



Partnering to Improve Home Energy Efficiency in North Central Texas

presented by

Texas Home Energy Rating Organization

Maci McDaniel, Tom Fitzpatrick

&

ICF International

Michael Flatt

Agenda

- ❑ Introduction
 - ❑ Who is Texas HERO?
 - ❑ Why Energy Efficiency?
 - ❑ Why outreach to existing homes?
 - ❑ How can cities work with Texas HERO?
- ❑ What is the Oncor Residential Energy Audit Program?
- ❑ What Other Market Transformation Programs does Oncor offer?
 - ❑ Home Performance with ENERGY STAR
 - ❑ Solar Water Heating
- ❑ Q&A: How can we work together?

Texas HERO

- ❑ **Texas Home Energy Rating Organization (Texas HERO)** is a non-profit, membership organization that exists to;
 - ❑ Educate the public and home energy rating profession
 - ❑ Provide a forum for cooperation on best practices, ethical standards and policy goals
 - ❑ Promote the benefits of energy conservation initiatives and incentives
 - ❑ Assist the State of Texas in its implementation plan to achieve clean air goals and reduce carbon emissions
- ❑ **Texas HERO** implements Oncor's Residential Energy Audit Program as an independent contractor

Texas HERO Initiatives

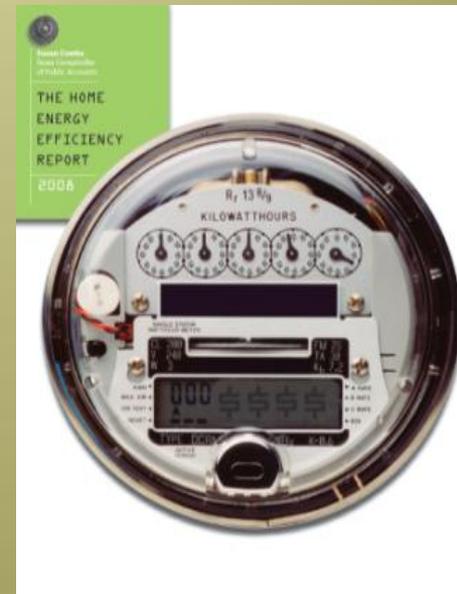
- ❑ **Texas HERO** has worked with cities on energy code and Green building code implementation issues for new construction
 - ❑ **ENERGY STAR**
 - ❑ **2009 IECC Implementation**
 - ❑ **HERS Based Performance Programs (TVLB)**
- ❑ **Texas HERO** developed audit program as leverage to reach existing homes
- ❑ **Texas HERO** wants to help local governments engage their citizens in energy efficiency
- ❑ **Texas HERO** has worked with Cities to develop and implement ARRA funded Programs
- ❑ **Texas HERO** Develops and Provides Training for Code and Above Code Programs
 - ❑ 2009 Performance Verification Technician (PVT)

Why Energy Efficiency?

- ❑ Lowers cost of consumer monthly electricity bills
- ❑ Efficient homes improve local tax base
- ❑ Retrofits use local work force, improving local tax base
- ❑ Lowers electricity consumption and peak demand
- ❑ Reduces the need for new power plants and power lines
- ❑ Allows renewable resources to meet larger proportion of energy needs (on site AND at utility scale)
- ❑ Decreases air pollution and GHG additions

