



City of Tulsa
Energy Conservation Task Force
Report & Recommendations

City of Tulsa

Energy Conservation Task Force

December 8, 2005

Mayor Bill LaFortune

City Council

Dear Mayor LaFortune and City Councilors:

On October 6, 2005, the City Council established the Energy Conservation Task Force. Task Force participants met weekly, from October 11th through December 6th, to assess current energy costs and efficiency measures, and to discuss ideas for conserving energy.

The Task Force meetings proved to be enlightening discussions, and I have been gratified by the professionalism and expertise of city staff. It is both telling and reassuring that the City of Tulsa is already implementing, to some degree, many of the 'best practices' in the field of municipal energy efficiency and conservation.

For example, the Public Works Department recycles burnable gas produced by anaerobic digesters to fuel boilers and engine generators at both the Northside and Southside Wastewater Plants. A similar process in Portland was cited as an innovation in *Selected Best Practices for Successful City Energy Initiatives*, by the U.S. Conference of Mayors.

On behalf of the Task Force, I am pleased to submit the attached Report and Recommendations, which highlight current conditions and describe areas in which we might re-double our efforts to pursue energy efficiencies and cost savings.

Finally, I would like to thank the following participants, who have generously shared their time, experience, and expertise:

Chief Administrative Officer
Sam Roop

City Councilor Bill Martinson

City Councilor Roscoe Turner

City Council Staff
Keri Fothergill
John Fothergill
Jack Blair

Equipment Mgmt. Dept.
Paul Payne

Finance Department
Pat Connelly
David Bryant

Johnson Controls
John Bennett

Legal Department
Harris Prescott

Oklahoma Natural Gas Co.
Jim Stout
Bob Brown

Public Service Co. of Okla.
Chuck Walker
Jackie Butts

Public Works Department
Charles Hardt
Mike Buchert
Roy Smith
Terry Ball

Tulsa Fire Department
Chief Allen LaCroix
David Hayes

Tulsa Police Department
Chief Dave Been
Mark Andrus

Tulsa Public Schools
Doug Charette

Respectfully submitted,

Task Force Chairman –

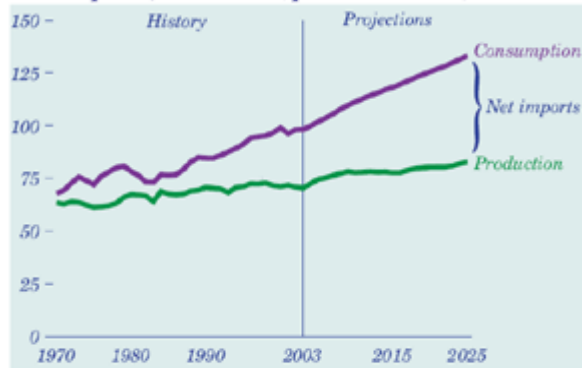


Bill Christiansen

I. NATIONAL ENERGY TRENDS

The United States Department of Energy projects that total domestic energy consumption will rise, through 2025, much more dramatically than domestic energy production, leaving energy consumers more dependent on expensive and volatile energy imports.

Figure 6. Total energy production and consumption, 1970-2025 (quadrillion Btu)

