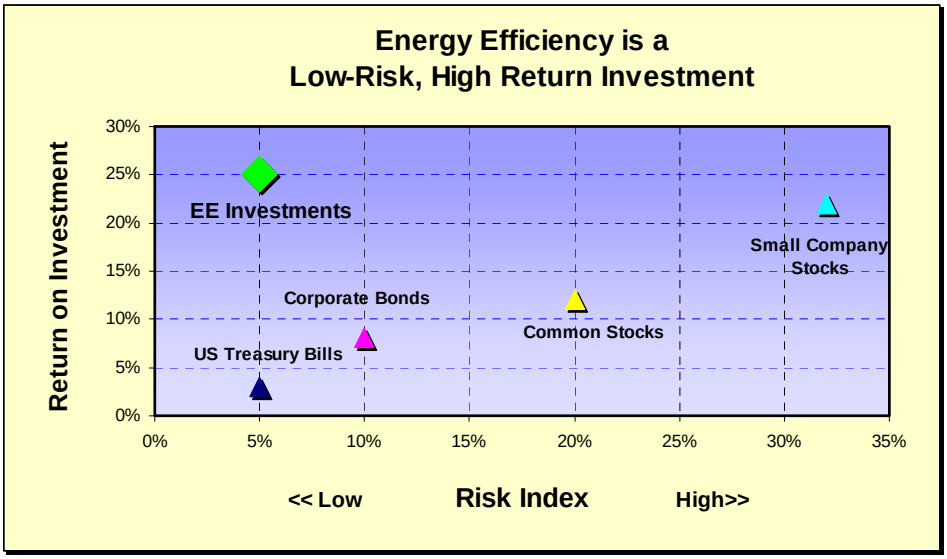
City of Cedar Hill				
Annual Energy Use	x	% Cost Reduction	=	Dollars Saved
$279,543		10%		$27,954
		20%		$55,909
		30%		$83,863

The next step towards realizing these savings is to identify specific energy efficiency opportunities within your city. Your Program Consultant can help you identify and evaluate energy efficiency opportunities and help you calculate the anticipated cost savings and cash incentives for each energy efficiency measure.

Project Financing

The Value of Energy Efficiency Investments

Compared with most any other type of financial investment, energy efficiency investments are by far the lowest risk per rate of return. The chart below illustrates this fact. Most buildings easily can achieve a 25% or greater return on investment by installing energy efficient equipment. What's more, installing higher-performing equipment is low risk. This is because, unlike speculative investments that may or may not pay off as expected, energy savings are virtually certain to accrue over the life of the new equipment as long as it is installed and running properly.



How to Pay for Your Energy Efficiency Improvements[2]

Significant cost savings are possible from energy projects, and delaying projects is an expensive decision. Many projects are delayed or prevented due to financial concerns or budget constraints. Since energy savings fall straight to the bottom line, it makes good business sense to use alternative solutions if budget dollars are unavailable. There are a number of ways to pay for projects, including self-financing and third-party financing, that can help cities immediately leverage the benefits of the energy and money they will save.

There is a perception in many organizations that money must be available in the current budget for energy efficiency projects. Many projects stall due to one or a combination of the following perceived financial barriers:

- If the project is not in this year's budget, it has to wait.
- Equipment improvements must be paid from the capital budget.
- Paying lower interest (by floating bonds) or no interest (by delaying the project and planning it into future budgets) saves money and, therefore, is in the best interest of the organization.
- Taxes or fees will have to be increased to pay for the improvements.
- Performance contracting is expensive and unreliable.
- Tax-exempt lease-purchase is expensive and may be prohibited by law.

[2] The information in this section on project financing was derived in large part from *Innovative Financing Solutions: Finding Money for Your Energy Efficiency Projects – A Primer for Public Sector Energy, Facility, and Financial Managers from the U.S. Environmental Protection Agency's ENERGY STAR® Program*. US EPA, November 2004.

Some of these comments may sound familiar. In fact, they are common misconceptions that the information presented below can help you overcome. The following sections present financing options, and a "cost of delay" example quantifies the savings opportunities that are lost if projects are delayed.

