GEO OUTLOOK

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Tulsa Townhouses Merit LEED Platinum

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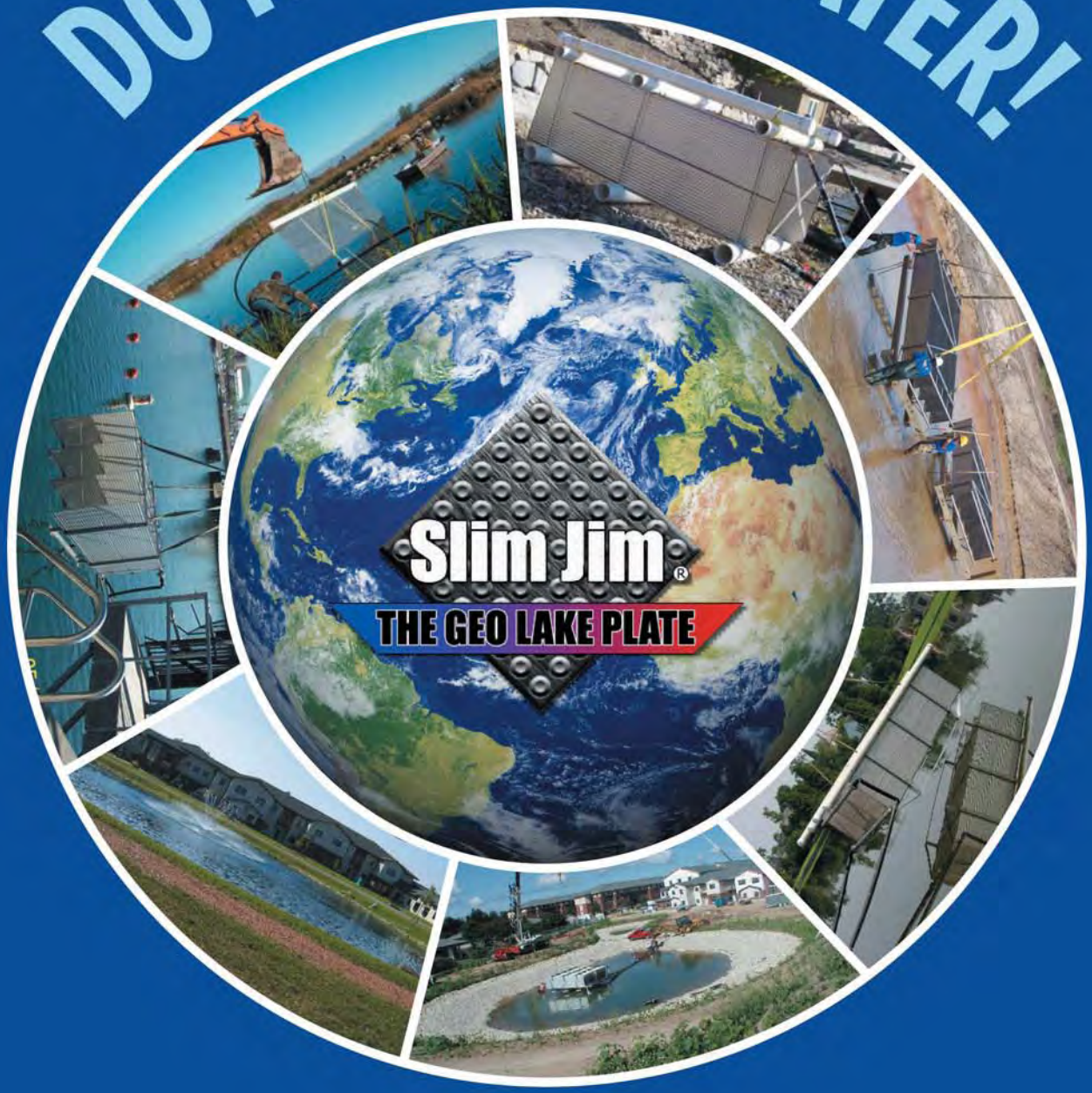

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Geo Outlook

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Directors' Forum

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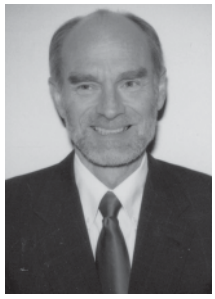

By John Kelly
Executive Director,
Geothermal Heat Pump Consortium

There's good news and bad news!

The bad news is that the housing market is a real challenge these days. For both existing homeowners and for those in the market to buy, things are more confusing than ever. Home mortgages are in a major state of flux, with turbulent conditions including fluctuating interest rates, contract terms, government interventions and tax policies, and the prospects of future bank bailouts (or not).

The good news is that there has never been a better time to install ground source heat pumps to heat and cool homes. Whether for new construction or for retrofit, GSHPs provide added comfort, low maintenance and even lower utility bills, not to mention the peace of mind of using less energy and enabling a smaller carbon footprint.

Buying a home now can be a bargain, and builders can differentiate themselves from their competition by offering GSHP systems. And there are more and more IGSHPA certified installers and Certified GeoExchange Designers available to support the housing market, as training has ramped up to address the dramatic increase in companies signing up for training.

To top all of that, homeowners can now deduct 30 percent of the cost of a GSHP system from their tax bill, with no cap. So a $15,000 GSHP system can enable a $4,500 tax credit in 2009. There's never been a better time to install a 400 percent efficient GSHP.

Notes from IGSHPA

By Jim Bose
Executive Director,
International Ground Source Heat Pump Association

The residential market to a large degree started the ground source heat pump (GSHP) market. Lessons learned from the early beginnings of residential GSHPs are the basis of the standards and installation methods that have been developed across all types of applications. The lower cost residential systems allowed local forward looking contractors to be able to gamble on what has become the premier HVAC system around the world. It is in those areas where early leaders came forward that strong programs are well developed.

That's the good news. But how do we approach the reluctant builder whose background is well anchored in the conventional world and who has a list of contractors who can generate a bid on square footage without looking at the project? When you say that energy consumption can be reduced by 50 to 70 percent through GSHPs and low energy construction techniques what are your sources? Satisfied customers are a must! Sit down sometime and make a list of what you know for sure that comes from reliable sources. Then practice these one-liners on your staff so when customers ask you or your employees about GSHPs, the response will be positive, consistent and believeable.

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Phil Rawlings is the Director of Geothermal Services for Trison Construction, Inc. Mr. Rawlings has been an active member of the ground source heat pump industry since January 1978. He has managed the geothermal marketing groups for leading geothermal heat pump manufacturers, has authored eight patents in industry related technologies, numerous installation manuals, and many magazine articles on the technology. He currently provides overall application support, technical support for major project feasibility studies, thermal conductivity testing, ground loop design, load calculation, and IGSHPA Installer Accreditation training for Trison. Mr. Rawlings is also a Certified Geothermal Designer, with successful projects throughout North America and in numerous foreign countries around the world – from inside the Arctic Circle to Riyadh, Saudi Arabia.

Reva Brown

President
Geothermal Design Associates

Reva Brown has been involved in the geothermal industry for more than 25 years through activities in sales and sales management. In 1991, Brown formed one of the Midwest's first "geothermal only" residential and light commercial contracting companies, Geothermal Design Associates, Inc. Design work has been a vital part of the company's success. Based in Fort Wayne, Ind., Brown works closely with electric utility personnel and builders throughout Northeast Indiana, Northwest Ohio and Southern Michigan to promote the growth of the industry. Geothermal Design Associates, Inc., recently designed and installed work at Fort Wayne's first "geothermal only" development, Heritage of Fort Wayne. With the help of her husband, Lane, who holds a graduate degree in environmental science, the Brown's have designed and supervised the installation of some of the largest lake-coupled systems in the United States. They have also developed innovative equipment for the installation of large horizontal loop fields and lake-coupled systems.