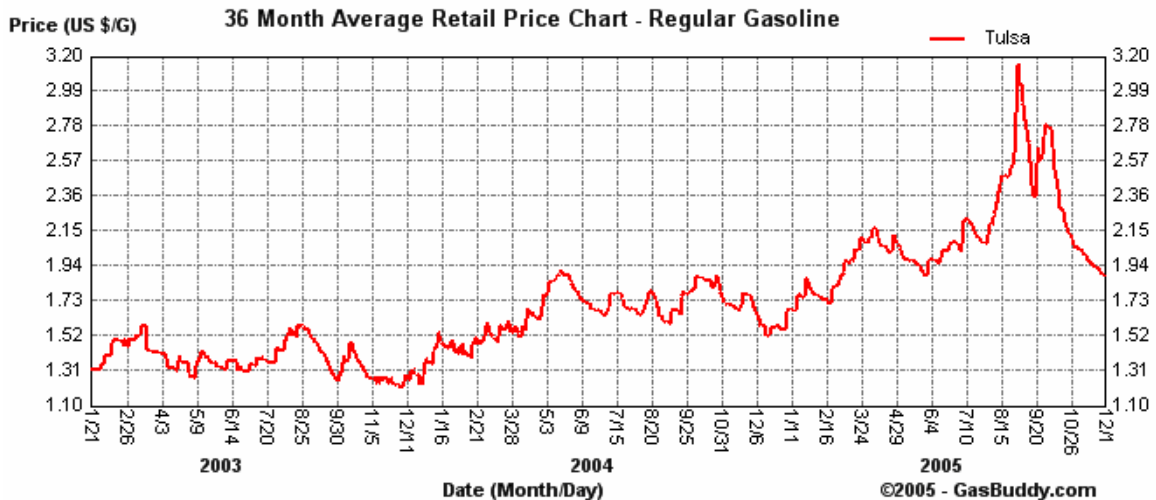


U.S. Dept. of Energy, 2005

“Trends in energy supply and demand are linked with such unpredictable factors as the performance of the U.S. economy overall, advances in technologies related to energy production and consumption, annual changes in weather patterns, and future public policy decisions.”¹

This unpredictability, in itself, can pose problems with regard to developing reliable municipal budgets and maintaining consistent levels of municipal services.

Both rising energy costs and market volatility are evident in retail gasoline price trends and recent post-hurricane price spikes.



While gas prices have recently fallen from near-record highs, they have been ratcheting upward for several years – tied generally to rising crude oil prices.

¹ U.S Department of Energy, *Annual Energy Outlook 2005*.

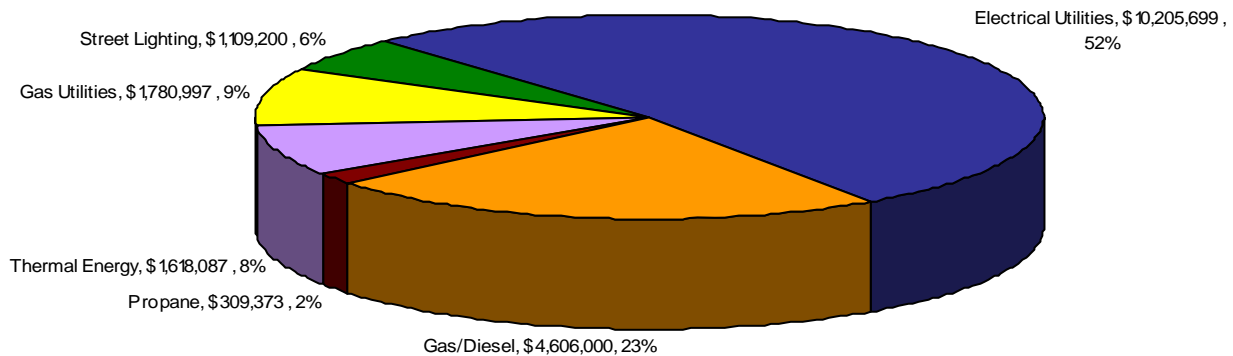
Strong growth in the demand for oil worldwide, particularly in China and other developing countries, is generally cited as the driving force behind the sharp price increases seen over the past 3 years. Other factors contributing to the upward trend include a tight supply situation that has shown only limited response to higher prices; changing views on the economics of oil production; concerns about economic and political situations in the Middle East, Venezuela, Nigeria, and the former Soviet Union; and recent supply disruptions caused by weather events....²

It is in this context of rising energy costs and general uncertainty that the City of Tulsa must develop its half billion dollar annual Budget and Capital Plan, and meet public expectations with regard to minimum levels of municipal services.

