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## WISCONSIN STATE LEGISLATURE ... PUBLIC HEARING - COMMITTEE RECORDS

### 2011-12

(session year)

### Assembly

(Assembly, Senate or Joint)

### Committee on Natural Resources...

#### COMMITTEE NOTICES ...

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#### INFORMATION COLLECTED BY COMMITTEE FOR AND AGAINST PROPOSAL

- Appointments ... **Appt** (w/Record of Comm. Proceedings)
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- Hearing Records ... bills and resolutions (w/Record of Comm. Proceedings)
  - (**ab** = Assembly Bill)                      (**ar** = Assembly Resolution)                      (**ajr** = Assembly Joint Resolution)
  - (**sb** = Senate Bill)                              (**sr** = Senate Resolution)                              (**sjr** = Senate Joint Resolution)
- Miscellaneous ... **Misc**

\* Contents organized for archiving by: Stefanie Rose (LRB) (August 2013)

Jim Bose  
President IGSHPA  
July 22, 2009

## **Introductory Questions**

In order to better understand your perspective, I'd like you to describe your area of expertise in the Ground Source Heat Pump (GSHP) Industry. Specifically, what is your role/title today?

*I started out in this industry in 1974. We formed an association in Indiana 25 years ago. At that time they had installed a number of systems in Oklahoma. IGSHPA offers membership, conference training, materials development and \$10 million in research.*

What is your current responsibility and authority regarding GSHPs?

*I am the Executive Director of IGSHPA. We have an advisory council that is elected by membership and we direct the staff and student interns. We write stories for the magazine, GeoOutlook.*

How long have you worked in this, or a closely related field?

*Since 1974.*

## **Industry Branding**

What terminology do you use to describe the industry/your product and why is that your preference?

*Ground Source Heat Pump – this is more in tune with the international community.*

In your experience, do industry participants and consumers use the same terminology when referring to this industry?

*It's all over the place. Georexchange, Ground Source Heat Pumps, Geothermal.*

And within the industry, do you find GSHP industry vernacular to be consistent? If not, is this a problem for the industry in terms of building market adoption?

What terminology do you think would be most appropriate for this industry and why?

*I don't know of anyone who has liked any of the names. The oldest name is ground source. But if we are going to be an international organization we need to be in tune with international standards.*

How important is standardized nomenclature across all segments of the industry and how could the industry achieve it?

*I don't know.*

### **Industry leaders' perspective on consumer decision-making**

Would you describe public awareness of GSHP to be high, low or about where you'd expect it to be given the industry's maturity? Why?

*It's about what you might expect. I didn't think it (industry growth) would take this long – people aren't keen to change. But it continues to grow – we have workshops filled to capacity, and the booth space at our conference in Dallas sold out.*

What do you think are the three most important messages to communicate about GSHP in order to generate positive public sentiment for GSHP systems?

- 1) *Save money*
- 2) *Comfort – peoples perspective changes whenever you give them an option (example of air-conditioning)*
- 3) *Environment*

How have your customers become aware of GSHPs/learn of your product?

*Word of Mouth*

What do you think the primary motivation was for consumers who purchased GSHP systems/your product?

*Saving money, there are some people who talk about environment.*

Have you observed any similarities in your customer demographics?

*The utility company has a lot to do with who purchases these things. People look to the utilities as a trusted advisor – this is important.*

*Generally, people who get these systems aren't moving around a lot, they are homeowners, and a bit older than the average person.*

If you were the head of an industry association, what would you do to increase public awareness of GSHP technology?

*Raise the price of energy.*

What are some suggestions that you have to better inform consumers of this industry/your product?

## **Adoption of Ground Source Heat Pump Technology**

As with any industry, there may be certain barriers that interfere with the market adoption of products and services. I'd like to ask you about your perception of barriers, if any, in relation to regulations, awareness and project economics for GSHP.

For both residential and commercial GSHP applications, what barriers, if any, have you encountered because of regulations – both state and local?

*I don't have a good feel for CA. In Oklahoma regulations are increasing. There might be a shortage of drillers – not everyone can get into the drilling business overnight.*

*There is also poor education on their part to let people know what pitfalls they might run into.*

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for residential applications?

*I don't have a large national perspective on this. It depends on building owners who are going to maintain control of building/facility vs. renter real estate.*

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for commercial applications?

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe manufacturers/deliverers of GSHP systems are experiencing?

*Higher first cost – just like an automobile. Generally you buy all the automobile you can afford. The GSHP product has a good return on investment, they can cut the utility bill in half in Oklahoma– however, people do not generally make decisions on how to save money.*

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe consumers are encountering?

*People haven't really thought about investing in energy efficiency and oftentimes the builder will talk you out of it. Ultimately, I think the utility will install these things. However, drillers are not too excited about the utility company doing the drilling. They have sessions on this at conferences. In Colorado, utilities do this. There are models out there that work.*

Do you believe that GSHP systems are priced too high, too low, or just right?

*The marketplace will determine the right price.*

When compared to traditional HVAC systems, do you think GSHP systems are priced too high, too low, or just right?

*If you go with the high performing units on both sides – they both have compressors, fans, GSHPs have the same components as an air conditioner. The additional cost is the outside ground/drilling. If you have conditions that are hard to drill, or lack of experienced driller – this affects cost.*

When compared to other alternative energy solutions, do you think GSHP systems are priced too high, too low, or just right?

For both commercial and residential applications, are there other issues besides cost that are a factor in the adoption of GSHP?

(If needed probe for: time, space, and permitting)

*I work with a local school board in trying to get them to go with GSHP – a big problem is a lack of understanding of the school's utility costs, coupled with a lack of understanding as to how they can control it. The people that you're talking to have to be educated about what you're trying to get them to buy.*

How would you characterize the size and growth of the GSHP industry, why, and what would need to happen in order to spur greater growth in this industry?

*All of my installation workshops are now filled to capacity. The rate of growth is around 18-20% compounded annually and this is probably a low estimate. California is not a major market – I'm not sure why.*

*30% tax credit – I'm not sure what impact that is going to have.*

## **Drilling**

Drilling is the single largest cost component of GSHP systems and thus has a large impact on GSHP project economics. How important is it to your company to reduce the cost of drilling? Do you have any suggestions as to how to reduce drilling costs?

*Drilling is a big part of the cost for these systems. However, if you get enough work out there the drilling costs would come down to a reasonable level. You can get it down by economies of scale.*

The GSHP industry currently faces a shortage of drillers. What changes need to be made in order to attract and retain more drillers to the GSHP industry?

*The industry did face a shortage of drillers, and now the shortage coming back (in Oklahoma).*

*IGSHPA is offering drillers training courses now – they have a lot of people in there who have never drilled in their life who are trying to decide if they should get into drilling business.*

Does the drilling technology currently available meet GSHP industry needs or is there a wish list you have for how the technology could be improved?

*New technology is coming; everyone would like to have it lower cost.*

*The guys that get costs down are the ones that are deliberately thinking about how to mechanize the process.*

How would you characterize the permitting process for the drilling required for GSHP systems? If you are dissatisfied with the process, what suggestions do you have as to how the permitting process could be improved?

*It is done state by state. In Oklahoma drillers have to have a license, in CA they have to have a license.*

Is there any other information you would like to share about the GSHP industry, or topic that I did not touch upon that would be useful to this survey?