Comptroller Recommends Home Energy Ratings to Increase Energy Efficiency

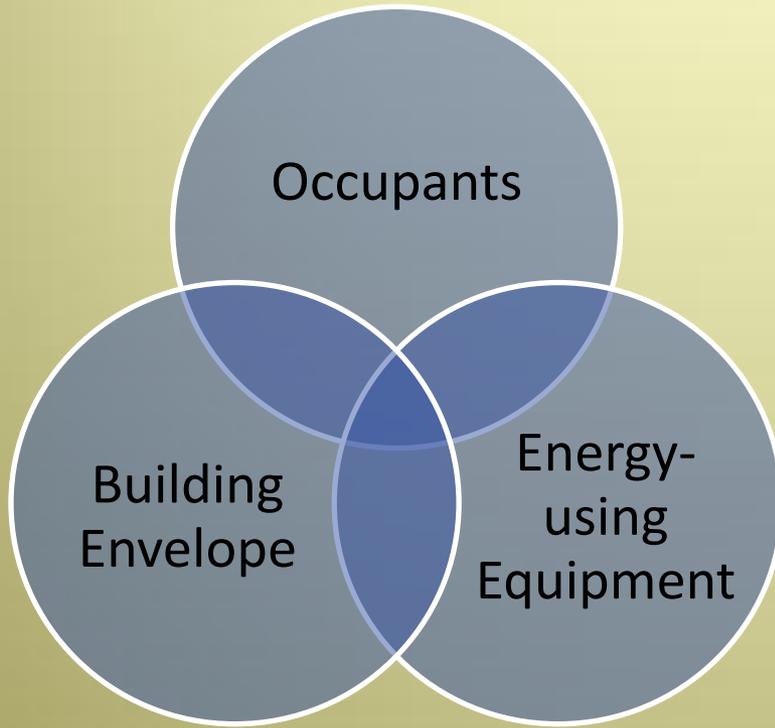
- (AUSTIN) — If every SF home in Texas increased efficiency by 20 percent, 7 yr. energy savings > \$13.7 billion
- Oct. '08 report by Texas Comptroller says savings are possible if consumers are armed with credible, EE info when buying a home or considering home energy upgrades.
- report advocates consumer education and voluntary energy ratings.



Texas Home Energy Audit Program

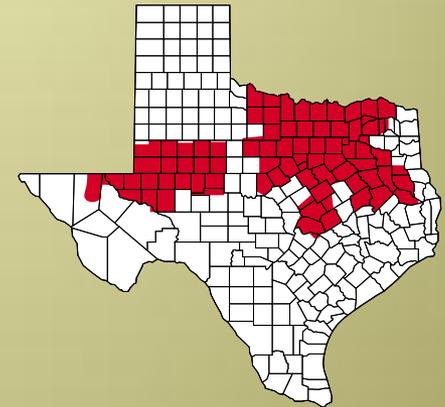
- ❑ **Texas HERO** determined a need for improving **reliability** of information provided to homeowners in “energy audits” that have varied widely in purpose, quality and comprehensiveness.
- ❑ **Texas HERO** worked with RESNET toward National Standards, and developed specific guidance for Texas audits of existing homes.
- ❑ **Texas HERO** implements a program of incentives for **comprehensive home energy audits** in the service area of Oncor Electric Delivery, LLC.
- ❑ **Texas Home Energy Audit Program** helps to bridge the gap between Audits and Improvements

Why “comprehensive”?



- A systems view of energy use
- A clear understanding of savings opportunities to maximize efficiency actions
 - Low cost/no cost behavioral and operational changes
 - Cost-effectiveness of investments
 - Sequence of improvements
 - Resources for follow-up
- A goal of improved efficiency, comfort, durability
- Characterize & capture as much savings as possible from contact

Oncor's Take A Load Off, Texas[®] Campaign



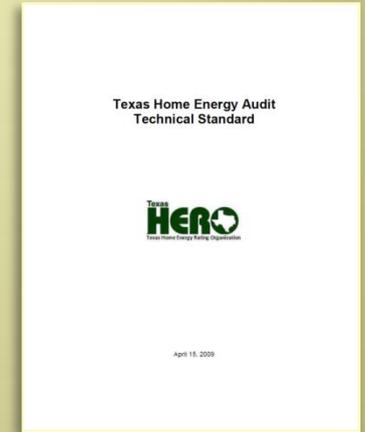
Oncor has made a \$100MM commitment over five years to fund an additional fleet of programs under the Take A Load Off, Texas campaign. These programs will be operated in all areas of Oncor's service area and will impact the residential, governmental, commercial and industrial sectors.

