Going Forward
City of Houston: Getting Greener

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Green Building Resource Center

Texas Energy

U.S. Energy Information Administration
Independent Statistics and Analysis

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Home > State & U.S. Historical Data > State Energy Profiles > Texas

Texas — STATE ENERGY PROFILES

Map & Facts | Overview | Data | Related Reports | Data Directory | Select a State

Last Update: May 27, 2010
Next Update: June 3, 2010

Print Full Report

Mouse over symbols for more details.

- Coal Mine, Surface
- Coal Mine, Underground
- Natural Gas Hub
- Petroleum Refinery
- Oil Import Site
- Oil Seaport
- Electricity Transmission Line (>= 345 kV)
- Natural Gas Flow (1 mile band width = 100 million cubic feet/day)
- Oil and Gas Active Leases

Major Electric Power Plants (>=100 MW)

- Coal
- Geothermal
- Hydroelectric
- Natural Gas
- Nuclear
- Petroleum
- Solar
- Wind
- Wood
- Other Renewable

Renewable Energy Potential

- Biomass (>= 50 tons/sq km/yr)
- Geothermal (>= 80 milliwatts/m2)
- Solar (>= 6.0 kWh/m2/day)
- Wind (>= 3 Power Class)

Texas Quick Facts

- Texas is the leading crude oil-producing State in the Nation (excluding Federal offshore areas, which produce more than any single State).
- The State's signature type of crude oil, known as West Texas Intermediate (WTI), remains the major benchmark of crude oil in the Americas.
- Texas's 27 petroleum refineries can process more than 4.7 million barrels of crude oil per day, and they account for more than one-fourth of total U.S. refining capacity.
- Approximately three-tenths of total U.S. natural gas production occurs in Texas, making it the Nation's leading natural gas producer.
- Texas also leads the Nation in wind-powered generation capacity; there are over 2,000 wind turbines in West Texas alone.
- Texas produces and consumes more electricity than any other State, and per capita residential use is significantly higher than the national average.

Garage Success Story

- 2 Tranquility Park Garages + Civic Center
- Carbon Monoxide Sensors added to control garage exhaust system
- Project cost roughly $225,000
- Monthly savings of $20,000-$30,000
- Paid back in the first year!!!!

Demand-Side Management

FYI: Your City Government facilities have reduced kWh use by 5.8% from 2004 through 2007 even as services have expanded.

This was a good start.

Cogeneration Sites Under Review

69th Street Wastewater Treatment Plant
Annual Consumption - 94,222,813 kilowatt hours
Annual Electric Cost - $ 6,732,487
6 of these plants total 30% of city purchased energy

East Water Treatment Plant
Annual Consumption - 91,026,298 kilowatt hours
Annual Electric Cost - $ 6,299,497

IAH Physical Plant
Annual Consumption - 48,435,029 kilowatt hours
Annual Electric Cost - $ 3,821,506

Mission: Reduce Greenhouse Gases

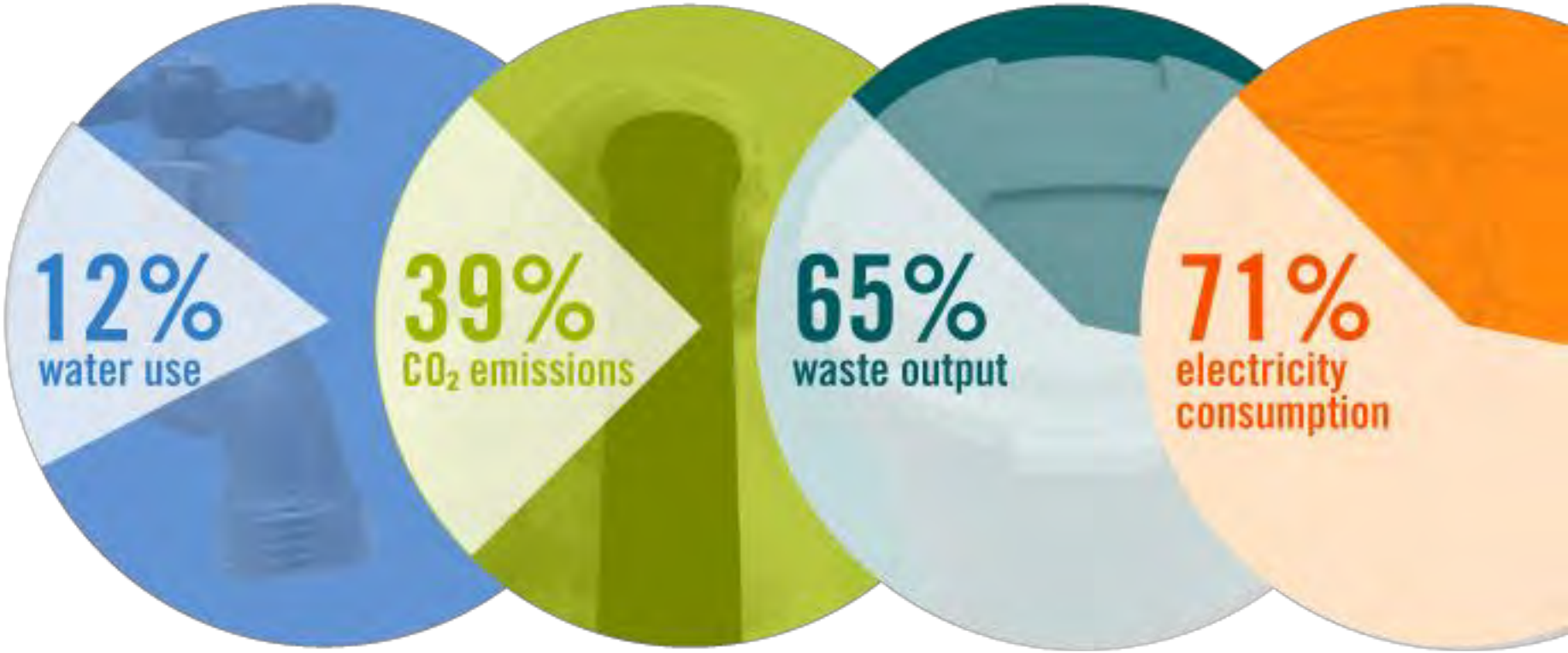
- A partnership to reduce energy consumption by 30% in City-owned facilities: 271 buildings, totaling 5.1 million square feet
- Houston, a member of the C40 (the 40 largest cities) was among the first to sign onto the program.
- Siemens and Schneider Electric selected as ESCOs
- 80 buildings completed @ $57 million to date financed through energy savings

Traffic Light Signal Replacement to LED

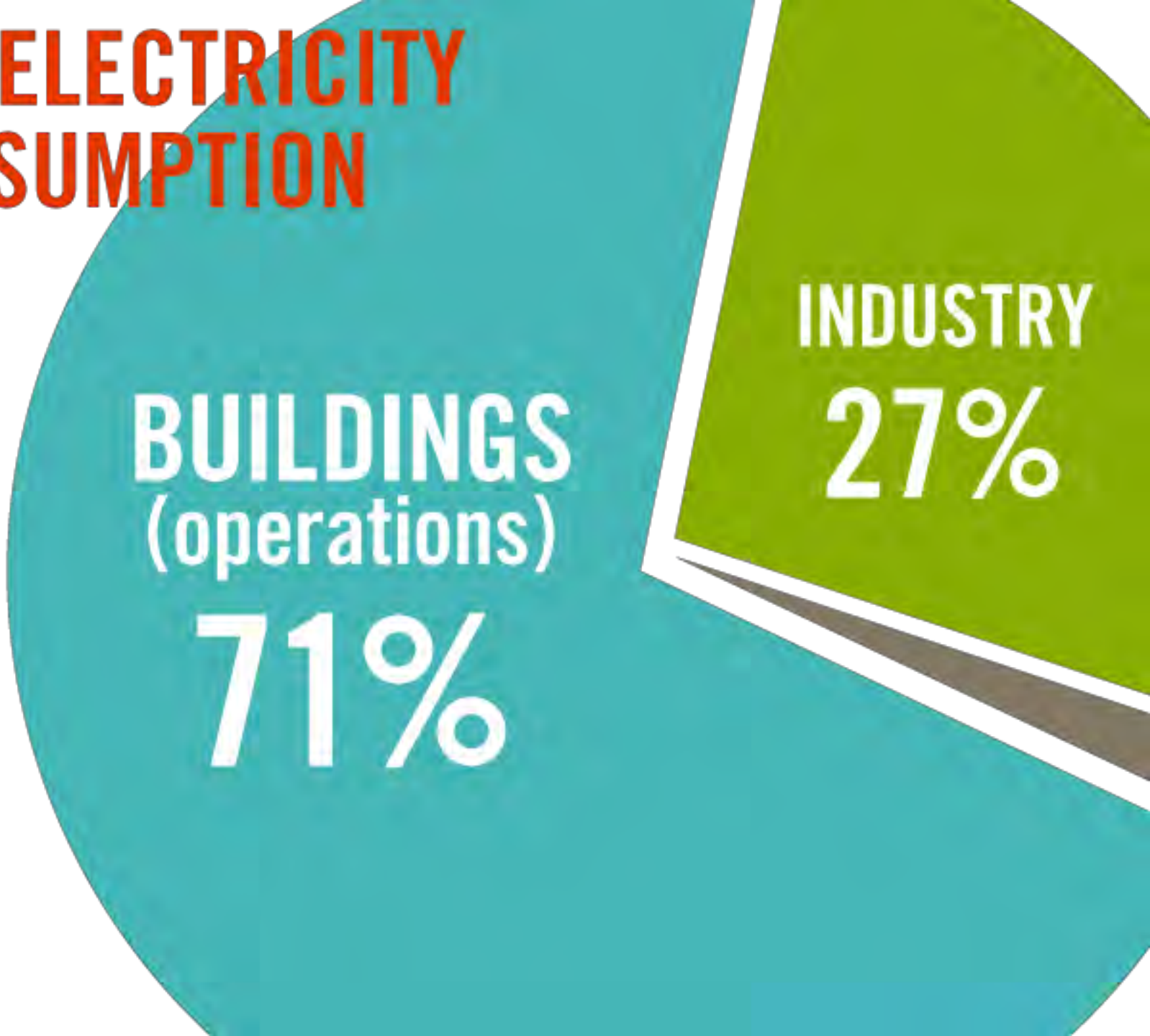
- 1400 of 2300 intersections completed
- 90% reduction in electricity use by new traffic light LEDs; last significantly longer (7 years versus 1 year)
- Saves the City $3800/day or $1.4M a year in electricity costs
- Upgrading heads from 8 inch to 12 inch as part of process

Why Buildings?

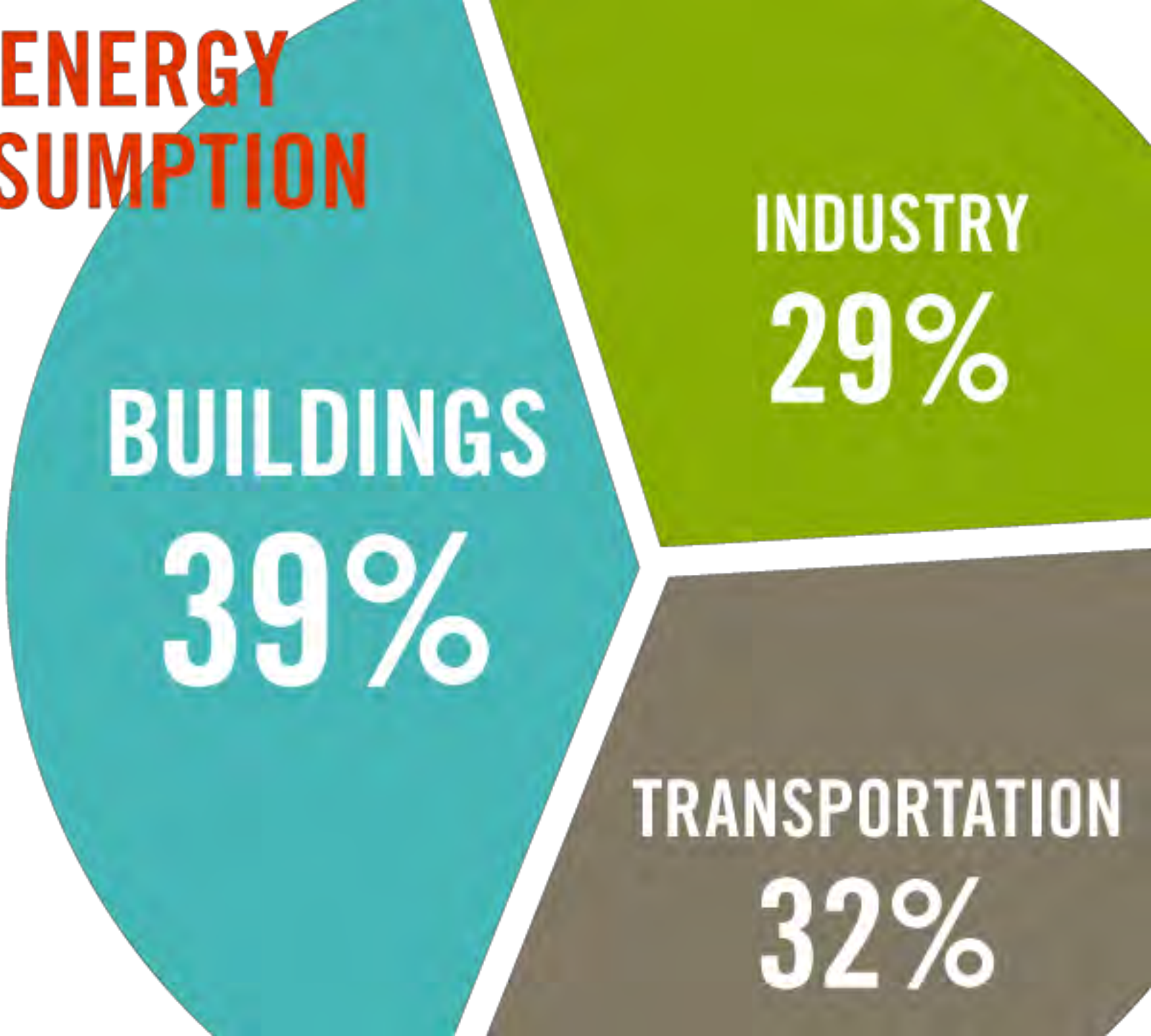
U.S. Building Impacts:



U.S. ELECTRICITY CONSUMPTION



U.S. ENERGY CONSUMPTION



Wasted Energy

About 56 percent of all energy in the U.S. economy is wasted. Some energy is always lost when fuels are burned and heat escapes. Inefficient technology and design are also culprits.