Capital and Operating Expenses

Capital expenses pay for long-term debt and fixed assets (such as new buildings, renovations, and furniture) whose repayment typically extends beyond one budget year. Operating expenses, such as salaries or supplies, typically are incurred during a single budget year. Repayment of a bond issue is considered a capital expense, whereas paying monthly utility bills is considered an operating expense.

Capital budget dollars can be raised to pay for energy projects, either through bond elections or by re-programming capital dollars from other projects that can be deferred and paid for later from the savings generated from the energy projects. Operating budget dollars also can be an effective way to pay for energy projects, particularly those with a short payback, when the savings generated offset the cost of the project. Projects with a multi-year payback can be funded from operating budgets through tax-exempt lease-purchase agreements as described below.

Tax-Exempt Lease-Purchase Agreements

Tax-exempt lease-purchase agreements (also known as municipal leases) are a type of performance contract that allows the project to be repaid from operating dollars instead of capital dollars. They are effective alternatives to traditional debt financing such as bonds or loans, and they allow public organizations to pay for energy upgrades by using money already set aside in annual utility budgets. This type of financing mechanism allows public sector agencies to draw on dollars saved from future utility bills to pay for new, energy-efficient equipment today.

Tax-exempt lease-purchase payments are not considered “debt.” Because of the non-appropriation language typically included in these agreements, this type of financing may be considered an operating rather than a capital expense. As a result, the payments are not considered “debt” from a legal perspective in most states and usually do not require taxpayer approval.

Performance Contracts

Performance contracting is a popular method for public sector organizations to finance energy efficiency improvements. Performance contracts can be comprehensive agreements that address project development, energy services, and financing issues. Financing options under a performance contract include (1) Energy Service Provider (ESP)-based financing; (2) tax-exempt lease-purchase agreements provided by independent third parties; and (3) state or utility funding. In these contracts, the service provider must by law provide a guarantee of the energy savings to offset the debt created to fund these improvements.

The table below summarizes financing options for energy projects.

Exhibit 1

COMPARING FINANCING OPTIONS FOR ENERGY PROJECTS

	CASH	BONDS	MUNICIPAL LEASES	PERFORMANCE CONTRACTS
Interest Rates	N/A	Lowest tax-exempt rate	Low tax-exempt rate	Can be taxable or tax-exempt
Financing Term Term	N/A	May be 20 years or more	Up to 10 years is common and up to 12-15 years is possible for large projects	Typically up to 10 years, but may be as long as 15 years
Other Costs	N/A	Underwriting, legal opinion, insurance, etc.	None	May have to pay engineering costs if contract not executed
Approval Process	Internal	May have to be approved by voters via referendum	Internal approvals needed. Simple attorney letter required	RFP usually required; internal approvals needed
Approval Time	Current budget period	May be lengthy—process may take over a year	Generally within one week	Generally within 1-2 weeks once the award is made
Funding Flexibility	N/A	Very difficult to go above the dollar ceiling	Can set up a master lease, which allows you to draw down funds as needed	Relatively flexible. An underlying municipal lease is often used
Budget Used	Either	Capital	Operating	Operating
Greatest Benefit	Direct access if included in budget	Low interest rate because it is a general obligation of the public entity	Allows you to buy capital equipment using operating dollars	Provides performance guarantees that help approval process
Greatest Hurdle	Never seems to be enough money available for projects	Very time consuming	Identifying the project to be financed	Identifying the project to be financed, selecting the energy service provider

Source: Zobler, Neil and Hatcher, Katy, "Financing Energy Efficiency Projects," Government Finance Review (February, 2003): 15.

The High Cost of Delaying Energy Saving Projects

Many building owners believe that it is financially prudent to wait for a future year's budget or a bond issue rather than financing a project (and incurring interest) with funds that may be more readily available. However, by delaying the project, they forgo the opportunity to accrue substantial savings on their energy bill that more than offsets the financing cost.

For example, consider a $500,000 project with a 5-year simple payback. This equals a savings of $100,000 per year. If the project were financed over 7 years at 4% interest, the total interest paid would be about $75,000. That is $25,000 ***less*** than the energy savings that the building owner passed up by delaying the project for just one year.

Under this program, the financial picture is better and the payback is shorter. You will receive a cash incentive for replacing older, inefficient equipment with high-efficiency equipment in addition to the savings realized by reduced energy usage! Contact your Program Consultant for more information.