*Growth is more than drilling the hole. We have to do a lot of training; we have a whole industry to educate. The key is to get organizations like Habitat for Humanity involved, associate the technology with things that really appeal to people and have high visibility.*

Brian Hayden  
President  
HeatSpring Learning Institute  
**September 2, 2009**

## **Introductory Questions**

In order to better understand your perspective, I'd like you to describe your area of expertise in the Ground Source Heat Pump (GSHP) Industry. Specifically, what is your role/title today?

*I started Heatspring 3 years ago. It is a training organization, we teach installers, designers, project managers, and building owners, how to design install and care for ground source heat pump systems. We are unique in that we don't use training as a marketing effort, it is our whole business. All the leading experts are teaching you rather than selling to you.*

What is your current responsibility and authority regarding GSHPs?

How long have you worked in this, or a closely related field?

*Approximately 3 years.*

## **Industry Branding**

What terminology do you use to describe the industry/your product and why is that your preference?

*Geothermal heat pumps – this bridges the gap between geothermal and ground source heat pumps.*

In your experience, do industry participants and consumers use the same terminology when referring to this industry?

*No it is not consistent.*

And within the industry, do you find GSHP industry vernacular to be consistent? If not, is this a problem for the industry in terms of building market adoption?

*Yes, it is a problem, however it isn't the primary problem.*

What terminology do you think would be most appropriate for this industry and why?

How important is standardized nomenclature across all segments of the industry and how could the industry achieve it?

*The name would follow if other things were figured out. The main problem is the fact that it [GSHP] is not presented as an option to consumers. There's enough confusion on part of building community due to a lack of education on the part of building community, which leads to greater misunderstanding on behalf of consumer.*

*There are always debates over appropriateness of the technology and we need to be clear about when it is appropriate – be open and honest about what it is. There are enough legitimate applications that if everyone had disclosure about what it is there would still be tremendous growth.*

*There is also a lack of warranty. Having a performance guarantee would solve a lot of the problems, but who is going to stand behind it when there are so many players on an installation.*

### **Industry leaders' perspective on consumer decision-making**

Would you describe public awareness of GSHP to be high, low or about where you'd expect it to be given the industry's maturity? Why?

*Low. There is a lack of good information, readily available and presented in a way that is contextually relevant for people.*

What do you think are the three most important messages to communicate about GSHP in order to generate positive public sentiment for GSHP systems?

1) *It works*

How have your customers become aware of GSHPs/learn of your product?

*A lot of it is online or via conferences or word of mouth. We train contractors whose customers are asking for the product so they see it as a business opportunity.*

What do you think the primary motivation was for consumers who purchased GSHP systems?

*Being smart or having the best – making wise decisions.*

Have you observed any similarities in consumer demographics?

- *Wealthy homeowners*
- *Institutions/commercial building owners with long payback horizon*
- *Schools*

If you were the head of an industry association, what would you do to increase public awareness of GSHP technology?

*First thing I would do is engage state regulators and state policymakers in a conversation and educate them.*

What are some suggestions that you have to better inform consumers of this industry?

*The best way to get info out is via the contractors. These are the people who are getting the calls when there are problems with existing HVAC equipment. They are also the people/experts who are in the house.*

## **Adoption of Ground Source Heat Pump Technology**

As with any industry, there may be certain barriers that interfere with the market adoption of products and services. I'd like to ask you about your perception of barriers, if any, in relation to regulations, awareness and project economics for GSHP.

For both residential and commercial GSHP applications, what barriers, if any, have you encountered because of regulations – both state and local?

*The biggest barrier I see is uncertainty about the regulations. People need to know if they are "allowed" to do something like this and if people don't get an answer right away they give up.*

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for residential applications?

*There's a learning curve and a time lag. If someone's furnace breaks in the winter you have to put in furnace in the interest of time and necessity. There is an interest to decision time lag, it's a short window and it takes a while to teach people about something. The problem is missing that window.*

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for commercial applications?

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe manufacturers/deliverers of GSHP systems are experiencing?

*The manufacturer only has so much power, if they drop their prices it doesn't necessarily translate to lower prices to consumer.*

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe consumers are encountering?

*Up-front cost.*

Do you believe that GSHP systems are priced too high, too low, or just right?

*I believe in market based pricing. I wouldn't say too high or too low, I would love to see lower prices because prices as they are now are too high for widespread adoption.*

When compared to traditional HVAC systems, do you think GSHP systems are priced too high, too low, or just right?

When compared to other alternative energy solutions, do you think GSHP systems are priced too high, too low, or just right?

*The financing mechanisms to offset the initial investment in GSHPs is worse than other alternative energy solutions. The price consumers are seeing is much higher than for other renewables, whereas the underlying cost may actually be lower.*

*Federal tax credit: I am waiting for it to impact the industry; I think it will have a positive impact but it won't drive industry growth.*

For both commercial and residential applications, are there other issues besides cost that are a factor in the adoption of GSHP?

(If needed probe for: time, space, and permitting)

*A lack of information, and a lack of a credible source of information.*

How would you characterize the size and growth of the GSHP industry, why, and what would need to happen in order to spur greater growth in this industry?

*Size: growing (20-25% a year)*

*The industry is small, but greater access to info and lower initial costs could spur growth.*

## **Drilling**

Would you agree with the statement, "Drilling is the single largest cost component of GSHP systems?" How important do you think it is to reduce the cost of drilling? Do you have any suggestions as to how to reduce drilling costs?

*It can be; it's the obvious thing that sets it apart from a traditional system. Reducing cost would be great. However, on the commercial side, I've seen ductwork costs right up there with drilling costs.*

Do you agree with the statement, "The GSHP industry currently faces a shortage of drillers,"? What changes need to be made in order to attract and retain more drillers to the GSHP industry?

*Yes.*

*There needs to be a more consistent level of demand. Drillers make big investments in their businesses they are motivated to make those investments when they know they will be busy.*

Does the drilling technology currently available meet GSHP industry needs or is there a wish list you have for how the technology could be improved?

*I would argue that probably anything could be improved.*

How would you characterize the permitting process for the drilling required for GSHP systems? If you are dissatisfied with the process, what suggestions do you have as to how the permitting process could be improved?

*I don't have a lot of experience getting permits. It can greatly impact the cost of the job and it can drive the design to some extent.*

Is there any other information you would like to share about the GSHP industry, or topic that I did not touch upon that would be useful to this survey?

Carl Hauge

Department of Water Resources (Retired)  
July 22, 2009

### **Introductory Questions**

In order to better understand your perspective, I'd like you to describe your area of expertise in the Ground Source Heat Pump (GSHP) Industry. Specifically, what is your role/title today?

*I have worked in groundwater issues for 31 years. In the early 90s, the CEC was interested in pushing the GSHP industry because cost of electricity going up, and they wanted to avoid building new plants.*

*The CEC invited people from IGSHPA, bentonite industry, drilling, EPRI, - it was recognized that there needed to be some standards. The result is the DWR Draft Standards from April 1999.*

*I am no longer full time staff with the DWR, there is no budget for this work, but I'm doing what I can.*

What is your current responsibility and authority regarding GSHPs?

How long have you worked in this, or a closely related field?

*Since early 1990s.*

### **Industry Branding**

What terminology do you use to describe the industry/your product and why is that your preference?