II. CITY OF TULSA ENERGY CONSUMPTION

The City’s energy expenditures of more than \$19 million represent approximately 4.25% of the City’s annual operating budget. More than half of the City’s energy expenditures consist of electricity for utilities and street lighting. Motor fuel represents about 23% of the City’s energy expenditures.

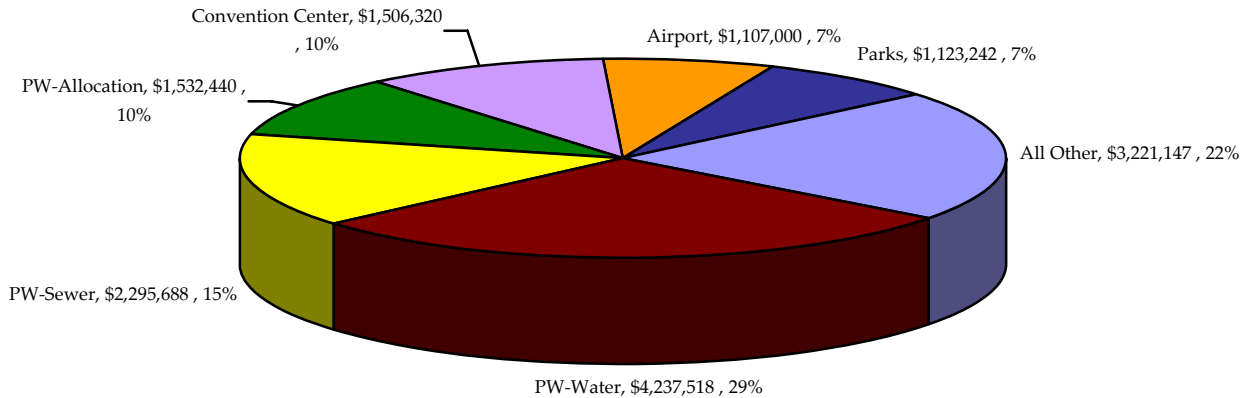
FY 06 Energy Appropriations by Type



The Public Works Department spends the bulk of the City’s energy appropriations (approximately 54%) for water and sewer treatment and transport, and for public facilities.

^{2 2} U.S Department of Energy, *Annual Energy Outlook 2005*. Tight refining capacity is often cited as another significant factor contributing to rising retail gasoline prices.

FY 06 Energy Appropriations by Department (excluding gas/diesel)



It is important to note that City departments take efficiency very seriously. The Public Works Department, for example, estimates that its recent energy reduction efforts have resulted in the following savings:

<u>Section</u>	<u>KWH saved/yr.</u>
Water Supply and Treatment	2,000,000
Wastewater Treatment and Collection	4,500,000
Facilities Maintenance	2,500,000
Traffic Engineering (e.g. LED traffic lights)	<u>3,000,000</u>
Total	12,000,000

At \$.08 per KWH, these savings amount to ***\$960,000 per year.***

As new buildings are built, such as the BOK Center and fire stations, energy efficient heating, air conditioning, air handling, lights, etc., are installed – along with energy efficient windows, insulation, and doors. Passive solar heating, for example, will be used in the BOK Center, with its large south-facing window.

