

**ROYALTY  
CALCULATION**

$$\text{ROYALTY (\$)} = \text{ROYALTY RATE (\%)} \times \text{RESOURCE VALUE (\$)}$$

CALCULATION OF  
RESOURCE VALUE

GROSS ELECTRICITY REVENUES

MINUS

TRANSMISSION COSTS

EQUALS

TAILGATE VALUE OF ELECTRICITY

MINUS

GENERATING COSTS

EQUALS

RESOURCE VALUE

TIMES

Royalty Rate

Equals

Royalty

NETBACK METHOD  
KEY PARAMETERS

**BOND RATE** - STANDARD AND POOR'S BBB INDUSTRIAL BOND RATE IN EFFECT AT THE TIME THE TRANSMISSION AND GENERATING COST RATES ARE ESTABLISHED; USED TO COMPUTE INTEREST ATTRIBUTED TO THE DEVELOPER'S CAPITAL INVESTMENT AND IN CONJUNCTION WITH THE MULTIPLIER TO ESTIMATE THE DEVELOPER'S COST OF CAPITAL

**MULTIPLIER** - A MULTIPLE APPLIED TO THE INTEREST ATTRIBUTED TO THE DEVELOPER'S CAPITAL INVESTMENT

**LIMIT ON COST DEDUCTIONS** - A LIMIT ON THE TRANSMISSION DEDUCTION OF 50% OF THE GROSS ELECTRICITY REVENUES AND A LIMIT ON THE GENERATING DEDUCTION EQUAL TO TWO THIRDS THE TAILGATE VALUE OF ELECTRICITY.

**TAILGATE VALUE OF ELECTRICITY** - GROSS ELECTRICITY REVENUES MINUS THE TRANSMISSION DEDUCTION

**EXCLUSION OF CERTAIN COSTS** - COSTS THAT ARE NOT ALLOWABLE INCLUDE STEAMFIELD COSTS, STATE AND FEDERAL TAXES, ROYALTIES, FINES AND PENALTIES

**FLOOR** - THE FLOOR IS A MINIMUM AMOUNT OF RESOURCE VALUE OR ROYALTY

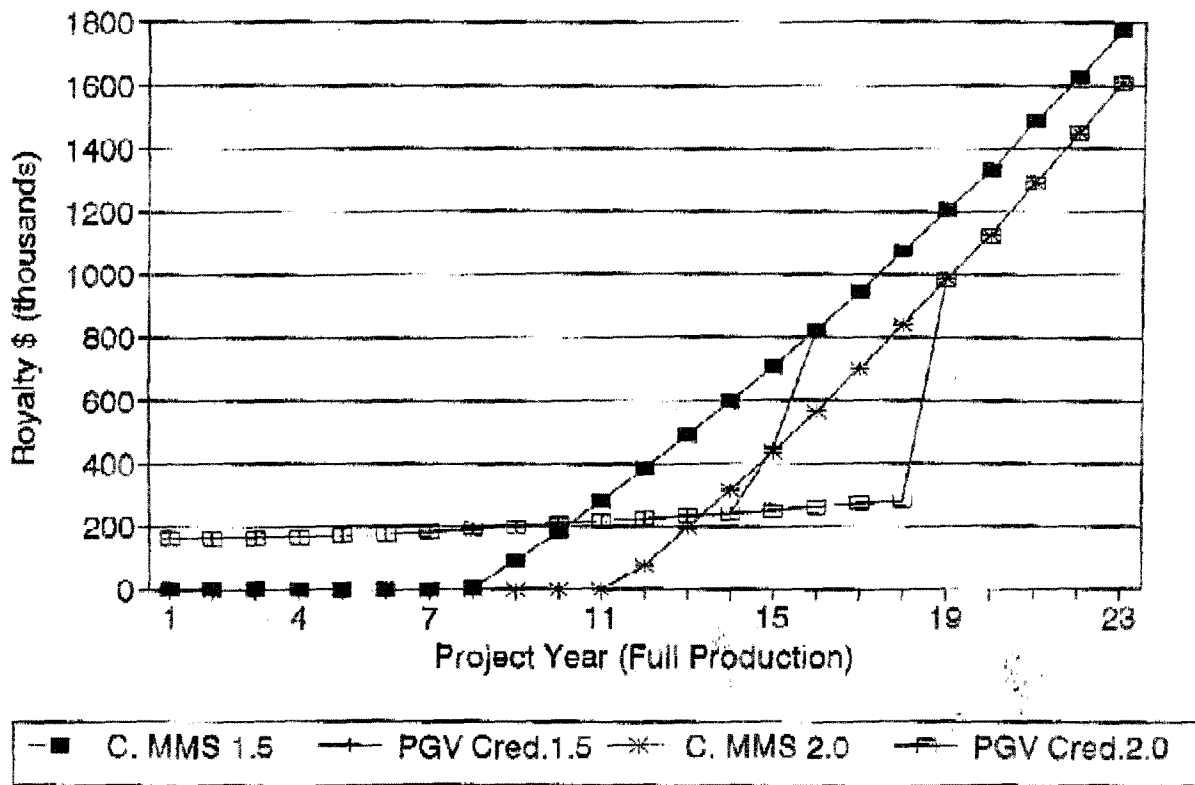
**DEPRECIATION OR RETURN ON INVESTMENT METHODS** - EITHER METHOD MAY BE USED; DEPRECIATION METHOD IS RECOMMENDED BECAUSE BOTH DEVELOPER AND RESOURCE OWNER BENEFIT (SMALLER ROYALTY IN EARLY YEARS FAVORS DEVELOPER; LARGER OVERALL ROYALTY AMOUNT FAVORS RESOURCE OWNER)