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A simple open stairway contructed using recycled wood leads to the upper level of one of the NINE project townhomes in mid-town Tulsa.

Tulsa Townhouses Merit LEED Platinum

By Linda Allen

Shelby Navarro of ONE Architecture in Tulsa is at the leading edge of sustainable, eco-friendly residential design in Oklahoma – and possibly the nation. Navarro's NINE project, two side-by-side townhouses in mid-town Tulsa recently received LEED Platinum certification for meeting and even exceeding certification requirements.

"We like to call ourselves Platinum Plus because we exceeded the requirements by 10 points," said Navarro, principal of the firm. At the time of certification, less than 40 projects in the world had achieved platinum certification.

NINE is the acronym for New Inspirations for a Natural Environment, the name of this specific project. It is also the philosophy that Navarro incorporates into all his designs.

"I wanted to design, develop and build a sustainable project that allowed expressiveness in the design. The project is a showcase for building techniques in green technology," he said. Navarro's wife and business partner, Rachel, added, "The NINE project allowed him to do some things design-wise that he's always wanted to do."

"It was a great learning experience. No one in this area has done a project like this," said Mickey Payne of Happy Hammer LLC, Navarro's partner and construction contractor for the project.

Navarro said using a ground source heat pump (GSHP) system was an easy decision for him since it met the design criteria of low maintenance and high-energy efficiency. He was also pleased with the environmental benefits inherent in the technology.

"We chose the GSHP system for the NINE project for its overall efficiency, longevity, indoor air quality and LEED certification. It's a great complement for all the other energy saving features. It provides comfort, low maintenance and zone control for the two-level, open plan of the house," said Navarro.

Air Comfort of Jenks, Okla., designed and installed the closed loop vertical system. The system required four 150-foot deep boreholes. Water circulates through polyethylene pipe to heat and cool the units. A two-ton unit manufactured by Florida Heat Pump services each townhouse.

Navarro and Larry O'Malley, loop designer, included energy recovery ventilators (ERVs) to optimize

The back entry shows Navarro's approach to a narrow lot and highlights an upper level balcony.

the system. ERVs automatically reuse system energy to preheat or cool incoming air depending on the season. ERVs reduce the costs of ventilation and maintain a comfortable indoor humidity level. They also used Minimum Efficiency Reporting Value 11 (MERV), the highest rated air filtration, to improve indoor air quality (IAQ) and to remove dust, pollen and spore particles.

Air Comfort has been in business for 40 years with a successful history of over 250 installations. O'Malley praises GSHPs for their longevity and efficiency, especially in new construction. "For efficiency, the system just 'cruises along.' It runs at a high load. All it knows is 68 degrees."

While these benefits are usually the top ones claimed for GSHPs, the environmental benefit is equally important to O'Malley. "A strong environmental selling point is that they emit absolutely no pollutants," he said.

There were only minor challenges to the drilling and installation of the system. A narrow lot bordered by a house, an apartment complex and a large tree presented a slight challenge for drillers. "It rained a lot during the time we installed the GSHP. Of course, it has to go in first. The mud was a challenge." Payne commented.

Another installation challenge became a creative opportunity. During the pouring of the concrete floor slab, the geo-pipes intended to come up through the inside wall shifted and instead came up through the interior floor space. "We had to bend the geo-pipes 90 degrees into the wall, resulting in the refrigerator sitting about six inches above the floor level. It makes for an interesting design element," said Payne.

Total installation cost was $40,000 or $20,000 per unit. Navarro took advantage of state and federal tax incentives to help with construction costs. Credits totaled $12,000 or $6,000 per unit.

Navarro's sustainable ideas and solutions come from his background. Raised by his grandfather on an 80-acre farm in northeast Oklahoma, they practiced the close-to-the-earth lifestyle of their Creek heritage: an organic garden, food sustainability, recycling and passive solar energy. All were a natural way of life for

Navarro before they became popular with the mainstream population. He was raised green and continues to live and practice that lifestyle personally and professionally.

Inspiration for NINE was the concept of a rain barrel to represent man and nature working together to collect rain water. The exterior is sealed cpäar - an abundant resource in Oklahoma - that represents the slats or staves of a rain barrel. A sculptural Corten™ steel wall accents the exterior to simulate the bands of the barrel.

The house is enclosed with a rain screen system that allows water to flow behind the exterior materials, which helps prevent mold. The house also has a green roof for additional insulation, a rain collection system and drought tolerant landscape to adapt to Oklahoma's extreme summer heat.

Navarro combined the contemporary design with the wisdom and practicality of the old ways and his Native American elders to create a comfortable, functional residence. Green technology incorporates eco-amenities from the grass rooftop to the underground GSHP loops in the townhouses.

Energy efficient features for the platinum rated NINE project in addition to the ground-source heat pump, include CF and LED lighting, structural insulated panels (SIP), Star Energy appliances, recycled carpet, recycled paper countertops, tankless water heating systems, dual flush toilets, no volatile organic compounds (VOC) finishes, bamboo floors and aluminum frame windows.

Reclaimed wood is used throughout the townhouses; some salvaged from a 100-year-old farmhouse in Wisconsin; other sections harvested from local trees dam-

Lower level living areas are also simple, but aesthetically pleasing and eco-friendly.

aged in the 2007 ice storm that paralyzed Tulsa and devastated a record number of mature trees.

The Navarro's live in one of the recently completed townhouses and say the GSHP system easily passed the comfort test when temperatures dropped to 10 degrees in early December 2008. The system "cruised along" as designed with no problems. Utility bills are already less with more square footage than their previous residence. Payne estimates about $100 per month in energy costs for each of the 2,276 square foot townhouses.

Efficient construction, resourceful use of materials and Navarro's environmental conscience combined to create a contemporary residence that supports green living. The NINE project also caught the attention of Keep Oklahoma Beautiful Inc., a nonprofit organization that promotes beautification, enhancement and preservation of Oklahoma's environment. NINE received the 2008 award for environmental excellence and beauty in the business division.