Oncor Energy Efficiency Commitment Programs

- **Residential Energy Audit**
- Home Performance with ENERGY STAR®
- Solar Water Heating
- Solar PV
- LED Lighting
- Targeted Industrial
- Non-Residential Audit
- City Improvement Grants
- Independent School District Grants
- Student Education
- Worship Facility Grants
- Not-for-Profit Facility Grants

Program Overview

- ❑ Standardized Audit
- ❑ Trains and certifies HERS Raters as comprehensive Home Energy Auditors
- ❑ Active, proactive Quality Assurance to ensure reliable information



Opportunity to Partner

- ❑ Educate citizens about energy efficiency opportunities
- ❑ Utilize comprehensive, whole house audits to focus efficiency improvements
- ❑ Record voluntary participation in emissions reduction strategy
- ❑ Help direct homeowners to incentives and other resources for getting retrofits completed
- ❑ Assure effective use of EECBG funds

Sample Framework

- Determine role/limits of local government role/resource commitment
- Determine level of assistance desired
 - Program Design
 - Administration
 - Use of Incentives
 - Quality Assurance/Program Verification
- Determine role of certified Auditors
 - Single Point of Contact (Project Management Model)
 - Third Party Verification

Simple Rules

- Promotion (Piggyback with Program marketing)
- Application (if local funds involved)
- Establish Scope with Comprehensive Audit
- Approval (if local funds involved)
- Resident Completes Improvements
- Verification/QA

Example: Plano (EECBG grant)

- On-line Sign-up
- Notification with List of Approved Providers
- Comprehensive Audit (Test-In Index); Obtain Quotes
- Approval (DOE Priority list)
- Work Performed (& Test-Out Index)
- Homeowner Acceptance/Payment/Assignment of Grant (for City Release of Funds)
- Quality Assurance: Document Approved Measures, No Double-Dipping, Complaint Resolution

Part 2

Oncor's Residential Energy Audit Program

Part 3

Oncor's Other Residential Market Transformation Programs

Part 4

CONCLUSION/Q&A

Take Away Messages

- ❑ Take advantage of audits to help educate citizens and leverage action
- ❑ Partner up to maximize benefits and available resources for citizens
- ❑ Lead the way – market transformation programs are a natural fit with local initiatives

Questions?

Thank You!

- **Texas Home Energy Rating Organization**
www.txhero.org
- Maci McDaniel, Project Director, maci@txhero.org
- Meghan McCoy, Program Manager, mmccoy@txhero.org
- Audit Program info: www.txsmartstart.org
- Information on all of Oncor's Commitment Programs
- www.takealoadoftexas.com



Residential Energy Audit Program

Presented by
Texas Home Energy Rating Organization
Maci McDaniel

Take A Load Off, Texas[®] is provided by Oncor Electric Delivery, LLC as part of the company's commitment to reduce energy consumption and demand. Texas HERO implements the Residential Energy Audit Program as an independent contractor. For more information, visit www.takealoadofftexas.com

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Texas Home Energy Audit

Program Overview

What is the Texas Home Energy Audit Program?

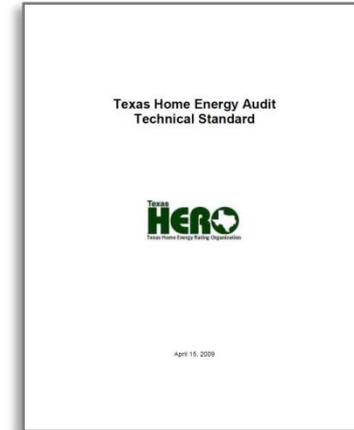
- A Statewide Initiative based on Texas HERO's Texas Home Energy Audit Technical Standard
- Supports Comprehensive Home Energy Audits and advice for residential customers in existing homes
- Recognized in 2009 by RESNET® as a Comprehensive Home Energy Audit/Home Performance Program to certify Auditors
- Recognized in 2010 by RESNET with Industry Innovation Award
- Assures quality of service delivered by Home Energy Auditors
 - Reliability
 - Consistency
 - Value to Homeowner