## NETBACK METHODS

PARAMETERS	ORIGINAL MMS METHOD	CURRENT MMS METHOD	STAFF NETBACK METHOD
Multiplier	1.0	2.0	1.5
Limit on Generating Deduction	Limited to 2/3 Tailgate Value of Electricity	No Limits	Limited to 2/3 Tailgate Value of Electricity (or Threshold)
Limit on Transmission Deduction	50% of Gross Electricity Revenues	No Limits	50% of Gross Electricity Revenues (or Threshold)

# PGV 7/23/93 Proposal

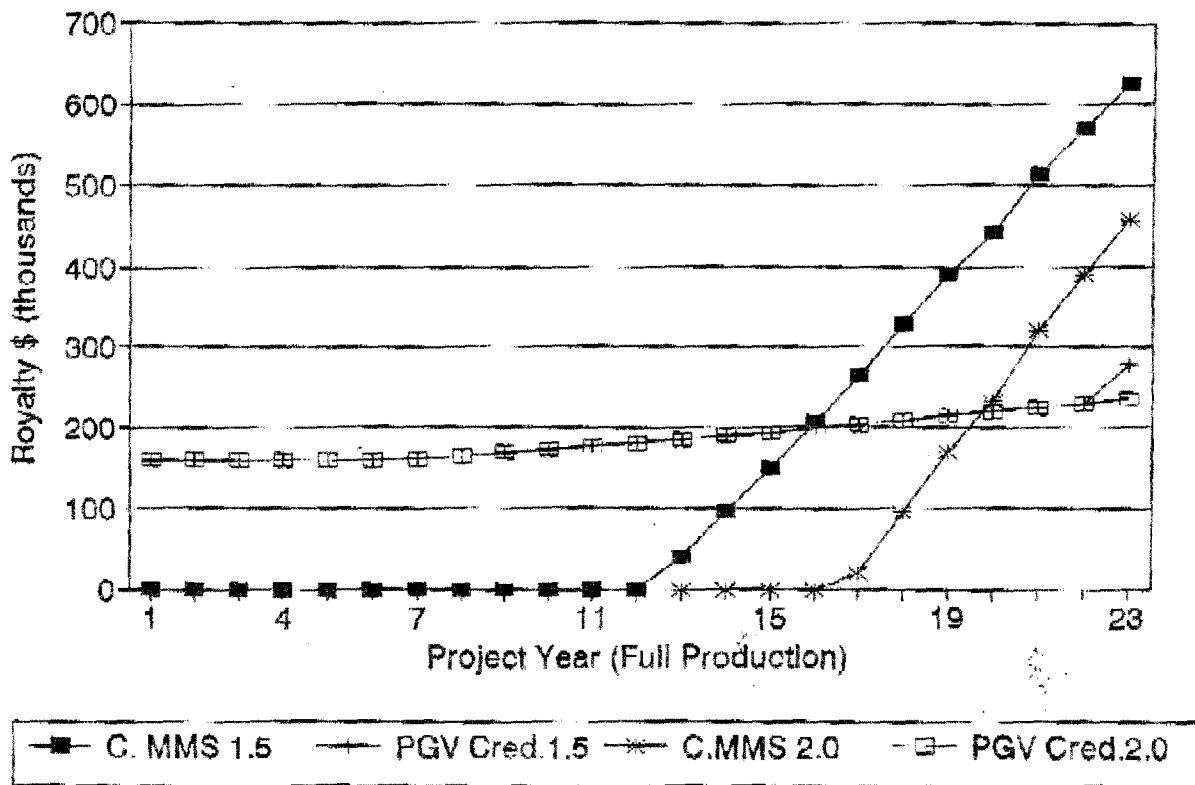
## 1.5, 2.0 Mult. Comparison



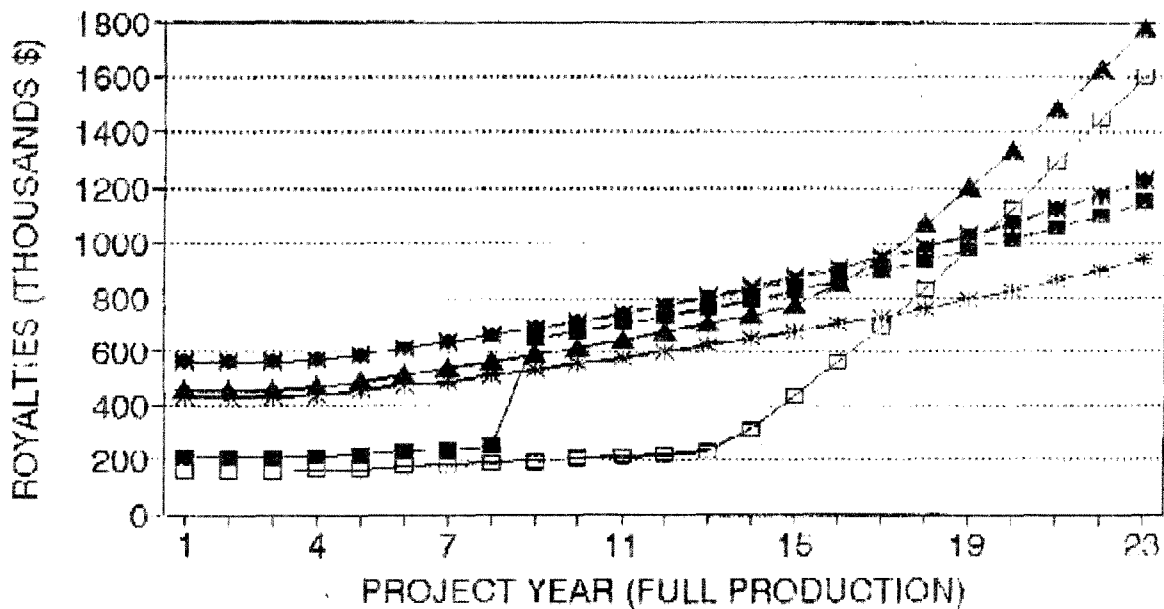
5% 900.

# PGV 7/23/93 Proposal

## 1.5,2.0 Mult. Comparison



# 4 PGV PROPOSALS VS. STAFF, 35% PR. 1990-1993 (USING 5/93 FIGURES)



■ PGV 12/90	+ PGV 3/91	* PGV 3/91
□ PGV 7/93	* 35% PROCEEDS	▲ STAFF NETBACK

PGV 12/90: 33 percent of proceeds method with 60 percent waiver for first eight years, net present value \$7,838,000  
 PGV 3/91: proportion of profits method, net present value \$9,683,000  
 PGV 3/91: 27 percent of proceeds method, net present value \$7,495,000  
 PGV 7/93: current MMS method with 10 percent of proceeds floor, net present value \$5,016,000  
 35 percent of proceeds method: net present value \$9,716,000  
 Staff netback method: net present value \$9,274,000

8/21/93

AUG 23 1993

Puna Geothermal Venture  
Economic Impact of State Royalty

**CONFIDENTIAL**

Projected Final Capital Structure of PGV (000s)

Bank Debt	\$70,000	40%
Debt from Affiliates	50,000	29%
Partner Equity	<u>55,000</u>	<u>31%</u>
	<u>\$175,000</u>	<u>100%</u>