Motor Fuel

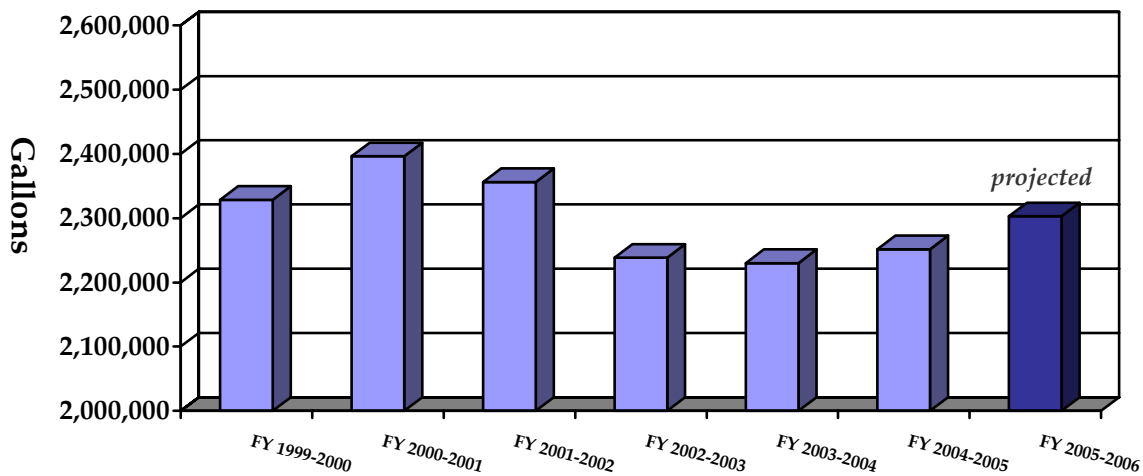
The City maintains approximately 2,700 fuel-burning vehicles, including 1,238 passenger cars (including police cruisers), 328 light trucks (1/2 ton or less), and 103 SUVs. The remainder consists of heavy trucks and equipment.

Four departments consumed 97% of City's fuel in FY 2004-05:

Public Works	44.7%
Police	41.0%
Fire	7.0%
Parks	4.3%

The City consumes approximately 2.3 million gallons of fuel annually, approximately 35% of which is diesel and 65% of which is gasoline. Revised projected fuel expenditures for the current fiscal year are approximately \$4.6 million, at an estimated average price of \$2.00 per gallon (not including fuel taxes).

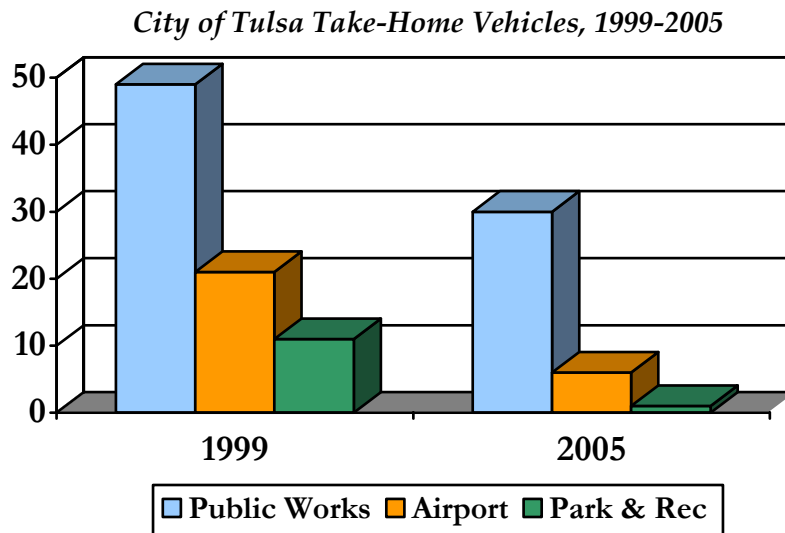
City of Tulsa Fuel Consumption, 1999 to Present



The FY 2002-2003 drop in fuel consumption was generally concurrent with budget cuts related to an economic downturn and declining sales tax collections – just as more recent increases are generally concurrent with a gradual recovery.³ Even with higher projections for the current fiscal year, *the City will consume nearly 100,000 fewer gallons of fuel in 2005-06 than in 2000-01*. At current fuel costs, this represents an annual savings of \$200,000.

Reductions in fuel consumption might also be partially attributable to the implementation of the revised Energy Policy (Ordinance No. 20546) and Take-Home Vehicle Policy (Ordinance No. 20525).

