

THE INNOVATOR

NEWSLETTER

A TOM GREEN & COMPANY ENGINEERS, INC. PUBLICATION

3701 Executive Center Drive | Suite 258 | Austin, Texas 78731 | 512.345.7793



A TGCElebration to Remember

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TGCE Lifestyles

They say time flies when you're having fun. That's never been more true in our first 25 years. Having been blessed with so many friends over the past years, TGCE couldn't have celebrated without saying thank you...to all of you. And what a better way to give thanks than to throw a big party.

On October 21, 2010 at the Umlauf Sculpture Gardens, 25 years of public and private engineering service were celebrated by many. With a crowd of nearly two hundred fine folks, we talked, we laughed, we ate, and we danced. It was truly rewarding for the employees of TGCE to share these activities with so many friends...some from yesterday, some from today, and no doubt some new ones for tomorrow.

What a great night in Austin. The weather, the setting, and the people were just what you'd expect for Austin...darn near perfect. Surrounded by beautiful artwork, inviting landscapes, rippling waters, everyone enjoyed great food by Word of Mouth Catering and Amy's Ice Cream. Tommy Alverson's Texas signature country & western band entertained the onlookers and the two-steppers. And in the midst of it all, there was fun in remembering the what was and envisioning the what will be.

The beauty of the night was the perfect icing on the cake to the blessings of our first 25 years. A "TGCElebration" to remember! It makes us even more excited about the next 25! Cheers! Greg Maxwell, LEED AP - Designer/CAD IT

Geothermal Water Source Heat Pump Water Heaters - High Efficiency Electric Water Heating

Heat pump water heaters use electricity to move heat from one place to another instead of generating heat directly. Therefore, they can be many times more energy efficient than conventional electric resistance water heaters. As an example, to heat 70 gallons of water per hour from 60°F to 120°F takes just over 10 kW using electric resistance heaters. A high efficiency geothermal water source heat pump can heat the same 70 gallons of water per hour using approximately 2.4 kW.

There are two basic types of heat pump water heaters, air to water, and water to water. This article focuses on a water to water type heat pump system, specifically the geothermal water source heat pump. A heat pump operates by extracting heat from one source and rejecting it to another via a refrigerant cycle. A geothermal water source heat pump uses the Earth's ability to store heat energy as the source.

To extract the heat energy stored within the Earth, a closed-loop system circulates water (or sometimes a water/glycol solution) through a closed-loop system of underground pipes. Closed-loop systems can be installed horizontally, vertically, or in an open body of water. More information on geothermal loop piping can be found [HERE](#).

Geothermal heat pumps used for domestic water heating must be coupled with a storage tank. Piping and a small circulating pump moves the water from the tank to the heat pump and back. A small electric resistance heating element is provided in the tank to serve as back-up. See the general piping schematic in *Figure 1* below.

Geothermal water source heat pump water heaters are an excellent choice when natural gas service is unavailable, as may be the case in rural locations. The trend toward green construction and Austin's Net-Zero Initiative have given rise to Net-Zero Energy subdivisions that are 100% electric and use geothermal water source heat pumps for HVAC. The types of heat pumps used for HVAC are often times provided with a secondary heat exchanger ("desuperheater") that provides essentially "free" hot water. *Figure 2* below illustrates the general concept of the Earth's heat transfer in an HVAC geothermal water source heat pump application. More information on Austin's first Net-Zero Energy community can be found [HERE](#). - Robert Williams, Senior Designer

LEED Design:

Under the Energy and Atmosphere section of LEED for Homes, water source heat pump water heaters can qualify for up to 3 points for Efficient Domestic Hot Water Equipment.

Tax Credits:

There are tax credits available for home and commercial building owners who install geothermal heating and cooling systems through the Energy Improvement and Extension Act of 2008 (H.R. 1424). H.R. 1424 offers a one-time tax credit of 30% of the total investment for homeowners who install residential geothermal water source heat pump equipment. A credit of 10% of the total investment is also available (no maximum) for a commercial system installation. The tax credit is available through December 31, 2016.