Post-It™ brand fax transmittal memo 7671		# of pages ▶
To Tak Yoshihara	From Steve Morris	
Co.	Co. PGV	
Dept. DBEDT	Phone # 528-5225	
Fax # 586-2377	Fax # 524-9349	

Project Economics (30 years)

- Assume 3% Revenue Escalation
  - State Royalties
  - Internal Rate of Return – Partner Equity
  - Internal Rate of Return – Partner Equity/Debt from Affiliates
  - Years of zero State royalty
  
- \* Assume 5% Revenue Escalation
  - State Royalties
  - Internal Rate of Return – Partner Equity
  - Internal Rate of Return – Partner Equity/Debt from Affiliates
  - Years of zero State royalty

<u>MMS Method</u>	<u>MMS Method (10 % SV floor)</u>	<u>Staff Method</u>
\$9,533	\$12,103	\$21,037
0.00%	0.00%	0.00%
2.37%	2.27%	1.95%
14	0	0
\$31,401	\$33,092	\$40,660
0.68%	0.00%	0.00%
6.55%	6.48%	6.27%
9	0	0



# GEOHERMAL ROYALTY VALUATION

August 17, 1993

## Background

Under Section 182-18 of Hawaii Revised Statutes, the Board of Land and Natural Resources (BLNR) is authorized to "fix the payment of royalties to the state for the utilization of geothermal resources at a rate which will encourage the initial and continued production of such resources." This section also provides that "...where the board determines that it is necessary to encourage the initial or continued production of geothermal resources, the board shall have the authority to waive royalty payments to the state for any fixed period of time up to but not exceeding eight years." Furthermore, "The board's assessment of each waiver application shall include, but not be limited to, the examination of such factors as the progress of geothermal development taking place in the state at the time of the application, the technical and financial capabilities of the applicant to undertake the project, and the need for providing a financial incentive in order for the applicant to proceed."

The Department of Land and Natural Resources' (DLNR) Administrative Rule, Section 13-183-31 (a) states that "The rate of the royalty paid to the State for the production of geothermal resources shall be determined by the board prior to the bidding for or granting of a mining lease, but the rate shall not be less than ten percent nor more than twenty percent of the gross amount or value of the geothermal resources produced under the lease as measured at the wellhead and sold or utilized by the lessee."

Section 13-183-31 (b) also states that "For the purpose of computing royalties, the amount or value of the geothermal resources produced shall be determined as the gross proceeds received by the mining lessee from the sale or use of geothermal resources produced from the leased land as measured at the wellhead. In the event that geothermal production hereunder is not sold to a third party but used or furnished to a plant owned or controlled by the lessee, the gross proceeds of the production for purposes of computing royalties shall be that which is reasonably equal to the gross proceeds being paid to other geothermal producers for geothermal resources of like quality and quantity under similar conditions after deducting any and all treating, processing, and transportation costs incurred."

Where geothermal resources, i.e., steam, is sold directly by a mining lessee the value of the resource is equal to the gross proceeds of the resource sold.

The value of the resource is not as easily determined where the mining lessee both produces the geothermal resource and utilizes it in its own power plant to generate electricity. In this situation, the electricity is sold, and the value of the resource must be deduced from the gross proceeds from the sale of the electricity. Alternative methods commonly used to establish the value of the steam for royalty payment purposes include the Netback Method and the Percentage of Proceeds Method.

### Federal Netback Method

The federal netback method used by the U.S. Department of the Interior, Minerals Management Service (MMS) for geothermal leases on federal lands allows for the deduction of electricity generation and transmission costs from the gross revenues received from the sale of electricity to arrive at a value of the geothermal resource. Included in the deductible amount is an annual return on the capital invested, or depreciation plus a return on the undepreciated investment. Rules promulgated by the MMS in November 1991 for the netback-depreciation method allows a return on the undepreciated capital of 2.0 times the current industrial bond rate, and deductions based on the full costs of transmission and generation of electricity. By limiting deductions to a maximum of 99% of the gross proceeds, the MMS method effectively establishes a minimum payment requirement.

Some characteristics of the MMS netback method are:

- The federal MMS netback method is an established and accepted method used in the leasing of federal lands for geothermal development. This method was adopted pursuant to a public review and revision process with input from both industry and government.
- This method can provide a consistent valuation method applicable to all geothermal development projects.
- The method is relatively complex, requiring submission of detailed capital and operating costs to establish eligible costs. Periodic audits may be required to validate such costs.
- The method, without a minimum royalty provision, can result in zero royalty to the lessor for a number of years.
- This method provides a mechanism for the up-front recovery of costs by the developer for electrical generation and transmission costs and a return on the invested capital.