*Ground Source Heat Pumps*

*Geothermal Heat Exchange Wells – they are using the heat exchange of the earth. We're talking about a pretty esoteric field here, not many people know about wells or boreholes, when you talk to people about it – especially legislators – you have to explain things to them. Trying to standardize terminology is difficult when you have that level of ignorance at the legislative level. This is one of the problems in groundwater, a lack of standardized terminology (ex, abandoning a well = destroyed).*

In your experience, do industry participants and consumers use the same terminology when referring to this industry?

And within the industry, do you find GSHP industry vernacular to be consistent? If not, is this a problem for the industry in terms of building market adoption?

What terminology do you think would be most appropriate for this industry and why?

*GSHP and Geoexchange – both are valid terms.*

How important is standardized nomenclature across all segments of the industry and how could the industry achieve it?

*It is very important but it is difficult to achieve this. Policy-makers have to be on the same page and they will use whatever they are given by water people.*

### **Industry leaders' perspective on consumer decision-making**

Would you describe public awareness of GSHP to be high, low or about where you'd expect it to be given the industry's maturity? Why?

*Very low – thinking in terms of water wells, even water wells fall low in terms of public awareness. People move out to the foothills and they have to build a well and they don't know anything about it. There is a lack of understanding of basic principles.*

*GSHPs are even more mysterious – geothermal elicits thoughts of high temp geothermal and geysers. Even people who have been living on wells, in the Sacramento and San Joaquin valleys are more aware of some of these water well issues but this does not translate into awareness of GSHP issues.*

*I've encountered banks that don't want to loan money to projects w/GSHP. County staff will get a proposal for GSHP, and have to call me with questions because they don't know what they are.*

*We need to educate architects and contractors.*

What do you think are the three most important messages to communicate about GSHP in order to generate positive public sentiment for GSHP systems?

- 1) *Saves Energy*
- 2) *Good heating and cooling system*

- 3) *Aside from environmental issues connected with generating energy, has no deleterious environmental impact that they have found thus far.*

How have your customers become aware of GSHPs/learn of your product?

*Before energy was deregulated, utilities were telling people about these systems so they could reduce their energy consumption. This may be one way to get people to know about it – to get energy companies involved.*

What do you think the primary motivation was for consumers who purchased GSHP systems/your product?

*Long-term savings.*

Have you observed any similarities in your customer demographics?

*Schools*

If you were the head of an industry association, what would you do to increase public awareness of GSHP technology?

*I would work with building contractors groups, building industry associations, any architects who get involved in developments, or larger office buildings and I would approach PG&E SMUD, So Cal Edison to see if they might be interested in re-instituting a plan to subsidize the wells required for GSHP systems.*

What are some suggestions that you have to better inform consumers of this industry/your product?

*Utilities can inform customers. The GSHP industry could always get together some TV ads.*

### **Adoption of Ground Source Heat Pump Technology**

As with any industry, there may be certain barriers that interfere with the market adoption of products and services. I'd like to ask you about your perception of barriers, if any, in relation to regulations, awareness and project economics for GSHP.

For both residential and commercial GSHP applications, what barriers, if any, have you encountered because of regulations – both state and local?

*People in the industry might look on the standards as a regulatory barrier but the contractors I've worked with, look on the standards as something they have to live with and enforce. The reason the standards are there is so that contractors, drillers know that they have to do GSHP projects a particular way to protect groundwater quality. The standards do require a level of technical expertise, but new standards have been made using input of players of stakeholders. They are an attempt to be standards that protect and can be implemented without excessive cost.*

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for residential applications?

*Lack of awareness is a barrier. People move around so much that they do not realize the long-term benefits. If you are only going to be in a house for 5 years, it is not a long enough time to accrue the savings.*

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for commercial applications?

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe manufacturers/deliverers of GSHP systems are experiencing?

*There is no business.*

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe consumers are encountering?

*Upfront Cost.*

Do you believe that GSHP systems are priced too high, too low, or just right?

*Building costs a certain amount. If you talk to a contractor in California, there are certain costs that they incur (fuel, insurance, etc). I thinks these costs are determined by the market and the market is going to keep those costs in the right place because the drilling contractors have expenses they have to cover. The out of state contractors charge a lower price but they don't know what they are doing. Inspectors have to deal with these contractors who don't understand the standards.*

When compared to traditional HVAC systems, do you think GSHP systems are priced too high, too low, or just right?

When compared to other alternative energy solutions, do you think GSHP systems are priced too high, too low, or just right?

For both commercial and residential applications, are there other issues besides cost that are a factor in the adoption of GSHP?

(If needed probe for: time, space, and permitting)

*Lack of awareness and people not staying long enough in one home to accrue the savings.*

How would you characterize the size and growth of the GSHP industry, why, and what would need to happen in order to spur greater growth in this industry?

*If the cost of energy skyrocketed, this would spur growth.*

*As to size of the industry, in the early 1990s it was growing rapidly, but after deregulation it slowed. More recently, interest has increased for larger projects because they will be there over the long term (10+ years) so they benefit from the savings. More of the large installations are occurring now than they have in the past and I think they will increase.*

## **Drilling**

Drilling is the single largest cost component of GSHP systems and thus has a large impact on GSHP project economics. How important is it to your company to reduce the cost of drilling? Do you have any suggestions as to how to reduce drilling costs?

*Yes, this is what I've been told by more than one person in the industry. This is why the power companies were subsidizing the upfront costs of wells.*

The GSHP industry currently faces a shortage of drillers. What changes need to be made in order to attract and retain more drillers to the GSHP industry?

*The reason drillers from out of state get contracts is because contractors need to have had a large installation under their belt. The CGA is trying to help drilling contractors to get certified by IGSHPA to become familiar with the techniques.*

Does the drilling technology currently available meet GSHP industry needs or is there a wish list you have for how the technology could be improved?

*There's always improvements in the technology in these fields. What's out there currently meets the GSHP standards.*

How would you characterize the permitting process for the drilling required for GSHP systems? If you are dissatisfied with the process, what suggestions do you have as to how the permitting process could be improved?

*We have 58 counties in California and almost all of them have local enforcement agencies. They are the ones who have developed the permitting process – Dir. Of Environmental Health in conjunction with County Supervisors. So, there are at least 40 different ways that the permitting process works and 40 different fee schedules. The only way to make this more uniform is to have the 40 counties get together and work something out. This is an issue that CGA is working with California Conference of Environmental Health. There is quite a difference on the fees charged by different counties.*

Is there any other information you would like to share about the GSHP industry, or topic that I did not touch upon that would be useful to this survey?

Dennis Terhove

City of Calgary  
July 22, 2009

### **Introductory Questions**

In order to better understand your perspective, I'd like you to describe your area of expertise in the Ground Source Heat Pump (GSHP) Industry. Specifically, what is your role/title today?

*I'm a regulator now. Prior to that I was involved with geoexchange.*

*At the city I've established a permanent inspection process for GSHPs. We are the first municipality to do that in North America. I encountered resistance from the industry but the truly legitimate contractors are happy with it, and customer confidence is good due to the 3<sup>rd</sup> party inspection process. We set up the process in September of 2006 and started from scratch. Nothing else out there, started from scratch. Have a Canadian standard, full guideline for GeoExchange systems.*

What is your current responsibility and authority regarding GSHPs?

How long have you worked in this, or a closely related field?

*10 years*

### **Industry Branding**

What terminology do you use to describe the industry/your product and why is that your preference?

*Geoexchange – Canada is moving towards this, thanks in part to the Canadian Geoexchange Coalition.*

In your experience, do industry participants and consumers use the same terminology when referring to this industry?