Recognition for Your Energy Efficiency Accomplishments

Program Publicity

This program helps publicize your energy efficiency achievements by working with you and your communications staff to:

- Develop and issue press releases at key milestones of program participation, including MOU signing, Master Plan Workshop completion, and project completion; and work with local media outlets to obtain print and electronic placements.
- Generate newsletter articles/website content/success stories for expanding the city's internal and external audiences.
- Conduct incentive check presentations at City Council meetings and issue press releases with stories and photos of the event.

ENERGY STAR® Label for Buildings

America's desire for environmentally friendly buildings is growing, and superior energy efficiency — identified by the ENERGY STAR — is a critical element of a green building. Buildings achieving a rating of 75 or higher through EPA's online Portfolio Manager performance rating system are potentially eligible to apply for the ENERGY STAR Building Label. The application process requires that a Professional Engineer visit the building to ensure that energy data is correct and that lighting and ventilation levels are appropriate.

ENERGY STAR Labeled buildings are the top performers for energy efficiency nationwide and use about 35 percent less energy than average buildings. Nearly 4,000 buildings in all 50 states have earned the prestigious ENERGY STAR.

ENERGY STAR® Leaders

EPA recognizes municipalities and businesses as ENERGY STAR Leaders based on organization-wide, documented improvement in energy performance. To be eligible for recognition as an ENERGY STAR Leader, an organization must reduce its normalized energy use by 10%, 20%, 30% (or more), or achieve an average Portfolio Manager rating of 75 or better across their portfolio of buildings.

For assistance with program publicity or ENERGY STAR Award applications, contact your Program Consultant. For more information on ENERGY STAR Awards, visit www.energystar.gov.

The U.S. Green Building Council LEED Rating Systems

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is the nationally accepted benchmark for the design, construction and operation of high performance green buildings. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. Energy efficiency comprises 25 percent of all the possible credits in the LEED rating system. For more information on LEED Rating Systems or the U.S. Green Building Council, visit www.usgbc.org.

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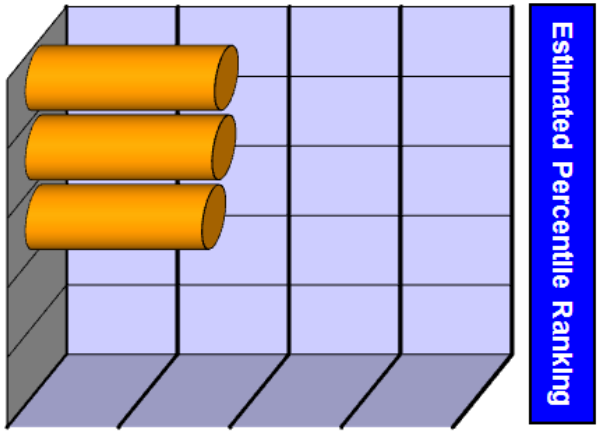
Appendix

Major Building Energy Performance Benchmarking Analysis Charts

Energy Performance Benchmarking Analysis

Fire Station #1 / City of Cedar Hill

National Benchmarks	National Average *	Your Building
Annual Energy Use (kBtu/sq.ft.)	77.9	**91.6**
Annual Energy Cost ($/sq.ft.)	$1.86	**$2.22**
Annal Energy Cost ($/occupant)	$1,505	**$1,896**
U.S. EPA Benchmark	**Average Score**	**Your Score**
Portfolio Manager Score **	N/A	**N/A**



Higher percentiles indicate lower energy use & lower costs.

Building Characteristics		Energy Use/Cost Data	
Type of Building ***	Fire/Police Station	**Beginning Billing Month**	September-07
Year Built	1987	**Ending Billing Month**	August-08
Floor Area (sq. ft.)	11,121	**Electricity Usage (KWh)**	184,032
Number of Occupants	13	**Electricity Cost ($)**	$20,540
Number of PCs	10	**Natural Gas Usage (therms)**	3,908
Type of Heating System	Gas Heating Only	**Natural Gas Cost ($)**	$4,104
Weekly Operating Hours	168	**Total Energy Cost ($)**	$24,645

* National Averages are from the Department of Energy's (DOE) Commercial Building Energy Consumption Survey (CBECS) and Building Energy Data Book.