Texas Home Energy Audit

Standard Procedures

- Initial Interview
- Visual Inspection
- Performance Testing
- Combustion Safety
- Energy Simulation and Analysis
- Reliable report of improvement measures and repairs to improve energy efficiency, comfort, durability, and indoor air quality
- Consult with homeowner to identify priorities for making improvements and taking advantage of energy savings





Interview



- How old is the home and how long have you lived here?
- Do you have any problems or complaints?
- Which rooms do you use most and longest?
- How do you use lighting and ventilation appliances?
- Have you made recent repairs or improvements?
- How old are various equipment and appliances?
- Where are the air conditioner, furnace and water heater?
- Did anyone ever show you how to use your programmable thermostat?



Visual Assessment

- Graphic Record
- Exterior
- Foundations
- Conditioned Floors over Unconditioned Spaces
- Exterior Walls
- Interior Moisture
- Windows
- Doors



- Skylights
- Ceilings
- Attics
- Roofs
- HVAC Systems & Ductwork
- Domestic Water Use
- Lighting
- Appliances
- Garages





Diagnostic Assessment

Gas Leakage Testing

Envelope Infiltration

Duct Leakage

Airflow Testing

Zonal Pressure Testing

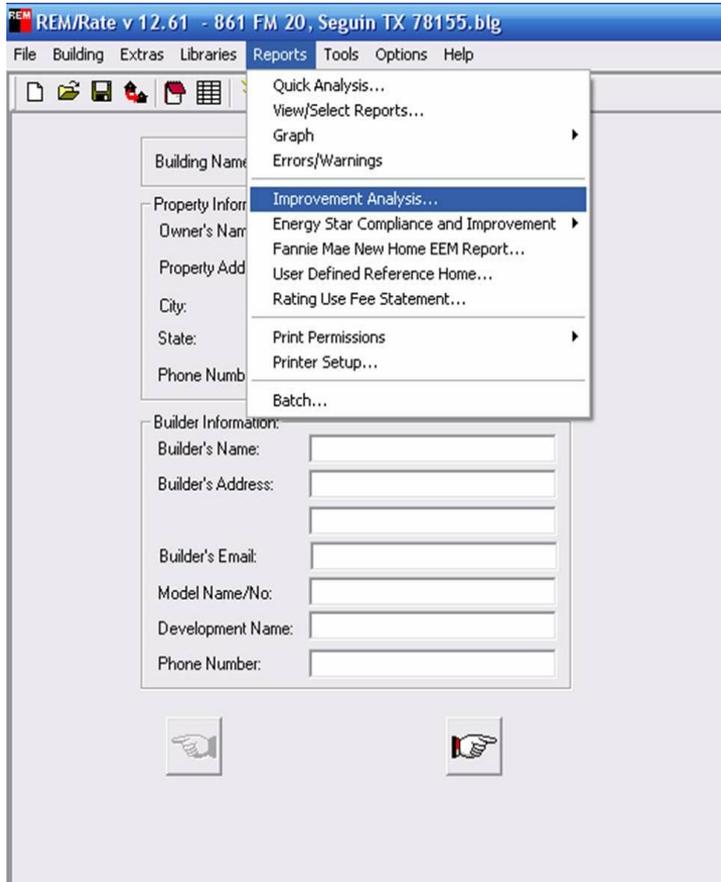
Carbon Monoxide Testing

Worst Case Depressurization Testing

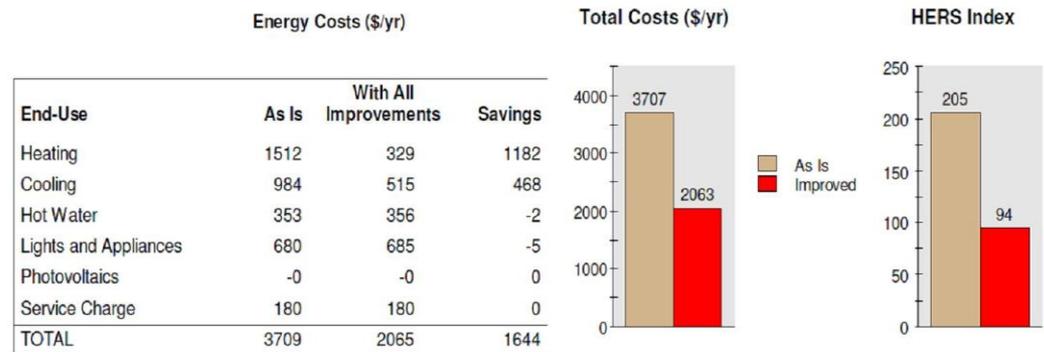




Analysis

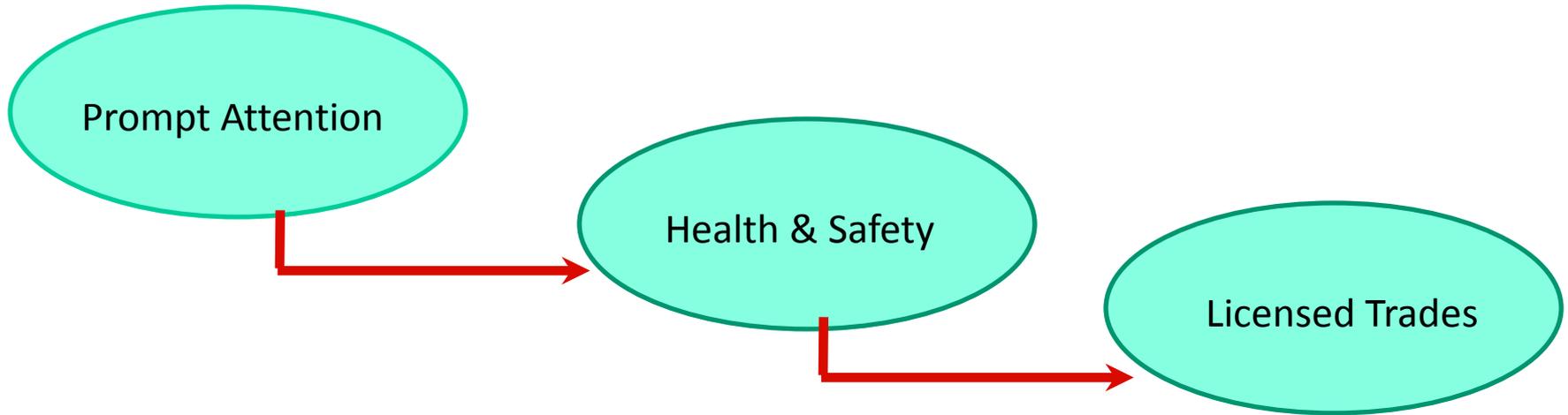


- Improvement Measures
- Energy Savings
- Cost Effectiveness
- Interaction with Other Measures
- Standard Report Includes Index





Contractor Scopes of Work



In addition to a clear description of efficiency measures, the scopes of work will identify:

- Repairs needed
- Codes and standards with which work must comply
- Identification of skilled or licensed trades required for portions of the work



At Completion of Audit

- Improvement Analysis
- Prioritized List of Recommendations
- Detailed Scopes of Work
- Guidance to Resources to Facilitate Follow-Through
 - Contractor Networks
 - Local Programs
 - Utility Incentives
 - Tax Incentives



Texas Home Energy Audit

Program Overview

Certification Requirements for Texas HERO Home Energy Auditors:

1. Certified by a RESNET[®] accredited Home Energy Rating System (HERS[®]) Provider
2. Certified by Texas HERO to conduct home energy audits that meet the Texas Home Energy Audit Technical Standard



