Geothermal Tax Credits Included in House Tax Bill

By Doug Dougherty, President & CEO
GEO – The Geothermal Exchange Organization

On Nov. 2, the U.S. House of Representatives released H.R. 1, the Tax Cut and Jobs Act, to reform the federal tax code. The Geothermal Exchange Organization (GEO) was pleased to see that the extension of residential and commercial tax credits for geothermal heat pumps that we have worked so hard for was included in the bill. This is a huge victory for the geothermal heat pump (GHP) industry, its customers and contractors.

The strong, coordinated campaign led by GEO for the past two years has resulted in Kevin Brady (R-TX), Chairman of the House Ways and Means Committee, and Paul Ryan (R-WI), Speaker of the House, agreeing with our position that Congress picked winners and losers when tax credits for solar and wind were extended in December of 2015, but not for GHPs. Since then, GEO has worked tirelessly to fix this tax inequity.

The language contained in the tax reform bill mirrors the language found in H.R. 1090. It would extend the residential and commercial tax credits until January 1, 2022. The residential income tax credit would be retroactive back to January 1, 2017 at 30% and continue at that level until 2020 when it would drop to 26% and then at 22% for 2021 and end December 31, 2021. The 10% commercial investment tax credit would be extended until January 1, 2022 and change the language for placed in service to “property the construction of which begins before Jan.1, 2022.”

Please remember this action is not yet law. No business decisions or marketing efforts related to geothermal heat pumps should be made in reference to this action by Congress.

GEO continues to work with both houses of Congress to enact legislation that would give GHPs an extension of residential and commercial tax credits. House acceptance of the provisions of H.R. 1090 in the Tax Reform bill marks a significant step toward achieving our goal of tax parity for our technology. But there remains much to do.
The House may vote as early as this week on its H.R.1 tax reform bill. The Senate released its version of the tax bill on Nov. 9. We are now working to make sure that both commercial and residential tax credits are part of that legislation, which the Senate is expected to move on soon in hopes of meeting President Trump’s stated goal of signing a bill before Christmas.

Regardless of inclusion in the Senate tax bill, GEO will explore other opportunities, including getting our tax language added to an end-of-year Omnibus bill. GEO staff and Board members will conduct yet another Fly-In to Washington, D.C. the week after Thanksgiving to press Congress to fix the current tax inequity faced by our industry.

Again, inclusion of our tax credits in the House tax reform bill is a tremendous victory for the GHP industry. Thanks to all who helped us to accomplish this major step toward reaching our goal. In the coming days and weeks, GEO will be working hard to push tax parity for GHPs over the finish line. (GEO)

Help GEO Win Tax Credit Parity with Solar
Make Your Voice Heard on the Heller Bill in the Senate!

Now that we have tax credit parity included in the H.R. 1 tax reform bill released by the U.S. House of Representatives on Nov. 2, we must win similar support in Senate legislation. Sponsored by Sen. Dean Heller (R-NV), S. 1409 reflects the same provisions that GEO and the industry championed in the House, giving commercial and residential geothermal heat pumps parity with solar by reinstating and extending our tax credits through 2021 with a 3-year phase-out. Please help us convince the Senate that they should include the language of S. 1409 in their version of the tax reform bill.

- Please check if your U.S. Senators are cosponsors of S. 1409 ([click here](#)).
- If not, email and/or call their offices, urging them to get on board. You can find contact information for your Senators [here](#).
- Urge your U.S. Senators to help fix the inequity between solar and geothermal heat pumps by supporting the Heller Bill, S. 1409. If appropriate, tell them about your personal experiences with business decline and layoffs since the geothermal tax credits expired last year.
What the Geo Tax Credit Extension Means for You

By Kathy Hannun, Co-founder and CEO at Dandelion (Home Geothermal)

It's a tiny line item on the federal tax reform plan released last week by the U.S. House of Representatives, but it's big for the geothermal industry: lawmakers tentatively plan to restore a tax credit that allows most homeowners to get back 30 percent of the cost of their home geothermal installation.