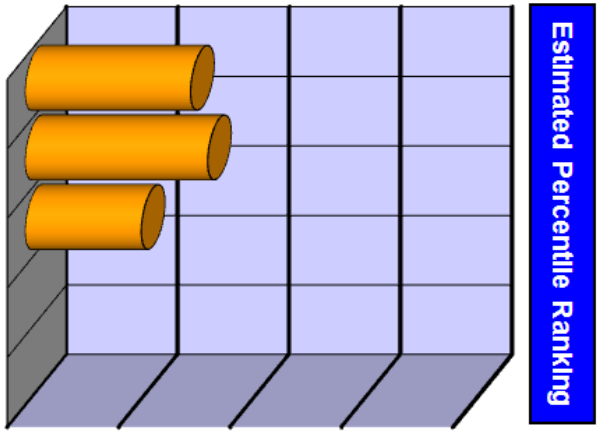
** A score of "N/A" signifies that Portfolio Manager does not yet have the capability of producing a score for this building type.

*** This analysis compares similar building types to each other only (i.e. hospitals are only compared to hospitals, offices are only compared to offices, etc.).

Energy Performance Benchmarking Analysis

Fire Station #2 / City of Cedar Hill

National Benchmarks	National Average *	Your Building
Annual Energy Use (kBtu/sq.ft.)	77.9	**104.9**
Annual Energy Cost ($/sq.ft.)	$1.86	**$2.27**
Annal Energy Cost ($/occupant)	$1,505	**$2,885**
U.S. EPA Benchmark	**Average Score**	**Your Score**
Portfolio Manager Score **	N/A	**N/A**



Higher percentiles indicate lower energy use & lower costs.

Building Characteristics		Energy Use/Cost Data	
Type of Building ***	Fire/Police Station	**Beginning Billing Month**	September-07
Year Built	1979	**Ending Billing Month**	August-08
Floor Area (sq. ft.)	6,355	**Electricity Usage (KWh)**	91,008
Number of Occupants	5	**Electricity Cost ($)**	$10,773
Number of PCs	2	**Natural Gas Usage (therms)**	3,563
Type of Heating System	Gas Heating Only	**Natural Gas Cost ($)**	$3,654
Weekly Operating Hours	168	**Total Energy Cost ($)**	$14,427

* National Averages are from the Department of Energy's (DOE) Commercial Building Energy Consumption Survey (CBECS) and Building Energy Data Book.

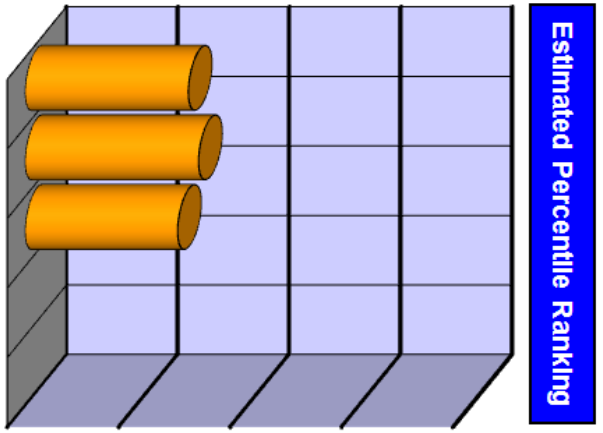
** A score of "N/A" signifies that Portfolio Manager does not yet have the capability of producing a score for this building type.

*** This analysis compares similar building types to each other only (i.e. hospitals are only compared to hospitals, offices are only compared to offices, etc.).

Energy Performance Benchmarking Analysis

Fire Station #3 / City of Cedar Hill

National Benchmarks	National Average *	Your Building
Annual Energy Use (kBtu/sq.ft.)	77.9	**106.3**
Annual Energy Cost ($/sq.ft.)	$1.86	**$2.39**
Annal Energy Cost ($/occupant)	$1,505	**$2,198**
U.S. EPA Benchmark	**Average Score**	**Your Score**
Portfolio Manager Score **	N/A	**N/A**



Higher percentiles indicate lower energy use & lower costs.

