GeoExchange® Technology
Barriers & Lessons Learned

June 12, 2019

Beneficial Electrification Conference
History Colorado Center
Denver, CO

Terry Proffer, CGD, Geothermal Manager
Major Geothermal
tproffer@gomajornow.com
www.gomajornow.com

GEOEXCHANGE®
The Geothermal Exchange Organization

The Geothermal Exchange Organization® (GEO):

- The Voice of the Geothermal Heat Pump Industry in the United States. As a non-profit trade association, GEO promotes the manufacture, design and installation of GeoExchange® systems—the most energy efficient and environmentally friendly heating and cooling technology in the world.
- Advocacy
- Partnerships
- Public outreach
- Quality standards

The GeoExchange Organization®
312 South 4th Street, Suite 100
Springfield, Illinois 62701
(888) 255-4436
www.geoexchange.org

- Presenter has been in industry since 1992
- 18,000,000 ft² of cond'd space by GSHP
- Commercial, residential
- Design, peer review, quality assurance
- Vertical, horizontal, SWHX closed loop
- Open loop
- enviroPlate™
- Functional testing
- Controls
- Forensics
- Construction defect litigation
- Guest lecturer, Colorado School of Mines
- IGSHPA training committee

Major Heating Major Geothermal
6285 West 48th Avenue, Wheat Ridge, CO 80033
303-424-1622 www.gomajornow.com

Barriers to Expanding GSHP Systems - RESIDENTIAL

- Typically higher installed cost
  - Ground heat exchanger (GHX)
- Customer lack of awareness of basic system advantages, such as…..
  - Typical forced air GSHP unit provides cooling, heating and domestic hot water (all or part)
  - Not just simple payback, but ROI and life cycle advantages
- Incorrect design, installation
  - Insufficient training, backup tech support of local assets
- Condemnation by local ‘experts’ without any relevant experience (no successful design/install history)
- Problem installations in immature market can slow acceptance, growth

Barriers to Expanding GSHP Systems - COMMERCIAL

- Sometimes higher installed cost
  - Economy of scale can work in favor of large GSHP systems
- Inexperienced design can result in unjustified 1st costs
  - Example, not uncommon to see higher controls cost then for ground loop even with fewer control points
- Inexperienced contractor assets
- Excessively complex basis of design, controls
- Poor outdoor air management strategies, resulting in ground loops larger then necessary – greater cost for loop, infrastructure, controls
- As with residential, we still see condemnation by 'experts' without any relevant experience (no successful design/install history)
- Problem installations in immature market can slow acceptance, growth

Barriers to Expanding GSHP Systems - GOVERNMENT

Some states inhibit GSHP growth:

- Restrictive, cumbersome, unnecessary regulations for loop installations by some agencies and in some cases actually increase the likelihood of problems (aquifer contamination, etc.)
- Multiple regulatory authorities with different, conflicting rules – state, county, local municipality

Regional Success – LESSONS LEARNED

Mature / expanding GSHP markets, common traits:

- History of reliable, cost effective installations
- Successful residential and commercial installations are publicized
- Consumers are better informed about GSHP advantages, short and long term
- System installation designs take advantage of inherent simplicity of GSHP fundamentals
- Design, construction assets are better trained
- Greater technical depth and support by wholesalers and factory reps who work with contractors and engineers
- Regulations / licensing / permitting are common sense, reasonable
- Incentives and tax rebates helpful but not primary motivating factor for long term industry growth

Training – LESSONS LEARNED

- Appropriate training for contractors and engineers for load calculations, sizing of heat pumps and ground loop design needs to increase for those regions that do not have a developed design/construction infrastructure
- Correct use of design tools
- Develop/train drilling and excavation assets
- Do away with ‘rule of thumb’ assumption design and construction mentality
- Contractors and commissioning agents to be trained to perform simple functional testing of GSHP systems to verify system integrity

MOTIVATION – Government, Utilities

Government and utilities can encourage more GSHP installations:

- Work with local industry assets to develop advocacy programs to encourage GSHP systems
- Promotion of GSHP technology will be limited if industry assets are not in place locally
- Promote and publicize successful installations – submetering, lower maintenance, lower life-cycle, higher ROI, etc.
- Educate consumers, both residential and commercial, on what is required for a successful installation
- If incentives are offered, validation of design and/or proof of performance should be required to earn the incentive
- Regulatory agencies in some states need to streamline permitting and licensing for loop installations, working with local assets for regional concerns, and GEO, IGSHPA and NGWA for standards

The GSHP industry has the infrastructure to meet demand nationally:

- GEO, IGSHPA & ASHRAE for technical standards and training
- Top heat pump manufacturers are here in the US
- Related support industries – HDPE fittings and pipe, circulation pumps, controls, etc., are mature and US based
- Wholesalers exist in all 50 states cataloging everything from GSHP products to HDPE pipe
- Training is improving and expanding

GeoExchange® Technology
Barriers & Lessons Learned

June 12, 2019

Beneficial Electrification Conference
History Colorado Center
Denver, CO

Terry Proffer, CGD, Geothermal Manager
Major Geothermal
tproffer@gomajornow.com
www.gomajornow.com