The tax reform bill still needs to pass both the House and Senate, and the Geothermal Exchange Organization says there's more work to be done before the credit gets finalized. The group is now lobbying the U.S. Senate Finance Committee to make sure the tax credit appears in its version of the tax bill.

"It's not the end of the game because there's so much uncertainty about the fate of these tax bills in the House and Senate," Geothermal Exchange Organization CEO Douglas Dougherty said. "We were successful in the House. We've pivoted to the Senate and will keep pushing until it's a done deal."

The proposed geothermal tax credit is retroactive to Jan. 1, 2017, which means homeowners who bought a geothermal heating and air conditioning system at any point this year would qualify.

The credit is particularly beneficial for homeowners in New York State, many of whom would qualify for both a state rebate from NYSERDA and a federal tax credit. For example, take a homeowner in upstate New York who buys a geothermal heating and air conditioning system for $26,000, and qualifies for a $6,000 rebate from NYSERDA. The 30 percent federal tax credit would apply to the balance of $20,000, bringing the cost of the system down to $14,000.

If approved, the federal geothermal tax credit would remain at 30 percent until 2019, drop to 26 percent in 2020 and 22 percent in 2021, when it expires at the end of that year.

Dougherty said the geothermal tax credit represents nearly two years of lobbying by his organization and other renewable energy trade organizations.

Between 2009 and 2016, the federal government approved tax credits on residential solar, small wind turbines, fuel cell and geothermal systems under the Residential Renewable Energy Tax Credit plan. But a drafting error led lawmakers to extend solar and wind tax credits into 2021, but allow fuel cell and home geothermal tax credits to expire at the end of 2016.

As a result, the Geothermal Exchange Organization estimates that geothermal installations in the U.S. have fallen this year by 45 to 50 percent.

"We went to these [lawmakers’] offices and said, ‘It’s not about revenue, it’s about fairness,’” Dougherty said. "‘You guys picked winners and losers. Our contractors in the green space were pushing solar and geothermal, but now they’re just pushing solar.’ We have a public policy issue of fairness and equitable application of the tax code for a set number of industries." (Dandelion)

Join Our Effort!

The Geothermal Exchange Organization (GEO) is working hard for the geothermal heat pump industry with advocacy and outreach. To learn about how you can help, CLICK HERE
Oct. 9 – An article by Ron Rajecki in the Air Conditioning, Heating and Refrigeration News (ACHR – The News) says: “It’s not unusual for one to wake up with a headache on Jan. 1, but the headache that greeted the geothermal industry on Jan. 1, 2017, wasn’t caused by excessive late-night celebration. On that date, geothermal systems lost their 10% investment tax credit under Section 48 of the Internal Revenue Code (which covers energy tax credits). In addition, when geothermal lost its tax credit under Section 48, it also lost five-year accelerated depreciation and 50% first-year bonus depreciation under Section 168, meaning that when doing a payback analysis, commercial geothermal equipment is now amortized over 39 ½ years.

“This led to a “triple whammy” of tax breaks that were taken away from geothermal commercial installations at the beginning of 2017 but were left in place for solar and wind, said Doug Dougherty, president and CEO of the Geothermal Exchange Organization (GEO), a nonprofit trade association that promotes the manufacture, design, and installation of geothermal systems.

“The definition of energy property in Section 168 of the Internal Revenue Code cites those energy properties that are defined in Section 48,” Dougherty said. “So, we had a triple whammy when we lost Section 48. The 10% was nice, but the five-year accelerated depreciation and the 50% first-year bonus depreciation was far more beneficial. We lost everything, and right now, on the commercial side, we have absolutely no tax benefit to offer. None. Meanwhile, a commercial solar project gets a 30% income tax credit, five-year accelerated depreciation, and 50% first-year bonus depreciation. We can’t compete with that. Congress screwed up. They picked winners and losers.

“Dougherty said he and others are working hard to remedy the situation, and bills in the House (H.R. 1090) and the Senate (S. 1409) are designed to level the playing field. However, movement on those bills has been frustratingly slow.

“We’ve had hundreds and hundreds of meetings on the Hill,” Dougherty told The NEWS. “And we keep hearing, ‘We’re going to take care of it,’ but although we have support from many congressmen on both sides of the aisle, we’re finding that the coalition of the willing is huge, and the coalition of the committed is extremely small.