*Consumers typically use the term geothermal.*

And within the industry, do you find GSHP industry vernacular to be consistent? If not, is this a problem for the industry in terms of building market adoption?

What terminology do you think would be most appropriate for this industry and why?

*Geoexchange.*

How important is standardized nomenclature across all segments of the industry and how could the industry achieve it?

*I don't know, it still is a new technology for consumers, but it's pretty much established. The name won't matter too much.*

### **Industry leaders' perspective on consumer decision-making**

Would you describe public awareness of GSHP to be high, low or about where you'd expect it to be given the industry's maturity? Why?

*It's about where I'd expect it to be – but you'd also have to look at the regional differences. We are in oil and gas country, and the cost of gas is lower. There has been a drop off in projects due to economics at the moment.*

What do you think are the three most important messages to communicate about GSHP in order to generate positive public sentiment for GSHP systems?

- 1) *Bad stories are sticking around way too much*
- 2) *Advertising would help*
- 3) *Public awareness*
- 4) *Promote the industry as opposed to negative attitudes towards competitors.*

How have your customers become aware of GSHPs/learn of your product?

- *Primarily through publications- web-based or print.*
- *Word of mouth.*

What do you think the primary motivation was for consumers who purchased GSHP systems/your product?

- *Be green*
- *Add to a collection of toys*

Have you observed any similarities in your customer demographics?

- *Wealthy*
- *Techies*
- *Environmentally conscious.*

If you were the head of an industry association, what would you do to increase public awareness of GSHP technology?

*Extra lobbying. They are more proactive in Canada than we are in the US. Make the technology a lot more available, not just through websites, but through public broadcast on television and radio (they do this in Canada).*

What are some suggestions that you have to better inform consumers of this industry/your product?

## **Adoption of Ground Source Heat Pump Technology**

As with any industry, there may be certain barriers that interfere with the market adoption of products and services. I'd like to ask you about your perception of barriers, if any, in relation to regulations, awareness and project economics for GSHP.

For both residential and commercial GSHP applications, what barriers, if any, have you encountered because of regulations – both state and local?

*Contractors are not used to having to deal with it. Contractor awareness of value of permit can be a barrier. Regulations protect everyone – they work as a neutral agency. This needs to be realized; regulations have a purpose.*

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for residential applications?

*Need to form organizations so that they could go in as a cooperative and express an organized front. Do their own local advertising and promotions – tremendous value to that.*

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for commercial applications?

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe manufacturers/deliverers of GSHP systems are experiencing?

*Cost of production – equipment costs are too high. They need higher output to drop cost. The systems are also technically demanding, they need to be fine tuned and maintained properly.*

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe consumers are encountering?

*Upfront costs and drilling.*

Do you believe that GSHP systems are priced too high, too low, or just right?

When compared to traditional HVAC systems, do you think GSHP systems are priced too high, too low, or just right?

When compared to other alternative energy solutions, do you think GSHP systems are priced too high, too low, or just right?

For both commercial and residential applications, are there other issues besides cost that are a factor in the adoption of GSHP?

(If needed probe for: time, space, and permitting)

*Simply the operation itself can be an issue. For retrofits, if the drilling contractors are in and out, they must operate at certain times of day (there are restrictions). The operation necessitates ripping up lots and loud noisy equipment. They are immediately impacting. These sorts of things are walking advertisements for the industry and technology – for good or bad.*

How would you characterize the size and growth of the GSHP industry, why, and what would need to happen in order to spur greater growth in this industry?

*GSHP industry is still in its infancy. It's growing extremely fast, almost doubling every year in Canada. One of the biggest hindrances to growth is the stand-alone, we're special attitude the industry has had. The industry needs to form organizations so that they can share experiences, new trends and technologies.*

## **Drilling**

Drilling is the single largest cost component of GSHP systems and thus has a large impact on GSHP project economics. How important is it to your company to reduce the cost of drilling? Do you have any suggestions as to how to reduce drilling costs?

*Absolutely I would agree, drilling is almost half of the price.*

*As to reducing drilling costs – I don't know if that is feasible. Drillers are dealing with very expensive equipment and people need to make a living.*

The GSHP industry currently faces a shortage of drillers. What changes need to be made in order to attract and retain more drillers to the GSHP industry?

*I haven't heard of anyone short a driller in my area but we are oil and gas country so we have drillers.*

Does the drilling technology currently available meet GSHP industry needs or is there a wish list you have for how the technology could be improved?

*I would like to see a drilling process that will go through every kind of strata – we deal with 2-3 types of drilling method and we would prefer just one.*

How would you characterize the permitting process for the drilling required for GSHP systems? If you are dissatisfied with the process, what suggestions do you have as to how the permitting process could be improved?

*The permitting process for us is the simplest part of it. Projects have to be certified and registered with the city, then they are inspected.*

Is there any other information you would like to share about the GSHP industry, or topic that I did not touch upon that would be useful to this survey?

*CA has some pretty tough conditions. Forming an association might be even more important there.*

John Kelly

Executive Director  
Geothermal Heat Pump Consortium

**August 11, 2009**

## **Introductory Questions**

In order to better understand your perspective, I'd like you to describe your area of expertise in the Ground Source Heat Pump (GSHP) Industry. Specifically, what is your role/title today?

*I am the Executive Director of Geothermal Heat Pump Consortium, we are a national non-profit trade association for the geothermal heat pump industry. We promote the technology, educate consumers. We are a member organization and we support the business efforts of our members. We also educate regulators/legislators and encourage them to pass appropriate regulations/legislation favorable to industry.*

What is your current responsibility and authority regarding GSHPs?

[see above]

How long have you worked in this, or a closely related field?

*Since 1995, with the Consortium.*

## **Industry Branding**

What terminology do you use to describe the industry/your product and why is that your preference?

*Branding is an issue. We own the trademark Geoexchange and we are making a conscious effort to popularize that brand. Canada has been more successful with the term geoexchange than the U.S. This is because Canada didn't really have much of a term they used prior. In the U.S. the term "ground source" had been used for a number of years, since the 1970s (IGSHPA). The other term is "geothermal" – this is the term of preference at federal government level. Geoexchange was an attempt to resolve confusion of the other terms but we only succeeded at adding a third term into the mix. It would be good to have one term that everyone uses. We came to the conclusion that the real problem is the term "heat pump". It is the hardest to explain to people, there is confusion among consumers as to what it actually does. They would go along with one name if there was industry consensus.*

In your experience, do industry participants and consumers use the same terminology when referring to this industry?

*Consumers still largely don't understand the technology or are not aware of it. Whatever term they hear first is what they relate to. "Geothermal heat pump" is the term on the 30% tax credit forms. There are also differences within the commercial and residential projects – we need to view this along these lines, there are different audiences.*

And within the industry, do you find GSHP industry vernacular to be consistent? If not, is this a problem for the industry in terms of building market adoption?

What terminology do you think would be most appropriate for this industry and why?

How important is standardized nomenclature across all segments of the industry and how could the industry achieve it?

*Very important. This is one of the reasons why I am open to using a term other than the trademark Geoexchange. It would be a net positive. Consumers are not confident that ground source means the same thing as geothermal.*

### **Industry leaders' perspective on consumer decision-making**

Would you describe public awareness of GSHP to be high, low or about where you'd expect it to be given the industry's maturity? Why?

