
Dr. John W. Lund, PE
Director of the Geo-Heat Center and Professor of Civil Engineering
Oregon Institute of Technology, 3201 Campus Dr., Klamath Falls, OR 97601

Past President of the Geothermal Resources Council
Ph: 541-885-1750; FAX: 541-8851754;
email: lundj@oit.edu Web: geoheat.oit.edu

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Charles Brook
Lead, Geothermal Team
Solid Minerals and Geothermal Compliance
and Asset Management
Mineral Management Service
Denver, Colorado

SUBJECT: Geothermal Royalty Valuation

These comments and information are in response to the Federal Register notice announcement concerning the royalty valuation approaches for Federal geothermal resources.

I have worked in the geothermal field for over 25 years, with an emphasis in the area of direct-use of geothermal resources. During that time I have had many discussions and conversations with developers and users of geothermal resources. Users of geothermal energy (fluids) from Federal lands for direct-use projects are especially frustrated with the current royalty policy. In fact, many potential users tend to avoid using resources from Federal lands due to what they consider, an unfair "tax" on their operation.

Three of the main dissatisfactions with the present royalty system, is that 1) it is difficult and expensive to measure the energy used through the required "Btu meters", 2) the "tax" does not reflect the actual benefit received from the energy use, and 3) the geothermal energy may not displace an alternate (fossil) fuel use. As an example, gold mine heap leaching sites in Nevada (at Florida Canyon and Round Mountain) were using geothermal heat to extend their operating season and improve the extraction process of the gold ore. This resulted in an approximate 17% increase in recovery. However, paying a royalty on the cost of a percentage of the a competing fuel was not appropriate, since natural gas, propane or fuel oil would not have been used if the geothermal energy were not available - it would have been much too expensive to transport and use at these remote sites. Due to the royalty expense and a poor market, these operations no longer use geothermal energy.

Another example of a royalty problem is at the Masson Greenhouse operation in New Mexico. They drilled a geothermal well on Federal land through a cost share program with USDOE. However, they have not used the well, as it was cheaper to drill another well on private land and use it instead for heating the greenhouses.

In summary, it appears that a different approach should be taken to charge for the use of fluid taken from a geothermal well on public land. A more equitable approach would be to charge a percent of the gross income received for the product produced: roses and vegetables from greenhouses; gold recovered from mine workings, fish sold from a aquaculture operation, etc.

This would be similar to normal mining operations and the method that geothermal power plants pay based on kWh produced. Thus, in a poor year due to disease in a greenhouse for example, the product sold would be less, but so would the royalty payment - which would lessen the financial burden for an owner in a "bad" year.

This product produced and sold approach would have to be modified to take into account the period through which the geothermal was used, i.e. probably mainly during the winter months, and for night time operation. Thus, based on our experience, a greenhouse in Klamath Falls might have a geothermal capacity factor of around 0.20, or it uses the full geothermal resource only and equivalent 20% of the time during a year. Based on this number, the royalty payment would then be based on: annual sales x 0.20 x the royalty rate. If the

royalty rate were 5% of sales, then this would give a factor of 0.01 times the annual sales. For other commercial operations and in different climates, the capacity factor would be different. In addition, the royalty rate should be less or even suspended during, say the first five years of operation, to allow a new operator to recover for their high initial capital investments.

Finally, my impression is that the present royalty valuation approach has discouraged developers and potential users of geothermal energy for direct-use project from either developing in the first place or using alternate sources of energy on a reduced basis. This is confirmed in part by the limited number of direct-use operations presently using a geothermal resource on Federal land. Since, I feel we should maximize the use of our domestic energy resources, the use of geothermal energy should be encouraged, not discouraged.

Sincerely,

John W. Lund
Director of the Geo-Heat Center
Oregon Institute of Technology
Klamath Falls, OR 97601
email: lundj@oit.edu