“Dougherty said tax reform may offer the best hope for a level playing field, and GEO would be willing to support radical reform to allow geothermal to match up with other energy choices based on its merits. ‘We’re an advocate of total tax reform,’” Dougherty said. “Get rid of all subsidies for any energy, including fossil fuels. Level the playing field, and let the free market decide.”

“Despite his frustration with the tax credit situation, Dougherty noted that geothermal still is maintaining some momentum in the institutional market and among building owners who are willing to take a long-term view. “There are some businessmen who, regardless of cost and length of payback, want to go as much off the grid as they can. They’re probably looking at doing solar or geothermal,” he said. “And even without a tax credit, they may still choose geothermal. It’s tough right now, but there are a few positives.”

“Steve Smith, Enertech’s president and CEO (and GEO Board Member) told The NEWS a challenge the commercial geothermal industry faces is that mechanical engineers don’t always promote geothermal to building owners — even those whose buildings would be good candidates for it.

“In many cases, we lose the opportunity to talk about the advantages of a geothermal system right out of the chute,” he said. Smith also lamented the tendency for building owners to select
geothermal but then to “race to the bottom” seeking the lowest price. Unfortunately, the lowest price typically means the lowest efficiency.

“My analogy is someone ordering a Cadillac but then specifying they want one with no options,” Smith said. “In many cases, just a few hundred dollars in upgraded equipment could make a difference of two to four points in EER over the life of the product. That obviously makes it a much better investment. The lowest price on the job doesn’t provide the lowest long-term cost to the building owner.”

“Joe Parsons, president, EarthLinked Technologies (and GEO Board Chairman), said that EarthLinked’s focus is primarily residential and light commercial. However, midway through 2016, the company was impacted—along with the rest of the geothermal industry—when commercial geothermal specifiers learned they could not assure their clients that the federal incentives would be in place by the time projects were completed. That led the company to seek projects that were not tied to a tax credit and accelerated depreciation, such as not-for-profit organizations, municipal and government projects, and the hospital industry.

“My advice for HVAC contractors who have experience on the commercial side is to remain engaged with prior customers, get more involved with commercial service, and be prepared to provide replacement equipment when required,” Parsons said. “Also, stay the course in hope of the return of incentives and continue to let your elected officials know that the extension of federal incentives are vital to the health of the geothermal heat pump industry.” Read the article here. (ACHR – The News)

Commercial Geo Market is Upbeat

Oct. 9 – An article by Ron Rajecki in the Air Conditioning, Heating and Refrigeration News (ACHR – The News) says: “Both the commercial and residential geothermal markets have felt the sting of the loss of federal tax credits for geothermal projects, but contractors on the commercial side remain reasonably upbeat about their market’s outlook. Certain building owners are able to take a long-term view of their properties that makes the return on investment offered by geothermal systems very attractive. In addition, environmental sustainability has become a corporate initiative at an increasing number of companies.”

The article quotes Geothermal Exchange Organization (GEO) Member Steve DiBerardine, president, Strategic Energy Solutions Inc. (SES), a consulting engineering and geothermal contracting company in Berkley, MI, who said the ideal customer for a geothermal project is a building owner who already has knowledge of and a strong interest in geothermal when they contact SES. “Cheap natural gas is a threat, but the people who are committed to geothermal are thinking long term,” he said. “They see it as the right thing to do. They are looking at life cycle cost not just first cost.”

The article also quotes Dan Ellis, CEO of Comfortworks, Goldsby, OK, and GEO Board Member, who said, “The geothermal industry is making good strides despite the challenges it has faced — challenges he likens to an engine that’s not hitting on all of its cylinders. According to Ellis, there are three factors that drive the commercial geothermal market: construction starts, the cost of energy, and incentives.