Texas Home Energy Audit

Program Guidelines

Report results of Texas Home Energy Audit to Texas HERO

- Auditors must report results to Texas HERO for quality assurance purposes
- Submittals reviewed will include:
 - Completed Audit Report Form
 - Initial Condition software analysis building file (REM/Rate®, Energy Gauge USA®) using the Improvement Analysis or equivalent
 - A copy of the Improvement Analysis
 - A copy of Scopes of Work for Recommended Improvements
 - A copy of the Standard Disclosure Form signed by the Customer
 - Photographs



Texas Home Energy Audit

Program Guidelines

Post-Improvement Test Out

❑ A “Test Out” Audit must be reported to Texas HERO using the Test Out Audit Form if any of the following measures were completed based on recommendations in the initial audit:

- ❑ Air sealing improvements
- ❑ Duct system sealing
- ❑ HVAC equipment or duct system change-out
- ❑ Water heater change-out
- ❑ Repairs due to combustion safety or draft test failures
- ❑ Repairs due to appliances having high CO levels or gas leaks



Texas Home Energy Audit

Quality Assurance

- ❑ Texas HERO provides Quality Assurance on the Texas Home Energy Audits using accredited Quality Assurance Designees (QAD).
 - ❑ At least 50% of completed project building files are reviewed by a Texas HERO Quality Assurance Designee (QAD)
 - ❑ For new Auditors in Program, at least one in 10 audits is physically reviewed on-site by a Texas HERO QAD
- ❑ This is independent of (in addition to) the Quality Assurance program that may be implemented by the Auditor's RESNET® HERS® Provider.



Texas Home Energy Audit

Summary

- Energy efficiency potential in existing homes presents a wealth of environmental and consumer benefits
- A comprehensive approach is needed
- A comprehensive audit includes counseling homeowners toward a plan of action
- Certified Auditors and active QA provide a credible basis for action, assuring customers of
 - Reliability
 - Consistency
 - Value



Why Partner with Texas HERO?

- ❑ A Team with a Track Record working with Cities on ARRA funded Programs
- ❑ Established Network of Service Providers
- ❑ A Program that is Easily Implemented and Delivers Results
- ❑ The Texas Home Energy Audit is a Sustainable Energy Efficient Model



Part 3

Oncor's Other Residential Market Transformation Programs

www.takealoadofftexas.com





Oncor's Home Performance with ENERGY STAR Program

Take A Load Off, Texas® is provided by Oncor Electric Delivery, LLC as part of the company's commitment to reduce energy consumption and demand. ICF International implements the Home Performance with ENERGY STAR® Program as an independent contractor. For more information, visit www.takealoadofftexas.com

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Oncor HPwES

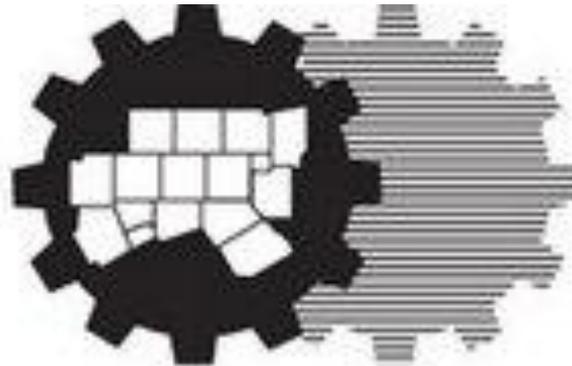
Home Performance with ENERGY STAR® provides a comprehensive, whole-house approach to making a home more comfortable, reducing its energy usage, improving indoor air quality, and creating a healthier & safer home.





NCTCOG RERI

Oncor HPwES is synchronous with NCTCOG Regional Energy Efficiency and Emission Reductions (RERI) Sustainability Initiatives



**North Central Texas
Council of Governments**



texasavesenergy.com

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 HOME PERFORMANCE WITH ENERGY STAR

Oncor's Home Performance with ENERGY STAR®

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High energy usage? Rooms too hot? Want to improve your home's efficiency?