Efficiency's role in cutting emissions is a matter of debate. Most scientists agree that both cleaner fuels and greater efficiency are needed. Here is how much energy goes unused, by sector.

ELECTRICITY Most is generated from coal and natural gas; the heat from burning those fuels is largely lost. Then transmission lines leach out electricity, as much as 10 percent of what is generated.

Circles sized according to the amount of energy each sector consumes

TRANSPORTATION Needed: lighter vehicles with more efficient engines. Plug-in hybrids, using electricity generated from carbon-free sources, could drastically reduce energy loss and emissions.

INDUSTRY Efficiency can be improved by harnessing excess heat to power production.

RESIDENTIAL AND COMMERCIAL BUILDINGS Higher efficiency lighting and appliances would decrease energy loss. Reduced demand for heating and cooling from improved insulation and architecture would lower energy use.

Source: Lawrence Livermore National Laboratory

BILL MARSH/THE NEW YORK TIMES

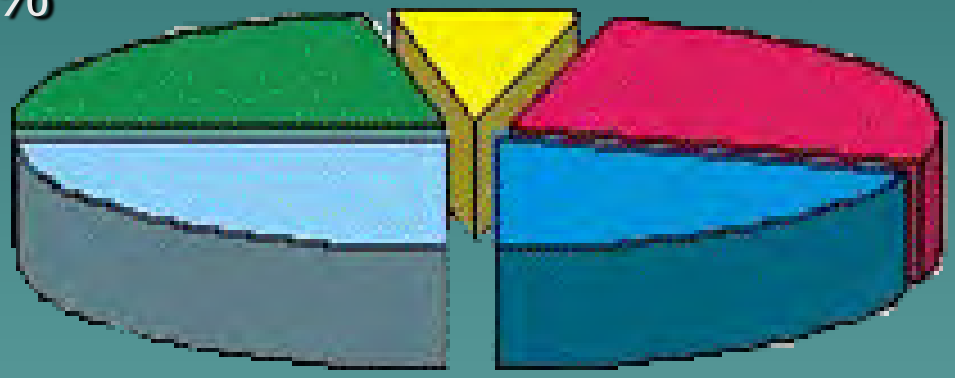
Let's not forget…

Why Buildings?
Residential AC Load

Roof/Duct Heat Gain
22%

Walls
7%

Window Heat Gain
26%



Appliance Generated
Heat Gains
25%

Infiltration
20%

HOME COOKING

The kitchen uses a big chunk of your home energy budget. Your refrigerator alone—which is on 24 hours a day—accounts for about 10 percent of the total home electricity bill. So where can you apply energy efficiency in the kitchen?

Shopping for a major appliance before the old one breaks down gives you the best chance to find a higher efficiency model with the features you want. The typical refrigerator sold today has more features yet uses less than half the electricity of a comparable model sold in 1980. Choose ENERGY STAR® appliances to ensure greatest efficiency and energy savings.

Power$mart Tips : Put the Power in Your Hands

* Buy a new fridge that is the right size for your needs to avoid wasting energy cooling nothing.
* Use a microwave or toaster oven to cook small portions and a conventional oven or stove-top for larger items.
* A watched pot will eventually boil—but putting a lid on it reduces cooking time and energy use. Also, match the pot size to burner size to avoid energy waste.

FACT Refrigerators in the U.S. alone use the equivalent of the output of about 60 300-MW power plants. If all of the nation's households used the most efficient refrigerators, electricity savings would eliminate the need for about 20-30 power plants.

Why Buildings? Inside Energy

www.ase.org

Why Buildings? Inside Energy www.ase.org

And that second 'fridge in the garage: Bad idea

TOO 'PLUGGED IN'

Our consumer-oriented society, the growth of new technologies, and the fact that more people are working from home have dramatically increased the number of products that require power in the average home. The average home has roughly 2 TVs, a VCR, a DVD player and 3 telephones. Replacing these items with ENERGY STAR® models—which use as much as 50 percent less energy—would save more than 25 billion pounds of greenhouse gas emissions, the equivalent to taking 3 million cars off the road for one year, according to EPA.

Many idle appliances—TVs, VCRs, cable boxes, DVD and CD players, cassette decks, cordless phones, burglar alarms, microwaves—continue to consume energy when switched off. This energy keeps display clocks lit and memory chips and remote controls working. Lawrence Berkeley National Laboratory calculates that these energy "leaks" account for 5 percent of total domestic electricity consumption, cost more than $4 billion annually, and spew 12 million tons of carbon into the atmosphere.

Power$mart Tips : Put the Power in Your Hands

* Buy ENERGY STAR® -labeled electronics. Make sure you are using the power management or "sleep" feature on ENERGY STAR® qualified home office equipment (PC, fax, printer, scanner) so that they automatically power down when not in use to save up to $70 annually in electricity bills and improve product longevity.
* Turning off your computer and electronics during long periods of non-use cuts costs and improves longevity.

FACT Each year, Americans spend more money to power home audio and DVD products when turned off than when actually in use.

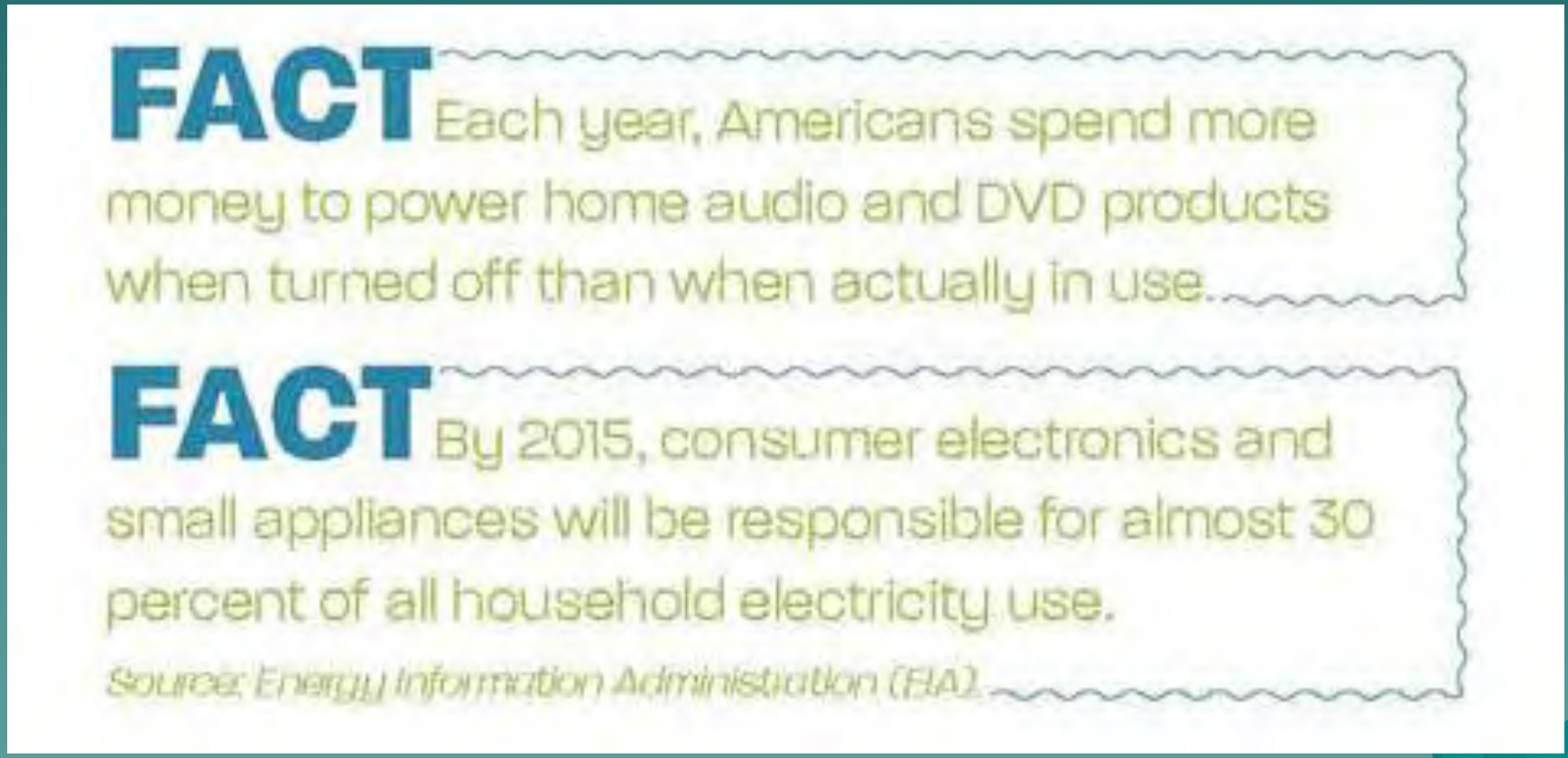
FACT By 2015, consumer electronics and small appliances will be responsible for almost 30 percent of all household electricity use.

Source: Energy Information Administration (EIA)

Why Buildings? Inside Energy

www.ase.org

Why Buildings? Inside Energy



www.ase.org

Residential Energy Efficiency Program

- Pressurize homes to determine energy leakage points and inefficiencies
- Weatherization protocol included
  - Installation of weather stripping
  - Caulking windows
  - Installing attic insulation
  - Installing insulation on exposed hot water piping
  - Insulating water heaters
- Approximate cost per house: $3,500
- Free to Residents within income zone

Residential Energy Efficiency Program

REEP
Residential Energy Efficiency Program

www.houstontx.gov/reep/

Residential Energy Efficiency Program

- Approximately 11,000 homes weatherized across 12 different neighborhoods since 2006
- Participation rates approach 50%; home owner satisfaction high
- 12 – 18% "weather adjusted" kwh reduction; high as 20% over summer months
- Average Savings: $50 - $100 per month
- Efficient implementation model; contractors go house to house
- After securing $23 million in Federal stimulus funding, the program has expanded city wide
- We could not secure additional funding. This program is over.

5-Star Energy Program

- Builder incentive (up to $50K) to provide energy efficiency measures and renewable energy
- Program for new affordable housing in Houston Hope Neighborhoods (now closed)
- Baseline home energy rating (HERS) of 60 or lower

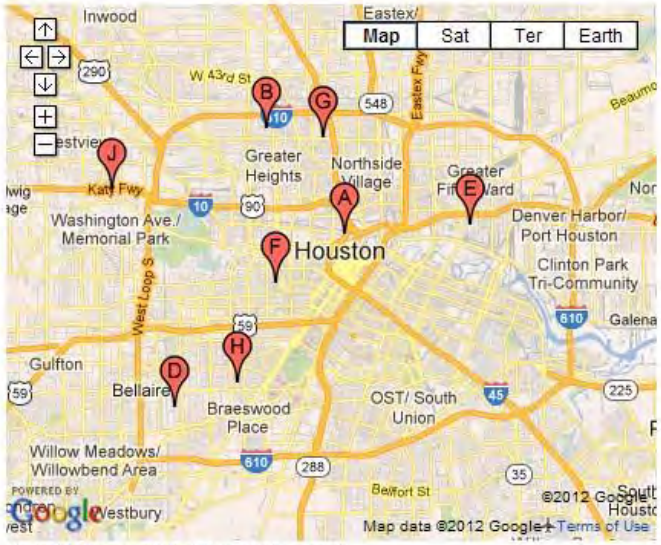
HERS 45-36	*	$25,000
HERS 35-31	**	$35,000
HERS 30-26	***	$40,000
HERS 25-21	****	$45,000
HERS 20-0	*****	$50,000

- This program is over.

Houston: Solar City

Project Sites

2012 TOUR SITES



View 2012 Houston Solar Tour in a larger map

Houston: Solar City

2008: $8.00 per watt installed

Today: $5.00 per watt installed

38% Price Drop in 3 years.

Tomorrow?