“We’ve never had all three of those hitting at the same time,” Ellis said. “Every time we’ve gotten two out of three, the industry has experienced powerful growth. We got the tax incentives when the economy was really struggling and construction starts were way off. Then, the economy started to pick up, but energy had become cheap because of shale gas and fracking. Immediately after Hurricane
Katrina, we had a peak in construction combined with a natural gas spike, and our industry grew at the highest rate ever despite the fact that we had no tax credits at that time. Right now, we have a pretty good construction economy but no tax credits and continuing cheap energy. So, again, we’re trying to run the engine on one cylinder. If we get just one more of those cylinders going, we’ll take off again.

“Ellis lamented the loss of the [federal geothermal heat pump] tax credits, and said even if the credits were going away, they should have been phased out gradually to provide the industry with a soft landing. ‘Not only is it simply not fair that the government is picking winners and losers by keeping the credits for solar and wind while removing them from geothermal, it also really hurt that we got dropped off a cliff.”

“However, tax credit or no, Ellis noted that his company has built an installed base of nearly 70 geothermal reference projects in Oklahoma that are opening new doors for them daily. He believes excellent opportunities exist in the commercial geothermal market for contractors who have above-average drive and above-average aptitude.” Read the complete article here. (ACHR – The News)

**National Grid Geo Loop Demo**

Oct. 21 – Ten homeowners in Glenwood Village, in Riverhead, NY (north shore of Long Island) will enjoy lower heating and cooling bills with free installations of geothermal heat pumps as part of a demonstration project by National Grid and the New York State Energy Research and Development Authority. According to news website RiverheadLOCAL, “The geothermal systems, which use the earth to provide heating and cooling, are expected to reduce the homeowners’ annual heating and cooling costs up to 25%.”

Glenwood Village is part of an innovative three-year “Reforming the Energy Vision” (REV) demonstration project with the New York State Energy Development Authority (NYSERDA). According to NYSERDA, “The goal of the project is to gather detailed data on cost, effectiveness and customer satisfaction and ultimately determine, in collaboration with the New York State Public Service Commission, whether the project can be replicated on a larger scale. The project was ordered by the State Public Service Commission in December as part of National Grid’s rate case approval, and supports Governor Cuomo’s REV strategy.”

National Grid installed a shared community loop system underground in a common recreation area in Glenwood Village, then connected geothermal heat pumps in 10 surrounding homes to the heat exchanger system. In the past, the homes were heated with propane gas and cooled by electric air conditioning units. Previously, these customers did not have a cost-effective way to benefit from natural gas heat, because their remote location was too far away from National Grid natural gas distribution pipeline systems.

“This is the first of its kind,’ said National Grid New York president Ken Daly. ‘It’s the first time a utility is installing a loop system not to serve one customer but a whole community…. It’s really special for us because it’s good for the customer. The average customer cooling load will be down by 30%, and the heating load can be down by up to 70%. To put dollars on that, the cooling bill will be down $300 to $400 and the heating bill will be down about $1,000, every year…. But the real win is for the environment. A single home geothermal conversion is the equivalent of taking 20 cars off the road,’ Daly said. ‘So the 10 homes today is the equivalent of 200 cars coming off the road.’” Read the article here. (RiverheadLOCAL)
Certified GeoExchange® Designer Courses
Certification for HVAC Engineers, Architects and Designers

With the cooperation of the Geothermal Exchange Organization (GEO), the CGD® Training Course is presented by the International Ground Source Heat Pump Association (IGSHPA), with certification awarded by the Association of Energy Engineers (AEE). The CGD® Course covers the gamut of professional geothermal heat pump system applications, from an introduction to the technology to a complete review of commercial design processes.

Who Should Attend  The 3- day comprehensive Installation Workshops are designed for GSHP installers, contractors, dealers, home builders, manufacturers, distributors, architects, heating cooling mechanical engineers, trenching/water well drilling contractors, and anyone who desires a working knowledge of this innovative technology. Representatives from public utilities, private utilities, and rural electric cooperatives can also benefit from training. Workshop information can help utility representatives serve as information sources on ground source heat pump systems.

Accreditation  Upon successful completion of the workshop and passing the IGSHPA installer's exam, you will be issued IGSHPA accreditation as an installer of GSHP systems, a 3-year installer's card and certificate, and a 1-year IGSHPA membership.