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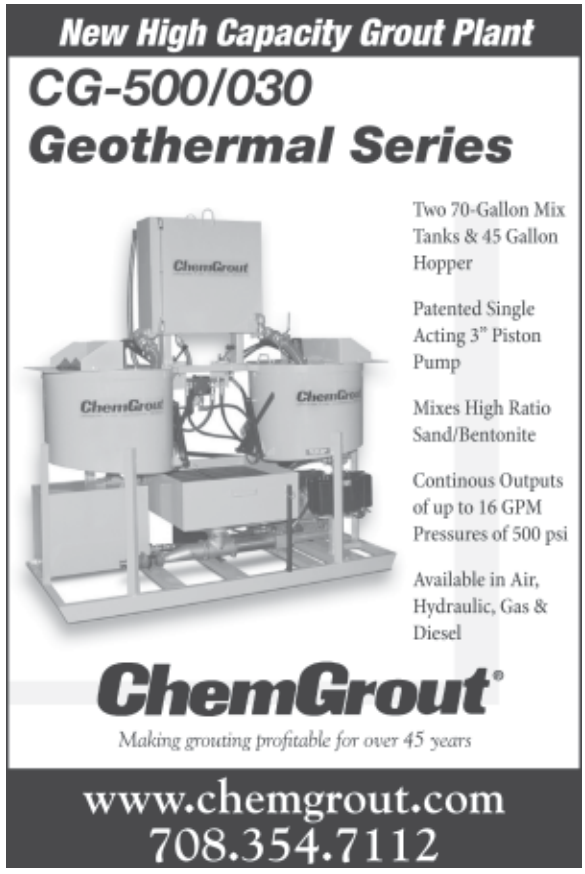
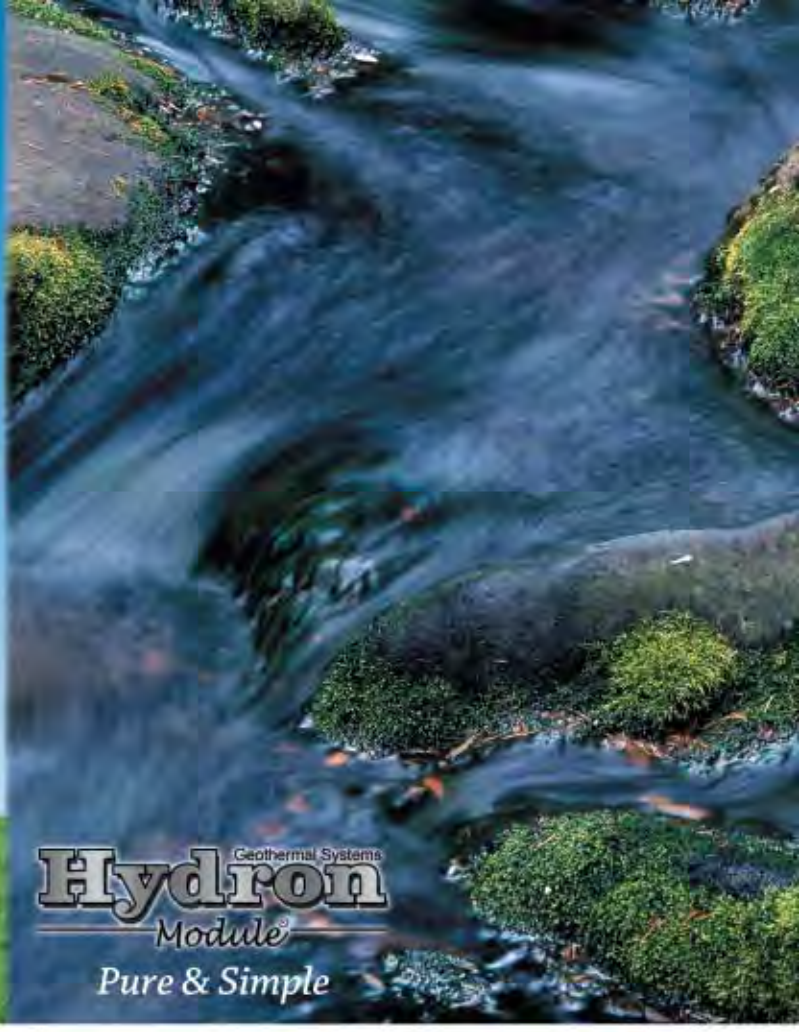
All photos courtesy of Ralph Cole of Ralph Cole Photography. http://www.ralphcolephotography.com





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ClimateMaster Generosity Provides GHPs to Habitat

By Janet F. Reeder

The entry to the Hope Crossing development by Central Oklahoma Habitat for Humanity reflects the high quality of the homes.

Habitat for Humanity's Hope Crossing

housing development in Oklahoma City has become a perfect testing ground for heat pump installation in affordable low-energy housing. The neighborhood's homes incorporate a wide variety of environmental and energy conservation applications including ClimateMaster's geothermal heat pump (GHP) systems.

Ann Felton, CEO of Central Oklahoma Habitat for Humanity (COHFH), is quick to commend Dan Ellis of ClimateMaster for his work promoting that effort.

"Without support from the corporate community and companies like ClimateMaster, Habitat's mission would be greatly hindered," said Felton. "ClimateMaster has stepped up to the plate in a big way and I'm very appreciative to them for their generosity and the active role they have taken in supporting this project."

Felton said efforts to build energy friendly homes will "significantly reduce energy bills for our Habitat families, maximizing their disposable income and increasing quality of life." She said she has already seen that savings applied by single mothers who have been able to return to college, or provide extra opportunities such as dance lessons for their children.

As president of Oklahoma City based ClimateMaster, the world's largest manufacturer of heat pumps, Ellis has a personal investment in COHFH's work in the community. Felton and Ellis, together with Oklahoma Gas and Electric (OG&E), the local electric utility, have formed a viable and beneficial partnership that will continue to influence the energy efficiency of homes built by the Habitat for Humanity International affiliate.

Ellis also sees the Hope Crossing development project as a market transformation tool that shows on a large scale what can be done to provide affordable, low-energy housing. He has set goals for the partnership that involve reducing the total energy demand of the homes to the maximum extent using cost-effective and generally available measures.

Ellis and ClimateMaster began partnering with the non-profit Christian housing ministry Habitat for Humanity's local group for the June 2006 COHFH Builder's Blitz Week. Utilizing the brute force of an army of professional builders volunteering for one week – ten homes were built from the ground up.

Photo courtesy of Central Oklahoma Habitat for Humanity.

Ann Felton, CEO of Central Oklahoma Habitat for Humanity, stands near one of the homes built by the group.

The 2006 Home Builders Blitz was the largest single building event in COHFH's history, as well as Habitat for Humanity's 30-year history. During the Blitz 2006 week, more than 400 homes were built nationwide in just five days.

Ellis says his company was pleased to join with COHFH during the blitz effort because of Habitat's contribution to the community. "Central Oklahoma Habitat is an organization that does so much good and it is an honor for ClimateMaster to be associated with them," Ellis said.

Following through on that earlier partnership, ClimateMaster is now helping COHFH to develop 240 energy efficient homes in a five-phase project on 59-acres

Photo by Janet F. Reeder.

Photo by Janet F. Reeder.

One of the three bedroom brick homes built during Central Oklahoma Habitat for Humanity's 2008 Homebuilders Blitz shows the appeal of Hope Crossing.

donated by Edmond, Okla., real estate investor Stephen Hurst and partners. When completed, Hope Crossing will have the distinct honor of being both the largest GHP housing development and the largest Habitat development in the United States.

Before the Hope Crossing slabs were poured, ground loops were placed under the garage area of each home for the GHP units the company donated and installed. Ellis says the units, all installed by Comfort Works of Goldsby, Okla., will provide long lasting, low maintenance, high-comfort heating and cooling for the new Habitat home owners. The units, ClimateMaster Tranquility 20 models, were installed in utility closets in the garage areas over a 400-foot closed loop, a system design change made to help decrease installation costs. Some units have outside access doors while others are in inside closets in the garage area.

OG&E is contributing funds to underwrite the cost of energy-saving improvements at Hope Crossing that include low-E windows, expandable foam insulation, CFL lighting and energy efficient appliances, said Ken Grant, OG&E managing director of marketing.

"Steve Sullivan really is the guy on the ground working with Habitat," Grant added. Sullivan, who was recruited to the project by Ellis, is coordinator of builder and developer programs in OG&E's Utility Commercial Operations.

"This came out of the relationship that Steve built with Dan Ellis. I really give most of the credit to Dan. He was the one with the energy to get this going," Grant said.

Grant said OG&E has committed to making sure all of the Hope Crossing homes meet OG&E's Positive Energy Standard, the same standard applied to new housing. OG&E is helping Habitat to obtain the $4,000 Oklahoma State Energy Efficiency Tax Credit on each home. Hope Crossing homes will also seek LEED certification.