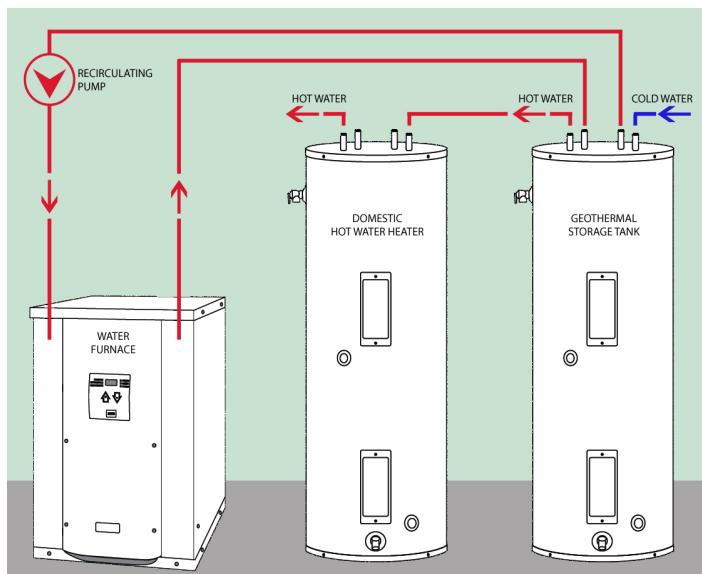


Figure 1: Geothermal Domestic Water Source Heat Pump Piping Schematic

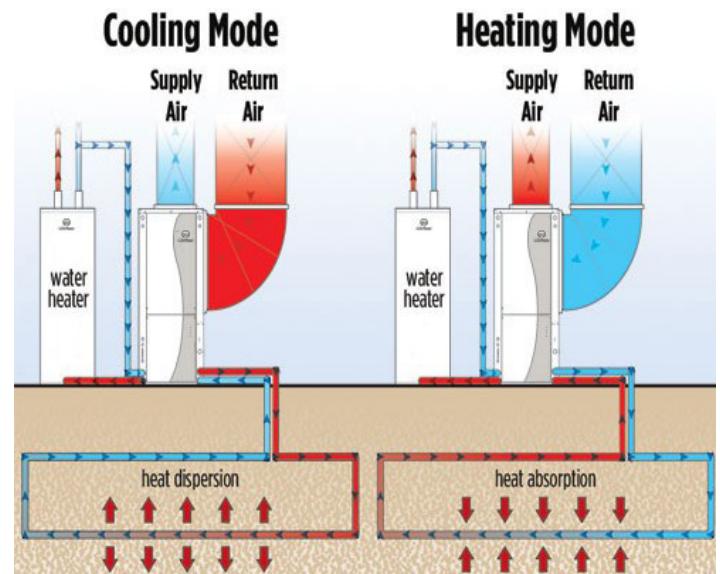


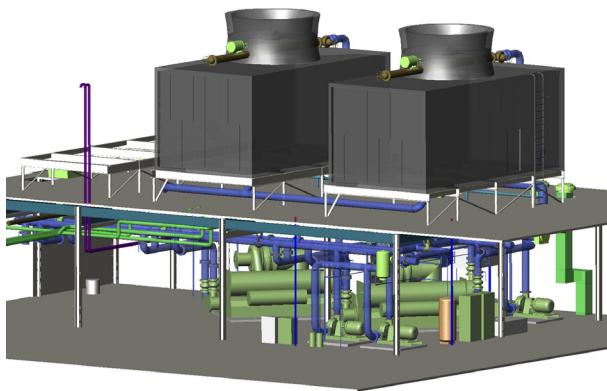
Figure 2: HVAC Geothermal Water Source Heat Pump Schematic

This Thing Called Commissioning: Part I

This firm and this Engineer are not without a bit of knowledge and experience in the process that has become known as “Commissioning”, abbreviated “Cx”. We have “commissioned”, to one level or another, every constructed project designed by this firm for the past twenty-five years: about 850 to date. So I figure why not impart some of the wisdom that has been imparted to us during this period.

First, just what is “Commissioning”? Colleague Mike Green, P.E., of MEP Engineering has answered, “It depends.” I would agree. Yes, it depends, for Commissioning can range from Cx “Lite” to Cx with full documentation and engineering verifications. And the whole range can be, and often is, called Commissioning.

One reported origin relates Cx back to the Navy (circa 1863) as a way to confirm that ships and submarines were seaworthy and ready for battle. It was performed by those who built the vessel, with guidance, direction, and verification provided by those who designed the vessel AND by those who would operate it. Pretty important process, as there was no room for failure.



TGCE performed Cx verifications for the University of Texas at Brownsville/Texas Southmost College ITECC Central Chilling Plant.

This basic model was, over time, adapted to land-based enterprises, mostly for all kinds of industrial facilities such as refineries, power plants, manufacturing, and the like. In the 1980's, a few specific Owners and projects began to include Cx, ASHRAE formed its Cx Guidelines Committee, and in the latter '80's published its first *HVAC Commissioning Guideline*.

In the 1990's, the benefits of Cx began to be recognized for the increasingly sophisticated building systems, particularly those in the HVAC realm. Accordingly, Cx began to emerge in the institutional and commercial building sectors, seemingly focused in the public sector. Since circa 2000, Cx has spread to fairly completely encompass larger scale public and private sector building projects. Market penetration into smaller projects, whether public or private sectors, remains spotty but with growth.

But what is “it” that has spread in the last decade? Again, “it depends.”