Topics  Design and Material Options • System Layout • Pipe Joining Techniques - Hands-on for butt, socket, saddle and electro fusion • Trenching/Drilling Processes • Air and Debris Purging • Pressure Drop Calculations • Pump and Fluid Selection • Thermal Conductivity • Start-up, Performance Checking and Troubleshooting

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IGSHPA 2018 Call for Papers
You still have time to submit your abstract for the 2018 IGSHPA Conference and Expo "Better Together" in Orlando, Florida, March 27-28. Topics may include any GSHP industry related best practice, job or project, or innovation. For more information and instructions on how to submit your abstract for review, visit the IGSHPA website here.
Nov. 8 – The geothermal heat pump (GHP) system engineered and built by GI Energy for the Emma and Georgina Bloomberg Center at Cornell Tech, Cornell University’s new applied tech campus on New York City’s Roosevelt Island is now fully operational.

Highly efficient and cost-effective to run, the GHP system delivers all the heating, cooling, and domestic hot water for the Center with no direct combustion of fossil fuels. The combination of the facility’s low energy design, solar photovoltaic panels and GI Energy’s GHP system is expected to save up to 500 tons of carbon dioxide per year.

Eighty boreholes have been drilled to a depth of 400 feet, intercepting water-filled fissures in the local bedrock. The system then takes advantage of this water to increase its efficiency. According to GI Energy, it’s the first time in the United States that a supplemental groundwater pumping system has been applied to a closed-loop geothermal system in this way. The system is designed to support the Bloomberg Center’s aspiration for radically lower energy use and minimal environmental impact.

Steve Beyers, Energy Engineer at Cornell University, said, “The Bloomberg Center’s innovative ground-source heat pump system is a perfect match for Cornell’s mission of education, research, and outreach. It demonstrates respect for the environment while saving energy dollars for investment into our education mission, but it’s also a great experiment in new technology. It’s a win-win for the University.” GI Energy’s CEO, Tom Chadwick added, “This project provides a blueprint for achieving New York City’s ambitious geothermal energy plans, as set out by Mayor di Blasio. Cornell Tech and the city are both iconic and visionary—the geothermal system we have created is in keeping with this.” (GI Energy)

NY Green Bank to Raise $1 Billion

Oct. 27 – Gov. Andrew M. Cuomo has announced that the New York Green Bank wants to raise an additional $1 billion in private-sector funds to expand financing availability for clean energy projects. The additional funds from third-party investors will enable the bank to broaden the scope of investable projects beyond the boundaries of the state. Because of its robust track record which has resulted in driving nearly $1.4 billion in clean energy investment, the bank has seen strong interest from third-party entities like pension funds and insurance companies seeking to utilize it as an investment vehicle for sustainable infrastructure projects. NY Green Bank will also work with other states and philanthropic entities to help establish local Green Banks in other states. Read the article here. (North American Clean Energy)
**Geo at New Google Bay View Campus**

Oct. 24 – Construction of Google’s new Bay View campus–on NASA land near the San Francisco Bay–will include geo-thermal heating and cooling. According to an article on the news website, Fast Company, “It’s one piece of an overall design for the campus that aims for LEED Platinum certification, the highest level possible in the sustainability rating system for buildings.”

The article notes that the new facility will boast 20 acres of open space planted with native species, stormwater collection and reuse, and advanced window systems. “Electricity use, as in other Google campuses, will be offset by renewable energy.” Google says that Bay View will save 8 million gallons of water normally used for cooling, and by avoiding the use of fossil fuels for heating and cooling, generate about 50 percent less carbon emissions.

“Google has been considering the use of heat pumps in its buildings for several years, and in 2010 it installed a small system on its main campus to provide hot water for a kitchen. But until now, the company hadn’t found the right project for a large system.”

Fast Company describes how the system’s ground loop heat exchangers will be part of 4,000 concrete piles that serve as foundational supports for the buildings to make them more affordable. “In 2,500 of the buildings’ 4,000 piles, a construction crew has been drilling holes, filling them with wet concrete, and dropping in the tubing to create energy piles.”