ClimateMaster also joined with OG&E in funding the installation of solar panels on two homes in the ad-

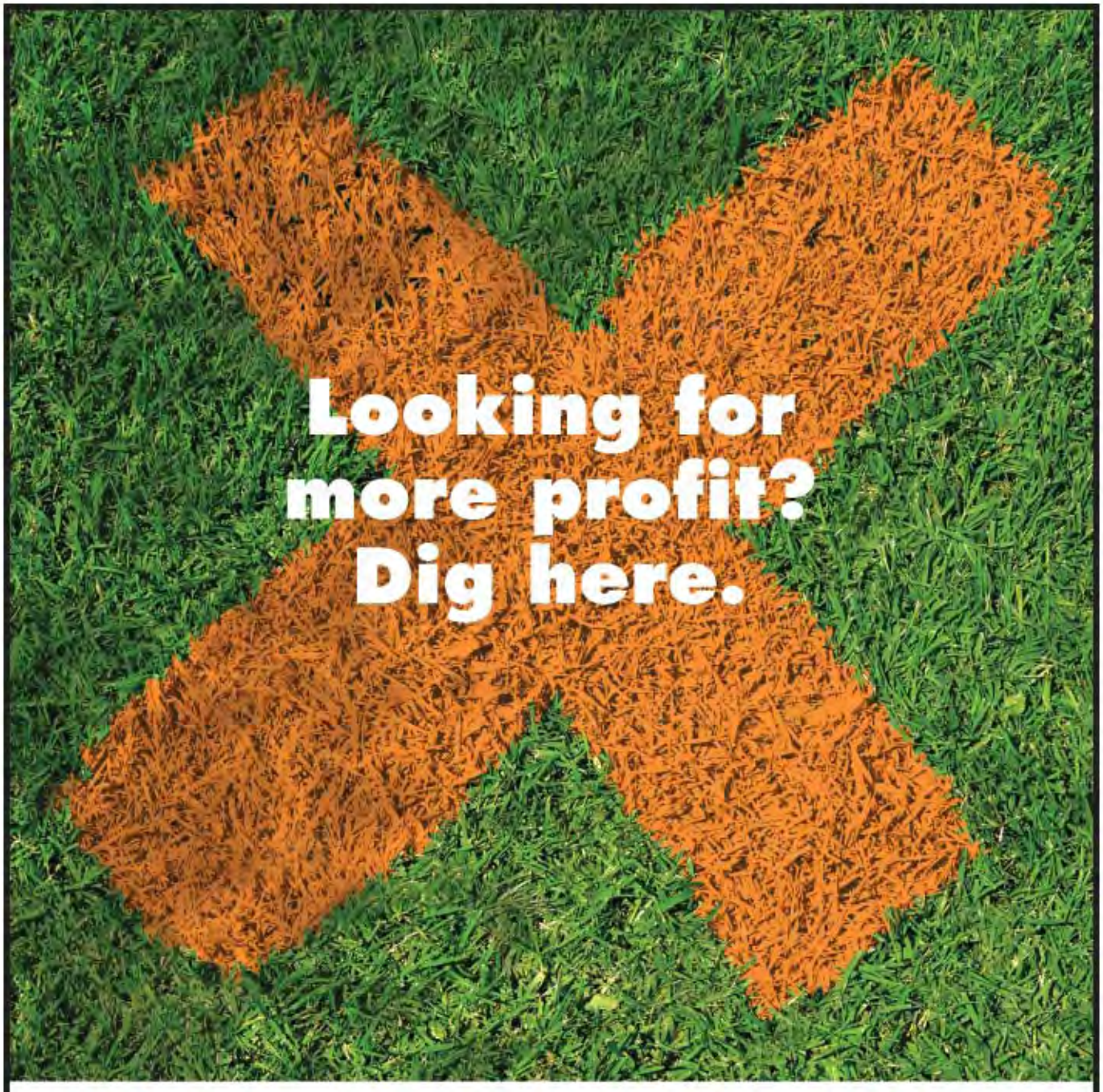

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Photo courtesy of Central Oklahoma Habitat for Humanity.

Dan Ellis and Ann Felton share pride in their partnership during a recent award presentation.

dition as another part of their study. Ellis said the rooftop solar units made at the Oklahoma City ClimateMaster facility, will allow the homes to save more than $1,200 a year in anticipated energy costs over that of previous Habitat homes.

OG&E also inspects the homes and conducts blower door tests. "We make sure the home is as tight as it needs to be," he said. "When it comes to helping Habitat, it doesn't take much coaxing," Grant said. "I think for OG&E, this really has to do with being involved in the community. The Hope Crossing involvement is part of our corporate identity."

The city of Oklahoma City, Chesapeake Energy, 7-Eleven Stores, the Meinders Foundation and the Samuel Roberts Noble Foundation have been instrumental in providing generous grants and support to make the infrastructure – roads, water, sewer and drainage – to Hope Crossing possible, Felton says.

The homes in Hope Crossing are being monitored to see how the GHP units and the high efficiency energy measures perform. Ellis has collected data from COHFH homes using GHPs, and the two homes using GHPs and solar collectors, and made presentations to the 9th International IEA Heat Pump Conference in Zurich, Switzerland, in 2008. The presentation highlighted the in-

corporation of low energy construction techniques and GHP technology for COHFH's affordable low energy housing.

Conclusions from information Ellis presented show that total energy reduction of 50 percent to 75 percent is possible using both GHPs and the extra energy saving measures OG&E funded.

The study estimates that the 240 low energy GHP homes in Hope Crossing will collectively eliminate nearly 1,100 metric tons of CO2 emissions per year, and 22,000 metric tons over 20 years, compared to the standard gas furnace homes typical of prior COHFH developments.

The low energy GHP + Photovoltaic homes studied showed an annual energy use of 19 MMBtu, an annual energy cost of $522 and annual CO2 emissions of 9,825 lbs.

In comparison, the standard gas homes previously built by COHFH have an annual energy use of 95 MMBTu, an annual energy cost of $1,739 and C02 emissions of 25,460 lbs.

Ellis also made a presentation about Hope Crossing and COHFH at the 2008 International Ground Source Heat Pump Association Conference in Nashville. That presentation, which includes more data on energy savings, can be found on the IGSHPA Web site, http://www.igshpa.okstate.edu/ under "Conferences" in the menu bar.

Founded in 1976, Habitat for Humanity is the third largest private homebuilder in the United States, building more than 5,000 homes annually. Worldwide, the group has provided more than a million people with safe, decent, affordable shelter. Through the use of volunteer labor and donations, including corporations such as ClimateMaster, costs are reduced and interest-free mortgages can be made to qualified applicants.

ClimateMaster, Inc., designs and manufactures water-source heat pumps for geothermal and water-source applications for residential, commercial and industrial buildings. Headquartered in Oklahoma City, Okla., ClimateMaster is a subsidiary of LSB Industries. ◆

Photo by Janet F. Reeder.

Dusty Boren, owner of 4 Corners Custom Homes shows the exterior closet where the ClimateMaster unit is installed.

Little People, GREEN WORLD

By Megan Wible

Matt Roloff is a successful salesman and entrepreneur. For years, he sold software systems to Fortune 500 companies. He also established his own business, Direct Access Solutions. His wife, Amy, takes care of the couple's four children, all while holding down two jobs; part-time soccer coach and preschool teacher. They are the typical American family, with one exception: they are shattering boundaries set for people with disabilities. Matt and Amy both have dwarfism and so does one of their children.