If you answered yes to any questions, are within [Oncor's service area](#), and are served by an Oncor electric meter, you've come to the right place! Oncor's Home Performance with ENERGY STAR® Program is an effective way for you to significantly reduce your home's energy consumption while improving its comfort—even in hot Texas summers. By visiting this Web site, you've taken the first step toward making your home more energy efficient.



What is Home Performance with ENERGY STAR?

[Home Performance with ENERGY STAR](#) provides a **comprehensive, whole-house approach** to making your home more comfortable, reducing its energy use, improving indoor air quality, and creating a healthier home for your family.

Rather than focusing on a single problem, like an old heating or cooling system, not enough insulation, or leaky windows, Home Performance with ENERGY STAR looks at your house as a system and how improvements throughout your home can work together to give you the best results.

Typical improvement measures:

- High-Efficiency (SEER) Air Conditioners
- Duct System Efficiency and Air-Balance
- Attic Insulation
- Duct Sealing
- Sealing External Air Leaks
- Solar Window Shades
- ENERGY STAR Lighting and Appliances

Learn which ones are right for you!

www.takealoadofftexas.com





Tangible Homeowner Benefits

Customer Incentives:

Oncor's cash incentives are calculated and based upon specific eligible measures:

- Up to \$1,500 for **All Electric** Homes
- Up to \$1,000 for **Dual Fuel** Homes

OR

Customer Financing:

Electric & Gas Industries Association (EGIA) 7.99% unsecured revolving loan



Tangible Homeowner Benefits

Customer testimonials

“The improvements have been valuable toward our energy bill and we are happy with the results.” Homeowner in Killeen

“We are extremely pleased with the new electrical efficiency of our home. It has reduced our electric bills by more than half.” Homeowner in Tyler



Intangible Homeowner Benefits

Combustion Analysis

Numerous cases “discovering” carbon monoxide in homes

Numerous cases “discovering” natural gas leaks in homes





Intangible Homeowner Benefits

Other “discoveries”

Two 80 gallon DWH tanks over master bed

Wide open supply ducts to attic (after new ducts installed)

Raccoon in duct system

Totally non existent return system in crawl space



Oncor HPwES: 2010

2010 Results

- ~ 470 jobs performed
- ~ \$316K incentives paid
- ~ 600 KW load reduction
- ~ 15,500 tons of CO2 reduction

Currently 45 Program approved analysts

Any Oncor served homeowner eligible to participate
(~ 85% of NTX residents)



Oncor HPwES: 2011

2011 Goals

2011 Program will double in size

Expect jobs/incentives to quickly fill pipeline
beginning January 2011

Strengthen partnerships with NTX municipalities on
reaching 2011 sustainability goals



Questions?





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**Thank
you**



www.takealoadofftexas.com





Solar Water Heating Program

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Solar Water Heating System

What is a solar water heating (SWH) system and why should I install one?

A SWH system uses the sun's energy to supplement a home's hot water supply for dishwashing, laundry, showers, etc.

While a SWH system cannot replace an electric water heater, it will drastically reduce the electricity you purchase for your hot water needs:

- Typically by 40 to 85 percent in single family residential

- About 66 percent in small commercial and typically more for buildings with high daytime water heating loads, such as hotels, hospitals, laundries and dry cleaners; agricultural and industrial facilities; colleges and universities, and buildings with dining services.

The sun's energy is free, and can cut your electricity consumption in an environmentally friendly way.



Function of a Solar Water Heating System

1. Collect solar heat

Evacuated tube collector or flat plate collector (glazed or unglazed)

2. Store solar heat

Single tank or double tanks

3. Deliver hot water

Heat transfer fluid, pumps, piping, insulation, heat exchangers, expansion tanks

4. Control SWH system operation

Controllers, valves, gauges

5. Protect SWH system from freezing

Drainback systems, freeze switch, freeze prevention valves, antifreeze in heat transfer fluid



Solar Water Heating System

How does solar water heating work?