*Low because the industry has done a lousy job of branding.*

What do you think are the three most important messages to communicate about GSHP in order to generate positive public sentiment for GSHP systems?

- 1) *Good deal – cost effective*
- 2) *Really works*
- 3) *Comfortable*
- 4) *Environmentally friendly – low carbon footprint, does not really pose any risk to the earth.*

How have your customers become aware of GSHPs/learn of your product?

*Up till now consumers have found out through the media: seeing something on TV, reading an article in a magazine. Or, they have found out about it from their utility; rural co-ops have a magazine that they customize (Country Life/Living) to different areas and geothermal heat pump manufacturers advertize in these publications!*

*I think that a lot of people will find out about it when doing their taxes thanks to the 30% tax credit that was passed in February.*

What do you think the primary motivation was for consumers who purchased GSHP systems?

*What gets you in the door isn't the same as what gets you to buy. What gets people in the door is the fact that GSHPs are environmentally friendly/green and people are looking to be green. However, this won't get them to spend \$20k on a GSHP system, the economics will ultimately sell them on it. The tax credit gets the price closer to conventional systems and legitimizes the technology. It is a tremendous incentive and gives consumers confidence in the technology.*

Have you observed any similarities in consumer demographics?

*These systems are expensive - upper middle class and higher.*

If you were the head of an industry association, what would you do to increase public awareness of GSHP technology?

*Get Warner Brothers to donate bugs bunny - as a spokesman. He crosses generational lines (kids, baby boomers) and can start educating kids about the technology. The environmental movement took root through education.*

What are some suggestions that you have to better inform consumers of this industry?

*Generically, the industry needs to do a better job of doing outreach and media advertising. You could have some very effective outreach. Most common question I get from consumers is: does it really work, and how does it work? We need to get some materials out that explain the technology simply by using diagrams and taking a common sense approach to media marketing.*

## Adoption of Ground Source Heat Pump Technology

As with any industry, there may be certain barriers that interfere with the market adoption of products and services. I'd like to ask you about your perception of barriers, if any, in relation to regulations, awareness and project economics for GSHP.

For both residential and commercial GSHP applications, what barriers, if any, have you encountered because of regulations – both state and local?

*Yes, the barriers are:*

*1) uncertainty – people don't know what licenses/permits are necessary or if it is allowed where they live. A factor that amplifies this is the fact that there are 100s of different rules that apply. Each state has their own set of regulations. Also, local jurisdictions have different regulations as well. There is significant uncertainty as to what rules and regs are – however, this is a rapidly changing environment. Many jurisdictions do not have any regs and or do not understand the tech. There are a lot of jurisdictions that say they cannot do it. Regulators are trying to do their jobs. No professional wants to be the first one to try something because there is significant risk of ruining their career if something goes wrong. Significant uncertainty creates risk for both consumers and regulators.*

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for residential applications?

*Residential – lack of consumer awareness*

*Commercial – lack of awareness by engineers. Engineers will talk folks out of the technology, this is the biggest failure as an industry. If they had put all of their money putting into a college course for geothermal heat pumps for engineering grads they would be more comfortable in the future. 2-3% of engineers are comfortable/have done this before. The liability if things don't work is huge.*

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for commercial applications?

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe manufacturers/deliverers of GSHP systems are experiencing?

*Economy of scale. Except for Bosch, of the geothermal heat pump manufactures who are focused/dedicated to technology, none are big enough to risk very much. It takes a long time to deliver – if things pick up they cannot deliver enough in time. Construction scheduling is important! You have to fit into their construction schedule – this means you may have to wait 12 weeks for a geothermal heat pump*

*and this can put a project in jeopardy. Once someone decides they want a GSHP – one of the biggest barriers is fitting into construction schedule.*

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe consumers are encountering?

*Up-front cost. The tax credit, there is a lot of uncertainty about the tax credit. A 30% tax credit can make or break it. Until the IRS has a few test cases, we don't know how it will turn out.*

Do you believe that GSHP systems are priced too high, too low, or just right?

*I think it's about as good as it's going to get. It is realistic. Heat pump units themselves could get a little cheaper. Units themselves are probably close to the right price. There's not much economy of scale in doing the ground loop. Uncertainty drillers face when they do a job – if they do it wrong it costs them a lot of money. In my opinion, people are barking up the wrong tree when they pound on drillers, asking them to make the ground loops cheaper.*

When compared to traditional HVAC systems, do you think GSHP systems are priced too high, too low, or just right?

When compared to other alternative energy solutions, do you think GSHP systems are priced too high, too low, or just right?

*GSHPs are competitive with something like solar – the problem is that you don't get credit for it. The problem with geothermal is that it is invisible whereas solar panels are visible. If you put in a geothermal system and no one knows you've got it. Big projects are impressive and people like to have big projects. Public perception is important.*

For both commercial and residential applications, are there other issues besides cost that are a factor in the adoption of GSHP?

(If needed probe for: time, space, and permitting)

*Confidence.*

How would you characterize the size and growth of the GSHP industry, why, and what would need to happen in order to spur greater growth in this industry?

*Size: tiny, 2% of the total heating and cooling market. Tax credits are going to be a big deal but it will take a few years to sink in. Once this starts taking hold the other big problem is having enough people to do it. We will need trained people to do good jobs and we need to avoid bad installations. Having the necessary infrastructure is the key.*

## **Drilling**

Would you agree with the statement, "Drilling is the single largest cost component of GSHP systems?" How important do you think it is to reduce the cost of drilling? Do you have any suggestions as to how to reduce drilling costs?

*Agree. Not real important to reduce the cost of drilling.*

Do you agree with the statement, "The GSHP industry currently faces a shortage of drillers,"? What changes need to be made in order to attract and retain more drillers to the GSHP industry?

*Yes. Drillers could use help with business planning. If you can convince a driller that they won't get in trouble by doing these projects, they wouldn't hesitate so much to do it. At the moment, water well drilling is the safe choice. Drillers are open to new ideas but they need help w/business plan for geothermal wells. Regulatory certainty will help as drillers need to know the environment they are working in.*

Does the drilling technology currently available meet GSHP industry needs or is there a wish list you have for how the technology could be improved?

*I don't have the technical knowledge to answer this but my guess is that while there are opportunities for improvements with new technologies for drilling, ultimately it has more to do with geology than drilling equipment. Drillers need to make the hole and not cause environmental damage.*

How would you characterize the permitting process for the drilling required for GSHP systems? If you are dissatisfied with the process, what suggestions do you have as to how the permitting process could be improved?

*The permitting process is very fragmented. It is different in every state, and local jurisdictions.*

*If the industry (geothermal industry and drilling industry) could get together and agree on a campaign of what the model regulations for permitting and licensing should be and went to 50 states to educate regulators and got a consistent set of regulations established in all 50 states – that would be a big help. I am not in favor of a federal regulation.*

Is there any other information you would like to share about the GSHP industry, or topic that I did not touch upon that would be useful to this survey?

Mike Thomas

ClimateMaster  
Regional Manager  
August 6, 2009

### **Introductory Questions**

In order to better understand your perspective, I'd like you to describe your area of expertise in the Ground Source Heat Pump (GSHP) Industry. Specifically, what is your role/title today?

*I am a Western Regional Sales manager for ClimateMaster, I do all the promotional sales.*

What is your current responsibility and authority regarding GSHPs?

How long have you worked in this, or a closely related field?

*I've worked in the HVAC/Geothermal industry for 38 years.*

### **Industry Branding**

What terminology do you use to describe the industry/your product and why is that your preference?