Green Building Resource Center

Original

Green Building Resource Center

Renewed

Green Building Resource Center

Renewed

Green Building Resource Center

- 50 displays of green building components
- Complimentary green building consultation
- Complimentary education seminars

Houston Permitting Center

On track for LEED Gold

What Green is, and what Green isn't

What we show on the Display

www.codegreenhouston.org

Our Website

Energy Audits

Conduct a home energy audit

TAGS: **ADD A FLOOR ABOVE**, **KITCHEN OR BATH ADDITION**, **GABLE OR EAVE END ADD-ON**, **KITCHEN OR BATH EXPANDED EXISTING SPACE**, **TUCK UNDER**, **GUT REHAB**, **HOME PERFORMANCE & WEATHERIZATION**, **DEEP ENERGY**, **FINISHED ATTIC**, **FINISHED BASEMENT**, **GUT REHAB**, **HOME PERFORMANCE AND WEATHERIZATION**, **COLD**, **DRY**, **HOT_HUMID**, **MARINE**, **MIXED_HUMID**

A home energy audit can identify ways to save money.

The audit should cover moisture and air leaks, indoor air quality, insulation, combustion safety, and durability of building components. Audits may be conducted by inspectors who specialize in private homes, or through weatherization programs that often are funded by local utilities. A home energy audit won't save any energy, but carrying out the recommended improvements will. An infrared camera can hep identify heat losses.

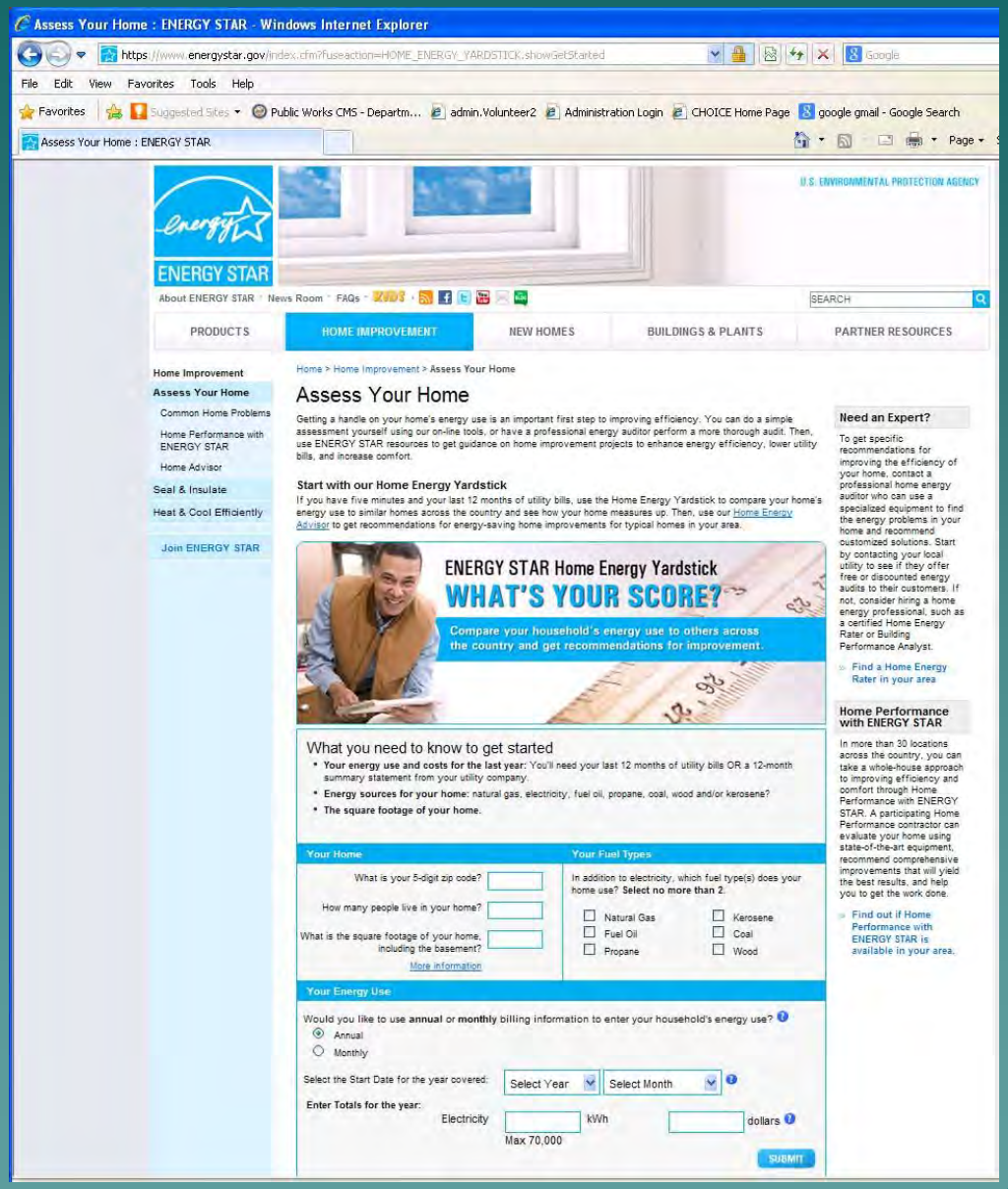
Learn more in the Green Building Encyclopedia

Remodel Project: Deep Energy Retrofit
Remodel Project: Weatherization
Insulation

More articles from Green Building Advisor

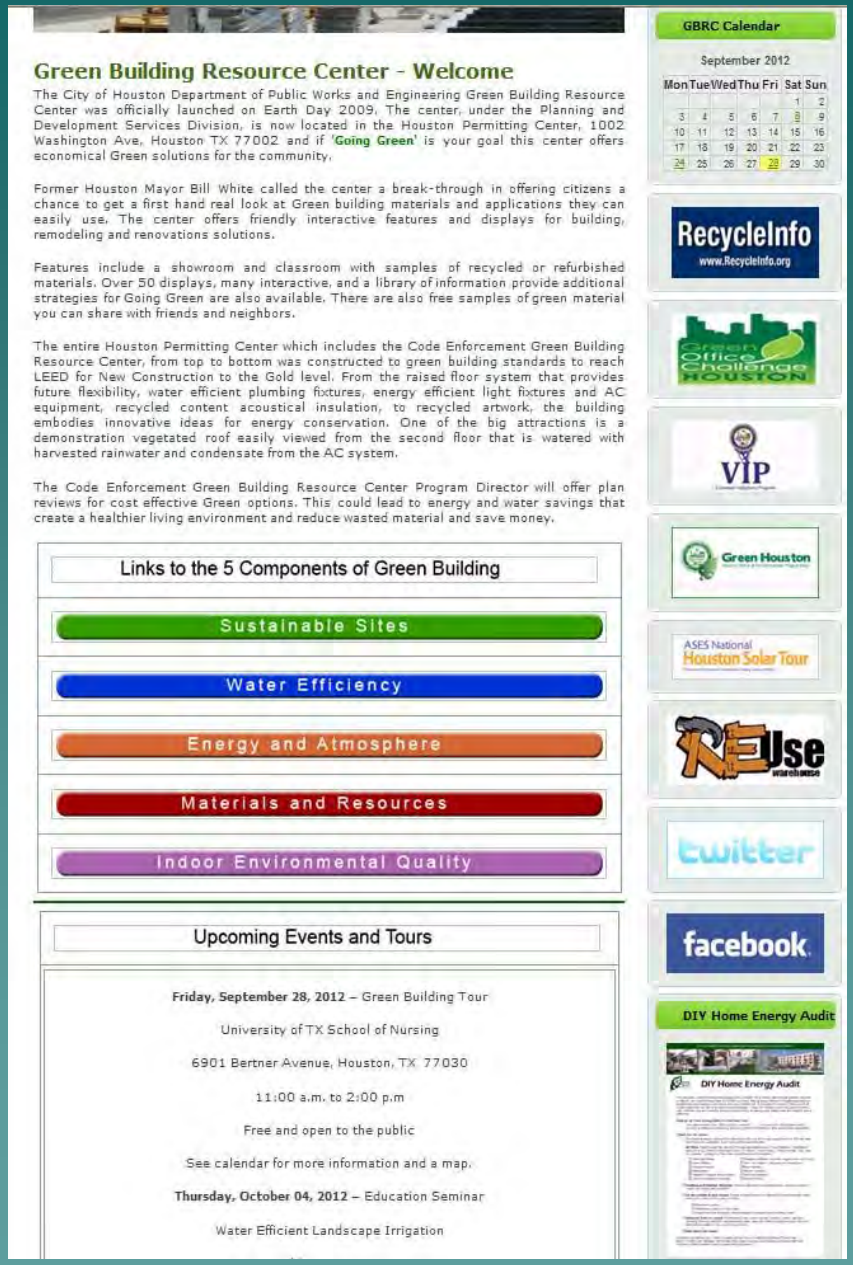
Blower Door Basics
An Introduction to Thermal Imaging

Energy Audits



Start with Energy Star's Home Energy Yardstick

Energy Audits



Green Building Resource Center - Welcome

The City of Houston Department of Public Works and Engineering Green Building Resource Center was officially launched on Earth Day 2009. The center, under the Planning and Development Services Division, is now located in the Houston Permitting Center, 1002 Washington Ave, Houston TX 77002 and if 'Going Green' is your goal this center offers economical Green solutions for the community.

Former Houston Mayor Bill White called the center a break-through in offering citizens a chance to get a first hand real look at Green building materials and applications they can easily use. The center offers friendly interactive features and displays for building, remodeling and renovations solutions.

Features include a showroom and classroom with samples of recycled or refurbished materials. Over 50 displays, many interactive, and a library of information provide additional strategies for Going Green are also available. There are also free samples of green material you can share with friends and neighbors.

The entire Houston Permitting Center which includes the Code Enforcement Green Building Resource Center, from top to bottom was constructed to green building standards to reach LEED for New Construction to the Gold level. From the raised floor system that provides future flexibility, water efficient plumbing fixtures, energy efficient light fixtures and AC equipment, recycled content acoustical insulation, to recycled artwork, the building embodies innovative ideas for energy conservation. One of the big attractions is a demonstration vegetated roof easily viewed from the second floor that is watered with harvested rainwater and condensate from the AC system.

The Code Enforcement Green Building Resource Center Program Director will offer plan reviews for cost effective Green options. This could lead to energy and water savings that create a healthier living environment and reduce wasted material and save money.

Links to the 5 Components of Green Building

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality

Upcoming Events and Tours

Friday, September 28, 2012 – Green Building Tour

University of TX School of Nursing

6901 Bertner Avenue, Houston, TX 77030

11:00 a.m. to 2:00 p.m

Free and open to the public

See calendar for more information and a map.

Thursday, October 04, 2012 – Education Seminar

Water Efficient Landscape Irrigation

GBRC Calendar

September 2012

Mon	Tue	Wed	Thu	Fri	Sat	Sun
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

RecycleInfo www.RecycleInfo.org

Green Office Challenge HOUSTON

VIP

Green Houston

ASES National Houston Solar Tour

REUse warehouse

twitter

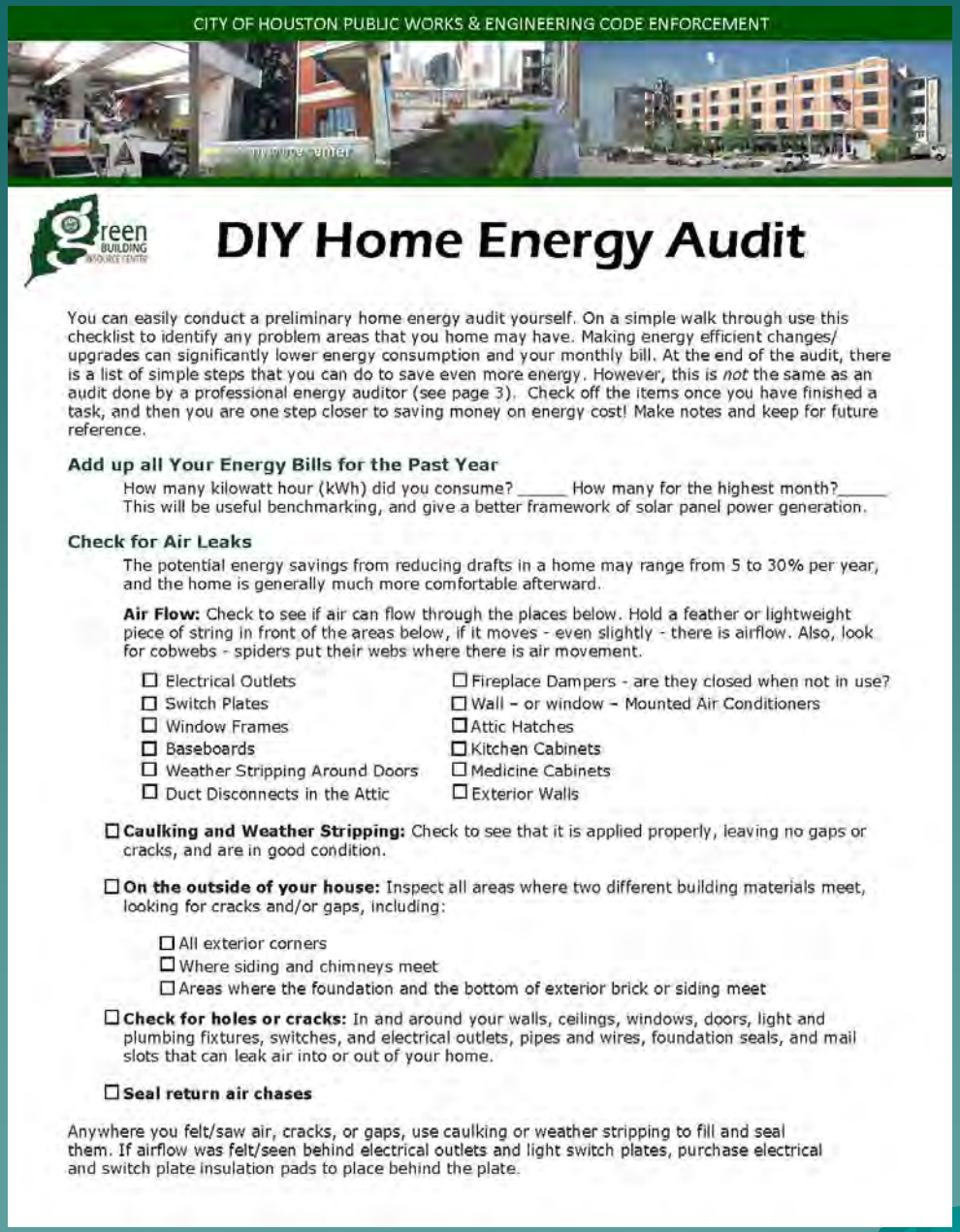
facebook

DIY Home Energy Audit

DIY Home Energy Audit

Then scroll down the GBRC Home page to the DIY Home Energy Audit

Energy Audits



CITY OF HOUSTON PUBLIC WORKS & ENGINEERING CODE ENFORCEMENT

DIY Home Energy Audit

You can easily conduct a preliminary home energy audit yourself. On a simple walk through use this checklist to identify any problem areas that you home may have. Making energy efficient changes/ upgrades can significantly lower energy consumption and your monthly bill. At the end of the audit, there is a list of simple steps that you can do to save even more energy. However, this is *not* the same as an audit done by a professional energy auditor (see page 3). Check off the items once you have finished a task, and then you are one step closer to saving money on energy cost! Make notes and keep for future reference.