On the family's journey to success they experienced numerous ups and downs before coming out on top. For the last four years they have been followed by camera crews for The Learning Channel's (TLC) award-winning docu-series, *Little People, Big World*. Since 1990, the Roloffs have had a 34-acre farm just outside of Portland, Ore., and the show follows them as they work, play and just enjoy being a family. One project recently depicted on the show is the installation of a ground source heat pump (GSHP) system.

"Matt liked the idea of harvesting something on his farm," ECONAR GeoSystems president Del Overholser said. "They grow pumpkins out there, and now, they can use the earth underneath the field for something – he really liked that."

Making the Right Choice

TLC's parent company, the Discovery Channel, wanted to go green and producers decided that in 2008, each of its shows must have two green-themed episodes. When Matt heard of this, he began to research environmentally friendly ways to heat and cool his home. His home was already in the middle of a remodel that included additional living space, a pool and a pool house. Matt asked his heating contractor, Rite Way Heating and Air Conditioning Inc. of Hillsboro, Ore., to tell him about geothermal heating and cooling.

Rite Way, an ECONAR dealer, connected Matt with the Minnesota-based GSHP manufacturer. Overholser flew to Portland in January 2008 to discuss the Roloff's options and assess their property. "They had looked at wind, they had looked at solar, but geothermal was a better fit for the land," Overholser said.

Mark Kennedy, Scott Jones, Susie Overholser and Del Overholser from ECONAR GeoSystems pose for a picture with Matt and Amy Roloff in front of the geothermal loopfield.

Upon meeting with Matt, Overholser quickly learned that reality TV was serious business. "When we first got there and got out of the vehicle, the production crew met us in the parking area and put mics on us," Overholser said. "Then the production crew asked us to leave and come back so they'd have a fresh start."

Approximately 20 minutes of the 30-minute show was about GSHPs, starting with Overholser's initial meeting with the family and continuing through the installation. During that first meeting, Matt and Amy's son Zach overheard Overholser explaining geothermal as a refrigerator and later said, "My dad's had a lot of ideas in the past, but now he wants to bury a refrigerator

ECONAR president Del Overholser discusses geothermal with Matt Roloff as a cameraman films them for TLC's award-winning docu-series, Little People, Big World.

under the pumpkin patch to heat our house." This quote became one of Overholser's favorites of the episode, he said.

All in the Family

The Roloffs were convinced that geothermal heating was right for them, and equipment started being shipped from Minnesota to Oregon in February 2008. Next, ECONAR installed the loopfield and in March, Rite Way finished the GSHP installation. "There were actually three parts to the job: the remodel of the existing house that they're actually living in, the new construction to triple the size of their house, and then there's the swimming pool and the pool house." Overholser said. Using his personal backhoe, Matt dug a 100-square-foot hole for the slinky installation. "A slinky installation was chosen because the Roloffs have

Zach, Jacob and Molly Roloff were fascinated by the slinky coils that were to go in the ground. The system has 12 slinky coils that are 3/4-inch by 600 feet for a total of 7,200 feet.

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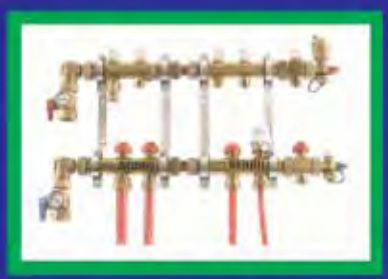

Each ground loop circuit can be balanced individually using the PRO-BALANCE manifold.

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One of ECONAR's managers, Scott Jones, makes sure everything in the mechanical room is running properly. The Roloff's geothermal systems consist of two forced-air units and a hydronic unit for the pool.

the land space and the track hoe needed for the slinky loop design," ECONAR training and product application manager Scott Jones said.

Matt's involvement, along with the kids, added a human interest aspect to the episode, but Overholser wanted to make one thing clear: "I don't want the population of the United States to see this as a do-it-yourself project – it's not. You have to call the experts."

Getting Technical

The Roloffs have three units on their property for a connected capacity of 12 tons. This consists of two forced-air units that are three and five tons plus a 4-ton hydronic unit for the pool. The high-density polyethylene pipes use ECONAR GTF with 50 percent water as the circulating fluid, making the end result 20 percent methanol by volume. The 12 slinky coils are 3/4-inch by 600 feet for a total of 7,200 feet. There is also 200 feet of 2-inch header pipe.

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All construction on the house was completed in May 2008 and the next month the Roloffs hosted a party for all the people involved in the project. "They are a great family and after going out there twice for the initial talk and install we were invited for a Hollywood-style party," ECONAR creative director Susie Overholser said. "We brought our kids and had a great time."

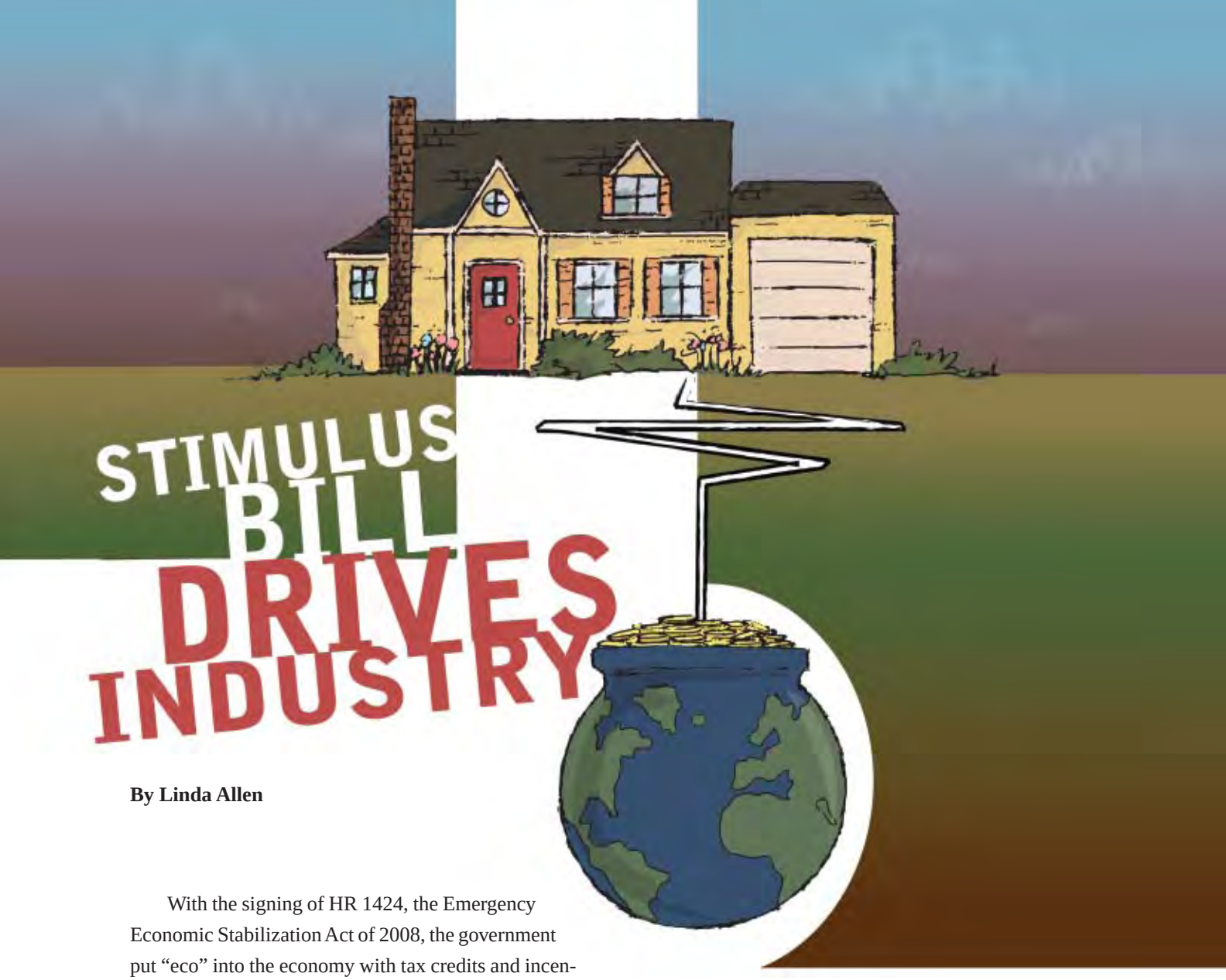
The total installation of the system was approximately $58,000, which included removal of the previous system. Annual savings for home heating, cooling, pool heating and domestic hot water are estimated at $4,855 with current fuel and electric rates, Jones said. The Roloffs and Overholser talk on a semi-regular basis and there has only been one problem with the system to date.

