Geothermal Resources in Nevada

This map is a compilation of several databases that contain various information on thermal springs and thermal gradient wells in Nevada. Where sufficient data were available from the individual databases, all springs with a temperature of >10°C above average annual surface temperature and those noted as warm or hot were retained in the database (see Houghton and others, 1975 for a map of mean annual surface temperatures). Wells with temperatures >10°C above average annual surface temperature, and with temperature gradients of >25°C/km were retained in the database. Thus sites potentially useful for direct use applications (e.g., vegetable drying, aquaculture, spas, space heating, and gold heap leaching) are included on the map. Questionable records were eliminated from each database. The four categories of thermal sites included on the map are (1) springs with temperatures ≤37°C (but still >10° above average surface temperature) or those identified as warm, (2) springs with temperatures >37°C or those identified as hot, (3) wells with temperatures ≤37°C or those identified as warm, and (4) wells with temperatures >37°C or those identified as hot. Thermal waters in mines are indicated with the well symbol. The databases plotted on this map were obtained from the following sources:

1. Garside (1994) — All reported thermal wells and springs from Garside and Schilling (1979), GEOTHERM, and WATSTORE that contain reliable water chemistry data. This is a database of Nevada low- to moderate-temperature spring and well locations and chemical analyses.
2. GEOTHERM and other unpublished NBMG data (*ftp://ftp.nbmg.unr.edu/NBMG/geotherm/readme.htm*) — This includes GEOTHERM data and wells and springs digitized from 7.5' topographic maps throughout Nevada. Wells and springs that were shown on the maps as warm or hot are included, as are those identified as thermal based on a record in GEOTHERM. Thermal gradients could not be calculated for many of the records, but they were retained if the well temperature was >10°C above average annual surface temperature.
3. SMU (David Blackwell) — Geothermal temperature and gradient data from geothermal exploration drill holes. These data are maintained by the Geothermal Lab at Southern Methodist University. Numerous records had no recorded temperatures. Where data were available for both gradient and well depth, temperatures were estimated. Where temperatures could not be estimated, wells with a gradient of <50°C/km and located in alluvium, playas, landslides, or moraines were eliminated based on considerations of the variations in gradient between alluvium and bedrock (e.g., see Blackwell and Chapman, 1977). Location data for these alluvial units were taken from a digital version of the 1:500,000-scale geologic map of Nevada (Stewart and Carlson, 1978).
4. WATSTORE — U.S. Geological Survey chemical data. Thermal gradients could not be calculated for many of the records, but they were retained in the database if the well temperature was >10°C above average annual surface temperature.
5. Trexler and others (1983) map — Any sites plotted on the Trexler map and not captured by the previous four databases were included on this map.
6. Locations of power transmission lines are approximate and based on data in Lockard (1970) and digital data provided by Sierra Pacific Power Company (June 2000). Neither data set plots transmission lines into Las Vegas.

Power plant locations and direct use applications (unpublished data, L. Garside, R. Hess, J. Snow) are shown separately on the map.

POWER PLANTS
(year of initial operation and capacity)

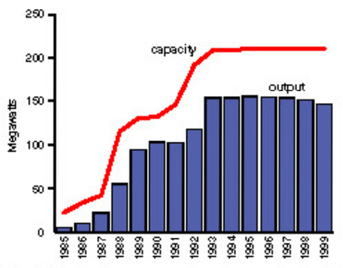
1. Wabuska (2 plants, 1984 and 1987, 0.6 MW each)
2. Beowawe (1985, 16.7 MW)
3. Desert Peak (1985, 9.9 MW)
4. Steamboat (4 plants, 1986, 7.1 MW and 1992, 48 MW)
5. Empire (1987, 3.6 MW)
6. Soda Lake (2 plants, 1987, 3.6 MW and 1991, 13 MW)
7. Dixie Valley (1988, 66 MW)
8. Yankee Caithness (1988, 14.4 MW)
9. Stillwater (1989, 13 MW)
10. Bradys (1992, 21.1 MW)

DIRECT-USE APPLICATIONS

11. San Emidio Desert - vegetable dehydration
12. Bradys - vegetable dehydration
13. Elko - pool, space heating
14. Wells - geothermal heat pump
15. Moana - space heating
16. Steamboat Springs - spa, space heating
17. Bowers Mansion - pool
18. Carson City - pool
19. Walleys Hot Springs - spa
20. Darroughs Hot Springs - spa
21. Caliente - spa, pool, space heating
22. Ash Springs - spa
23. Baileys Hot Springs (Beatty) - spa

Hot well (>37°C)
Warm well (≤37°C)
Hot spring (>37°C)
Warm spring (≤37°C)
Transmission line (≥ 55 kilovolts)

Scale 1:1,000,000
1 inch equals approximately 16 miles
0 10 20 30 40 50 miles
0 20 40 60 80 kilometers



Currently developed resource capacity and average net output of Nevada geothermal plants, 1985-1999. Average net output is annual sales in megawatthours divided by the number of hours in a year. No commercial geothermal power was produced in Nevada before 1985. Figure updated from Hess (1999).

Bradys (10)

Walleys Hot Springs (20)

Dixie Valley (7)

Steamboat II, III (4)

Soda Lake (6)

Beowawe (2)

NEVADA GEOTHERMAL RESOURCES

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Nevada Bureau of Mines and Geology

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NEVADA BUREAU OF MINES AND GEOLOGY
MACKAY SCHOOL OF MINES

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