

**2009/2010**

# **Geothermal Heating and Cooling Systems State Regulatory Oversight Survey**



The **2009/2010 Geothermal Heating and Cooling Systems State Regulatory Oversight Survey** was funded in a collaborative effort by the Geothermal Heat Pump Consortium (GeoExchange), the Ground Water Protection Council, the International Ground Source Heat Pump Association, and the National Ground Water Association in an effort to protect groundwater.

Industry Insights, a professional research and consulting firm that specializes in conducting industry surveys and customized research services, conducted, tabulated and analyzed the results of this report.

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# Introduction

## About This Report

The **2009/2010 Geothermal Heating and Cooling Systems State Regulatory Oversight Survey** represents the most complete, accurate, and up-to-date information for geothermal system regulation available anywhere. The report is designed to allow readers to easily compare state-by-state regulations as well as aggregate data on all responding states.

The report is divided into two major sections. The first section contains a quick graphical overview of which geothermal systems are regulated. The second portion shows aggregated data for all responding states and each state's individual answers.

## Survey Methodology

The survey instrument used for this study was an online questionnaire that primarily requested geothermal heating and cooling regulatory data. An email containing a link to the online survey was sent to state contacts in mid-January. If multiple contacts existed for a state, all contacts were copied on one email to encourage collaboration and discussion. The email also instructed the recipient to forward the survey link on to others whom may be more qualified to answer the questions. To encourage participation, reminder emails were sent by both Industry Insights and the associations funding the study.

Data was collected on nine geothermal system configurations. They were:

1. Open loop – single well for water withdrawal, water returned to a surface source
2. Open loop – single well for water withdrawal, water returned to a second well
3. Standing column – single well for water withdrawal and water return
4. Closed loop – vertical boreholes
5. Closed loop – subsurface trenched, or other configuration, but not vertical boreholes
6. Closed loop – surface water body emplacement
7. Direct exchange (DX) – vertical boreholes
8. Direct exchange (DX) – subsurface trenched, or other configuration, but not vertical boreholes
9. Concentric pipe systems (heat exchange fluid flows to the bottom of the hole through a small diameter inner pipe and then up the annular space between the inner and outer pipes)

Survey submissions were collected through early April with 34 states responding to at least a portion of the survey. Before the results were finalized, each respondent's data was sent back to them in report-format for verification.

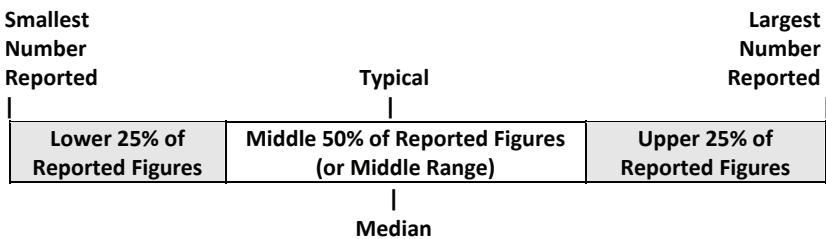
All data were checked both manually and by a specially designed computer editing procedure. Final results were tabulated and the report was completed in early May 2010. Respondents of the survey were sent the final report, which was offered as an incentive to participate.

# Introduction

## Interpreting the Numbers

Throughout the individual state data an "X" denotes the response the state gave for all frequency questions.

Most of the numeric measures and statistics included in the "All States" section of this study are reported on the basis of medians rather than arithmetical averages or means. Unlike the mean, the median is not distorted by a few unusually high or low values that may exist in the sample due to special circumstances. The "median" figure represents the mid-point of the figures for a particular measure, with one-half of the respondents reporting figures above it and one-half below. Each median has been independently selected from its own array of figures.