³ In addition to other budget factors, the Police and Fire Departments indicate that emergency call rates are increasing and that there are more emergency vehicles coming on-line as a result of such investments as a new Police Academy class and new Homeland Security equipment purchased with federal funds, but maintained and operated with city funds.



Since 1999, at least 44 non-police/fire take-home vehicles have been eliminated.

III. RECOMMENDATIONS

Consistent with the provisions of the City of Tulsa’s Energy Policy and Take-Home Vehicle Policy (Revised Ordinances, Title 12, Ch. 1 and 3), the Task Force makes the following recommendations to enhance the energy conservation and efficiency efforts of City employees, departments, and agencies:

1. Improve monitoring and measurement of energy usage and savings.

The first step in conserving energy is developing reliable information by which to gauge success. Many of the examples of energy savings provided in the annual Energy Report are anecdotal. While anecdotal savings are no less real, it is important that we be able to measure and quantify our energy costs and savings. To determine whether alternative-fuel vehicles are more cost-effective, for example, it is necessary to make accurate assessments and develop reliable payout schedules.

The Energy Policy provides that the City will “regularly conduct and publish energy audits.” These should be done, in conjunction with performance-based contracts (see #6).

Example: The Equipment Management Department conducted a study of shop vehicles to evaluate usage. The Department changed work assignments as a result of the study’s findings.

Example: The Public Works Department is in the process of implementing a plan to measure and monitor the power used through sub-metering to isolate specific loads, noting “it is difficult to manage what you cannot measure.”

2. Set challenging energy conservation and efficiency goals.

The City's Energy Policy establishes a city-wide goal of reducing "the City's overall, total energy consumption 3-5% per year through calendar year 2006." This broad goal was largely met as the City's budget was cut in response to declining sales tax revenues. As budgets increase, however, there is a danger of allowing rates of energy consumption to increase accordingly. In light of rising energy costs, it is crucial that we set attainable, but challenging conservation goals, so that higher municipal revenues are not lost to higher energy costs.

Example: The Equipment Management Department established a goal "to reduce fossil fuel consumption by 5% by June 30, 2002." FY 2002-03 fuel usage was 9% less than FY 1999-00 fuel consumption.

3. Continue to solicit and reward employee innovations.

Recognizing that front-line employees are in the best position to develop innovative energy-saving solutions, the City's Energy Policy establishes "an energy-savings program to encourage efficiency in City government." This program should be periodically re-emphasized and "re-publicized," to encourage employee participation.

Example: In 2000, City Mechanical Journeyman Joe Farney received a \$10,000 reward from the City's \$FYI: Cash for Your Ideas program, for designing a way to use the existing valve system to control steam and chilled water as it came to public buildings from the Trigen plant. Farney was able to lower the amount of steam and chilled water the city purchases from Trigen, which supervisors estimated would save the Civic Center complex \$100,000 to \$150,000 per year in utility costs.

4. Continually educate and remind employees about energy conservation and efficiency measures in the workplace.

We are all becoming more aware of energy usage and conservation in the home, but it is sometimes easy to forget to apply simple energy conservation measures in the workplace. It is important that we continually emphasize the importance of energy efficiency to maintaining department budgets, and that we continually educate ourselves about best practices and common sense approaches to saving energy.

Example: The Public Works Department has established a goal to "educate and follow-up on a continuous basis changes in workplace habits such as opening and closing of windows and doors during heating and cooling seasons, turning off office equipment and vehicles when not in use, shutting off lights when leaving a room for a prolonged period of time, etc."

5. Manage working and driving habits to maximize efficiency.

Other cities have developed creative ways to shift work schedules and other habits to minimize duplication of effort or to consolidate tasks – thereby saving energy. Additionally, there are relatively simple actions, such as observing posted speed limits, which can save energy costs.

Examples: The Tulsa Fire Department has changed its supply delivery schedule from a weekly delivery of supplies and fuel to every-other-week.

With the exception of K-9 Units, the Police Department prohibits leaving unoccupied vehicles idling.