The article says that only about half of the piles are being employed as heat exchangers, “because if they’re too close together, the ground can get overheated or overcooled, making the system less efficient.” Google says its system is the largest in North America, with tubing that stretches a total of 69 miles. Read the article [here](http://www.fastcompany.com) (Fast Company)

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**Chicago Net-Zero Community to Use Geo**

Nov. 10 – Hawthorne Development in Burr Ridge in Lockport, IL (30 mi. southwest of Chicago) plans a spring start for its proposal of a “net-zero” community of 500 homes, businesses and condominiums using solar power and geothermal heating and cooling systems. Called Serenity Landing, the development will be built on a 189-acre site.

According to *Crain’s Chicago Business*: “Its energy needs would be met via solar panels atop virtually every structure, and geothermal [heat] pumps that circulate water below ground to capture the naturally steady temperature there and use it in heating or cooling air, depending on the season. Energy-tight construction will contribute, as well.

“In all, the energy generated on site would equal what the residents and businesses consume, or ‘net zero’. Energy brought in for cooking, for example, would be offset by the excess solar power generated.” Read the article [here](http://www.crainschicago.com) (Crain’s Chicago Business)
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In the October edition of the International Ground Source Heat Pump Association (IGSHPA) newsletter, The Loop, Board of Directors President Garen Ewbank reported that the IGSHPA Board of Directors gathered in Stillwater for our annual strategy and planning work session. “Three areas were identified to be our focus to Survive and Thrive during the next year to become more dynamic,” he said. The three areas of focus include:

**Educate and raise awareness of GSHPs—need for market development**
- A. Identify demographics to target
- B. Create alliances w/other stakeholders, including utilities, environmental groups, and policy makers (public utility commissions and regulators)
- C. Secure funding and expertise for above

**Increase the relevance of Training & Membership Services**
- A. Needs assessments of various member sectors and by region
- B. Educate our stakeholders of why they need IGSHPA

**Promote targeted research to increase value to membership**

Ewbank described how IGSHPA’s efforts to date fit within the three items above:

1) Looking at education and awareness and further the need for market development the demographics to target are all HVAC/R systems and owners. GSHP provides the very best and most efficient systems and the higher first cost barrier is being overcome as we speak. The advocacy committee published a white paper and living document titled, “Action Plan to Expand the Market for Ground Source Heat Pumps in North America.” This is aimed directly at market development for our members. The three key pieces to market development are, 1) to create alliances, 2) engage the environmental benefits, and 3) work with policymakers, public Utility Commissions and regulators. Going forward and connecting the white paper with the newly designated ANSI/CSA/IGSHPA 2016 Standards provides a solid base to engage allies and stakeholders.

2) Increasing the relevance of Training and Membership will clearly be the result of implementing our newly developed Master Training Schema and following standards used by successful associations. Policymakers, regulators, code official and inspectors will begin to understand our industry and its position to greatly improve the lives of our consumers. IGSHPA should secure funding and expertise to fully develop items 1) and 2), and our vision has to be clear and concise as defined above. This funding should come from within our industry, reach into our own funds, and not try to pick others’ pockets.

3) Targeted research to increase the value to membership would have a strong component of funding and financing the consumer, AND delivering a great system.

In conclusion, Ewbank said, “To sum up the above, using the “Action Plan to Expand the Market for Ground Source Heat Pumps in North America,” the Master Training Scheme, and shifting the higher first-cost to third parties will produce the results all of us have been seeking. I am in—are you?”
Making Geothermal Heat Pumps a Household Word

By Marlene Taylor - Oak Ridge National Lab

As a boy growing up in China, Xiaobing Liu knew all about Oak Ridge and the World War II Manhattan Project. He had no idea that he would one day work at the U.S. Department of Energy’s Oak Ridge National Laboratory (ORNL), the Secret City’s successor.

Liu is a lead researcher in geothermal heat pump (GHP) technology, developing software and smart controls and performing characterization and modeling for GHPs in both component and system levels. Accessing energy stored in the earth’s crust to heat and cool buildings is a no-brainer to Liu. His years of research have made him confident, if not passionate, about using GHPs as a viable option to clean and renewable energy.