"Amy called us in October and said she had a problem with her geo-system," Overholser said. "She said, 'it's too warm in here,' and then she laughed before saying, 'it's never been warm in our house before and we love it, but it actually is a little warm.' We sent the contractor to go and check things out for them."

Remodeling and expanding the house is only one of many projects Matt has taken on. Past projects include a three story tree house, a life-size pirate ship and castle complete with a mote, and a 10 building model of a Western town. Each fall, the public can tour Roloff Farms and hand select pumpkins, the farm's main crop.

The episode including the GSHP installation, titled "The Heat is On," first aired in September 2008 and is now played during reruns of the hit show. The popularity of the show was a success for the entire geothermal industry, Overholser said. "I think we all worked together, and the producers put together a very, very good program for geothermal in the sense that you walk away with the feeling that geothermal is for everybody," Overholser said. "They fulfilled their name The Learning Channel."

Photos courtesy of ECONAR GeoSystems.



STIMULUS BILL DRIVES INDUSTRY

By Linda Allen

With the signing of HR 1424, the Emergency Economic Stabilization Act of 2008, the government put "eco" into the economy with tax credits and incentives to encourage alternative energy construction and improvements. Energy incentives encourage forward-thinking solutions to long-term problems and challenges. New incentives will benefit the consumer as well as contractors, energy producers and manufacturers.

Tax incentives and rebates offer a win-win solution to energy producers and end-users.

Estimates by the American Council for an Energy Efficient Economy (ACEEE) predict tax incentives from 2006-2020 could reduce consumer energy bills by $27 billion, prevent 51 million metric tons of carbon emissions and reduce peak electric demand by more than 6000MW. This is equivalent to 20 medium-sized power plants. Other benefits are reduction in air pollution and green house gas emissions.

Benefits of geothermal energy are known and promoted by the construction industry. While government and educational institutions have long been the forefront users of the technology, the industry is expecting new growth in other sectors.

The evolution of green technology from an eco-friendly trend to increasing mainstream acceptance will be more of a factor as the construction industry ramps up its efforts to produce energy efficient public and commercial buildings and private residences.

Once considered a high-dollar construction option, geothermal is gaining use and popularity as homeowners opt for long-term, lifetime savings. The upfront investment of additional construction costs is now considered

in terms of return on investment (ROI). Additional new tax incentives and rebates for residential installations make ROI terms look more and more attractive in that market.

Specifics of HR 1424 pertaining to geothermal technology and ground-source heat pumps (GSHPs) include:

- A 30 percent tax credit on the cost of a GSHP up to $2,000. The GSHP must be Energy Star rated. The credit will be available through 2016 and is retroactive for 2008.
- A new tax credit of up to 10 percent of the cost of combined heat and power systems. The system must achieve at least 60 percent efficiency with up to 50 MW capacity. These credits can be used to offset the alternative minimum tax (AMT).
- A five-year extension of the deduction for energy-efficient improvements to commercial buildings through 2013. Up to $1.80 per square foot of building floor area for buildings achieving a 50 percent energy savings target is deductible.
- A one-year extension of the $500 home improvement tax credit for installation of energy efficient windows, insulation, heating and air-conditioning, heat pumps, and hot water heaters. Unused portions of tax credits from 2006-2007 can be used in 2009.
- A one-year extension of the new energy-efficient home tax credit. Currently, contractors of new homes that achieve a 30 percent reduction in energy consumption can receive a tax credit of $1,000. Homes meeting the 50 percent standard are eligible to receive $2,000. This tax credit ends in December 2009.
- Authorization of $800 million of energy bonds to finance facilities that generate electricity from geothermal and other alternative energy sources. The authorization is divided into thirds: one-third for state, local or tribal governments; one-third for public power providers; and one-third for electric cooperatives.

Tax credits are available to both businesses and individuals. A tax credit will lower the amount of federal income tax for taxpayers by matching the product purchase price dollar for dollar. The benefit of a tax credit is that it will increase the tax refund paid or decrease the tax amount owed, while a tax deduction lowers the taxable income.

Illustrations by Ryan Johnson.

FIND THE LATEST INFORMATION

Alliance to Save Energy (ASE)
http://www.ase.org
American Council for an Energy Efficient Economy (ACEEE)
http://www.aceee.org/
Database of State Incentives for Renewable Energy (DSIRE)
http://www.dsireusa.org/
McGraw-Hill Construction
http://www.construction.com/
National Association of Home Builders (NAHB)
http://www.nahb.org/
National Rural Electric Cooperative Association (NRECA)
http://www.nreca.org/
Tax Incentives Assistance Project (TIAP)
http://www.energytaxincentives.org/
U.S. Green Building Council (USGBC)
http://www.usgbc.org/

Credit for product purchase is claimed on the federal tax form at time of filing. In addition to the special tax form, taxpayers must produce purchase receipts and manufacturer's certification. Check with your tax accountant for eligibility and filing requirements.

To qualify for tax incentives, GSHPs must meet Energy Star criteria: for a closed loop system, 14.1 EER and a coefficient of performance (COP) of at least 3.3 for an open-loop system; 16.2 EER and 3.6 COP for a direct expansion system, 15 EER and 3.5 COP. Geothermal heat pumps must include a desuperheater to help heat water or an integrated water heating system.

In addition to federal tax incentives, many states and electric co-ops offer tax credits and rebates for GSHPs. The Database of State Incentives for Renewable Energy (DSIRE) is a comprehensive information source for eco-savings. The database provides current information about renewable energy and energy efficiency incentives. Incentive information can be accessed by individual state using a clickable map of the United States that provides financial incentives and rules, regulations and policies. The site also includes categories on eligibility, types of incentives, resources links and contact information for each state.

According to the site, the information is updated as soon as it is available, usually daily. Information sources include federal agencies, state energy offices, public utility commissions, renewable energy organizations and the news media.

Geothermal technology and GSHPs are often a part of LEED certified projects. Projects awarded LEED Platinum certification are eligible to receive a rebate for all certification fees except registration fees, appeal review fees and additional fees to expedite certification. Rebates apply to new construction; existing buildings; commercial interiors, core and shell; and schools.