Add up all Your Energy Bills for the Past Year

How many kilowatt hour (kWh) did you consume? _____ How many for the highest month?_____
This will be useful benchmarking, and give a better framework of solar panel power generation.

Check for Air Leaks

The potential energy savings from reducing drafts in a home may range from 5 to 30% per year, and the home is generally much more comfortable afterward.

Air Flow: Check to see if air can flow through the places below. Hold a feather or lightweight piece of string in front of the areas below, if it moves - even slightly - there is airflow. Also, look for cobwebs - spiders put their webs where there is air movement.

- ☐ Electrical Outlets
- ☐ Switch Plates
- ☐ Window Frames
- ☐ Baseboards
- ☐ Weather Stripping Around Doors
- ☐ Duct Disconnects in the Attic
- ☐ Fireplace Dampers - are they closed when not in use?
- ☐ Wall – or window – Mounted Air Conditioners
- ☐ Attic Hatches
- ☐ Kitchen Cabinets
- ☐ Medicine Cabinets
- ☐ Exterior Walls

☐ **Caulking and Weather Stripping:** Check to see that it is applied properly, leaving no gaps or cracks, and are in good condition.

☐ **On the outside of your house:** Inspect all areas where two different building materials meet, looking for cracks and/or gaps, including:

- ☐ All exterior corners
- ☐ Where siding and chimneys meet
- ☐ Areas where the foundation and the bottom of exterior brick or siding meet

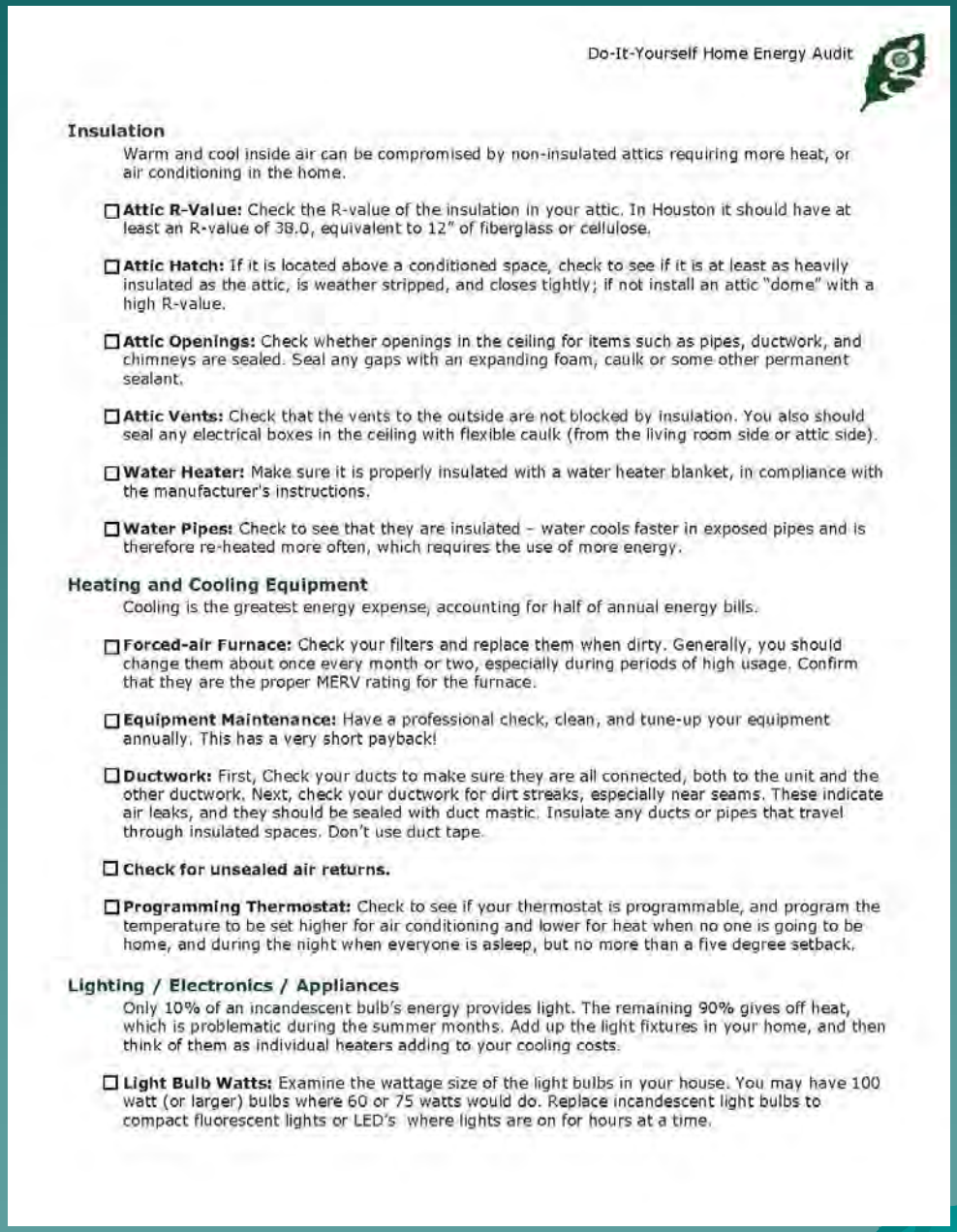
☐ **Check for holes or cracks:** In and around your walls, ceilings, windows, doors, light and plumbing fixtures, switches, and electrical outlets, pipes and wires, foundation seals, and mail slots that can leak air into or out of your home.

☐ **Seal return air chases**

Anywhere you felt/saw air, cracks, or gaps, use caulking or weather stripping to fill and seal them. If airflow was felt/seen behind electrical outlets and light switch plates, purchase electrical and switch plate insulation pads to place behind the plate.

Download the DIY Home Energy Audit

Energy Audits



Do-It-Yourself Home Energy Audit

Insulation

Warm and cool inside air can be compromised by non-insulated attics requiring more heat, or air conditioning in the home.

- ☐ **Attic R-Value:** Check the R-value of the insulation in your attic. In Houston it should have at least an R-value of 38.0, equivalent to 12" of fiberglass or cellulose.
- ☐ **Attic Hatch:** If it is located above a conditioned space, check to see if it is at least as heavily insulated as the attic, is weather stripped, and closes tightly; if not install an attic "dome" with a high R-value.
- ☐ **Attic Openings:** Check whether openings in the ceiling for items such as pipes, ductwork, and chimneys are sealed. Seal any gaps with an expanding foam, caulk or some other permanent sealant.
- ☐ **Attic Vents:** Check that the vents to the outside are not blocked by insulation. You also should seal any electrical boxes in the ceiling with flexible caulk (from the living room side or attic side).
- ☐ **Water Heater:** Make sure it is properly insulated with a water heater blanket, in compliance with the manufacturer's instructions.
- ☐ **Water Pipes:** Check to see that they are insulated – water cools faster in exposed pipes and is therefore re-heated more often, which requires the use of more energy.

Heating and Cooling Equipment

Cooling is the greatest energy expense, accounting for half of annual energy bills.

- ☐ **Forced-air Furnace:** Check your filters and replace them when dirty. Generally, you should change them about once every month or two, especially during periods of high usage. Confirm that they are the proper MERV rating for the furnace.
- ☐ **Equipment Maintenance:** Have a professional check, clean, and tune-up your equipment annually. This has a very short payback!
- ☐ **Ductwork:** First, Check your ducts to make sure they are all connected, both to the unit and the other ductwork. Next, check your ductwork for dirt streaks, especially near seams. These indicate air leaks, and they should be sealed with duct mastic. Insulate any ducts or pipes that travel through insulated spaces. Don't use duct tape.
- ☐ **Check for unsealed air returns.**
- ☐ **Programming Thermostat:** Check to see if your thermostat is programmable, and program the temperature to be set higher for air conditioning and lower for heat when no one is going to be home, and during the night when everyone is asleep, but no more than a five degree setback.

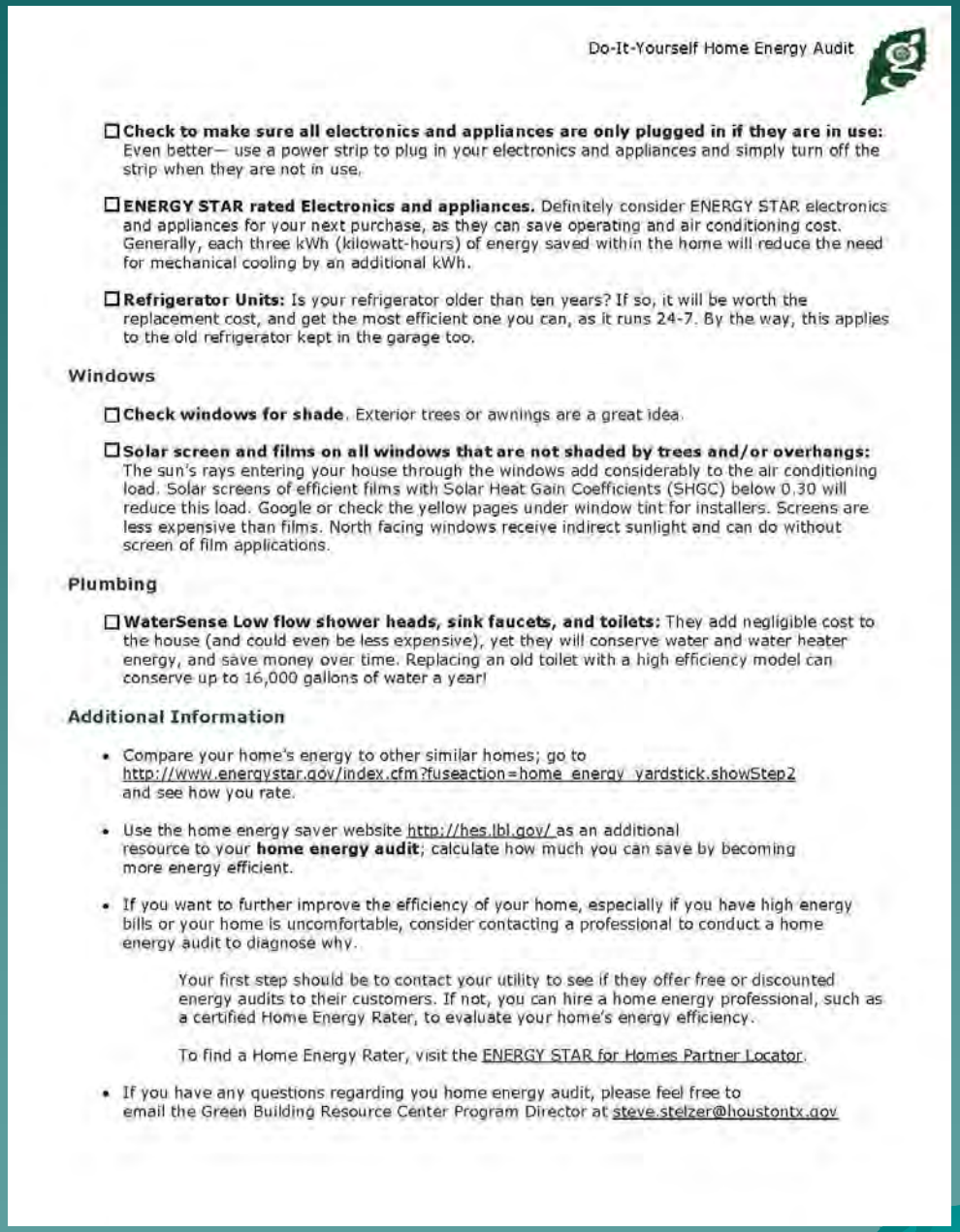
Lighting / Electronics / Appliances

Only 10% of an incandescent bulb's energy provides light. The remaining 90% gives off heat, which is problematic during the summer months. Add up the light fixtures in your home, and then think of them as individual heaters adding to your cooling costs.

