

# Earthship draws energy from sun, surroundings



CHRISTINE WEBBER

Joe Callahan's 1,500-square-foot home, called an earthship, is tucked into a steep, sunny hillside in Emerson Gulch 20 minutes west of Boulder.

## Local 'green' industry calls veteran builder Callahan 'solar angel'

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When it came time for Joe Callahan to build his own home, he applied the lessons he's learned from 15 years as a custom solar installer. Owner and president of Simple Solar Systems, Callahan constructed an earthship, an off-the-grid structure that takes advantage of the characteristics of the land around it.

His 1,500-square-foot dwelling is tucked into a steep, sunny hillside in Emerson Gulch 20 minutes west of Boulder. Its passive solar design complements Callahan's own custom-built solar-electric and solar hot water systems.

An earthship typically is built as an energy-independent structure using discarded mate-

rials. Used tires filled with compacted soil give form to the north wall, which is completely bermed into a hillside or earthen mound. Covered with adobe, the thick north wall provides thermal mass to keep indoor temperatures stable. In winter, passive solar heats the thermal mass of the walls and slab floor while in summer this mass provides a cooling effect.

Gray water from the sinks, showers and washing machine soaks into planters next to south-facing windows. Other waste breaks down in the closed sewage system, often aided by a composting toilet.

Callahan built his earthship out of used car tires, pop bottles and cans, and rocks and logs (only from dead trees) from the site. He also salvaged wood from deconstructed homes, recycled colored glass, and made his

own adobe. Four-inch thick pieces of slightly flawed foam insulation and Greenwood cotton insulation made from recycled textiles insulate the roof and wall cavities.

Inspired by Michael Reynolds, a Taos architect who pioneered the earthship concept, Callahan spent eight months assisting in the construction of three different earthships in Taos, N.M.

"I was looking for a completely energy-independent home to design and build," he said. The energy autonomy and self-contained nature of the earthship appealed to him. Out of his training in Taos, he gained the essential skills for building his own version.

Having previously built another home in Crested Butte in 1987, Callahan said he wanted to "go a little more extreme" with

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his next one. Extreme does not mean expensive, however. Callahan estimates the labor and material cost for this two-bedroom, one-bath home at \$70,000. Most of the savings came from using recycled materials and committing his own labor during the span of one year.

Callahan's engineering background also helped him improve upon the standard earth-

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