*I've changed from "geothermal heat pumps" to "ground-coupled pumps". One of the issues when you use geothermal is that it brings up hot rocks, steam, that kind of thing. It is confusing for lay people, they think you are talking about some exotic form of using deep earth steam or hot water. I still have to do some explanation of what the process is. "Earth coupled" helps explain ground source vs. air source. Usually by the time I'm talking to customers they've done some investigation to research the technology but there is still some confusion as to how it works.*

In your experience, do industry participants and consumers use the same terminology when referring to this industry?

And within the industry, do you find GSHP industry vernacular to be consistent? If not, is this a problem for the industry in terms of building market adoption?

What terminology do you think would be most appropriate for this industry and why?

How important is standardized nomenclature across all segments of the industry and how could the industry achieve it?

*Most people are using different terminologies, and this is one of the biggest problems they have is that there is no consistency the terms people are using. I sees terminology as a big problem.*

### **Industry leaders' perspective on consumer decision-making**

Would you describe public awareness of GSHP to be high, low or about where you'd expect it to be given the industry's maturity? Why?

*I think it's about where you would expect, however there is a growing interest (residentially). People are coming into green home shows knowing about GSHP. They are looking to retrofit their existing system or building a new home. The difference between this year vs. 4 years ago is almost meteoric – people know so much more than they used to.*

*Why is this? It's due to the rise in energy costs. Consumers are looking at stabilizing household expenses and people are acutely aware of rising energy costs. .*

What do you think are the three most important messages to communicate about GSHP in order to generate positive public sentiment for GSHP systems?

- 1) *Energy conservation*
- 2) *Affordability*
- 3) *Reliability*

How have your customers become aware of GSHPs/learn of your product?

*Local TV stations have had 5-minute spots on ground-coupled applications. It's also been in local news, newspaper. The local electric utility has put on seminars for architects, homeowners, engineers re: green homes and ground coupled is part of that. They've put on 3 in the last 15 months and they have turned people away due to over subscription.*

What do you think the primary motivation was for consumers who purchased GSHP systems?

*Energy conservation, comfort are the two drivers of the people who I talk to.*

Have you observed any similarities in consumer demographics?

*It's all over the board. I've got 40-50-60 year olds. Most people you talk to have done some research so they are cognizant of the basic principles and basic application.*

If you were the head of an industry association, what would you do to increase public awareness of GSHP technology?

*We need to push contractors to more specific advertising and trade shows and work with utilities to do more seminars that are green related. People are looking to combine solar with ground coupled. We need to work harder with utilities and contractors to get them to do more promotion of the technology.*

What are some suggestions that you have to better inform consumers of this industry?

*This is really difficult on a national level because the target audience is so fragmented. Demographics are probably older and higher income (majority) – but how do we attract this demographic? Perhaps tie into groups like AARP. This demographic looking to minimize their household expenses and this is one of the ways they could do it. He's never seen any article in AARP magazine about ground-coupled technology. Some of the jobs are 20-40-50k \$, the end user is working with an architect/builder this is different than convention because they are very involved.*

## **Adoption of Ground Source Heat Pump Technology**

As with any industry, there may be certain barriers that interfere with the market adoption of products and services. I'd like to ask you about your perception of barriers, if any, in relation to regulations, awareness and project economics for GSHP.

For both residential and commercial GSHP applications, what barriers, if any, have you encountered because of regulations – both state and local?

*The water quality people; I've had a number of barriers thrown up especially in northern California. The local water quality people have said they are going to do whatever it takes to stop the technology and they try to make it cost prohibitive to do. I've heard inspectors requiring the drillers to call the inspector out to watch driller drill each borehole, this compounds the cost and may shut the technology down.*

*The biggest problem is turf wars from local regulators. This is one of the biggest problems or barriers that CA has is the water quality people + the cost of drilling. It limits what you can do.*

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for residential applications?

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for commercial applications?

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe manufacturers/deliverers of GSHP systems are experiencing?

*The only barrier they have is getting the loop in the ground. It's not the cost of the equipment.*

- 1) *Contractor knowledge – business has been so good for last 15 years for HVAC contractors. They've been doing new construction, 2 systems a day for HVAC.*
- 2) *Salesmen are paid on what they sell. It takes no effort to sell conventional HVAC, even in a downtime, they are scrambling to sell as many furnaces and air conditioning units as possible. Why waste 4-5 weeks to sell one unit (GSHP) where the salesperson has to hand hold the contractor. It takes a lot of effort for a distributor salesman and why do it? He could sell 20 units a month of conventional HVAC equipment and only 20 GSHP units a year. To sell ground coupled units you have to know a lot of information. You also have to meet with the contractor salesman, and handholding is involved. It takes a lot more effort to sell one unit. The Midwest might be different/easier. But in the west – this is one of the biggest barriers we have*

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe consumers are encountering?

*The cost of getting it in, the limited number of contractors that are actually involved in it.*

Do you believe that GSHP systems are priced too high, too low, or just right?

*The pricing is fine on the equipment side. Really the barrier is getting the loop into the ground (\$) in the west because there is a limited number of drillers who will even participate in it. The new ones who show an interest, water well drillers, will charge \$30-\$40/foot to drill, if they could get it to \$14-\$18/foot it would be more reasonable but they won't touch that. There are a limited number of people doing the loop side.*

When compared to traditional HVAC systems, do you think GSHP systems are priced too high, too low, or just right?

When compared to other alternative energy solutions, do you think GSHP systems are priced too high, too low, or just right?

For both commercial and residential applications, are there other issues besides cost that are a factor in the adoption of GSHP?

(If needed probe for: time, space, and permitting)

*Local municipalities and local regulations.*

How would you characterize the size and growth of the GSHP industry, why, and what would need to happen in order to spur greater growth in this industry?

*Size: overall it is going largely – 15-20% growth a year, realistically (in the west). The Midwest and northeast are growing faster than that due to factors such as utility interest and more contractors doing it.*

## **Drilling**

Would you agree with the statement, “Drilling is the single largest cost component of GSHP systems?” How important do you think it is to reduce the cost of drilling? Do you have any suggestions as to how to reduce drilling costs?

*Yes. It is important to reduce the cost of drilling. There are different technologies that people are looking at to bring down the cost of drilling and new technology will be important. New pipes, new drills are possibilities.*

*Drilling barriers: Drilling conditions, size of drill rigs. From a drillers perspective they need to break even. Drill bits are expensive! (\$2,000 per bit). Soil/geologic conditions are important factors when it comes to cost. Drillers can lose money on the job. Drilling conditions in the west are different vs. Midwest or the South.*

Do you agree with the statement, “The GSHP industry currently faces a shortage of drillers,”? What changes need to be made in order to attract and retain more drillers to the GSHP industry?

*Yes. Driller expectation of what they need to earn per foot on ground-coupled jobs is unrealistic. To grow the industry, they have to be willing to work for less money and the water well drilling business has gone downhill- as a result they are getting more interest from water well drillers but when you talk to them about the cost expectations per foot (\$18/foot) they are not interested, they need like \$40/foot. The*

*driller doesn't know anything about heat pumps. They are drilling the hole, and they think they can sell/install the unit but it is not always so easy.*

Does the drilling technology currently available meet GSHP industry needs or is there a wish list you have for how the technology could be improved?