SWH systems typically include one or more solar panels, also known as collectors, mounted on a roof or similar surface, and one or two well-insulated storage tanks.

The solar collector(s) absorbs the sun's energy to preheat water before it is further heated by the electric water heater, thus cutting down on the amount of electricity needed to heat a home's water.

To install an effective solar water heating system, you will need sufficient roof area or other area on which to place the solar collector(s).

An ideal location to install a SWH system is an area on your roof with southern sun exposure and no shading from 9:00 a.m. to 3:00 p.m.



Operating Cost

Water Heater type	Efficiency (EF)	Installed Cost ¹	Yearly Energy Cost ²	Life (Years)	Total Cost (Over 13 Years) ³
Conventional gas storage	0.60	\$850	\$350	13	\$5,394
High-efficiency gas storage	0.65	\$1,025	\$323	13	\$5,220
Condensing gas storage	0.86	\$2,000	\$244	13	\$5,170
Conventional oil-fired storage	0.55	\$1,400	\$654	8	\$11,299
Minimum Efficiency electric storage	0.90	\$750	\$463	13	\$6,769
High-eff. electric storage	0.95	\$820	\$439	13	\$6,528
Demand gas (no pilot) ⁴	0.80	\$1,600	\$262	20	\$5,008
Electric heat pump water heater	2.20	\$1,660	\$190	13	\$4,125
Solar with electric back-up	1.20	\$4,800	\$175	20	\$7,072

1. Purchase costs include our best estimates of installation labor and do not include financial incentives.

2. Operating cost based on hot water needs for typical family of four and energy costs of 9.5¢/kWh for electricity, \$1.40/therm for gas, \$2.40/gallon for oil.

3. Future operating costs are neither discounted nor adjusted for inflation.

4. Estimates for tankless gas water heaters are based on the federal EF rating method, which may over-estimate the efficiency.

Source: ACEEE hot water technologies – November 2007



Incentive Levels: Federal ITC

- Federal Tax Credit (ITC) covers 30% of project costs
- No cap on ITC amount
- Projects qualify for full 30% of costs, even if receiving other incentives

Neither Oncor nor the Program Implementer is giving specific tax guidance. Please seek tax advice from a tax professional.



Eligibility Requirements: Properties

Requirements to prevent fuel switching

	Single-family home	Individually metered multifamily property	Commercial property
Existing construction	Current water heater(s) must be electric	Current water heater(s) must be electric	Current water heater(s) must be electric
New construction	Property may not receive gas service	No requirement (property may receive gas service)	Property may not be built with a central gas space heating system

Residential Incentive Levels: Calculations



Existing

$$\$407 + (\$0.67 \times \text{kWh saved} \times \text{SOF})$$

New

$$\$379 + (\$0.62 \times \text{kWh saved} \times \text{SOF})$$

kWh saved - calculated by SRCC for each OG-300 System assuming optimal collector orientation in a specific location (Fort Worth, Austin, or Midland/Odessa)

SOF - Surface orientation factor, adjusting value if collector orientation is sub-optimal based on tilt and azimuth angle



Commercial Incentive Levels: Calculations

Existing

$$(\$547.71 \times \text{kW}) + (\$0.38 \times \text{kWh})$$

New

$$(\$511.20 \times \text{kW}) + (\$0.35 \times \text{kWh})$$

The TRNSYS model considers SOF when generating the kW and kWh values



Typical Incentive Levels

Single Family, Existing:	\$2,371
Single Family, New:	\$2,134
Low Income Residential:	\$3,800
Commercial, Existing:	\$2,740
Commercial, New:	\$2,529



Market Barriers

Lack of Customer Education

Customer Perception

Electric versus Gas water heating



Thank you!

Questions & Next Steps

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Part 4

CONCLUSION/Q&A



Take Away Messages

- ❑ Take advantage of audits to help educate citizens and leverage action
- ❑ Partner up to maximize benefits and available resources for citizens
- ❑ Lead the way – market transformation programs are a natural fit with local initiatives



Questions?



Thank You!

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