Building Characteristics		Energy Use/Cost Data	
Type of Building ***	Fire/Police Station	**Beginning Billing Month**	September-07
Year Built	1988	**Ending Billing Month**	August-08
Floor Area (sq. ft.)	4,600	**Electricity Usage (KWh)**	69,600
Number of Occupants	5	**Electricity Cost ($)**	$8,260
Number of PCs	1	**Natural Gas Usage (therms)**	2,514
Type of Heating System	Gas Heating Only	**Natural Gas Cost ($)**	$2,730
Weekly Operating Hours	168	**Total Energy Cost ($)**	$10,990

* National Averages are from the Department of Energy's (DOE) Commercial Building Energy Consumption Survey (CBECS) and Building Energy Data Book.

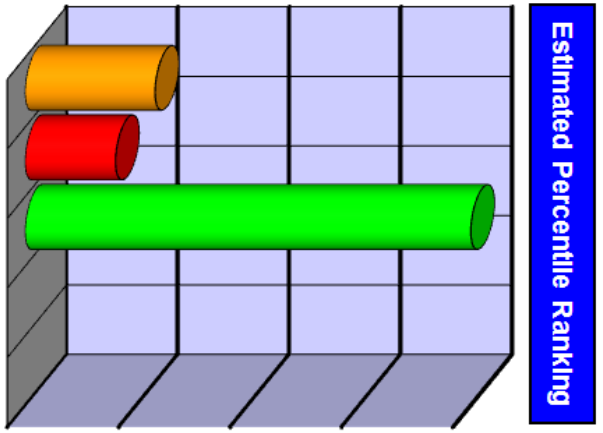
** A score of "N/A" signifies that Portfolio Manager does not yet have the capability of producing a score for this building type.

*** This analysis compares similar building types to each other only (i.e. hospitals are only compared to hospitals, offices are only compared to offices, etc.).

Energy Performance Benchmarking Analysis

Fleet Maintenance / City of Cedar Hill

National Benchmarks	National Average *	Your Building
Annual Energy Use (kBtu/sq.ft.)	50.7	**86.9**
Annual Energy Cost ($/sq.ft.)	$1.25	**$3.08**
Annal Energy Cost ($/occupant)	$1,381	**$575**
U.S. EPA Benchmark	**Average Score**	**Your Score**
Portfolio Manager Score **	N/A	**N/A**



Higher percentiles indicate lower energy use & lower costs.

Building Characteristics		Energy Use/Cost Data	
Type of Building ***	Maintenance Shop	**Beginning Billing Month**	September-07
Year Built	1996	**Ending Billing Month**	August-08
Floor Area (sq. ft.)	1,120	**Electricity Usage (KWh)**	28,521
Number of Occupants	6	**Electricity Cost ($)**	$3,448
Number of PCs	7	**Natural Gas Usage (therms)**	0
Type of Heating System	Electric Heating Only	**Natural Gas Cost ($)**	$0
Weekly Operating Hours	40	**Total Energy Cost ($)**	$3,448

* National Averages are from the Department of Energy's (DOE) Commercial Building Energy Consumption Survey (CBECS) and Building Energy Data Book.

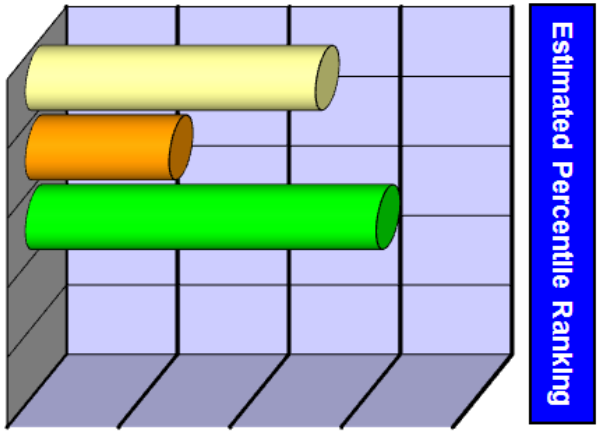
** A score of "N/A" signifies that Portfolio Manager does not yet have the capability of producing a score for this building type.

*** This analysis compares similar building types to each other only (i.e. hospitals are only compared to hospitals, offices are only compared to offices, etc.).

