

Overcoming Barriers to Ground Source Heat Pumps in California

May 2011

Fact Sheet

The Issue

Ground source heat pumps can play an important role in demand reduction and efficiency within the built environment but have so far made little impact in California. Estimates are that adoption of ground source heat pumps throughout American building practices would yield annual energy savings of 3.4 to 3.9 quadrillion British Thermal Units, representing estimated savings of \$33 billion – \$38 billion in retail utility bills, which dwarfs current combined contributions from solar photovoltaic, wind, and geothermal power.

The U.S. Department of Energy and Environmental Protection Agency identified heat pumps as the most effective way to heat and cool buildings. Problems to wider adoption identified years ago by these two agencies remain as barriers today.

Project Description

The project's goal was to identify ways to overcome barriers to ground source heat pumps in California.

This study identified the following barriers to increased use of ground source heat pumps: little awareness of ground source heat pumps by

consumers, industry and, government and high first costs. Compared to other states, California also has significant regulatory barriers, which include inconsistent permitting, confused work classifications and fee schedules, aggressive licensing requirements, and gaps of knowledge in local jurisdictions. (See chart.)

The project also investigated how to remove barriers to ground source heat pump drilling in California. Currently, California houses 12.1 percent of the country's population but represents only 2.3 percent of national ground source heat pump activity.

Key Distinctions	California	Missouri	New Jersey	Idaho	Washington	Oregon
Regulations	DWR Draft 74-99 (1999)	Heat Pump Construction Code (1996)	Water Well Standards (2001)	IDAPA 37.03.09 Construction Standards	Chapter 18.104 RCW Water Well Construction (2006)	Administrative Rule chapter 690, Division 240
Permitting	LOCAL	State	State	State	State	Permit not required; reports required.
Type of GSHP	Open & Closed Loop	Open & Closed Loop	Closed Loop	Closed Loop	Open & Closed Loop	Open & Closed Loop
Advisory Board with Industry Reps	NONE	Well Drillers Board	Well Drillers Examining and Advisory Board	Drillers Advisory Committee	Technical Advisory Group	Ground Water Advisory Committee
Driller Licensing	C-57 4 Year Apprenticeship	License 2 Year Apprenticeship	License 3 Year Apprenticeship	License 2.5 Year Apprenticeship	License 2 Year Apprenticeship	License 1 Year Apprenticeship
Well Log Data	Up to Local Jurisdiction, not public	Yes, web-based, not yet public	Yes, web-based & public	Yes, web-based & public	Yes, web-based & public	Yes, web-based & public
Fees	Local Fees Vary	Standardized Fee Schedule	Standardized Fee Schedule	Standardized Fee Schedule	Standardized Fee Schedule	Standardized Fee Schedule

Compared to other states, California's regulations are a key barrier to wider adoption of ground source heat pumps.

Source: GroundSource Geothermal, Inc.

Adoption of measures to expand the ground source heat pump market in California starts with the recognition that a closed-loop ground source heat pump borehole is not a water well. At present, all regulation for ground source heat pumps is tied to water wells. Closed-loop bores are drilled, a high-density polyethylene plastic u-bend tube is emplaced, and then the hole is immediately grouted. All of the work in the hole is completed within one day.

Unlike more exploratory water well drilling, casing and pump work, closed-loop boreholes for ground source heat pumps are about production and optimization. The two are fundamentally different yet subject to the same rules and regulations.

The project makes the following key recommendations:

- Publicize ground source heat pumps as a key energy efficiency technology for California, by retrofitting a high-profile state building.
- Designate a statewide leader and champion for ground source heat pump technology.
- Consider closed-loop bores in the regulatory process as something separate from water wells.
- Centralize state-level permit administration.
- The Contractors State License Board should consider a carve out for a closed-loop driller sub-classification separate from the water well drilling classification similar to the solar installer classification.
- The California Public Utility Commission should devise a specific rate schedule to account for a ground source heat pump's constant low-level usage of electricity.
- Integrate ground source heat pumps formally within the CaliforniaFIRST property assessed clean energy program

energy efficiency loading order as an approved and recognized technology.

PIER Program Objectives and Anticipated Benefits for California

The large-scale adoption of ground source heat pumps would benefit California ratepayers in several ways. It would increase energy efficiency of buildings, dramatically reduce fossil fuel consumption, reduce emission of greenhouse gases and other air pollutants, and build the statewide green collar workforce.

Project Specifics

Grant Agreement Number: GEO-07-007

Recipient: GroundSource Geo, Inc.

City/County: Redwood City, San Mateo County

Application: Statewide

Amount: \$144,730

Term: June 2009 to March 2010

Match Funding: \$72,365 GroundSource Geothermal, Inc.

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