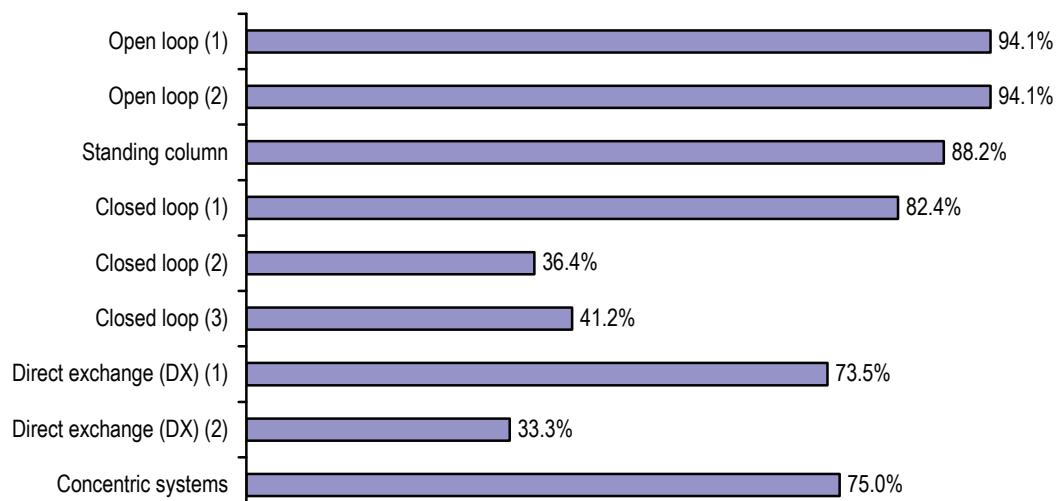
All open-ended/text-based questions were removed from the "All States" section of the report. The individual state responses can be found in each state's data.

## **Respondent Profile**



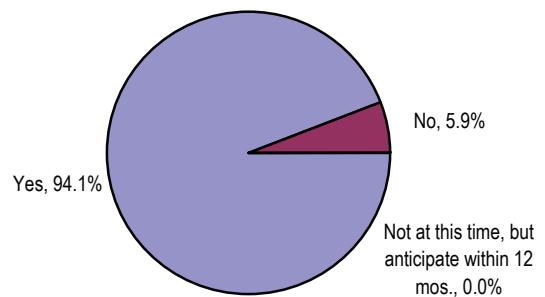
# Respondent Profile

## PERCENTAGE OF GEOTHERMAL SYSTEM CONFIGURATIONS CURRENTLY REGULATED BY RESPONDING STATES

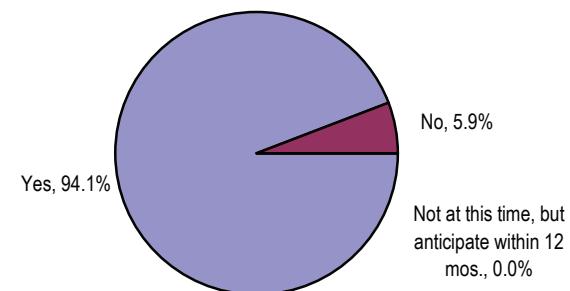


## PERCENTAGE OF GEOTHERMAL SYSTEM CONFIGURATIONS CURRENTLY REGULATED BY RESPONDING STATES

### OPEN LOOP (1)



### OPEN LOOP (2)



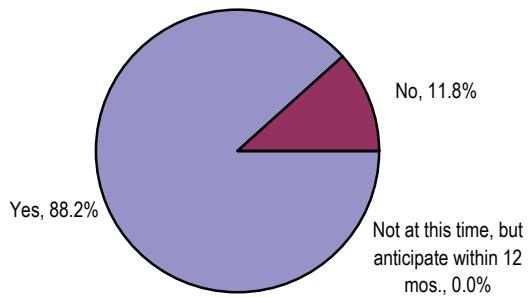
Open loop (1)–(single well for water withdrawal, water returned to a surface source)  
Open loop (2)–(single well for water withdrawal, water returned to a second well)  
Standing column–(single well for water withdrawal and water return)  
Closed loop (1)–(vertical boreholes)  
Closed loop (2)–(subsurface trenched, or other configuration, but not vertical boreholes)

Closed loop (3)–(surface water body emplacement)  
Direct exchange (DX) (1)–(vertical boreholes)  
Direct exchange (DX) (2)–(subsurface trenched, or other configuration, but not vertical boreholes)  
Concentric systems–(heat exchange fluid flows to the bottom of the hole through a small diameter inner pipe and then up the annular space between the inner and outer pipes)