Research from the National Association of Home Builders (NAHB) and McGraw Hill Construction in their 2009 Outlook Report indicate the markets for new green home construction and remodels are growing even in a down economy. In these markets, tax incentives and rebates can stimulate economic growth for the GSHP industry through additional job opportunities and product sales making eco-friendly technology available to more consumers at all income levels.

Editors note:

Since this article was written, the new Congress passed the American Recovery and Reinvestment Act of 2009, commonly referred to as the "Stimulus Bill." New incentives that will apply to the geothermal heat pump industry include greater tax breaks for the federal government, states, cities and consumers who elect to improve energy efficiency in buildings, schools and homes. Department of Energy guidelines for projects are to be released by summer.

Homeowners who are interested in heat pump technology can find a summary of the new tax incentives at http://www.geoexchange.org/ by clicking on Stimulus Bill Increases Homeowner Tax Credit.

Extreme Makeover: Home Edition

By Marie Kadavy

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The Akers family vacationed in San Francisco last July as volunteers and ABC's Extreme Makeover: Home Edition *crew transformed their West Chester, Ohio home.*

Seven days isn't long to build a house, but for a deserving family, ABC's hit television show *Extreme Makeover: Home Edition* takes on the challenge. Time constraints, jobsite obstacles and hundreds of volunteers can complicate things, but working together in the spirit of giving allows workers to complete–in just one week–a four-month job.

International Ground Source Heat Pump Association (IGSHPA) members Jackson Geothermal and WaterFurnace International experienced the whirlwind process firsthand in July 2008 when the companies donated equipment and volunteer hours to provide energy-efficient heating and cooling for the Akers family dream home.

Greg and Ginger Akers bought a home in West Chester, Ohio, with plans of starting a family. What they didn't expect is their three children would eventually be diagnosed with life-threatening conditions, which would make mobility difficult in their bi-level home.

Jackson Geothermal needed just 16 hours to drill the ground source heat pump system's six 150-foot boreholes in the home's front yard.

Both Brooke, 7, and Faith, 4, were diagnosed with Spinal Muscular Atrophy, and Christian, 11, was diagnosed with Crohn's Disease. Brooke's 200-pound wheelchair did not fit inside the house, and Ginger even injured herself from carrying the girls, who could not move around the house independently.

Medical bills left renovation and relocation out of the question, but the children's high spirits were recognized by a community who nominated them for *Extreme Makeover: Home Edition*. The design team and hundreds of volunteers, including employees of Jackson Geothermal and WaterFurnace, answered the call to surprise the family with a safe and comfortable home. The *Extreme Makeover* crew had just seven days to rebuild a more accessible Akers home while the family vacationed in San Francisco last July.

The First of Its Kind

"This was the first geothermal home *Extreme Makeover: Home Edition* has ever done," Jim Jackson, president and CEO of Jackson Geothermal, said. "They want to start incorporating more green within their homes." For the first time, ABC chose to install a ground source heat pump (GSHP) system in a home makeover as part of a larger effort to include environmentally friendly features in the TV series.

"*Extreme Makeover: Home Edition* has always felt a responsibility to showcase energy efficiency and sustainable building practices," said Diane Korman, *Extreme Makeover: Home Edition* senior producer. "Many extreme homes focus on reducing energy requirements, enhancing indoor air and water quality, and preserving natural resources. Our first green-certified home was

Photo courtesy of Duke Energy.

Preparations made in advance and components built off site, such as the ground source heat pump system's duct work, allowed volunteers to rebuild the house in one week.

Photo courtesy of Duke Energy.

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Ty Pennington, the design team leader and carpenter, and the rest of the Extreme Makeover: Home Edition *crew ensure the different trades work together to overcome obstacles.*

built in January of 2005, and we have been committed to green building ever since."

Extreme Makeover relied on builder Scott Dallis of Dallis Designer Homes to lead the project, Korman said. Due to limited space on the property and the jobsite, a vertical system was selected as the best option, and after a number of manufacturers recommended Jackson Geothermal, the company was ultimately contacted to drill and install the ground loops for the residence. Jackson Geothermal, like the other vendors, volunteered its labor and equipment for the fast-paced project. WaterFurnace and its dealer, Geothermal Solutions, donated all of the products for the GSHP system and executed the interior installation.

Teamwork Eases Hard Work

Despite working around the clock in the driving rain, Jackson reported a limited number of challenges. *Extreme Makeover* blocked off an area in the house's front yard for the drilling, and the only time constraint drillers faced was waiting for the roof tresses to be set before they could move the rig into the space. The team worked with one air rotary drill on site with another on standby in the parking lot nearby.

Drilling of the six 150-foot boreholes began one evening at 6:30 p.m., and Jackson and his employees worked through the night until the job was finished at 11 a.m. the next morning. Target production of one 5-inch bore every two hours was met although the operation had to be shut down when a lightning storm moved through the area. The crew had 24 hours to drill the boreholes and connect the system, but needed just 16.

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Photo courtesy of Jackson Geothermal

Jackson Geothermal donated equipment and volunteer hours to provide a more accessible and energy-efficient home for the Akers.

Terry Ferguson, western Ohio territory manager of WaterFurnace, knew the project would be demanding, but preparations made in advance helped things run smoothly, he said. "There were no regular days," Ferguson said. "Everybody was very ready though. As much ductwork that could be built ahead was. It went like clockwork." Geothermal Solutions, of Lebanon, Ohio, and Hill Air, of Fairfield, Ohio, had just four hours to install the 6-ton WaterFurnace Envision unit and put in the home's ductwork.

Jackson said this project was similar to other residential jobs other than the high production and the co-ordination of the effort. "You had to stay out of everybody's way," Jackson said. "We had to work along side all of the trades, but everyone got along very well."

Korman stressed the importance of teamwork on each *Extreme Makeover* site. "On no other job site will you see so many subs and trades who are typically competitors working together to overcome obstacles and race against the clock to build a quality house for a complete stranger," Korman said. "The build team is the true heroes of the show, and we could not do it without them."

A Lasting Gift

Ferguson recalled meeting a man who asked about geothermal technology the night of the system's installation. "I said, 'This unit is very efficient, and it is pro-

Photo courtesy of Duke Energy.

ABC's Extreme Makeover: Home Edition *has been committed to green building since 2005, and the Akers' ground source heat pump installation was a show first.*

jected to save them a couple thousand dollars a year in operating costs.' He started tearing up, and he said, 'I am the grandfather of the family, and this is just a tremendous thing that everybody is doing. To be able to save that much in operating costs is just great.'"

Ferguson and WaterFurnace project the GSHP system will save the family an average of $2,000 a year in operating costs compared to a high-efficiency gas furnace and air conditioner. After the family returned, Geothermal Solutions did a walkthrough with the family, showed them how the thermostat worked and talked to them about the operating costs. Although the system's installation wasn't a highlight of the show, Ferguson and Jackson expect the savings to make a difference for the family.

"With the family's financial stresses with their medical bills, I think the reduced energy costs of heating and cooling the house will be a tremendous burden lifted off of them." Jackson said. ◆

Photo courtesy of Duke Energy.

The 6-ton WaterFurnace ground source heat pump system is expected to save the family an average of $2,000 a year.

2008 IGSHPA Conference in Nashville Shows Growth

News good for GSHP industry

By Janet F. Reeder

For those who attended the 21st annual International Ground Source Heat Pump Association (IGSHPA) conference in Nashville this fall, news of the energy credits tied to the Emergency Economic Stabilization Act of 2008, released just prior to key conference sessions, was the best news the GSHP industry has heard in years.

IGSHPA, a non-profit member driven association based on the Oklahoma State University campus in Stillwater, Okla., has been working to promote ground source heat pump technology for 21 years, since Jim Bose, OSU professor and director of the group revived the technology in the 1980s.