“Living in China, I saw how people made homes in the sides of hills—they’re called Yao Dong—and the temperature inside was always comfortable, both in summer and winter,” said Liu. “Visiting my grandpa at age six, I was aware of the comfort in these cave-like structures compared to the outside temperatures.”

Perhaps his early exposure to these Chinese abodes is what fueled his drive to tackle geothermal energy in his career, so much so that his division director introduces him as the “evangelist of geothermal heat pumps.”

After receiving his bachelors and master’s degrees in mechanical engineering at Tongji University in Shanghai, Liu came to the United States for his Ph.D. at Oklahoma State University, which is the epicenter of GHP technology. After earning his Ph.D., Liu went to work as the system engineering manager at ClimateMaster, which at the time was the largest GHP manufacturer in North America.

At ClimateMaster, Liu developed software used in designing, analyzing, and optimizing GHP systems. The software is still in wide use today. He also helped design more than 30 GHP systems in the U.S. and other countries. In 2009, Liu joined the ORNL Building Technologies Research and Integration Center. “It was a difficult decision for me but very hard to refuse,” said Liu. “I had admired and respected the scientists at ORNL for a long time and was familiar with their work.” His boyhood knowledge of Oak Ridge’s history also enticed him to the laboratory.

Liu was the technical lead of building equipment research in the US-China Clean Energy Research Center for Building Energy Efficiency (CERC BEE), a partnership that was just renewed for another five years. He also serves as the research chair for the International Ground Source Heat Pump Association (IGSHPA), and the research chair for the TC 6.8 Geothermal Heat Pump and Energy Recovery Applications technical committee of the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE).

What would Liu like to see in GHP development if given more opportunities? “First, invest R&D in ground heat exchanger designs, installation, and drillings. If we can send people to the moon, we can make drilling cheap,” he said. “Geothermal systems need to be cheap and reliable.”
Second, enable wider adoption of the GHP technology. Liu said people need to be able to easily and accurately measure the energy savings they achieve when using GHP. And third, Liu says the industry needs software tools and cost effective systems for performance monitoring, as well as real-time diagnosis and optimization, to ensure GHP systems are running at optimal performance at all times.

Liu makes a strong statement for conditioning buildings with GHP technology with one simple comparison. “We use a flame that burns at approximately 3,000 degrees Fahrenheit to heat our homes when we only need 76°–80° Fahrenheit. Why do we do that?”

This article was originally published by the U.S. Department of Energy’s Oak Ridge National Laboratory in the public domain. Marlene Taylor is a technical writer for ONRL. Image credit: energy.gov.

C448 Condensed Contents
Available from CaliforniaGeo

Nov. 1 – California Geothermal Heat Pump Association (CaliforniaGeo) President Bill Martin has crafted a condensed Table of Contents for the ANSI / CSA / IGSHPA C448 Series-16, “Design and installation of ground source heat pump systems for commercial and residential buildings,” a Bi-National Standard by Canada and the United States.

“I realized that not everyone would acquire a copy of ANSI/CSA/IGSHPA C448 Series-16 if they didn’t have a clear idea of what was in it,” said Martin. “And not owning one heightens that chance that its value will remain unrealized. So, I built a condensed Table of Contents with a list of Technical References. This document has been approved by CSA for distribution, and I hope you will use it in your own promotion efforts.”

A PDF copy of the condensed Table of Contents is available here. A complete copy of this code book is available in searchable (digital) format for download for CAD$155 from the publisher, CSA Group. It is also available to members of the International Ground Source Heat Pump Association for US$100 on the IGSHPA website (scroll down the page).

For more information about CaliforniaGeo and how to participate with their advocacy and outreach for geothermal heat pumps in the Golden State, contact Bill Martin by email here, or by phone at (530) 394-8224.

GEO Industry News is a publication of GEO, the Geothermal Exchange Organization, a non-profit trade association that advocates the environmental, energy efficiency and economic benefits of geothermal heat pump systems for heating and cooling of residential, commercial, and institutional buildings. For more information, visit our website: www.GeoExchange.org.

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