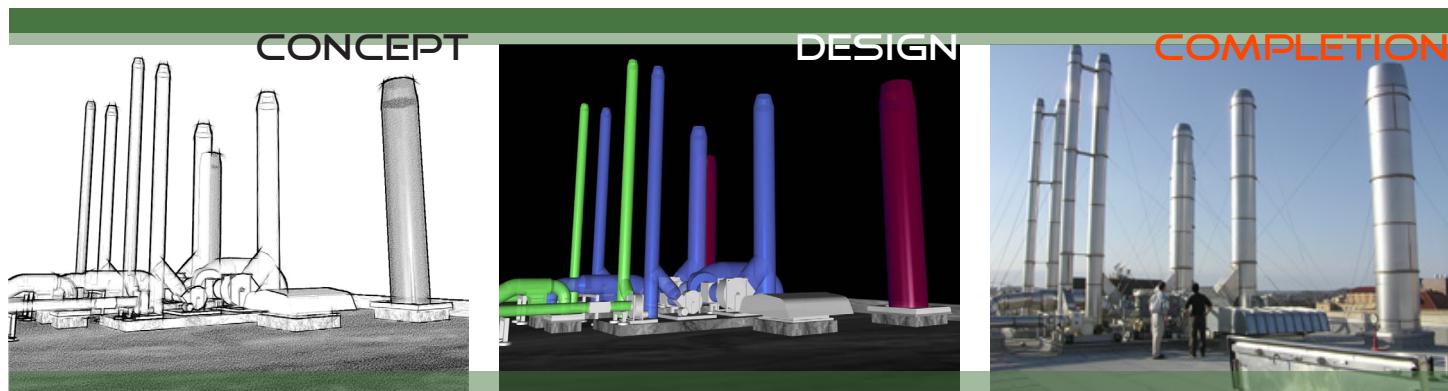


Currently, the reality is that there is no industry practice or uniform definition for Cx. True, there are some written standards by recognized authorities such as ASHRAE, but there is no uniform application of them. Even the large public sector institutions which have been the main proponents for Cx in the building industry have typically developed their own Cx expectations, specifications, and procedures.

As for me, I think the variety is a good thing. There should be no attempt at a one size fits all metric for the building industry. Having such, doing so, quite literally stifles thought, imagination, and innovation...and increases costs. Robots are great in many applications. They should gain no toehold, however, in the individual artistry and ingenuity of the building industry.

Look for Part II in the next newsletter. It will present arguments for customized levels of Cx which are tuned for the needs of an Owner and a project type. It will also discuss the Engineering aspects of Cx, and who should be candidates for doing what in the undefined world of Commissioning. See ya! - Tom Green, P.E., LEED AP - Principal Engineer

TGCE performed Commissioning verifications for the Ronald McDonald House Charities of Austin. A building also designed by our firm, the RMHC of Austin was the second building in the State of Texas to receive LEED Platinum Certification.



TGCE served as prime MEP Engineer for a new 65,000 Sq. Ft. leading edge nanotechnology research center. TGCE's design included tunnel extension under a neighboring building and across the site to bring thermal and select lab utilities to the building. Special MEP systems combine reliability, energy, maintenance, and simplicity to accommodate the widely varying uses of the sophisticated facility. TGCE provided final Commissioning verifications.

TGCE Lifestyles

PICKS OF THE SEASON



CULINARY CREATIONS



CROCKPOT TURKEY CHILI

Cooking Ingredients:

1 tbsp. extra virgin olive oil
½ med. sweet onion, coarsely chopped
2 cloves garlic, minced
1 pound ground turkey meat
2 cans (15 oz.) Diced tomatoes with green chilies
1 can (15 oz.) Ranch style beans
1 can (15 oz.) kidney beans, drained
1 can (15 oz.) sweet corn, drained
2 tbsp. chili powder
½ tbsp. garlic powder
½ tbsp. ground cumin (comino)
½ tbsp. black pepper
1 cup water



Garnish Ingredients:

Salt/Pepper to taste
Shredded Cheese
Jalapeño pepper, thinly sliced, seeds removed
Tortilla Strips

Method:

1. In a large skillet over medium heat, heat the oil and brown the ground turkey, onion, and garlic. Drain off excess fat as necessary.
2. Coat the inside of Crockpot with cooking spray. Mix in the rest of the ingredients.
3. Stirring occasionally, cover and cook 8 hours on low or 4 hours on high.
4. Add salt and pepper to taste and garnish to your liking.

A MOMENT OF THANKS



Our freedom is forever in debt. Happy Holidays to those who serve our country and their families.



IPHONE APPS

Allrecipes.com - FREE



In the spirit of the upcoming holidays, we know we are all bound to be eating more than we can handle. Tired of the same old traditional meals? I say try some new recipes to keep everyone on their toes!

This is a fun and useful recipe app from the world's #1 food site, delivering thousands of quick and easy recipes to your iPhone, iPod Touch, or iPad. Don't forget to mark your favorites for the future!

MyChristmas - \$0.99



My Christmas is a collection of Christmas fun and happiness, with a warm feel that will make you happy and bring a smile to your face.

What a great way to teach your child some Christmas carols, send electronic greeting cards, and countdown the days until Saint Nick comes to town.

TOM'S TRIVIA

A little piece of trivia to go along with our 25th year celebration.

Who was the first engineer to join TGCE (after Tom, of course)?

About how long ago was that?

Where does he work today?

* All "close to correct" responses will be pooled, with a winner drawn and awarded a \$25 gift card to The Home Depot.

Reply to newsletter@tgce.com.

Check our website at www.tgce.com/index_files/newsletter for results.