6. Invest in efficiency – “performance-based contracts.”

To paraphrase an old adage – it takes money to save money. As new facilities are built, or when payout schedules make it feasible to retrofit existing facilities, we should invest in the most energy efficient options available.

One way to make effective and self-supporting investments in energy efficiency is to engage in “performance-based contracts.” Performance-based contracts are tools for procuring, funding, and implementing infrastructure improvements today that are self-funded over time through guaranteed operational savings and/or increased revenues.

The Task Force recommends that we use conventional funding (such as sales tax) and/or savings in energy costs (where legally possible) to fund guaranteed-savings performance-based contracts. It is recommended that such an investment be included in the 2006 Third Penny Sales Tax extension. This investment of capital funds will result in operational savings in the General Fund.

Example: The Tulsa International Airport has made substantial infrastructure improvements through performance-based contracts, resulting in operational savings (estimated at \$440,000 annually) sufficient to pay for the improvements.

The Task Force also discussed the idea of maintaining an energy efficiency revolving fund, which might be replenished by operational savings based on a pre-determined formula.

7. Maintain close working relationships with energy providers and regulators, to develop beneficial rate structures.

The City of Tulsa is a major purchaser of electricity, natural gas, and motor fuel. As such, the City has a unique ability to negotiate beneficial rate structures and other arrangements with energy providers, such as Public Service Company of Oklahoma (PSO) and Oklahoma Natural Gas (ONG). We should maintain close relationships with energy providers and regulators, to

take full advantage of arrangements such as fixed-pricing, third-party purchasing, and meter consolidation.

Example: By communicating with ONG representatives, the Public Works Department has fixed natural gas rates for 24 City accounts at \$8.393 per dekatherm for the next twelve months, in contrast to the current market price, which is hovering around \$13.00 per dekatherm. The Department has also entered into third-party gas purchasing arrangements for at least 14 additional City accounts.

8. Manage facilities and equipment to minimize peak energy usage.

Energy is generally more expensive during periods of peak usage. Therefore, it is to the City's benefit to minimize peak energy consumption.

Example: The Public Works Department monitors both peak and base loads. The cost savings to "shave" peaks over short time intervals can result in large savings. The Department schedules "filter backwashing," for example, to negate the use of wash water and recovered water pumps during peak demand hours from 2:00 p.m. to 9:00 p.m.

9. Continually replace inefficient equipment and vehicles with more efficient alternatives.

The latest equipment is almost always more energy efficient than older technologies. As new facilities are built, as older equipment is replaced, or when payout schedules make it feasible to retrofit existing facilities, we should invest in the most energy efficient options available.

Examples: The Tulsa Police Department is utilizing smaller vehicles for both Patrol and Detective Divisions. The Public Works Department also replaces vehicles, especially large trucks, with more energy efficient models. The Equipment Management Department continually evaluates alternative fuels and vehicles (CNG, Ethanol, Methanol, Electric, Hydrogen, Hybrid, etc.).

The Public Works Department replaces pumps when they complete their useful life with more energy efficient pumps with variable speed or slow start pumps. The Department has also begun using chemicals to contain odors at the Cherry Creek Flow Equalization Basins, which have proven to be more cost effective than aeration.

Other equipment and facility efficiencies include LED traffic lights, building insulation and window tinting, compact fluorescent lighting, and programmable thermostats.

10. Maintain equipment and vehicles for maximum efficiency.

In addition to investing in newer, more efficient equipment and vehicles, it is to our advantage to make the most efficient use of what we have. We should maintain equipment for maximum efficiency, while maintaining necessary performance.

Example: The Equipment Management Department has evaluated and discontinued use of 89 octane fuel for City vehicles. The Department has also extended the oil change intervals to correspond with current vehicle manufacturer specifications. This action is projected to reduce engine oil use by 10% and reduce fuel costs \$60,000 per year.

IV. APPENDIX

- Department Energy Conservation Measures