

## Survey of Geothermal Heat Pump Shipments, 2004

This report provides information on geothermal heat pump shipments, based on the Energy Information Administration, Form EIA-902, "Annual Geothermal Heat Pump Manufacturers Survey." The survey shows that manufacturers shipped 43,806 geothermal heat pumps in 2004, a 20 percent increase over the 2003 total of 36,439. Most of the increase was for ARI-325/330 rated units. Of those shipped in 2004, 9,130 were ARI-320 rated,<sup>1</sup> and 31,855 were ARI-325 or ARI-330. ARI rated shipments increased to 40,985 units in 2004, while the number of non-ARI-rated units increased to 2,821 (Table 58).

The total rated capacity of heat pumps shipped in 2004 was 144,301 tons, compared to 124,438 tons in 2003 (Table 59). The average unit size shipped in 2004 was 3.29 tons, compared to an average unit size of 3.41 tons in 2003.

The proportion of geothermal heat pumps shipped to each Census Region in 2004 was as follows: the South (33 percent), the Midwest (33 percent), the Northeast (18 percent), and the West (8 percent) (Table 60). The proportion of geothermal heat pumps exported was 7 percent. Fifty-four percent of geothermal heat pumps were shipped to wholesale distributors, while 31 percent went to installers. The remaining 15 percent were sold to exporters, retail distributors, end-users, or other domestic customers (Table 61).

Analysis conducted by the Oregon Institute of Technology, Geo-Heat Center, indicates that geothermal heat pumps consumed almost 29 trillion Btu of geothermal energy in 2004 and direct uses, such as crop drying, consumed 9 trillion Btu of geothermal energy (Table 62). The recently enacted Energy Policy Act of 2005 includes incentives for the use of geothermal heat pumps in the future. Section 1333 gives a tax credit of up to \$300 per geothermal heat pump installed in a residence in the years 2006 through 2007. Also of interest is Section 206, which offers a 25 percent rebate (up to \$3,000) for renewable energy systems installed in residences or small businesses, including systems that transmit or use energy from "geothermal deposits," such as geothermal heat pumps. However funds have not yet been appropriated for rebates under this section.

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<sup>1</sup> For a detailed explanation of the Air-Conditioning & Refrigeration Institute (ARI) system of rating geothermal heat pumps see: [http://www.eia.doe.gov/cneaf/solar.renewables/rea\\_issues/geo\\_hp\\_art.pdf](http://www.eia.doe.gov/cneaf/solar.renewables/rea_issues/geo_hp_art.pdf).

**Table 58. Geothermal Heat Pump Shipments by Model Type, 1998-2004  
(Number of Units)**

<b>Model</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
ARI-320	10,510	7,910	7,808	NA	6,445	10,306	9,130
ARI-325/330	26,042	31,631	26,219	NA	26,802	25,211	31,855
Other Non-ARI Rated	1,714	2,138	1,554	NA	3,892	922	2,821
Totals	38,266	41,679	35,581	NA	37,139	36,439	43,806

NA=Not Available. No survey was conducted for 2001.

Source: Energy Information Administration, Form EIA-902 "Annual Geothermal Heat Pump Manufacturers Survey."

**Table 59. Capacity of Geothermal Heat Pump Shipments by Model Type, 1998-2004  
(Total Rated Capacity Tons)**

<b>Model</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
ARI-320	35,776	27,970	26,469	NA	16,756	29,238	23,764
ARI-325/330	98,912	153,947	130,132	NA	96,541	89,731	100,317
Other Non-ARI Rated	6,758	9,735	7,590	NA	12,000	5,469	20,220
Totals	141,446	191,651	164,191	NA	125,297	124,438	144,301

NA=Not Available. No survey was conducted for 2001.

Note: One ton of capacity is equal to 12,000 Btus per hour.

Source: Energy Information Administration, Form EIA-902, "Annual Geothermal Heat Pump Manufacturers Survey."

**Table 60. Geothermal Heat Pump Shipments by Export, Census Region and Model Type, 2004  
(Number of Units)**

Export and Census Region	ARI-320	ARI-325/330	Other Non-ARI Rated GHPs	Total
Export	127	2,251	606	2,984
Midwest	1,612	12,256	782	14,650
Northeast	2,144	5,655	261	8,060
South	3,880	10,237	557	14,674
West	1,367	1,456	615	3,438
Total	9,130	31,855	2,821	43,806

**Note:** The Midwest Census Region consists of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The Northeast Census Region consists of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. The South Census Region consists of Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. The West Census Region consists of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. "Export" in Table 60 and "Exporter" in Table 61 are different. "Export" refers to shipments outside of the country, while "Exporter" is the type of customer.

Source: Energy Information Administration, Form EIA-902 "Annual Geothermal Heat Pump Manufacturers Survey."

**Table 61. Geothermal Heat Pump Shipments by Customer Type and Model Type, 2004  
(Number of Units)**

Customer	ARI-320	ARI-325/330	Other Non-ARI Rated GHPs	Total
Exporter	2	514	576	1,092
Wholesale Distributor	4,779	18,444	424	23,647
Retail Distributor	0	228	127	355
Installer	3,419	9,190	953	13,562
End-User	0	110	287	397
Others	930	3,369	454	4,753
Total	9,130	31,855	2,821	43,806

**Note:** "Export" in Table 60 and "Exporter" in Table 61 are different. "Export" refers to shipments outside of the country, while "Exporter" is the type of customer.  
**Source:** Energy Information Administration, Form EIA-902 "Annual Geothermal Heat Pump Manufacturers Survey."

**Table 62. Geothermal Direct Use of Energy and Heat Pumps, 1990 -2004  
(Quadrillion Btu)**

<b>Year</b>	<b>Direct Use</b>	<b>Heat Pumps</b>	<b>Total</b>
1990	0.0048	0.0054	0.0102
1991	0.0050	0.0060	0.0110
1992	0.0051	0.0067	0.0118
1993	0.0053	0.0072	0.0125
1994	0.0056	0.0076	0.0132
1995	0.0058	0.0083	0.0141
1996	0.0059	0.0093	0.0152
1997	0.0061	0.0101	0.0162
1998	0.0063	0.0115	0.0178
1999	0.0079	0.0114	0.0193
2000	0.0084	0.0122	0.0206
2001	0.0090	0.0135	0.0225
2002	0.0090	0.0147	0.0237
2003	0.0086	0.0274	0.0360
2004	0.0090	0.0289	0.0379

**Note: 2003: Data is revised. Direct use includes applications such as: district heating, aquaculture pond and raceway heating, greenhouse heating and agricultural drying.**

**Source: John Lund, Oregon Institute of Technology, Geo-Heat Center (Klamath Falls, Oregon, March 2005).**