Measure: Enhanced Energy Efficiency of the City of Tucson Vehicle Fleet (T3)

The City would develop a policy for continuous improvement toward maximum fuel efficiency in its fleet, with net carbon neutral operations as an ultimate goal. It would begin with a commitment that as each vehicle in the current City fleet reaches replacement age it be replaced by a vehicle achieving, at a minimum, the fuel efficiency of new US fleet CAFÉ standards for the year of purchase, estimated to be 30% efficiency savings per vehicle.

COT Summary:

Emission reduction potential in 2020:	1,051 tCO_2e
Percentage of goal (2020):	0.05%
Total annual average implementation costs:	$0
Entity that bears the costs of implementation:	NA
Cost/Savings per tCO_2e in 2020:	$820
Net annual savings in 2020:	$575,000
Entity that realizes the financial return:	City of Tucson; community
Equitability (progressive/regressive, income/revenue neutral, etc):	Neutral
Potential unintended consequences:	None

Background information:

The City of Tucson fleet is comprised of approximately 2,450 vehicles.[1] These vehicles are used for various city departments such as law enforcement, waste management, street service/maintenance, and a city motor pool (69 vehicles) used by several departments. Greenhouse gas emissions (GHGs) attributable to the City's fleet accounted for just over 8% of the emissions from City government operations in 2008.

City facilities dispensed 1,414,885 gallons of gasoline in 2010, down from 1,500,000 gallons of gasoline in 2005. The city also dispensed 1,251,788 gallons of diesel, including biodiesel, in 2010 vs. 1,200,000 gallons of diesel in 2005.

The Fleet Services Division has historically purchased approximately 225 new vehicles each year, auctioning off replaced vehicles. Although new fleet vehicle purchases have been greatly reduced due to recent budgetary constraints, they have not completely halted. Fleet acquisitions for FY09 were 181 vehicles, and 61 for FY10.

The City's Fleet Services Division had already begun reducing GHGs by using alternative fuels. As of 2008, 220 Flex Fuel (E85 = 0.72 GGE/gal E85) vehicles, 460 Biodiesel (B20 = 1.126 GGE/gal B20) vehicles, and 79 Compressed Natural Gas (CNG = 0.18 GGE/gal CNG, 0.27 GGE/gal CNG, 0.225 GGE/gal CNG) vehicles were then in use.[2]

Business-as-Usual:

In the absence of an aggressive policy towards a more fuel-efficient fleet, the projected rising costs of gasoline and diesel fuels could act as a drag on the City's ability to provide essential services, or at the minimum a reduction in vehicle miles traveled.

The City reported in early 2011 that its Fleet Services Division has suspended the distribution of biodiesel for over the road use.[3] This was due to complications with fuel delivery and a loss of federal government incentives. Currently only red biodiesel, limited for off-road vehicles, is in use. When and if these complications are resolved it is Fleet Services' intention to again resume the use of green (on-road) biodiesel in diesel-powered fleet vehicles.

The City Fleet fuel usage and charges for FY10 are as follows:

- Unleaded: 1,401,846 gallons for $3,360,959
- Diesel: 108,296 gallons for $282,486
- Red Dye Diesel: 26,731 gallons for $64,916
- Biodiesel: 939,934 gallons for $2,491,679
- Red Dye Biodiesel: 176,827 gallons for $454,019
- Premium Unl: 13,039 gallons for $33,525
- E85: 24,888 gallons for $52,906

- E85 (from UofA): 4,709 gallons for 10,639
- LPG: 3,572 gallons for $7,807
- CNG: 6,266 eqv gallons for $7,460.

The City's Fleet Service Division reports that there are no immediate plans or timeframes to establish a carbon neutral fleet. However, the Division does support and encourage the use of alternative fuels whenever and wherever possible.

The Division reports that it is constantly reviewing ways to conserve energy and reduce the fleets' impact on the environment. Recent efforts include the addition of an on-site propane dispenser. This has reduced travel and time required to refuel the City's on-site propane powered vehicles and it will also allow for the expansion of propane vehicles within the City fleet.

Another such effort was the re-configuration of the City's refuse collection vehicles from ten-wheeled units to six-wheeled units. This change has increased the load carrying capacity of these vehicles and should result in a reduction in required trips to and from the landfill. Preliminary results are a notable reduction in fuel, brake and tire costs.

We project that under a business-as-usual scenario, City of Tucson fleet emissions will rise from approximately 24,000 tCO2e in 2010 to 26,500 tCO2e in 2020 (rising with population growth and corrected for efficiencies due to rising CAFE standards.)

Under this business-as-usual scenario, City fleet acquisitions will benefit from the rising CAFE standards but only to the extent that significant new acquisitions are made each year and fuel inefficient stock is retired. Moreover, the CAFE standards represents a fleet average for the manufacturer, with some vehicles having greater and some lesser mileage efficiency that the average.

Without a commitment to meet or exceed the average CAFE standard, the fleet could conceivably see replacement vehicles with little or possible even lower efficiency gains that a vehicle being replaced.

Description of Measure and Implementation Scenario:

The measure recommends adoption of a policy that directs each general use replacement vehicle to the City's fleet to meet or exceed the minimum US-EPA City fuel rating (CAFE standard) for the year of purchase. Currently the CAFE standard is 27.5 miles per gallon (MPG). In 2016 the CAFE standard rises to 35 MPG and reaches 43 MPG by 2020.