- ☐ **Light Bulb Watts:** Examine the wattage size of the light bulbs in your house. You may have 100 watt (or larger) bulbs where 60 or 75 watts would do. Replace incandescent light bulbs to compact fluorescent lights or LED's where lights are on for hours at a time.

Download the DIY Home Energy Audit

Energy Audits



Do-It-Yourself Home Energy Audit

☐ **Check to make sure all electronics and appliances are only plugged in if they are in use:** Even better— use a power strip to plug in your electronics and appliances and simply turn off the strip when they are not in use.

☐ **ENERGY STAR rated Electronics and appliances.** Definitely consider ENERGY STAR electronics and appliances for your next purchase, as they can save operating and air conditioning cost. Generally, each three kWh (kilowatt-hours) of energy saved within the home will reduce the need for mechanical cooling by an additional kWh.

☐ **Refrigerator Units:** Is your refrigerator older than ten years? If so, it will be worth the replacement cost, and get the most efficient one you can, as it runs 24-7. By the way, this applies to the old refrigerator kept in the garage too.

Windows

☐ **Check windows for shade**. Exterior trees or awnings are a great idea.

☐ **Solar screen and films on all windows that are not shaded by trees and/or overhangs:** The sun's rays entering your house through the windows add considerably to the air conditioning load. Solar screens of efficient films with Solar Heat Gain Coefficients (SHGC) below 0.30 will reduce this load. Google or check the yellow pages under window tint for installers. Screens are less expensive than films. North facing windows receive indirect sunlight and can do without screen of film applications.

Plumbing

☐ **WaterSense Low flow shower heads, sink faucets, and toilets:** They add negligible cost to the house (and could even be less expensive), yet they will conserve water and water heater energy, and save money over time. Replacing an old toilet with a high efficiency model can conserve up to 16,000 gallons of water a year!

Additional Information

- Compare your home's energy to other similar homes; go to http://www.energystar.gov/index.cfm?fuseaction=home_energy_yardstick.showStep2 and see how you rate.
- Use the home energy saver website http://hes.lbl.gov/ as an additional resource to your **home energy audit**; calculate how much you can save by becoming more energy efficient.
- If you want to further improve the efficiency of your home, especially if you have high energy bills or your home is uncomfortable, consider contacting a professional to conduct a home energy audit to diagnose why.

  Your first step should be to contact your utility to see if they offer free or discounted energy audits to their customers. If not, you can hire a home energy professional, such as a certified Home Energy Rater, to evaluate your home's energy efficiency.

  To find a Home Energy Rater, visit the ENERGY STAR for Homes Partner Locator.
- If you have any questions regarding you home energy audit, please feel free to email the Green Building Resource Center Program Director at steve.stelzer@houstontx.gov

Energy Star Home Partner Locator website

Energy Audits

Do-It-Yourself Home Energy Audit

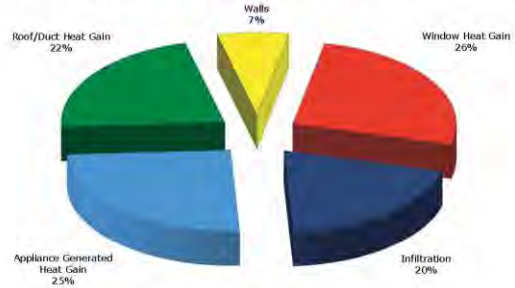
Energy Saving Tips

- Use task lighting instead of brightly lighting an entire room; focus the light where you need it
- Turn lights off when you are not in a room. Turn off the TV when no one is watching it.
- During hot summer days keep your window coverings closed to block the suns hot rays, and use white window shades, drapes, or blinds to reflect heat away from the house
- Use energy-saving settings on refrigerators, dishwashers, washing machines, and clothes dryers
- Air dry dishes instead of using your dishwasher's drying cycle
- Try raising the temperature in your house a degree or two
- Take short showers, with a low-flow showerhead, instead of baths
- Wash only full loads of clothes when possible and clean your dryer's lint filter after every load
- Turn off your computer when it is not in use; automatic switching to sleep mode or manually turning monitors off is always the better energy-saving strategy
- Don't place lamps or TV sets near your air-conditioning thermostat. The thermostat senses heat from these appliances, which can cause the air conditioner to run longer than necessary
- Reduce air conditioning costs by planting shade trees and shrubs around your house, especially on the west side and by your air conditioning unit

Visit http://www.takecareoftexas.org/ to find more tips on how to be energy efficient

Ceiling Fans: Ceiling fans can be extremely efficient for improving comfort and reducing air conditioning use, so don't stop with bedrooms. The cooling effect that people feel will encourage them to raise the thermostat by as much as 4°, and each degree the thermostat is raised above 78° will save about 7% of cooling costs, making fans a very good investment. Just remember to turn them off when you leave.

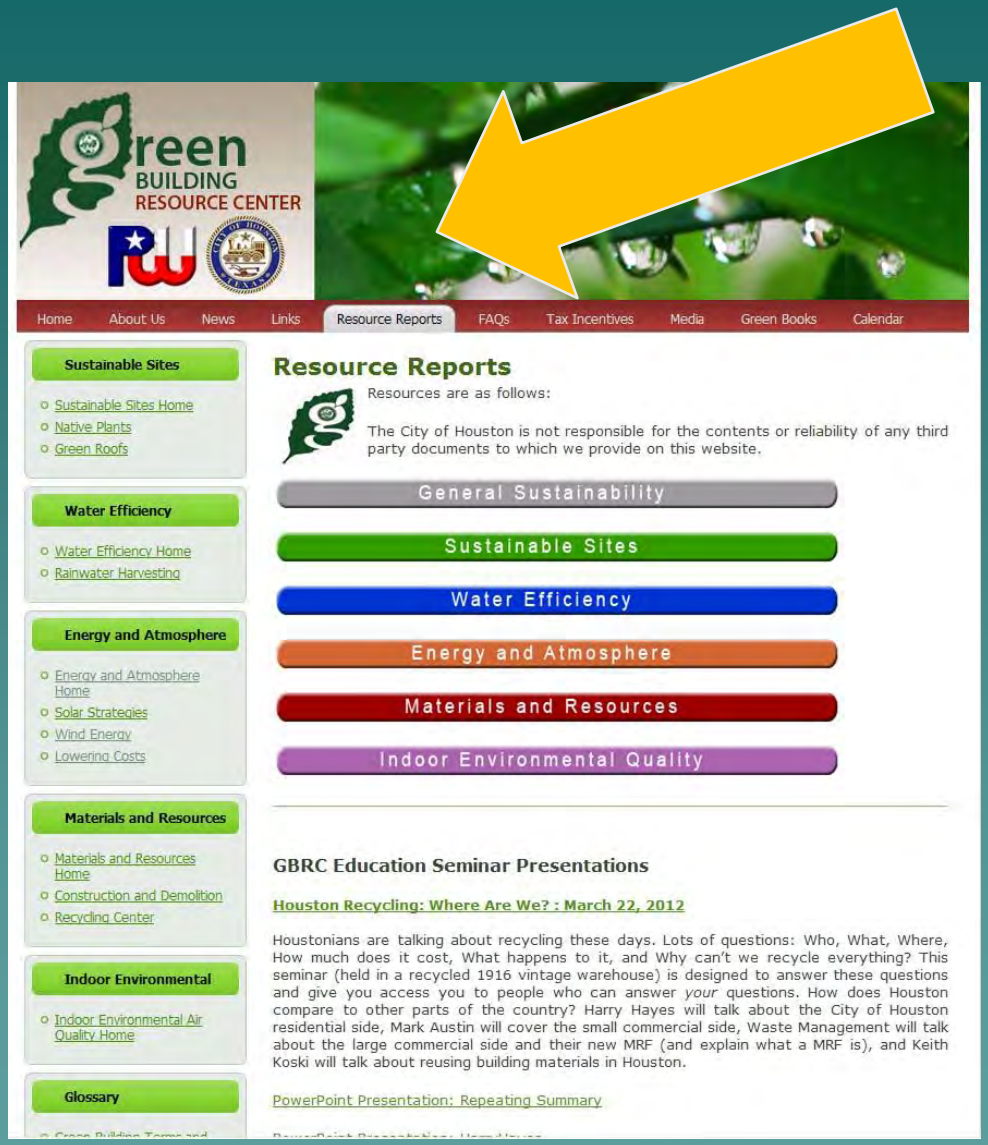
Load Contribution to a Typical Houston Home Air Conditioning System



Steve Stelzer, Program Director (832) 394-9050 www.codegreenhouston.org

Problems?
Call me.

Energy Audits



More info…. Click "Resource Reports" Tab on the GBRC website

Energy Audits

focus on new trends in product transparency and disc… …g in the green building movement and likely to change the way LEED m… …arded. Come and learn from one of the best…..

PowerPoint Presentation: Bill Walsh

Holistic Energy Conservation: Houston Methods: October 20, 2011

Houston has a tough climate for energy conservation. Learn from the design side and the construction side of real methods to keep your homes comfortable in the context of affordability, safety, and sustainability. With a focus on the building envelope and the equipment inside, we will hear from an engineer and an HVAC installer that have real know-how and experience with Houston climate challenges, and not only with new projects. We will hear about an "extreme makeover" residential project that will detail the host of retrofit techniques that changed an energy "hog" home to a high performer.

PowerPoint Presentation: Gary Beck

PowerPoint Presentation: Gary Parr

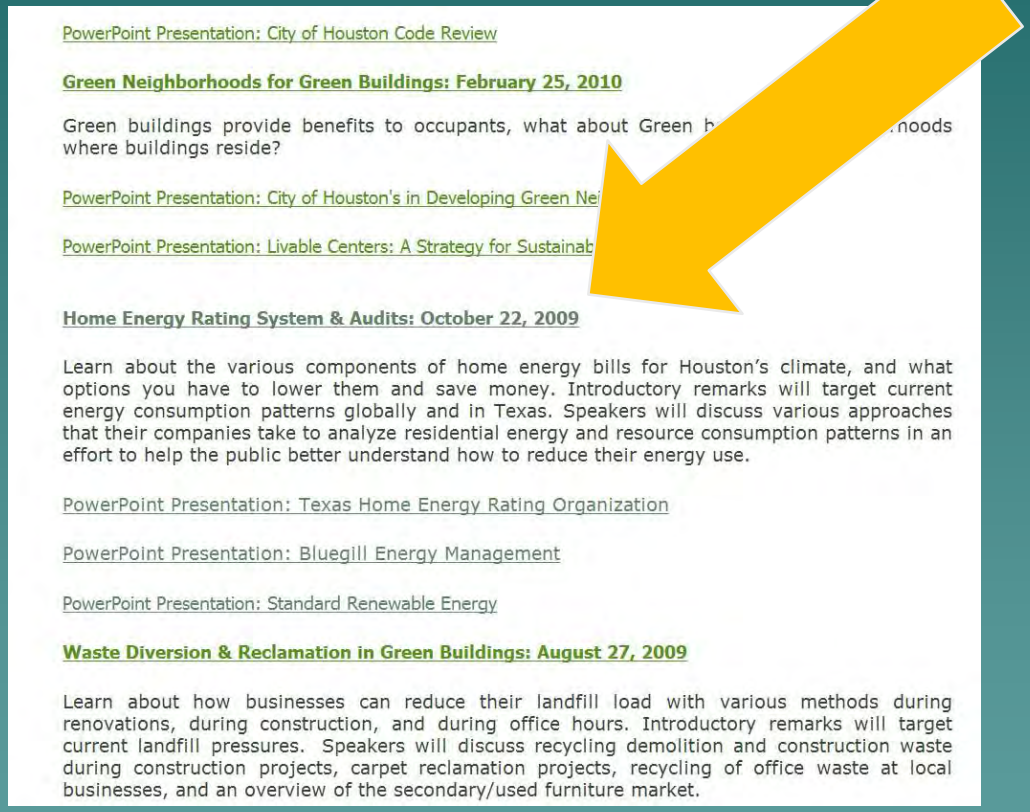
Midtown Houston & LEED for New Development: June 15, 2011

Sustainable development means compact mixed-use infill neighborhoods featuring connectivity, walkable streets and sites for social interaction – which contrast with sprawl development patterns that convert agricultural land, destroy wildlife habitat, require costly extensions of infrastructure, and make people dependant on personal automobiles. These are not new ideas — they work today just as they worked in neighborhoods built before the car. Learn how the LEED-ND rating system guides the development of new neighborhoods such as the City Centre project in West Houston. The same principles can be used to evaluate existing neighborhoods, using the results of the Midtown Livable Centers Study as an example. Then take a walk through Midtown and see how the design of streets, sidewalks, transit, and buildings work together to create livable, environmentally friendly places with a 40 minute total 3/4 mile walking tour of Midtown beginning and ending at the GBRC.

PowerPoint Presentation: LEED ND

Scroll down to the Holistic Energy Conservation Houston Methods Presentation

Energy Audits



PowerPoint Presentation: City of Houston Code Review

Green Neighborhoods for Green Buildings: February 25, 2010

Green buildings provide benefits to occupants, what about Green h… …hoods where buildings reside?