How would you characterize the permitting process for the drilling required for GSHP systems? If you are dissatisfied with the process, what suggestions do you have as to how the permitting process could be improved?

*In northern California it is very restrictive. Every county has a different permit process – they throw up barriers, there's no consistency. They seem to want to restrict the application by having no consistency in permit process, no consistency on price (permit fee).*

Is there any other information you would like to share about the GSHP industry, or topic that I did not touch upon that would be useful to this survey?

*In California it is turf battle/turf war – each municipality wants to run its own serfdom. There has to be more consistency in permit process, as to what's required and what's not required. Drillers won't waste their time in places like this. There has to be consistency on drilling side permit process. There's interest but also so many barriers.*

KC Spivey & Brian Bailey

Customer Energy Efficiency, Emerging Technologies  
PG&E

### Introductory Questions

In order to better understand your perspective, I'd like you to describe your area of expertise in the Ground Source Heat Pump (GSHP) Industry. Specifically, what is your role/title today? Tell me a little bit about your involvement or experience with the GSHP industry?

*I am a Summer intern with PG&E's emerging technologies group. I have been looking into ground source heat pump technologies. My colleague KC – has been with the Emerging technology group for about a year. We are focused on trying to get customers to save energy.*

What is your current responsibility and authority regarding GSHPs?

How long have you worked on GSHP issues?

*Brian has been working on GSHP issues for about 10 weeks. PG&E did a large study in the late 90s with the Davis energy group. There are people who have looked at it off and on and the study found they were competitive with traditional electric heating but not as competitive with natural gas heating. The interest waned for a while and now picking back up.*

How would you characterize utilities interest in GSHP technology?

*PG&E is very interested, this is why they assigned Brian this project. KC – had previously been a HVAC program manager and they did have an incentive – a rebate program. This program went away with the DOE min efficiency standard on Jan 1, 2006. They haven't had an HVAC incentive program since then.*

I understand that in the early 90s, SMUD and SO CAL EDISON were subsidizing the upfront costs of the wells required for GSHP systems – what has PG&E's involvement with GSHPs been? What role for the future? (what needs to happen in order for utilities to play a greater role?)

*PG&E had a program that was limited to education and training in the late 90s, when they were directed to undertake market transformation programs, these sunset in 2001. In the late 90s, early part of the decade, they were trying to reach customers in the foothills. They had training for the contractors to*

*install the systems, sponsored out of training center in Stockton. They also had a mobile training facility. One of biggest issues out West vs. Midwest is that customers don't know of GSHPs.*

Renewable Portfolio Standards – as I understand it, GSHP technology (since it is not a power generation technology) is excluded from renewable portfolio standards. Do you think inclusion in the RPS is a possibility and how might this impact the industry? Would this spark greater interest on behalf of utilities?

*They are just starting to look into this but haven't made any headway. Brian is trying to talk to other folks around PG&E to see what opportunities exist. They would need a large-scale roll out of technology to make an impact. KC thought he heard that GSHP – may have been RPS eligible at this time. The RPS angle is important.*

## **Industry Branding**

What terminology does PG&E use to describe the industry and why?

*PG&E does not have a terminology that it uses exclusively. Brian typically uses geothermal heat pump because more people are familiar with that. Probably the most correct term to use is ground source heat pump.*

In your experience, do industry participants and consumers use the same terminology when referring to this industry?

And within the industry, do you find GSHP industry vernacular to be consistent? If not, is this a problem for the industry in terms of building market adoption?

What terminology do you think would be most appropriate for this industry and why?

How important is standardized nomenclature across all segments of the industry and how could the industry achieve it?

*PG&E probably underestimates the importance of standardized nomenclature.*

## Industry leaders' perspective on consumer decision-making

Would you describe public awareness of GSHP to be high, low or about where you'd expect it to be given the industry's maturity? Why?

*Very low. Brian has been very surprised after talking to people discovering that most people don't know about the technology. However, a lot of people around PG&E know of them.*

What do you think are the three most important messages to communicate about GSHP in order to generate positive public sentiment for GSHP systems?

- 1) *Energy savings*
- 2) *Carbon implications moving forward*
- 3) *Complementary liability*

*The downside of GSHP – is the name "heat pump", customers have negative thoughts when they hear heat pump. Another challenge to getting this technology deployed is the temperate climate relative to where this technology has market share.*

How have your customers become aware of GSHPs/learn of your product?

What do you think the primary motivation was for consumers who purchased GSHP systems?

Have you observed any similarities in consumer demographics?

If you were the head of an industry association, what would you do to increase public awareness of GSHP technology?

*Increase the organizational capacity of industry – manufactures have trouble tracking down dealers and it is difficult to track down people to talk to who know what they are talking about. Brian hasn't seen much of a push to advertise this technology to consumers in California.*

*The industry needs to improve awareness and work with the manufactures, place ads in industry magazines. Get some of the big names like ClimateMaster and WaterFurnace to do collaborative advertising.*

What are some suggestions that you have to better inform consumers of this industry?

*Create a push around quality and maintenance.*

## Adoption of Ground Source Heat Pump Technology

As with any industry, there may be certain barriers that interfere with the market adoption of products and services. I'd like to ask you about your perception of barriers, if any, in relation to regulations, awareness and project economics for GSHP.

For both residential and commercial GSHP applications, what barriers, if any, have you encountered because of regulations – both state and local?

*The major barrier to large-scale implementation is the installation cost. What has come up multiple times is drilling in California. There are no regulations that limit PG&E's involvement and there are other utilities that are quite proactive in this space because they are seeing an opportunity to create benefits for their customers and themselves. However, PG&E is highly regulated by the Commission and they would be much more limited than other utilities.*

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for residential applications?

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for commercial applications?

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe manufacturers/deliverers of GSHP systems are experiencing?

*There is a lack of data collection. This makes it challenging to determine how much energy these systems use. There is a reason for this – the data differs on a case-by-case basis.*

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe consumers are encountering?

*PG&E has a complex rate structure (inverted block rate) and they want to try and get a better understanding of how that might impact customer choice. If a person implements this GSHP technology – costs are highly variable.*

Do you believe that GSHP systems are priced too high, too low, or just right?

When compared to traditional HVAC systems, do you think GSHP systems are priced too high, too low, or just right?

When compared to other alternative energy solutions, do you think GSHP systems are priced too high, too low, or just right?

For both commercial and residential applications, are there other issues besides cost that are a factor in the adoption of GSHP?

(If needed probe for: time, space, and permitting)

*A major issue in California (for the residential market) is our relatively temperate climate. There is not a lot of heating and cooling loads in the summer as in other parts of the country. Thus the overall energy savings are lower. Another issue is that technology of conventional systems have come a long way, thus the effect of GSHP may not be what it was 10 years ago.*

*On the commercial side, there is a lot of potential for GSHP because heating and cooling loads are much more consistent.*

*Another issue is installation infrastructure – if contractor not available in immediate area, how far is he willing to travel.*

*Another issue is the fact that California has a relatively affordable supply of natural gas – not very expensive for people to heat using natural gas.*

How would you characterize the size and growth of the GSHP industry, why, and what would need to happen in order to spur greater growth in this industry?

*In California the GSHP industry is small. Growth seems to be pretty slow recently although there have been some commercial installations done.*

*In order to spur growth we'd need to remove some of the barriers we talked about. Reducing the price of installation would be significant. The Commercial market is where there is real potential.*

## **Drilling**

Would you agree with the statement, "Drilling is the single largest cost component of GSHP systems?" How important do you think it is to reduce the cost of drilling? Do you have any suggestions as to how to reduce drilling costs?