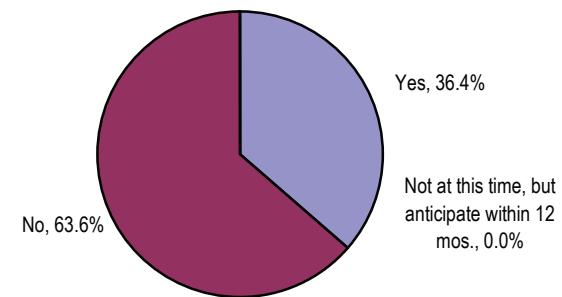
# Respondent Profile

## PERCENTAGE OF GEOTHERMAL SYSTEM CONFIGURATIONS CURRENTLY REGULATED BY RESPONDING STATES (CONTINUED)

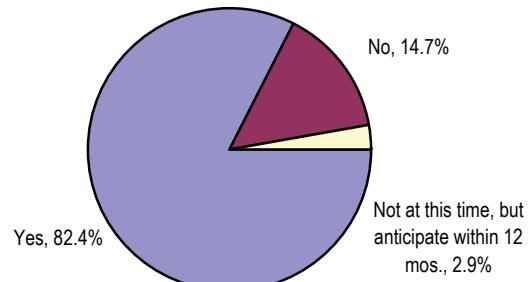
**STANDING COLUMN**



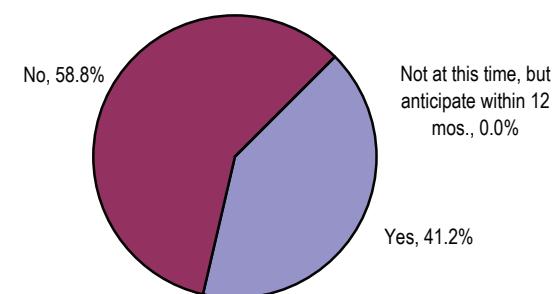
**CLOSED LOOP (2)**



**CLOSED LOOP (1)**



**CLOSED LOOP (3)**



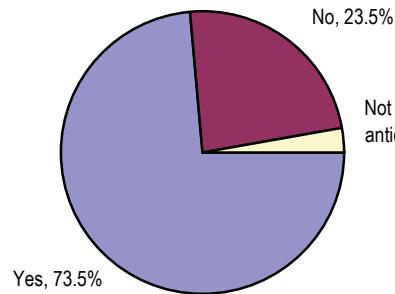
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Closed loop (1)–(vertical boreholes)  
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Direct exchange (DX) (2)–(subsurface trenched, or other configuration, but not vertical boreholes)  
Concentric systems–(heat exchange fluid flows to the bottom of the hole through a small diameter inner pipe and then up the annular space between the inner and outer pipes)

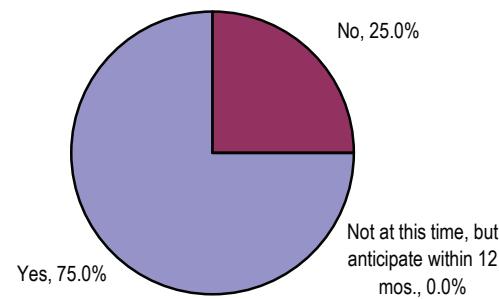
# Respondent Profile

## PERCENTAGE OF GEOTHERMAL SYSTEM CONFIGURATIONS CURRENTLY REGULATED BY RESPONDING STATES (CONTINUED)

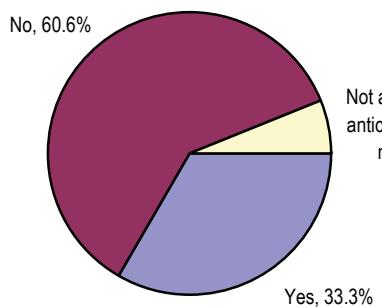
### DIRECT EXCHANGE (DX) (1)



### CONCENTRIC SYSTEMS



### DIRECT EXCHANGE (DX) (2)



Open loop (1)–(single well for water withdrawal, water returned to a surface source)  
Open loop (2)–(single well for water withdrawal, water returned to a second well)  
Standing column–(single well for water withdrawal and water return)  
Closed loop (1)–(vertical boreholes)  
Closed loop (2)–(subsurface trenched, or other configuration, but not vertical boreholes)

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