Energy Performance Benchmarking Analysis

Library / City of Cedar Hill

National Benchmarks	National Average *	Your Building
Annual Energy Use (kBtu/sq.ft.)	104.0	**79.8**
Annual Energy Cost ($/sq.ft.)	$1.56	**$2.41**
Annal Energy Cost ($/occupant)	$2,566	**$1,629**
U.S. EPA Benchmark	**Average Score**	**Your Score**
Portfolio Manager Score **	N/A	**N/A**



Higher percentiles indicate lower energy use & lower costs.

Building Characteristics		Energy Use/Cost Data	
Type of Building ***	Library	**Beginning Billing Month**	September-07
Year Built	1987	**Ending Billing Month**	August-08
Floor Area (sq. ft.)	10,800	**Electricity Usage (KWh)**	209,106
Number of Occupants	16	**Electricity Cost ($)**	$24,389
Number of PCs	26	**Natural Gas Usage (therms)**	1,488
Type of Heating System	Gas Heating Only	**Natural Gas Cost ($)**	$1,673
Weekly Operating Hours	56	**Total Energy Cost ($)**	$26,062

* National Averages are from the Department of Energy's (DOE) Commercial Building Energy Consumption Survey (CBECS) and Building Energy Data Book.

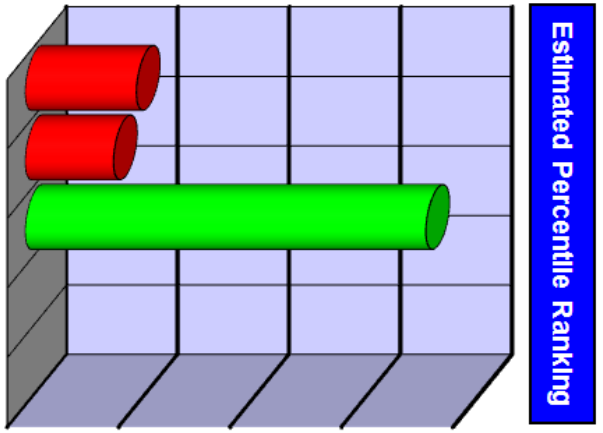
** A score of "N/A" signifies that Portfolio Manager does not yet have the capability of producing a score for this building type.

*** This analysis compares similar building types to each other only (i.e. hospitals are only compared to hospitals, offices are only compared to offices, etc.).

Energy Performance Benchmarking Analysis

Police Station / City of Cedar Hill

National Benchmarks	National Average *	Your Building
Annual Energy Use (kBtu/sq.ft.)	77.9	**155.9**
Annual Energy Cost ($/sq.ft.)	$1.86	**$4.69**
Annal Energy Cost ($/occupant)	$1,505	**$837**
U.S. EPA Benchmark	**Average Score**	**Your Score**
Portfolio Manager Score **	N/A	**N/A**



Higher percentiles indicate lower energy use & lower costs.

Building Characteristics		Energy Use/Cost Data	
Type of Building ***	Fire/Police Station	**Beginning Billing Month**	April-07
Year Built	1986	**Ending Billing Month**	March-08
Floor Area (sq. ft.)	5,000	**Electricity Usage (KWh)**	228,480
Number of Occupants	28	**Electricity Cost ($)**	$23,151
Number of PCs	45	**Natural Gas Usage (therms)**	1
Type of Heating System	Gas Heating Only	**Natural Gas Cost ($)**	$278
Weekly Operating Hours	168	**Total Energy Cost ($)**	$23,429

* National Averages are from the Department of Energy's (DOE) Commercial Building Energy Consumption Survey (CBECS) and Building Energy Data Book.

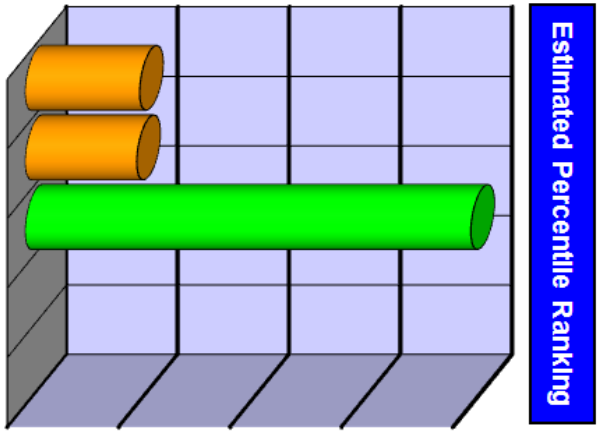
** A score of "N/A" signifies that Portfolio Manager does not yet have the capability of producing a score for this building type.

