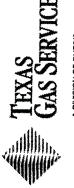


## TGS Conservation Program Quarterly Report

July 20, 2010

Teri Green, Conservation Program Manager



A DIVISION OF ONEOK

## Residential Programs

\$110,000 \$350,000 Budget Spent to Date \$481,960 \$2,730 # of Participants 2,983 Weatherization/Attic/Duct Sealing As of June 30, 2010 Free Heater/Weatherization\* Program

\$150,000 \$ 40,000 \$145,000 \$105,000 \$ 10,000 \$ 60,000 \$125,090 \$56,700 \$87,080 \$9,000 \$8,376 2,510 756 318 349 Water Heater/Tankless Natural Gas Vehicle Furnace Incentive **Hydronic Heating\* Green Saver Tariff** WashWise

\*10 free heater and 5 stove applications are pending installation. \$18,000 hydronic heating application pending payment.



### Commercial Programs

\$32,150 \$4,100	
44	Misc. Gas Equipment*
	Commercial WashWise

\*Several applications for high-efficiency water heating equipment totaling \$9,103 are pending approval and payment.



# Energy/Carbon Savings Report

PROGRAM	PARTICIPANTS	BUDGET	ACTUALS	VARIANCE	FY 2010 BUDGET	MOF	KWH	MCF Carbon Emissions	MCF Carbon Emissions KWH Carbon Emissions	Reduction of Carbon Emissions
ree Heater and Weatherkation	0	\$110,000	\$2,730	(\$109.610)			8			
umace Incentive	756	\$40,000	\$56,700	(\$8,275)		99	trac out	0	0	0
(esidentia) Weatherization		\$350,000		(\$78,843)		700	150/65	FC)/6/	287,5511	157,797
Duct Sealing	11,825		\$ 280,607	10		7.838	U92 538	0	0	0
Attic Insulation	1,158		5 201.353		7	SUE S	475.083	777774	1013/473	677,201
Vatural Gas Water Heater		\$150,000		(\$107,800)		A 7414	9 000	reb'ner	/TD/gde	375,985
High-efficiency	25		\$1.280	0.0		0.5	out of	0	0	o
Tankless	286		\$85,800			347	104 748	50613	13,980	9,277
seridential Hydronic Hearing.	0	\$145,000	920	(5145,000)			120 120 170			11670
VashWise	2,510	\$105,000	\$125,900	(\$47,900)		6	0	0	9	
datural Gas Vehicle Program:						5757	1/c'a/c	250,065	687,041	456,378
Rasidential	r	\$10,000	\$9,000	(ca con		THE S		0	0	0
Commercial	٥	530,000	0\$	(\$30.000)		7		0	0 3	o (
Commercial Equipment and Weatherization	0,	\$42,130	\$30	(\$42,150)				, c		
TOTAL INCENTIVE EXPENSES	6269	\$382,150	6759 370	16620.6281			ii R			0







### Highlights

Most programs are on track.

--Working closely with Austin Energy on the Free Gas Equipment Program

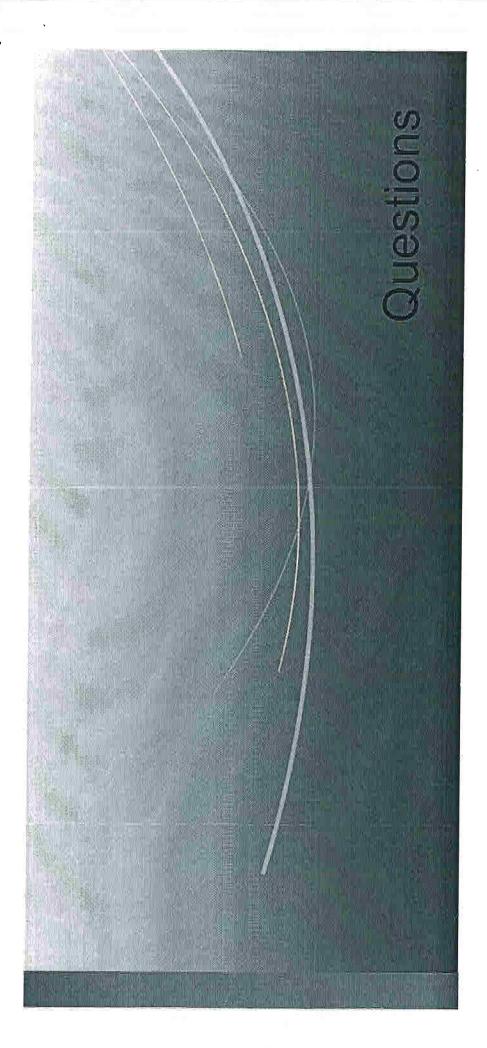
-- New rebates being considered for next fiscal year