### Percentage of Proceeds Method

In the percentage of proceeds method, the royalty is calculated on the basis of a percentage of the proceeds obtained from the sale of electricity, and not as a percentage of the value of the resource. The range of negotiated percentages (allocated to the value of the steam) is typically on the order of 35% - 50% of the gross proceeds from the sale of electricity.

Characteristics of the percentage of proceeds method include:

- The method is simple to calculate and is based solely on the total revenues generated from the sale of electricity.
- Royalty payments are due from the beginning of production.
- The method does not directly provide for the recovery of the capital investment made by the developer.
- Since the valuation method is based on a negotiated settlement, the percentage agreed upon can vary from project to project making a consistent approach difficult to attain and justify.

### Department of Land and Natural Resources (DLNR) Staff Method

DLNR staff has recommended a modified version of the current federal netback method. The principal differences between the DLNR staff method and the federal method can be summarized as follows:

<u>Parameters</u>	<u>MMS Method</u>	<u>Staff Method</u>
Multiplier	2.0	1.5
Limit on Generating Deduction	No limit	Limited to 2/3 of tailgate value of electricity (or threshold)
Limit on Transmission Deduction	No limit	50% of gross electricity revenues (or threshold)

Use of the revised parameters in the DLNR staff method results in a significant departure from the federal method. The staff method reduces the allowed rate of return on invested capital by 25%, and limits the amount of generation and transmission deductions allowed. Consequently, while the MMS

method applied to the Puna Geothermal Venture (PGV) project results in zero royalty calculations for approximately the first eleven years, the staff method forecasts initial royalty on the order of \$450,000 per year. Thus, it appears the DLNR staff was influenced heavily toward modifying the federal method by the fact that zero royalty payments under the State lease without a provision for a minimum payment would be unacceptable. An arbitrary reduction in the rate of return allowed and a capping of allowable deductions are both to the detriment of the developer. Whether DLNR staff made a serious "examination of such factors as the progress of geothermal development taking place in the state at the time of the application, the technical and financial capabilities of the applicant to undertake the project, and the need for providing a financial incentive in order for the applicant to proceed" in devising its recommended method is not known.

### Minimum Royalty and Waiver

Under the State lease, no provision is made for a minimum payment of royalty. Federal leases appear to establish a minimum resource value based on one percent of the gross revenues from the sale of electricity. Section 13-183-31 (a) of the DLNR Administrative Rules, states that in addition to royalties on geothermal production, "the board may also impose a royalty based on a percentage of the net profit, cash bonus, or otherwise." This clause would seem to imply that the board could establish a "minimum floor" payment, regardless of the valuation methodology selected.

As stated in the beginning paragraph of this paper, State law authorizes the BLNR to "waive royalty payments to the State for any fixed period of time up to but not exceeding eight years" in order to "encourage the initial or continued production of geothermal resources." The BLNR has not given consideration for any waiver to date for the PGV project.

### Conclusions

- a. The netback method is an accepted and suitable means of calculating geothermal royalty payments.
- b. Without a minimum payment provision, the federal method results in zero royalty during the early years of the project.
- c. The DLNR staff method departs significantly from the federal MMS method, to the detriment of the developer. It appears that changes to the federal method were made by DLNR staff as a result of their conclusion that zero royalty payments are unacceptable.

- d. It is difficult to determine what, if any, weight has been given by DLNR staff to the need to encourage geothermal development as a matter of State policy. The DLNR staff method is considerably less encouraging for the development of geothermal resources than the federal method.

### **Recommendations**

- a. The methodology adopted by the State to determine royalty payments should be supportive of the State goal to encourage geothermal development. It should not be less encouraging than the federal method.
- b. The federal MMS netback methodology should be adopted as the standard approach used for geothermal development in the State.
- c. A minimum royalty policy should be adopted by the BLNR which considers the maturity of the industry as a whole at the present time, the financial risks incurred by the developer, and the degree of financial commitment made by the State.
- d. Where a developer can demonstrate financial hardship the BLNR can consider granting a waiver of payments for a period not to exceed eight years.