"It is really important to us," Bose said of the tax news, "because it is the first time that we are being tied to renewable energy. It opens up tax incentives and credits we have not had."

An industry founded and based in Oklahoma that now circumvents the globe, GSHP technology, manufacturing and training are all heavily represented in the state. ClimateMaster, the industry's largest manufacturer of GSHP units, and a strong lobbying force for tax incentives in Washington, D.C., is located in Oklahoma City. Industry training is also centered in Oklahoma, at the IGSHPA headquarters on the Oklahoma State University campus in Stillwater.

For Dan Ellis, president of ClimateMaster, the conference was a real success. He said the energy credits should provide a stimulus to the industry from

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homeowners, an area that has lagged behind commercial, military and educational institution installations for years largely due to initial costs.

Attendees of the Nashville conference included nearly 600 engineers, architects, builders, HVAC installation experts, manufacturers of pipe, GSHP units, pumps, drilling rigs and others involved in the expanding geothermal heat pump realm. International members of IGSHPA were also in attendance from Greece, Romania, China and Canada, among other countries represented.

Enrollment in three classes offered to installers, drillers and system designers packed out the rooms as attendees sought accreditation and training in the industry.

The renewable energy incentives will now allow for up to a $2000 tax credit for homeowners who have installed in 2008 or will install geothermal heat pumps through 2016. The Long-term Extension and Modification of the Residential Energy-Efficient Property Credit also includes provisions for solar and small wind investments. It is the first federal tax incentive garnered by the geothermal heat pump industry for homeowners. ◆

Editor's note:

The Stimulus Bill signed February 17, by President Obama, eliminates the $2,000 limit on the 30 percent tax credit for homeowners who install GSHP systems in 2009 and later. Systems placed in service in 2008, still have the $2,000 limit.

Photos by Janet F. Reeder.

Earth Insights

If you have a question about geothermal installation, design or troubleshooting, send it to Phil Rawlings in care of *Geo Outlook*, Oklahoma State University, 374 Cordell South, Stillwater, OK 74078 or via e-mail to igshpa.news@okstate.edu.

Incentives for GSHP

Late last year when the "bail out" bill was passed, there were complaints about the amount of "pork" attached to that bill. However, some of that "pork" is of great benefit to the GSHP industry. Thanks to the efforts of Dan Ellis and others, as well as the members of Congress that approved the program, the GSHP industry now has a federal incentive program similar to those other "alternative" or "green" energy related technologies (wind, solar, etc.) are currently enjoying or have enjoyed in the recent past.

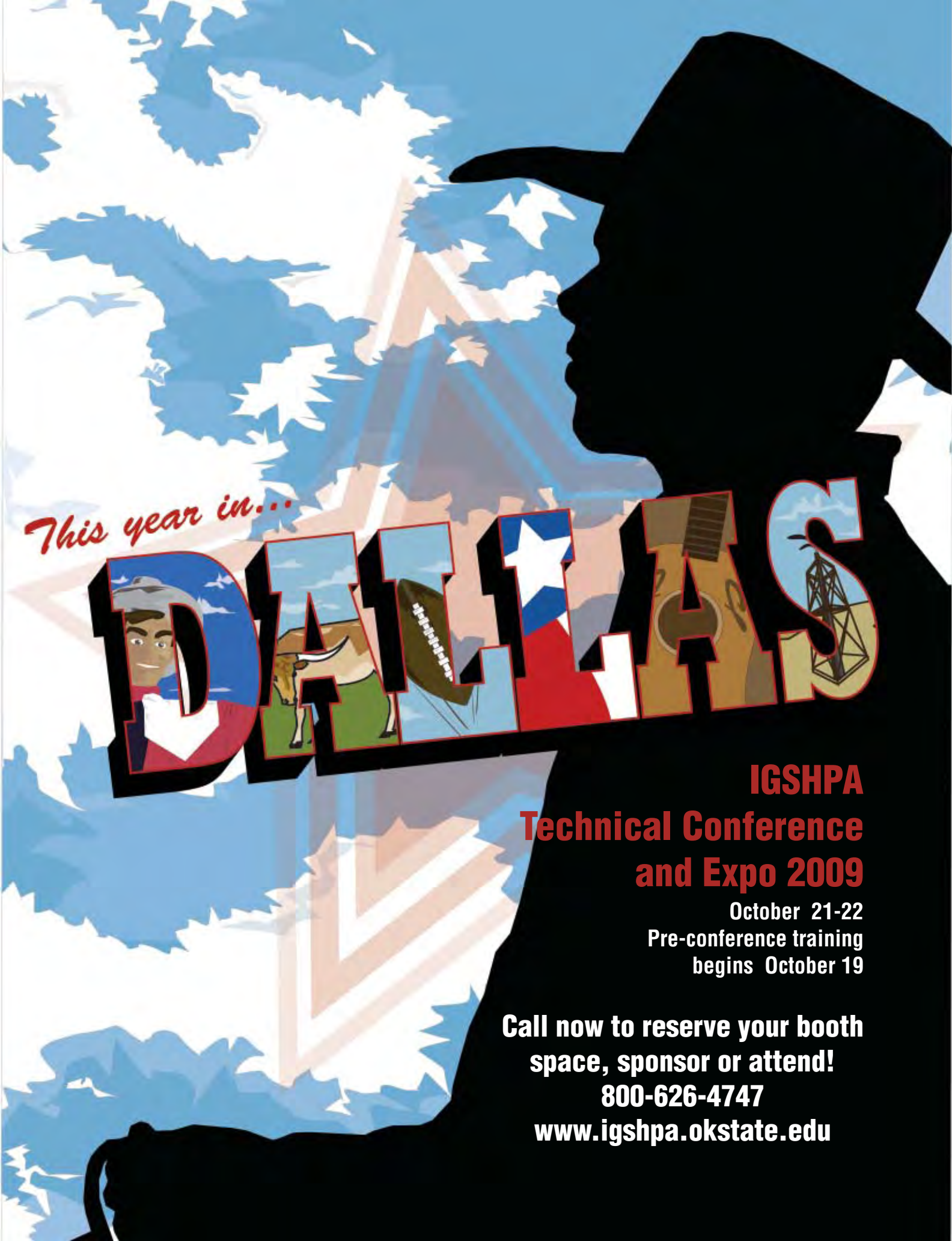
This program applies to both commercial and residential GSHP applications. Each new commercial GSHP application can apply for a one time federal tax credit of 10percent. Each new residential application can apply for a one time federal tax credit of up to $2,000.

Because of the global warming and energy issues that have filled the headlines over the last few years, energy awareness in the United States may be as high as during the oil embargo of the '70s, perhaps even higher. This increased awareness has resulted in a grass roots level move toward energy efficiency and conservation.

Traditional demand side management GSHP industry allies like Power Companies and Rural Electric Cooperatives either have begun or are considering GSHP promotional or incentive programs. The same types of programs are in place or being considered by some states. This will not happen overnight, and will not happen in every state, Power Company, or Rural Electric Cooperative, but support is growing.

The industry was growing without these incentives. Now, the GSHP industry has an unprecedented opportunity for increased growth and overall HVAC market share increase. Let's use quality products, quality designs and installations, trained professional designers and installers, business integrity, and a growing satisfied customer base to build this industry like never before.

Mr. Rawlings has more than 30 years experience in the geothermal industry. He is a Certified GeoExchange Designer (CGD) and an IGSHPA Accredited Installer and Trainer.



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