--Gas Dryer w/ Moisture Sensor (\$75)

--Residential Solar Water Heater w/ Gas Back-up (\$750)

--Customer Commercial Solar Water Heater w/ Gas Back-up





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RUDGET VS ACTUALS.	٠
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PROGRAM	PARTICIPANTS	BUDGET	ACTUALS	VARIANCE	FY 2010 BUDGET	MCF	КМН	MCF Carbon Emissions	KWH Carbon Emissions	Reduction of Carbon Emissions
Free Heater and Weatherization	0	\$110,000	\$2,730	(\$109,610)				.0	0	0
Furnace Incentive	756	\$40,000	\$56,700	(\$8,275)		661 1	199,357	79,754	237,551	157,797
Residential Weatherization \$350,000		\$350,000	000	(\$78,843)	(578,843)			0	0	0
Duct Sealing	1,825					2,838 8	855,560	342,272	1,019,473	677,201
Attic Insulation	1,158		\$ 201,353			1,576 4	475,012	190,031	210/995	375,986
Natural Gas Water Heater		\$150,000		(\$107,800)			/ MIRES	0	0	0
High-efficiency	32	A Company of the Company				39. 1	11,720	4,689	13,965	9,277
Tankless	286					347 10	104,748	41,905	124,816	82,910
Residential Hydronic Heating	0	\$145,000	\$0	(\$145,000)		0	0	0	O	0
WashWise	2,510	\$105,000	\$125,900	(\$47,900)		1,913 57	576,577	230,663	687,041	456,378
Natural Gas Vehicle Program		200 Sept.	The state of the s			35503		0	0	Q
Residential	2	\$10,000	\$9,000	(\$1,000)				, 0	0	0
Commercial	0	\$30,000	\$0	(\$30,000)				0	Ö	0
Commercial Equipment and Weatherization	0	\$42,150	0\$	(\$42,150)			(meneral)	0.	0.0	0
TOTAL INCENTIVE EXPENSES	6269	\$982,150	\$763,370	(\$570,578)				0	0.	0



Kapa da da da da		1,759,550	
Estimated	ANNUALCarbon	Reduction (lbs CO2)	

1,601,754

Carbon Reduction-Oct-Jun (lbs CO2) Frontier Associates LCC was contracted by Texas Gas Services to develop the annual report using TGS monthly reports and TGS's completed energy applications forms. MCF, KWH, and carbon emissions were calculated using the following methodology, formulas and assumptions.

### **Furnance, Attic Insulation, and Infiltration Savings**

A sample size of 345 applications was used to determine the average resident size and furnace capacity from a population of 941 applications and thus provide a cost effective estimate of each measure. The data extracted from the applications was used to derive the following averages:

Average Size of Residence: 1550 square feet Average Furnace Capacity: 75.5 KBtu/hr

Furnace AFUE: 78%

Savings attributed to improved furnace efficiency and weatherization measures were derived using EnergyGauge simulation software and a baseline 1550 square foot single floor residence. 8760 hour data was evaluated using TYM3 data for the Austin, Texas weather zone.