*Don't totally agree.*

Do you agree with the statement, "The GSHP industry currently faces a shortage of drillers,"? What changes need to be made in order to attract and retain more drillers to the GSHP industry?

*In California definitely. GSHP technology involves close collaboration between two very different trade types – drilling and HVAC contractors. There is the potential to grow some alliances here and get the two groups to work together more closely.*

Does the drilling technology currently available meet GSHP industry needs or is there a wish list you have for how the technology could be improved?

How would you characterize the permitting process for the drilling required for GSHP systems? If you are dissatisfied with the process, what suggestions do you have as to how the permitting process could be improved?

*Highly variable by jurisdiction and this is one of the challenges. Maybe this could change – if there were a way to do it through title 24 or a way the California Energy Commission could assist.*

Is there any other information you would like to share about the GSHP industry, or topic that I did not touch upon that would be useful to this survey?

*If the cost of drilling could be taken down to what it is in the Midwest then that could have big implications in California.*

Randy Dockery

Supervisor  
Gregg Drilling  
August 14, 2009

### **Introductory Questions**

In order to better understand your perspective, I'd like you to describe your area of expertise in the Ground Source Heat Pump (GSHP) Industry. Specifically, what is your role/title today?

*I am a Supervisor with Gregg Drilling. I've spent almost 30 years in the drilling industry. Geothermal is about 2% of what they do.*

What is your current responsibility and authority regarding GSHPs?

How long have you worked in this, or a closely related field?

### **Industry Branding**

What terminology do you use to describe the industry/your product and why is that your preference?

*The industry has an identity problem. I prefer the term geoexchange – it's what the systems do, they are basically heat exchangers. The term geothermal conjures up the wrong image (deep geothermal).*

In your experience, do industry participants and consumers use the same terminology when referring to this industry?

*Yes, for geothermal they are. Consumers don't understand drilling in and of itself.*

And within the industry, do you find GSHP industry vernacular to be consistent? If not, is this a problem for the industry in terms of building market adoption?

What terminology do you think would be most appropriate for this industry and why?

How important is standardized nomenclature across all segments of the industry and how could the industry achieve it?

*It would be really helpful but I don't see it happening. There are too many regional terminologies.*

### **Industry leaders' perspective on consumer decision-making**

Would you describe public awareness of GSHP to be high, low or about where you'd expect it to be given the industry's maturity? Why?

*Low, and I can't explain why that is. Geothermal has been around for many years and its come along way but for the age of the industry, it is still in its infancy. There has been a lack of education.*

What do you think are the three most important messages to communicate about GSHP in order to generate positive public sentiment for GSHP systems?

- 1) *It is a clean energy*
- 2) *It's very passive – doesn't require a lot of energy*
- 3) *Environmental (could become more cost effective w/carbon pricing)*

How have your customers become aware of GSHPs/learn of your drilling services?

*Most of the work they've done has been good work. Customers learn of our services through word of mouth, the internet, and the phone book. Generally contractors contact drillers for this kind of work. They don't market it. The majority of their work, they've had to bid on. Gregg Drilling pushes safety in their bids, technology, compliance with regulations. Total containment of drilling fluids – clean water act (Federal) and U.S. EPA directives – most people don't understand that states are required to enforce these laws. There are hazardous materials involved in drilling.*

*First 5-10 ft are pretty bleached, a lot of minerals and salts are bleached out but once you get down deeper you bring them up (salt, naturally occurring chemicals- arsenic, chromium) that are above the limits – it's not your products that are causing problem it's what you're bringing out of the ground. You can't just dump this anywhere! Gregg Drilling started drilling geothermal wells in early 2000s. They started back doing them in July of last year.*

What do you think the primary motivation was for consumers who purchased GSHP systems?

- *Cost-savings over conventional systems based on knowledge that energy will not be cheap forever.*

- *Trying to do something for global warming.*

Have you observed any similarities in consumer demographics?

- *Residential work: all high end*
- *Commercial work: economic calculation. Long-term payback.*
- *Schools: upfront cost*

If you were the head of an industry association, what would you do to increase public awareness of GSHP technology?

What are some suggestions that you have to better inform consumers of this industry?

### **Adoption of Ground Source Heat Pump Technology**

As with any industry, there may be certain barriers that interfere with the market adoption of products and services. I'd like to ask you about your perception of barriers, if any, in relation to regulations, awareness and project economics for GSHP.

For both residential and commercial GSHP applications, what barriers, if any, have you encountered because of regulations – both state and local? Other states?

*The cost of permits is the biggest barrier. Counties are used to dealing with small-scale projects, they are not geared for large numbers of wells. One geothermal project may have more wells than the entire county had the previous year. Counties have not quite figured out their fee schedules.*

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for residential applications?

What barriers, if any, have you experienced due to lack of awareness of GSHP technology for commercial applications?

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe manufacturers/deliverers of GSHP systems are experiencing?

*I don't know enough about this aspect to comment.*

For both residential and commercial GSHP systems, what economic barriers, if any, do you believe consumers are encountering?

*Up front cost.*

Do you believe that GSHP systems are priced too high, too low, or just right?

*Just about right. Until there is a radical technological advance to increase production the cost isn't going to come down really.*

When compared to traditional HVAC systems, do you think GSHP systems are priced too high, too low, or just right?

When compared to other alternative energy solutions, do you think GSHP systems are priced too high, too low, or just right?

*I think they're actually more competitive than other solutions.*

For both commercial and residential applications, are there other issues besides cost that are a factor in the adoption of GSHP?

(If needed probe for: time, space, and permitting)

*Room to put it in (you have to have the real estate).*

How would you characterize the size and growth of the GSHP industry, why, and what would need to happen in order to spur greater growth in this industry?

*There's a potential for a lot of growth. There's a lot of people wanting to do it but coming up with the upfront money/financing is very difficult in this economic environment. It could easily become 20-30 % of what they do in 2-3 years but it all hinges on the economy. I don't see residential going up much even with 30% tax rebate. Commercial will be the big area of growth because they can get a grant instead of a tax credit. However, a lot of businesses are just as strapped as the consumer.*

## Drilling

Would you agree with the statement, "Drilling is the single largest cost component of GSHP systems?" How important do you think it is to reduce the cost of drilling? Do you have any suggestions as to how to reduce drilling costs?

*Yes, easily. There really isn't any good technology out there that will increase production enough to drop the cost. In certain areas of the county you can drill extremely fast, there are other areas that are slowly. 300-400 foot per day is all you're going to get on average due to geology.*

Do you agree with the statement, "The GSHP industry currently faces a shortage of drillers,"? What changes need to be made in order to attract and retain more drillers to the GSHP industry?

*There is a lot of excess capacity in the drilling industry as a whole right now. Geothermal is actually very easy, it is one of the easier techniques.*

Does the drilling technology currently available meet GSHP industry needs or is there a wish list you have for how the technology could be improved?

How would you characterize the permitting process for the drilling required for GSHP systems? If you are dissatisfied with the process, what suggestions do you have as to how the permitting process could be improved?

*I would describe it as Byzantine. Each county and/or municipality has a different process; it adds some time in getting projects started but I don't see getting that changed right now.*

Is there any other information you would like to share about the GSHP industry, or topic that I did not touch upon that would be useful to this survey?