PowerPoint Presentation: City of Houston's in Developing Green Ne…

PowerPoint Presentation: Livable Centers: A Strategy for Sustainab…

Home Energy Rating System & Audits: October 22, 2009

Learn about the various components of home energy bills for Houston's climate, and what options you have to lower them and save money. Introductory remarks will target current energy consumption patterns globally and in Texas. Speakers will discuss various approaches that their companies take to analyze residential energy and resource consumption patterns in an effort to help the public better understand how to reduce their energy use.

PowerPoint Presentation: Texas Home Energy Rating Organization

PowerPoint Presentation: Bluegill Energy Management

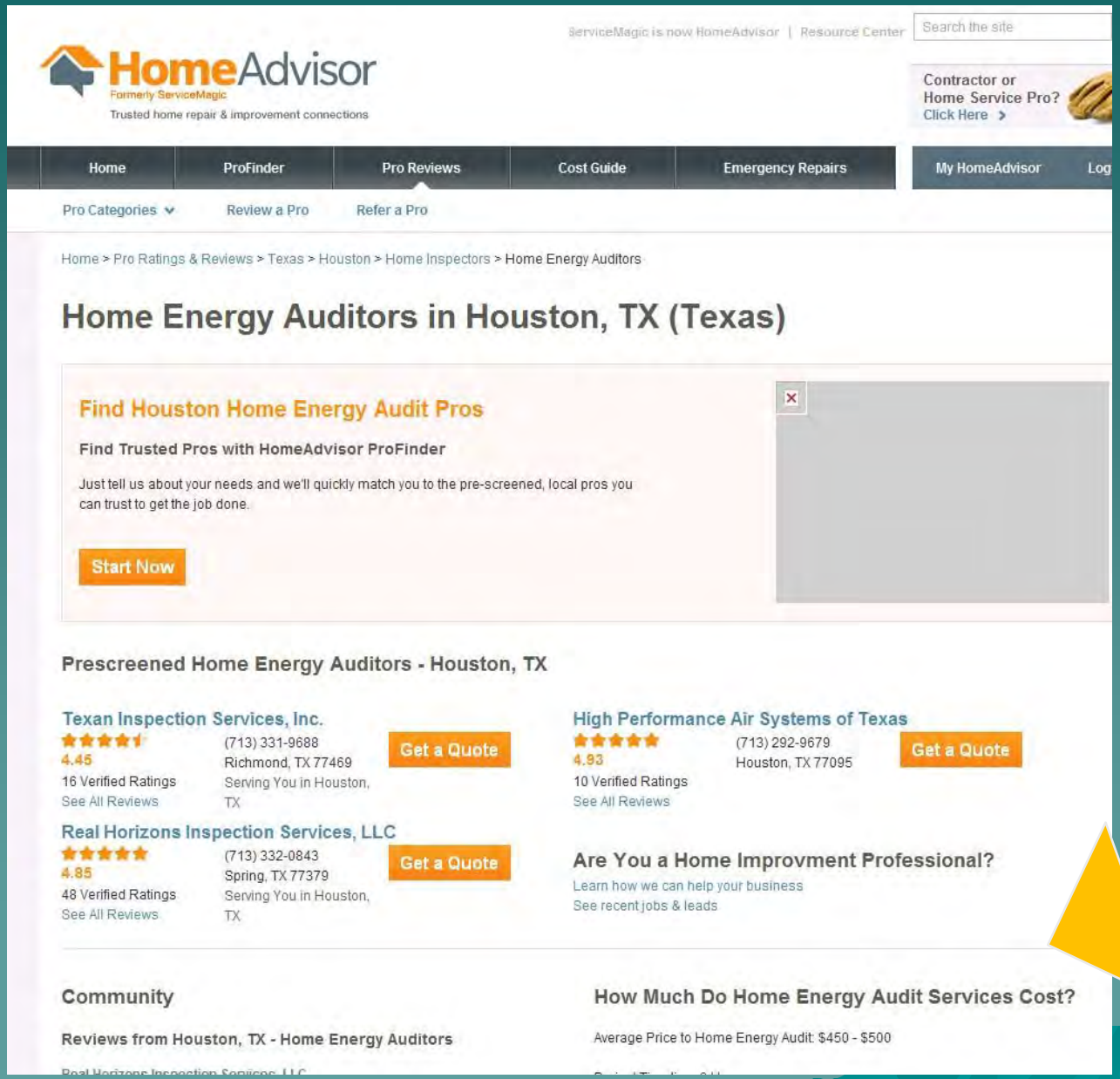
PowerPoint Presentation: Standard Renewable Energy

Waste Diversion & Reclamation in Green Buildings: August 27, 2009

Learn about how businesses can reduce their landfill load with various methods during renovations, during construction, and during office hours. Introductory remarks will target current landfill pressures. Speakers will discuss recycling demolition and construction waste during construction projects, carpet reclamation projects, recycling of office waste at local businesses, and an overview of the secondary/used furniture market.

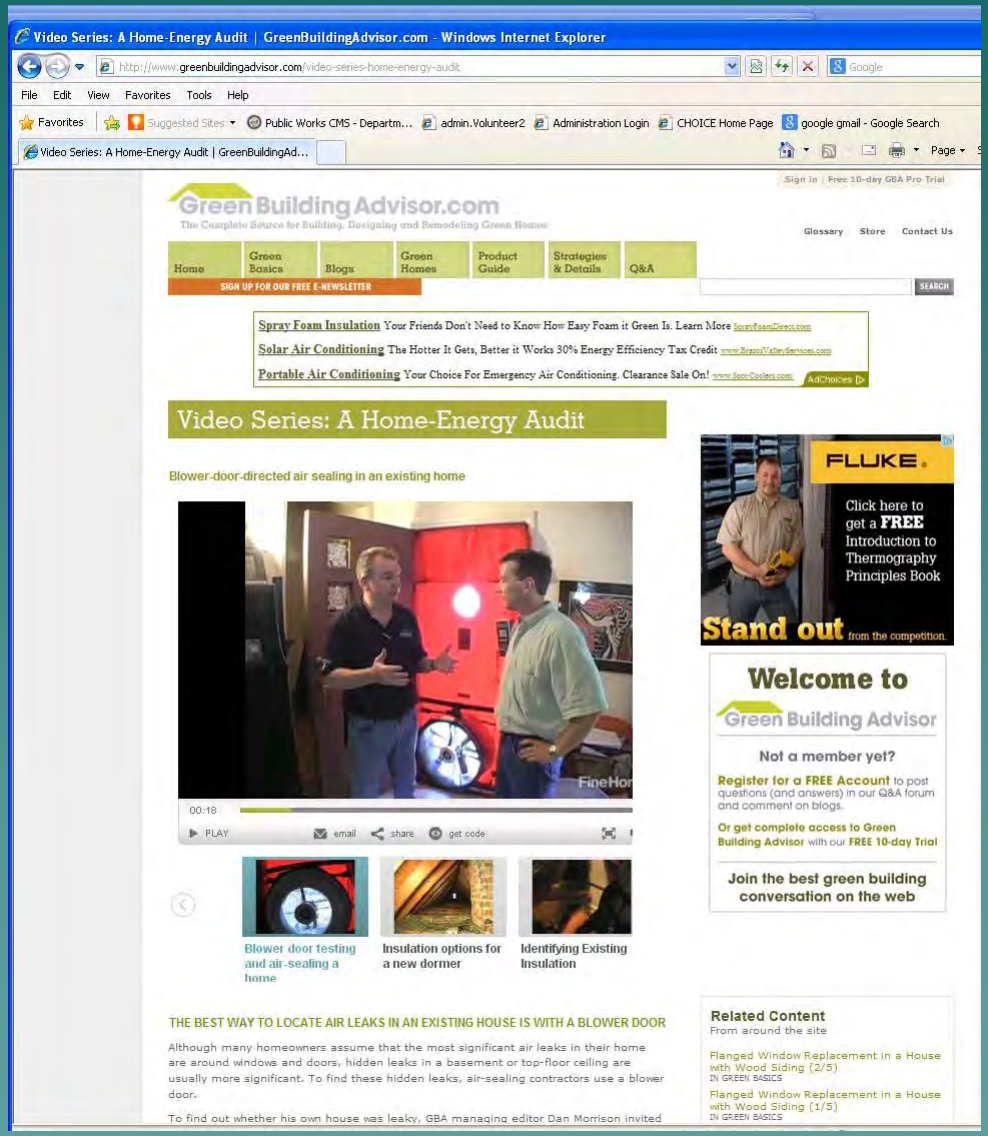
Scroll down to the Home Energy Rating System & Audits Presentation

Energy Audits



Cost?

Energy Audits



Green Building Advisor. Com video

ENERGY COST AND FEATURE REPORT

Date:	March 30, 2009	Rating No.:	
Building Name:	Standard Renewable	Rating Org.:	Standard Renewable Energy
Owner's Name:		Phone No.:	
Property:	1401 SRE Way	Rater's Name:	Bruce Bonderer
Address:	Houston, TX 77007	Rater's No.:	5168840-79
Builder's Name:			
Weather Site:	Houston, TX	Rating Type:	Based On Plans
File Name:	REM Standard Renewable House 20 yr Old.blg	Rating Date:	3/12/2009

Standard Renewable

ANNUAL ENERGY COSTS

Heating	$	380
Cooling	$	982
Water Heating	$	189
Lights & Appliances	$	827
Photovoltaics	$	-0
Service Charges	$	186
Total	$	2564
Average Monthly	$	214

ENERGY FEATURES

Ceiling w/Attic:	R-19 Batts GR 2 U=0.067
Vaulted Ceiling:	None
Above Grade Walls:	R-13, Grd 3 U=0.097
Foundation Walls (Cond):	None
Found. Walls (Uncond):	None
Doors:	1-3/4 Wd solid core U=0.329
Windows:	Single - Metal U=1.310
Frame Floors:	None
Slab Floors:	Uninsulated U=0.285
Infiltration:	Htg: 2700 Clg: 2700 CFM50
Infilt. Measure:	Blower door test
Mechanical Ventilation:	Exhaust Only: 58 cfm, 15.0 watts.
Interior Mass:	None
Mech Equip List:	Heating: Fuel-fired air distribution, 64.0 kBtuh, 80.0 AFUE. Cooling: Air conditioner, 48.0 kBtuh, 10.0 SEER. Water Heating: Conventional, Gas, 0.56 EF.
Programmable Thermostat:	Heat=No; Cool=No
Ducts:	R-6.0 Attic, exposed
Duct Leakage:	240.00 CFM @ 25 Pascals
Lights/Appliances:	Defaults
Active Solar:	None

REM/Rate - Residential Energy Analysis and Rating Software v12.41

Energy Audits

They are technical

ENERGY STAR

ENERGY STAR HOME REPORT

Date:	March 30, 2009	Rating No.:	
Building Name:	Standard Renewable	Rating Org.:	Standard Renewable Energy
Owner's Name:		Phone No.:	
Property:	1401 SRE Way	Rater's Name:	Bruce Bonderer
Address:	Houston, TX 77007	Rater's No.:	5168840-79
Builder's Name:			
Weather Site:	Houston, TX	Rating Type:	Based On Plans
File Name:	REM Standard Renewable House 20 yr Old.blg	Rating Date:	3/12/2009

Normalized, Modified End-Use Loads (MMBtu/year)

	ENERGY STAR	*As Designed*
Heating:	18.1	20.7
Cooling:	34.4	67.2
Water heating:	9.0	11.6
Lighting & Appliances:	22.1	27.5
Total:	81.6	127.1
HERS Index:	**85**	**132**

ENERGY STAR Mandatory Requirements

[X]	Thermal Bypass Inspection Checklist *	[X]	ENERGY STAR Products *
[ ]	Ductwork Requirements	[ ]	ENERGY STAR Scoring Exceptions

** Thermal Bypass Checklist and ENERGY STAR Products are not checked in REM/Rate at this time.*

This home DOES NOT MEET the energy efficiency requirements for designation as an EPA ENERGY STAR Qualified Home.