The recent slowdown in fleet additions will at some point need to accelerate unless there is a contraction in the use of City vehicles for the delivery of City services. We project an opportunity through the remainder of the decade to replace, on average 150

vehicles per year. If these vehicles achieve an average of 8 miles more per gallon than the vehicles they replaced we should expect to see fuel efficiencies for these new vehicles increase by 23% in 2016 and 37% by 2020 – assuming that each new vehicle replace one rated at the 2012 standard of 27.5 mpg.

Has the Measure been implemented elsewhere and with what results?

Measures to reduce GHGs through use of alternative fuels have been implemented in many U.S. cities.[4] **New Orleans** has a city fleet comprised completely of alternative fuel vehicles (Flex-fuel). **Las Vegas** has 90% of the city fleet using alternative and renewable fuels.

Austin TX has implemented a Climate Action Plan calling for a Carbon Neutral City Fleet by 2020.[5] Austin's has a fleet of 4,400 vehicles, over half of which have been replaced with alternative fuel vehicles as of 2008.[6]

The **Government of American Samoa**, a U.S. Territory, has adopted a policy wherein every government vehicle purchase request shall first be for a hybrid vehicle in the specification for bid.[7] If a hybrid vehicle is not available, the vehicle must meet US-EPA class size specifications and meet or exceed all of the following:

1) Combine the benefits of gasoline engines and electric motors through the use of one of the following methods/technologies: regenerative braking, electric motor drive/assist, and/or automatic start/shut off;

2) Have a minimum USEPA City fuel rating of 35 mpg (EPA's 2016 CAFE standard); and

3) Have a maximum U.S. Department of Energy "Greenhouse gases, Regulated Emissions, and Energy use in Transportation Model" (GREET) annual greenhouse gas emissions of 5 tons. The policy is intended to serve as a market pull for getting higher efficiency vehicles imported to the Territory.

Energy/Emission analysis:

Westmoreland Associates has assumed that City fleet management policies combined with rising fuel efficiency of comparable models could create an average of 30% efficiency gains for 1,350 vehicles between 2012 and 2020, based on an annual replacement of 150 vehicles/yr.

We have also assumed that
(1) These general use fleet vehicles are driven 10,000 miles per year;
(2) Vehicles have a ten-year life;

(3) The savings in the year of purchase are equivalent to one-half of one year; and
(4) All vehicles are operated on gasoline and in 2011 achieved an average of 25 MPG.

Climate Change Impact Summary in tCO_2e

COT 1990 Citywide GHG emissions (baseline):	5,461,020 tCO_2e
MCPA 7% reduction target for COT:	5,078,749
2012 BAU GHG emissions projection:	7,000,000
2020 BAU GHG emissions projection:	7,343,141
GHG emissions reduction to meet 7% goal (2012):	1,921,251
GHG emissions reduction to meet 7% goal (2020):	2,264,392
Contribution of this Measure:	1,051

Economic analysis:

Measure Costs

This economic analysis assumes that more efficient vehicles are not more costly than less efficient vehicles. The experience of the past decade is one of continued improvement of MPG in general use vehicles without expensive technologies such as hybridization. More efficient vehicles are frequently less expensive than standard vehicles, such as subcompact designs.

Measure Savings

The analysis is based on the gasoline prices projected for Tucson 2012-2030 by Westmoreland, based on prices being 5% below US projections of the Electrification Coalition to 2020, then rising 2.4% per year as predicted for consumer energy prices by the US EIA.

Gasoline costs saved by the City fleet budget are projected at $574,775 in the year 2020. From 2012 to 2020, savings total ~$2.84 million. Over the lifetime of the vehicles, fuel savings are projected at $6.66 million.

In 2020, the savings per tCO_2e is ~$820.

Net Impact

The economic impact of energy saved in the City of Tucson is projected to have a multiplier effect of 1.5 on the Tucson economy because energy, especially gasoline, has a small multiplier effect because of very little value added in the City.

The multiplier effect in 2020 is projected to be ~$862,000. The accumulated impact from 2012-2020 is projected to be ~$4.26 million. Over the 10-year lifetime of the vehicles, the economic impact is projected to be ~$10 million.

Co-benefits:

Over the lifetime of an increasingly energy-efficient fleet, the City will be taking a leadership role within the community in the transition to next generation transportation technology. Long-term fuel cost savings will help ease City operational expenses and allow funds to be directed to other pressing community needs.

Equitability:

Improving the fuel efficiency of the City vehicle fleet will have economic benefit to all taxpayers who now support the costs of City government operations.

Potential unintended consequences:

There appears no downside to the investment by the City in increasingly fuel-efficient vehicles at a time of tight current and future budgets and rising fuel prices.

Endnotes

[1] City of Tucson Fleet Services Division. http://ci.tucson.az.us/generalservices/fleet/index.html.

[2] City of Tucson - The Office of Conservation and Sustainable Development, 2008 - 2009 Sustainability Report, page 12. http://www.tucsonaz.gov/ocsd/docs/CMS1_035184.pdf.

[3] Communication with Tony Leon, Fleet Equipment Specialist, City of Tucson. January 2011.

[4] Sustain Lane, *Top 10 Alternative Fueled City Fleets*. http://www.sustainlane.com/reviews/top-ten-alternative-fueled-city-fleets//SD9V13Y7UBPSJ4IC7MYJ4F92WQ9H.

[5] Austin Climate Action Program - Municipal. http://ci.austin.tx.us/acpp/municipal_plan.htm.

[6] Austin Climate Protection Plan, 2008 update. http://www.ci.austin.tx.us/acpp/downloads/acpp_update_08apr.pdf.

[7] American Samoa Government. http://americansamoa.gov/News09/pr0903211.htm.