The following baseline and change case data was used to arrive at the savings:

	Baseline	Change case	Remarks
Furnace AFUE	69%	78%	Based on removed AFUE
Attic Insulation	R19	R38	Average Delta = R20
Infiltration	0.415 ACH	0.249 ACH	16 therm savings/house

### **Tankless Water Heating Savings**

In a similar approach, a sample size 83 applications was used to determine the average tankless water heater capacity. The data extracted from the applications was used to derive the following:

Average Input Capacity: 199,000 btu/hr

Average Flow rate: 6 gpm @ 35 psi operating pressure

EF: .82

Replaced Water Heater Efficiency: 0.5 (plus 7 year old water heater)

DOE, WHAM program was used to determine water heater savings. 0.5 EF used was for the removed water heater and 0.86 was used to provide a conservative estimate of the energy saved.

### **Hydronic Savings**

A hydronic systems consists of a fan coil unit (fan, hot water coil and cabinet) and a tankless water heater including a pump and accessories. The hydronic unit replaces the conventional gas furnace or electric heater. The efficiency of the hydronic system is assumed equal to the efficiency of the tankless water heater.

Savings attributed to the hydronic system were derived using EnergyGauge simulation software and a baseline 1550 square foot single floor residence. 8760 hour data was evaluated using TYM3 data for the Austin, Texas weather zone.

The following baseline and change case data was used to arrive at the savings:

	Baseline	Change case	Remarks
Furnace AFUE	69%	86%	Hydronic Efficiency = tankless efficiency
Water EF	0.50	0.86	Tankless water heater EF

### **Washer Savings**

The savings attributed to washing machines was derived from TGS change out of 3045 washers with Energy Star Rated Washers. The average Energy Star rated washer uses 17 gallons less water than a non rated washer per the following link:

(http://www.energystar.gov/index.cfm?c=clotheswash.clothes washers save money)

The energy consumption for the Energy Star rated washer was estimated using the following link: (<a href="http://www.energystar.gov/index.cfm?c=clotheswash.pr">http://www.energystar.gov/index.cfm?c=clotheswash.pr</a> clothes washers) and the Energy Star residential calculator: CalculatorConsumerClotheswasherBulk.xls

The value for therms saving was derived using a gas water heater. The KWH column was derived using both an electric water heater

### **Vehicle Carbon Emissions**

Car emissions are calculated by dividing the miles driven by the fuel efficiency of the vehicle. This number is then multiplied by the  $CO_2$  emissions coefficient, 19.36 lbs  $CO_2$ /gallon <sup>1</sup> of gasoline, and then divide by 2204.6 lbs/metric ton to obtain tonnes of  $CO_2$  emitted . To convert vehicle emissions:

Miles driven x 19.36 lbs 
$$CO_2$$
 ÷ 2204.6 =  $CO_2$  Emissions (tons)  
Fuel efficiency gallon

### **Natural Gas Carbon Emissions**

120.593 pounds CO₂ per mcf was used as per Energy Information Agency's Voluntary Reporting of Greenhouse Gases Program: Fuel and Energy Source Codes and Emission Coefficients (<a href="http://www.eia.doe.gov/oiaf/1605/coefficients.html">http://www.eia.doe.gov/oiaf/1605/coefficients.html</a>)

### **Electricity Carbon Emissions**

1.11886 pounds of CO<sub>2</sub> per kWh was used as provided by EPA in "Total, Non-baseload, eGRID Subregion, State? = Guidance on the Use of eGRID Emission Rates." See page 7, eGRID subregion name 'ERCOT All' for non-baseload (<a href="http://www.epa.gov/ttn/chief/conference/ei18/session5/rothschild.pdf">http://www.epa.gov/ttn/chief/conference/ei18/session5/rothschild.pdf</a>). Non-baseload values were used to reflect the fuel mix that will be reduced when load is reduced as per suggestion in this document. An average overall transmission and distribution loss of 6.5% was used, as per 'Integrated Assessment of Using Photovoltaic Technology in the United States Electricity Sector' by Deepak Sivaraman, page 67 (<a href="http://deepblue.lib.umich.edu/bitstream/2027.42/64604/1/lcalca">http://deepblue.lib.umich.edu/bitstream/2027.42/64604/1/lcalca</a> 2.pdf).