Pollution Prevented

Type of Emissions	*Reduction (lb/year)*
Carbon Dioxide (CO2)	0.0
Sulfur Dioxide (SO2)	0.0
Nitrogen Oxides (NOx)	0.0

Energy Cost Savings ($/year)

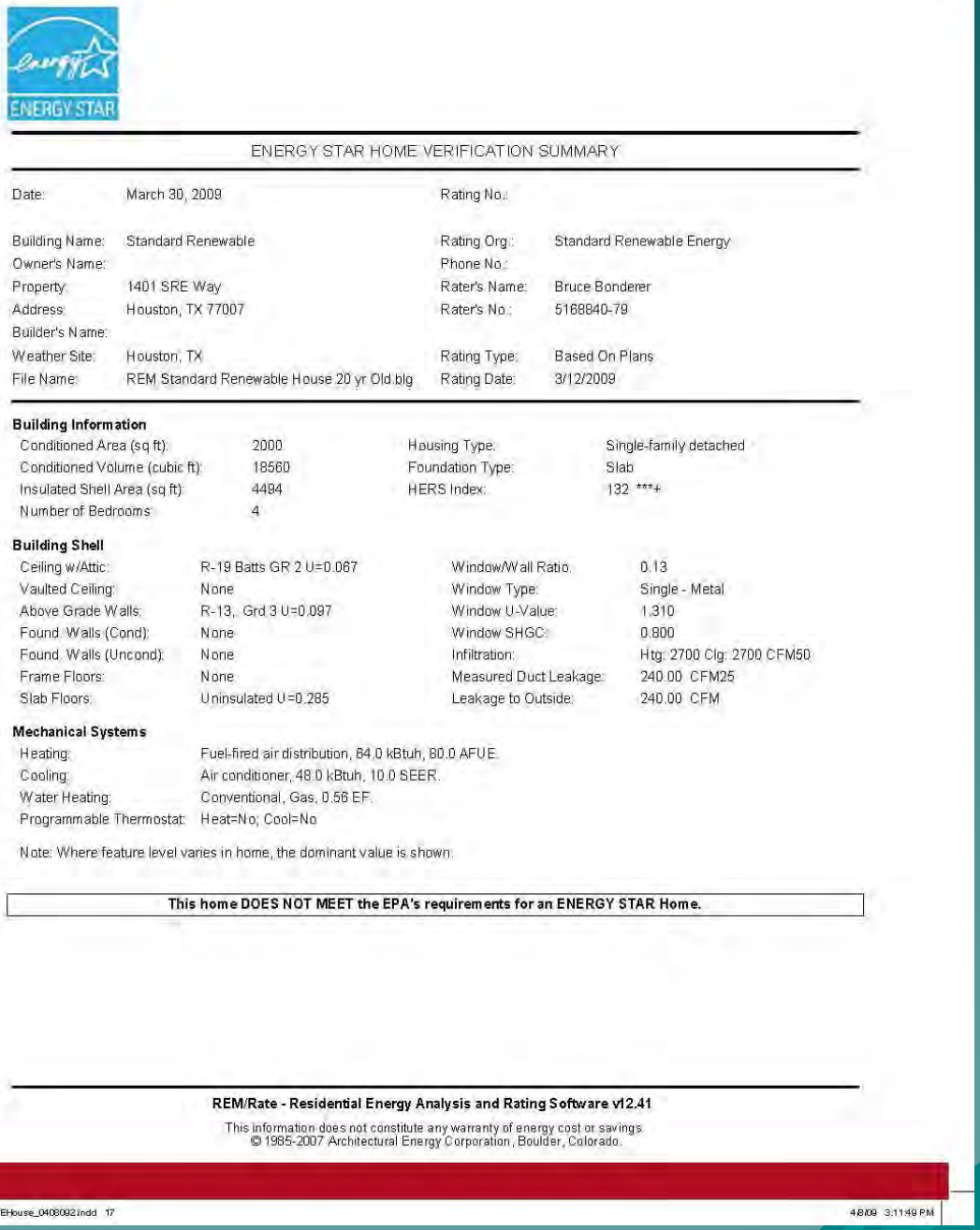
Heating:	$0
Cooling:	$0
Water Heating:	$0
Lights & Appliances:	$0
Total:	$0

The energy savings and pollution prevented are calculated by comparing the Rated Home to the Reference Home as defined in the "Mortgage Industry National Home Energy Rating Systems Standards" as promulgated by the Residential Energy Services Network (RESNET). In accordance with these guidelines, building inputs affecting setpoints, infiltration rates, window shading and the existence of mechanical systems may have been changed prior to calculating loads.

REM/Rate - Residential Energy Analysis and Rating Software v12.41

Energy Audits

They are technical



ENERGY STAR HOME VERIFICATION SUMMARY

Date:	March 30, 2009	Rating No.:	
Building Name:	Standard Renewable	Rating Org.:	Standard Renewable Energy
Owner's Name:		Phone No.:	
Property:	1401 SRE Way	Rater's Name:	Bruce Bonderer
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Builder's Name:			
Weather Site:	Houston, TX	Rating Type:	Based On Plans
File Name:	REM Standard Renewable House 20 yr Old.blg	Rating Date:	3/12/2009

Building Information

Conditioned Area (sq ft):	2000	Housing Type:	Single-family detached
Conditioned Volume (cubic ft):	18560	Foundation Type:	Slab
Insulated Shell Area (sq ft):	4484	HERS Index:	132 ***+
Number of Bedrooms:	4		

Building Shell

Ceiling w/Attic:	R-19 Batts GR 2 U=0.067	Window/Wall Ratio:	0.13
Vaulted Ceiling:	None	Window Type:	Single - Metal
Above Grade Walls:	R-13, Grd 3 U=0.097	Window U-Value:	1.310
Found. Walls (Cond):	None	Window SHGC:	0.800
Found. Walls (Uncond):	None	Infiltration:	Htg: 2700 Clg: 2700 CFM50
Frame Floors:	None	Measured Duct Leakage:	240.00 CFM25
Slab Floors:	Uninsulated U=0.285	Leakage to Outside:	240.00 CFM

Mechanical Systems

Heating:	Fuel-fired air distribution, 84.0 kBtuh, 80.0 AFUE.
Cooling:	Air conditioner, 48.0 kBtuh, 10.0 SEER.
Water Heating:	Conventional, Gas, 0.56 EF.
Programmable Thermostat:	Heat=No; Cool=No

Note: Where feature level varies in home, the dominant value is shown.

This home DOES NOT MEET the EPA's requirements for an ENERGY STAR Home.

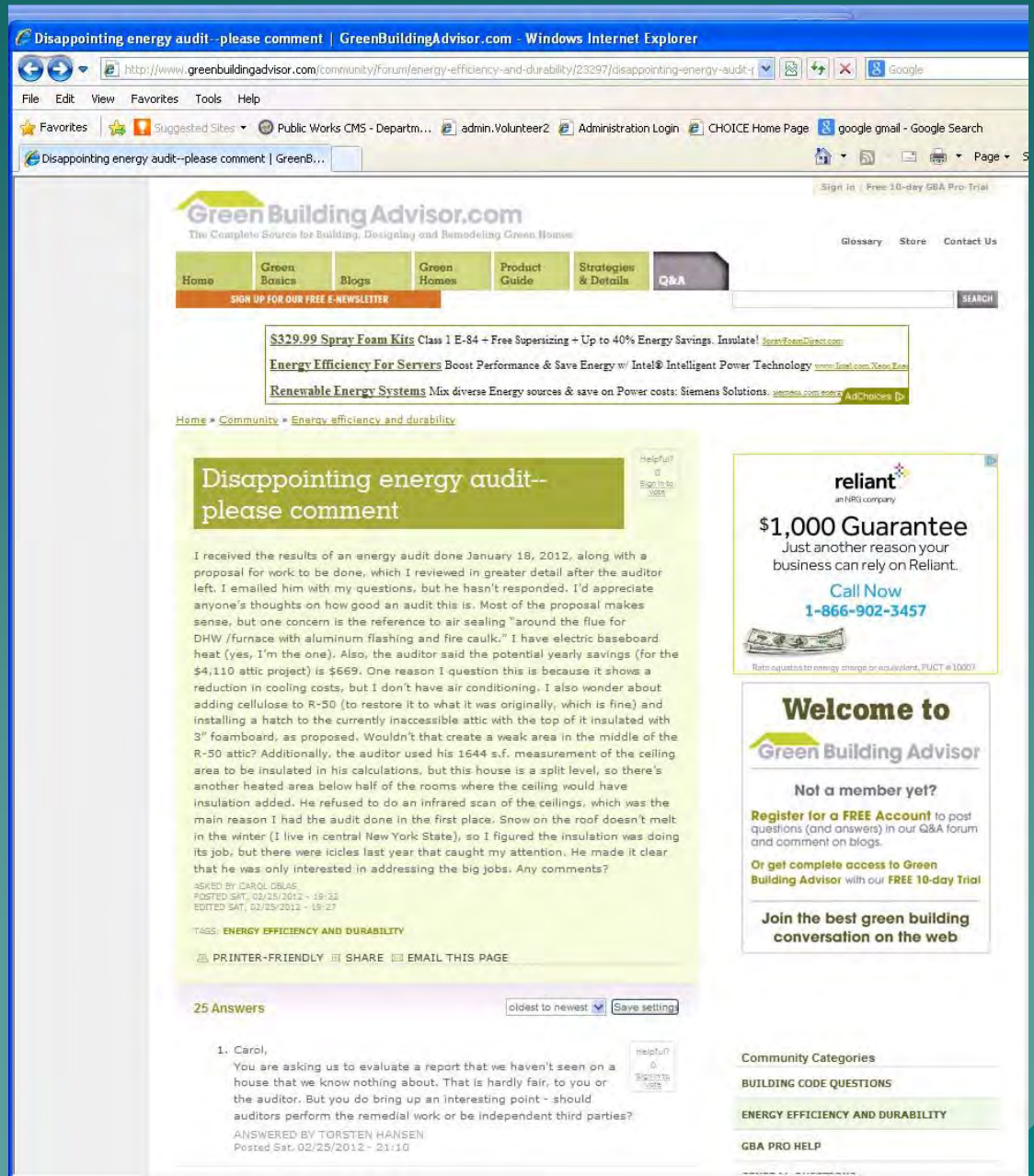
REM/Rate - Residential Energy Analysis and Rating Software v12.41

This information does not constitute any warranty of energy cost or savings.

Energy Audits

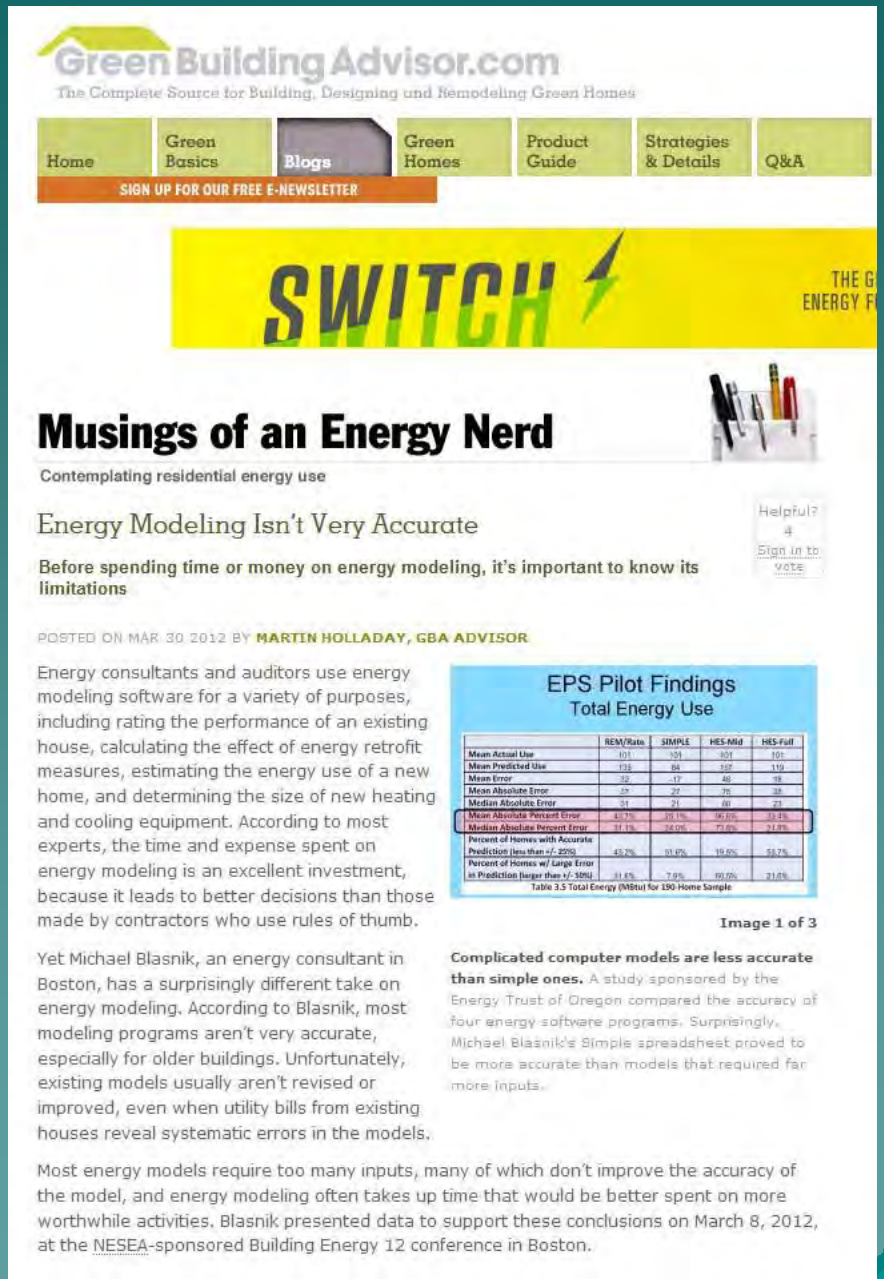
They are technical

Energy Audits



Green Building Advisor. Com Both sides of the story….

Energy Audits



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THE G ENERGY F

Musings of an Energy Nerd

Contemplating residential energy use

Energy Modeling Isn't Very Accurate

Helpful? 4 Sign in to vote

Before spending time or money on energy modeling, it's important to know its limitations

POSTED ON MAR 30 2012 BY MARTIN HOLLADAY, GBA ADVISOR

Energy consultants and auditors use energy modeling software for a variety of purposes, including rating the performance of an existing house, calculating the effect of energy retrofit measures, estimating the energy use of a new home, and determining the size of new heating and cooling equipment. According to most experts, the time and expense spent on energy modeling is an excellent investment, because it leads to better decisions than those made by contractors who use rules of thumb.