*** This analysis compares similar building types to each other only (i.e. hospitals are only compared to hospitals, offices are only compared to offices, etc.).

Energy Performance Benchmarking Analysis

Recreation Center / City of Cedar Hill

National Benchmarks	National Average *	Your Building
Annual Energy Use (kBtu/sq.ft.)	65.0	**126.4**
Annual Energy Cost ($/sq.ft.)	$1.56	**$3.11**
Annal Energy Cost ($/occupant)	$2,566	**$473**
U.S. EPA Benchmark	**Average Score**	**Your Score**
Portfolio Manager Score **	N/A	**N/A**



Higher percentiles indicate lower energy use & lower costs.

Building Characteristics		Energy Use/Cost Data	
Type of Building ***	Rec Center/Gym	**Beginning Billing Month**	April-07
Year Built	2004	**Ending Billing Month**	March-08
Floor Area (sq. ft.)	54,000	**Electricity Usage (KWh)**	1,390,920
Number of Occupants	355	**Electricity Cost ($)**	$147,278
Number of PCs	17	**Natural Gas Usage (therms)**	20,791
Type of Heating System	Gas Heating Only	**Natural Gas Cost ($)**	$20,754
Weekly Operating Hours	96	**Total Energy Cost ($)**	$168,032

* National Averages are from the Department of Energy's (DOE) Commercial Building Energy Consumption Survey (CBECS) and Building Energy Data Book.

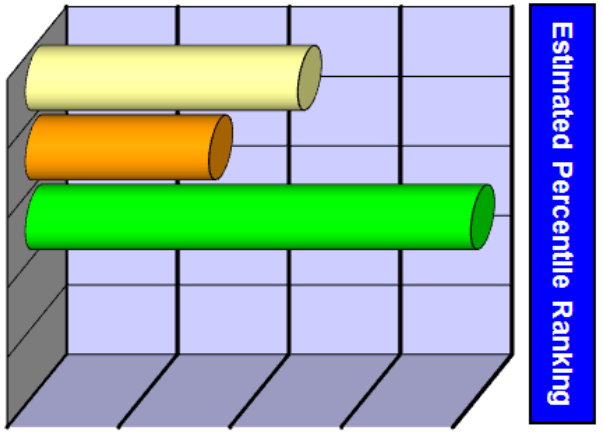
** A score of "N/A" signifies that Portfolio Manager does not yet have the capability of producing a score for this building type.

*** This analysis compares similar building types to each other only (i.e. hospitals are only compared to hospitals, offices are only compared to offices, etc.).

Energy Performance Benchmarking Analysis

Senior Center / City of Cedar Hill

National Benchmarks	National Average *	Your Building
Annual Energy Use (kBtu/sq.ft.)	52.0	**42.5**
Annual Energy Cost ($/sq.ft.)	$1.56	**$1.89**
Annal Energy Cost ($/occupant)	$2,566	**$340**
U.S. EPA Benchmark	**Average Score**	**Your Score**
Portfolio Manager Score **	N/A	**N/A**



Higher percentiles indicate lower energy use & lower costs.

Building Characteristics		Energy Use/Cost Data	
Type of Building ***	Social/Meeting	**Beginning Billing Month**	September-07
Year Built	1967	**Ending Billing Month**	August-08
Floor Area (sq. ft.)	4,500	**Electricity Usage (KWh)**	56,000
Number of Occupants	25	**Electricity Cost ($)**	$8,510
Number of PCs	5	**Natural Gas Usage (therms)**	0
Type of Heating System	Electric Heating Only	**Natural Gas Cost ($)**	$0
Weekly Operating Hours	40	**Total Energy Cost ($)**	$8,510

* National Averages are from the Department of Energy's (DOE) Commercial Building Energy Consumption Survey (CBECS) and Building Energy Data Book.

** A score of "N/A" signifies that Portfolio Manager does not yet have the capability of producing a score for this building type.

*** This analysis compares similar building types to each other only (i.e. hospitals are only compared to hospitals, offices are only compared to offices, etc.).