

ISSUE

IRS definition of geothermal energy property.

BACKGROUND

The proposed regulation to implement the Energy Tax Act of 1978 excludes geothermal equipment "that serves both a geothermal function... and a non-geothermal function." The IRS example is a pipe that carries both geothermal water and water heated by other means. There are three types of systems that would be affected by this position:

- o A geothermal heating system combined with an auxiliary system. The latter would provide supplemental heat during a very few extraordinarily cold days at the peak of the heating season. This design would allow a substantially lower cost geothermal installation in many cases, yet would provide geothermal heat for a very high proportion of dwelling's space heat requirements.
- o A geothermal heating system combined with a conventional "back-up" heating system intended for use only in the event of a geothermal system failure; such back-ups to new alternative energy systems are required by mortgage lenders, often at the insistence of Federal agencies that insure, guaranty, subsidize, or otherwise support residential mortgages.
- o A geothermal system that supplies domestic water as well as water for space heating. The proposed regulations would exclude such a system from the tax credit.

DOE POSITION

The proposed regulations obviously would serve as a disincentive to the adoption of residential geothermal heat, in addition to being quite difficult to administer. Three fairer and more practical options would be:

- o Allow the credit for the entire cost of any geothermal system designed to supply more than half of a dwelling's heat requirements. Certification by the builder or installer could be required for verification, but as a practical matter, geothermal systems designed to furnish less than half of a residential heating load would be economically unattractive even with a tax credit.
- o For the case of a system used to supply geothermal heat and for other purposes, allow a tax credit for the incremental geothermal cost. A multi-purpose system typically would require a larger well and pump, larger supply lines, etc.
- o For a multi-purpose system, allow a tax credit for that portion of the system required to support the geothermal space heating function. For example, if the flow capacity of a system is 18 gallons per minute, of which 12 gallons per minute is required for geothermal heating and 6 gallons per minute for domestic use, allow 12/18, or 2/3 of the systems cost to qualify for the tax credit.

## ISSUE

IRS temperature limit for geothermal resources.

## BACKGROUND

The proposed IRS regulations to implement the geothermal tax credit provisions of the Energy Tax Act of 1978 exclude geothermal resources at temperature below 60°C (140°F). The IRS has informally taken the position that it is economically impractical to use waters below this temperature for residential purposes, and that these waters are heated by solar rather than geothermal sources.

## DOE POSITION

The adoption of 60°C (140°F) is inappropriate. It was adopted based on a review of water well temperatures throughout the U.S., and it was intended to exclude all water wells. However, temperatures below 60°C can be used economically. The city of Pagosa Springs, Colorado is proceeding with a system to heat public and commercial buildings and residences with temperatures of 120°F - 130°F. Temperatures below 110°F are being considered for geothermal space heating projects in Idaho and Virginia. A number of recent engineering and economic studies reveals that hydrothermal resources cooler than 60°C can often represent the most economically attractive energy source for space heating.

High-to moderate temperature geothermal resources are limited principally to the western third of the U.S., but recent resources assessment projects\* have shown that low-to moderate temperature resource are many times more abundant and widespread throughout the U.S.; because of the higher population density of the east, many low and moderate temperature hydrothermal resources there

\* USGS Circular 790 (1979)

are co-located with ready markets for low grade heat. Adoption of the 60°C limitation would retard development of those geothermal resources for which the credit could have the most impact as a stimulus.

The DOE suggests defining geothermal energy systems by function rather than by an arbitrary temperature limit. For example, for the purpose of this regulation a geothermal system might be defined as one that removes natural heat energy contained in fluid and rock beneath the earth's surface for the purpose of providing space heat to a residential dwelling structure. Although the Congress has excluded all heat pump equipment from the tax credit, adoption of this recommendation would allow the credit for a geothermal well supplying a ground water heat pump (or that fraction of its cost not attributable to domestic water usage), or for an in-the-ground "loop" or heat exchanger used to furnish thermal energy for a heat pump system.

IRS asserts that waters at less than 60°C are heated by the sun rather than by geothermal energy. This is technically inaccurate. At depths below about 100 ft., the source of heat is geothermal. At depths less than 100 ft., water or earth is warmed by a varying mix of solar and geothermal heat. An analysis is now underway to characterize the relative fractions for a variety of situations.

DOE recommended in 1979 that the temperature limit be reduced to 18°C. We suggest four options for consideration, and we recommend the first:

- o No temperature limit - if equipment functionally provides geothermal heat, it should qualify, irrespective of temperature.
- o A simple function of depth and temperature could be developed to distinguish abnormally warm geothermally heated ground waters from solar heated waters, upon completion (by the end of August) of the study now underway.
- o 18°C limitation. This would include all non-heat pump geothermal use and most geothermally-assisted heat pump applications (excluding the heat pump itself).
- o 30°C. This would include nearly all non-heat pump geothermal use but exclude most geothermal-assisted heat pump applications.

## ISSUE

Impact of proposed IRS energy regulations.

## BACKGROUND

The energy Tax Act of 1978 extends income tax credits to occupants of residential dwellings who invested in certain energy conservation and renewable energy resource equipment. The IRS has drafted regulations for implementing the credit. In part, these regulations define renewable energy resources.

The proposed regulations for geothermal energy are drafted in such a way as to disqualify most geothermal space heating systems that might be installed in the U.S.

## DOE POSITION

The clear intent to the Congress in passing this law was to encourage residential dwelling occupants to reduce their dependence on fossil fuels. The proposed regulations in their present form are unduly restrictive and largely negate the intent of the credit by denying it to a large fraction of potential users. Furthermore, the limitations are based on certain invalid technical assumptions. IRS incorrectly assumes that waters at temperatures less than 60°C are heated by the sun rather than geothermal energy. A study is underway to define the mix of solar and geothermal heating as a function of temperature and depth. It will be completed by late August.

DOE has suggested two technical changes in the regulations that would substantially increase the number of dwellings eligible for the credit. Should an appreciable fraction of the eligible residents add geothermal systems, the

savings in fossil fuel equivalent would be large, and the cost to the Treasury proportionately greater.

The suggested changes are:

- o A redefinition of geothermal resources, currently limited in the proposed regulation to temperatures above 60°C (140°F). Lowering the figure to 30°C or 18°C would be helpful, but the best course of action would be to define geothermal energy on a functional basis rather than by an arbitrary temperature.
  
- o A more realistic definition of geothermal equipment. The proposed regulations currently exclude multi-purpose systems (e.g., geothermal space heat and domestic water). DOE suggests three options for allowing a proportional credit for the geothermal increment in multi-purpose systems.