EPS Pilot Findings
Total Energy Use

	REM/Rate	SIMPLE	HES-Mid	HES-Full
Mean Actual Use	101	101	101	101
Mean Predicted Use	133	84	107	119
Mean Error	32	-17	46	18
Mean Absolute Error	37	27	76	38
Median Absolute Error	31	21	69	23
Mean Absolute Percent Error	43.7%	35.1%	96.6%	53.4%
Median Absolute Percent Error	31.1%	24.0%	73.6%	21.8%
Percent of Homes with Accurate Prediction (less than +/- 25%)	43.2%	51.6%	19.6%	53.7%
Percent of Homes w/ Large Error in Prediction (larger than +/- 50%)	31.6%	7.9%	59.0%	21.6%

Table 3.5 Total Energy (MBtu) for 190-Home Sample

Image 1 of 3

Yet Michael Blasnik, an energy consultant in Boston, has a surprisingly different take on energy modeling. According to Blasnik, most modeling programs aren't very accurate, especially for older buildings. Unfortunately, existing models usually aren't revised or improved, even when utility bills from existing houses reveal systematic errors in the models.

Complicated computer models are less accurate than simple ones. A study sponsored by the Energy Trust of Oregon compared the accuracy of four energy software programs. Surprisingly, Michael Blasnik's Simple spreadsheet proved to be more accurate than models that required far more inputs.

Most energy models require too many inputs, many of which don't improve the accuracy of the model, and energy modeling often takes up time that would be better spent on more worthwhile activities. Blasnik presented data to support these conclusions on March 8, 2012, at the NESEA-sponsored Building Energy 12 conference in Boston.

Green Building Advisor. Com Both sides of the story….

Energy Audits

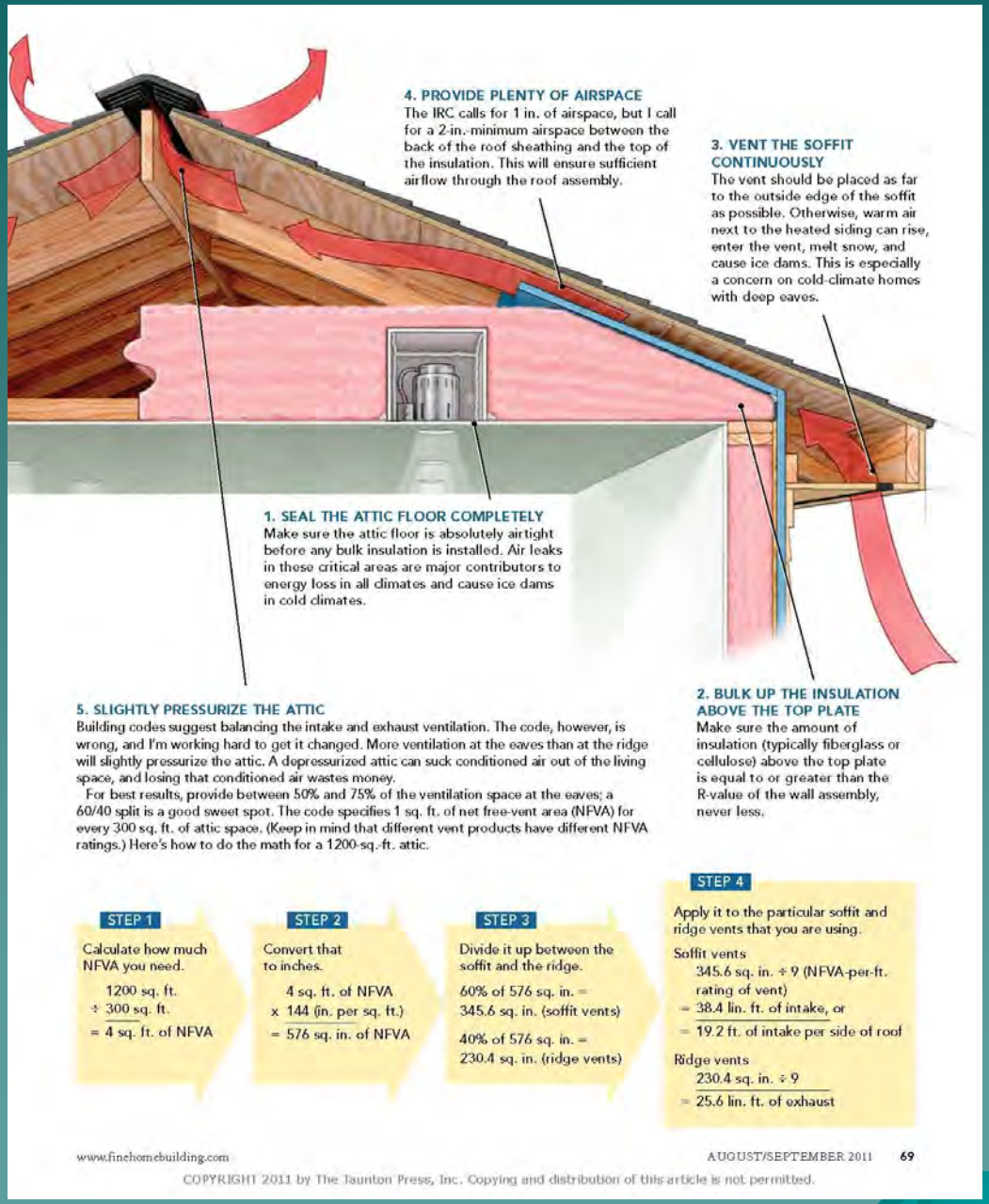
Remember, it's a house, not a science project

Blasnik reminds energy nerds that not every house needs to be a science project. "For energy retrofits, don't waste your time doing simulations with dozens of inputs," he said. "Do the obvious stuff. Just fix the leaky uninsulated house — don't model it. If you need a computer to find out what work you need to do, then you don't know the answer — no matter what the computer says. There are more important issues that come up in a retrofit project, like: Do we have people who know how to do the work? Will they do the work well?"

Energy nerds can get distracted by modeling and testing. "Bruce Manclark, an energy consultant working with Puget Sound Energy, realized that their duct-sealing program would have been cost-effective if only they didn't have to do Duct Blaster testing before and after the sealing," said Blasnik. "So Bruce said, 'Let's not test them.' He called it the 'Duct Ninja' program. He recommended that workers just start sealing — seal the air handler and then seal every single duct connection you can access, without any testing. That way you don't need testing equipment or training in using testing equipment, and you don't need to spend hours testing. A lot of us are getting distracted by tests and computer software. What we really need are efficient processes to improve homes."

Experienced energy retrofit workers rarely rely on models. "When we make retrofit decisions, other factors like experience are more important than modeling," said Blasnik. "Even if you need modeling to make design decisions, you don't have to model every house. Model something well just once, and then apply the lesson to lots of buildings. If a house isn't unique, modeling is a waste of time."

Energy Audits



4. PROVIDE PLENTY OF AIRSPACE
The IRC calls for 1 in. of airspace, but I call for a 2-in.-minimum airspace between the back of the roof sheathing and the top of the insulation. This will ensure sufficient airflow through the roof assembly.

3. VENT THE SOFFIT CONTINUOUSLY
The vent should be placed as far to the outside edge of the soffit as possible. Otherwise, warm air next to the heated siding can rise, enter the vent, melt snow, and cause ice dams. This is especially a concern on cold-climate homes with deep eaves.

1. SEAL THE ATTIC FLOOR COMPLETELY
Make sure the attic floor is absolutely airtight before any bulk insulation is installed. Air leaks in these critical areas are major contributors to energy loss in all climates and cause ice dams in cold climates.

2. BULK UP THE INSULATION ABOVE THE TOP PLATE
Make sure the amount of insulation (typically fiberglass or cellulose) above the top plate is equal to or greater than the R-value of the wall assembly, never less.

5. SLIGHTLY PRESSURIZE THE ATTIC
Building codes suggest balancing the intake and exhaust ventilation. The code, however, is wrong, and I'm working hard to get it changed. More ventilation at the eaves than at the ridge will slightly pressurize the attic. A depressurized attic can suck conditioned air out of the living space, and losing that conditioned air wastes money.

For best results, provide between 50% and 75% of the ventilation space at the eaves; a 60/40 split is a good sweet spot. The code specifies 1 sq. ft. of net free-vent area (NFVA) for every 300 sq. ft. of attic space. (Keep in mind that different vent products have different NFVA ratings.) Here's how to do the math for a 1200-sq.-ft. attic.

STEP 1
Calculate how much NFVA you need.

1200 sq. ft.
÷ 300 sq. ft.
= 4 sq. ft. of NFVA

STEP 2
Convert that to inches.

4 sq. ft. of NFVA
x 144 (in. per sq. ft.)
= 576 sq. in. of NFVA

STEP 3
Divide it up between the soffit and the ridge.

60% of 576 sq. in. =
345.6 sq. in. (soffit vents)

40% of 576 sq. in. =
230.4 sq. in. (ridge vents)

STEP 4
Apply it to the particular soffit and ridge vents that you are using.

Soffit vents
345.6 sq. in. ÷ 9 (NFVA-per-ft. rating of vent)
= 38.4 lin. ft. of intake, or
= 19.2 ft. of intake per side of roof

Ridge vents
230.4 sq. in. ÷ 9
= 25.6 lin. ft. of exhaust

Do you have enough attic insulation?
Are your ducts connected to the unit and NOT leaking?

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Plumbline's Energy Savings Tip of the Month

Lifestyle Habits to Improve Energy Conservation

There are many things you can change in your day to day life that can dramatically cut down on the amount of energy you use. Many of them will not even make a noticeable impact in your day.

- **Take Showers** – Showers require less hot water than baths. Install a water-saving shower head to reduce additional water consumption.
- **Change Timing of Appliance Use** – Use appliances that generate heat, such as the washing machine and dryer, and the oven, during the cooler times of day – early morning or later in the evening. This reduces the amount of air conditioning you will need to use.
- **Be Oven Conscious** – Electric cook tops use a lot of energy. If possible, do not use an electric cook top. Also make sure to use the right size burner for the pan you are cooking with. When selecting a pot or pan, use one with a flat bottom, as it will make better contact with the stove top, and will heat up more efficiently.
- **Try Using Compact Fluorescent Bulbs** – Instead of buying incandescent bulbs on your next shopping trip, try buying compact fluorescent bulbs – these put out four times as many lumens per watt. They also last about ten times as long.
- **Strategically Close Drapes** – In the hot summer months, pay attention to the areas of the house where the sun pours in, making it extremely hot. Close these drapes during the hottest times of the day. Then, in the winder, open the drapes on these windows to maximize the amount of heat from the sun filtering in the house. On winter nights, close all blinds and drapes to keep as much cold air out as possible.
- **Set Your Thermostat** – Set your thermostat to 78 degrees in the summer, and 68 degrees in the winder – this will save a ton of energy, and money on your next energy bill!

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- Do It Yourself Projects
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- Energy Efficiency
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- Furnace sales and Maintenance Denver Colorado
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Lot's of people getting on board

Lot's of people getting on board

Running and cooling a single 6-foot-high rack of servers occupying seven square feet of floor space can consume as much power as would thirty typical California homes.

***Losing Our Cool*, Stan Cox**

Next GBRC Event

City of Houston—Public Works & Engineering

Code Enforcement **Green Building Resource Center**

Presents an Education Seminar

Water Efficient Landscape Irrigation

Houstonians have been fighting too much water for years. Now we worry about drought and we hear that the general future of drinking water supply is a significant concern. What can people do to be part of the solution?

Ron Stevenson will cover smart turf practices, and John O'Donnell will cover smart irrigation practices. Heidi Sheesley and Angela Chandler will talk about the best plants for Houston and enumerate their Smart Plant Practices. Nooreen Jilani will talk about the supply side of water from the City of Houston viewpoint, and Margaret Menger will briefly update us about the Mayor's Task Force review of the draft water shortages ordinance for the City of Houston Drought Plan.

Guest Speakers.....

Ron Stevenson, Manager, *King Ranch Turfgrass*
John O'Donnell, VP of Technology, *WaterLogic*
Heidi Sheesley, Proprietor, *Treesearch Farms*
Angela Chandler, Business Mgr. *Treesearch Farms*
Nooreen Jilani, Engineer, *Public Works Infrastructure Planning*
Margaret Menger, Task Force Chair, *Metro*

Held in the new Green Building Resource Center located in the new Houston Permitting Center on track for a LEED Gold Certification, the GBRC is Houston's best location for seeing displays of green building materials and strategies.

Visit The Green Building Resource Center at **www.codegreenhouston.org** or on facebook twitter

Facebook.com/HoustonGBRC twitter.com/houstonGBRC

When.....

Thursday, October 4, 2012: 6:00 p.m. – 7:30 p.m.

PLEASE RSVP: **Free and open to the public**

Steve.stelzer@houstontx.gov or phone 832-394-9050

Location Details

City of Houston
Houston Permitting Center
1002 Washington Avenue
Houston, TX 77002

Parking Details

Free parking in lot just east and north of the building, meters on Washington & Elder.
Bus Stop: Preston @ Elder

Water Efficient Landscape Irrigation

Thursday, October 4, 2012

6:00 pm to 7:30 pm
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