11 April 2014

Re: Request for Expression of Interest to Supply Major Plant Components - 30 MW Cibuni Geothermal Power Project, West Java, Indonesia

Dear Sir,

PT Teknosatria Energi Geothermal (TEG) is an Indonesian firm that plans to develop a 30 MW power generation facility at the Cibuni geothermal project site. The project is located on government-owned tea plantation lands in a volcanic highland about 30 kilometers southwest of the city of Bandung in West Java, Indonesia. A commercial resource has already been proven by drilling and well testing at the Cibuni project. The 30 MW project will be constructed after completion of an initial 2 MW pilot facility which is expected to come on line in late 2014. The attached maps show the project location and the proposed layout of the 30 MW project.

Layman Energy Associates, Inc. (LEA), has been retained by TEG to support its development efforts and assist with securing financing for the project. Via this letter, TEG is contacting major turbine manufacturers and suppliers to request expressions of interest (EOI) to supply major plant components for the 30 MW Cibuni project. We anticipate that the EOI submitted by your firm will form the basis for future bid documentation to be included in a formal tender process.

TEG BACKGROUND

TEG is an Indonesian firm controlled by PT Satria Gemareksa (“Satria”) which owns 85% of TEG shares via its wholly-owned subsidiary PT Satria Tirtatama Energingindo. Satria was established in 1991 and has diverse business interests, including distribution of petroleum products for Chevron and other firms; building and operating LNG filling plants; financing of natural gas pipelines; construction and upgrading of oil refineries; operating palm oil plantations; real estate development; and poultry production. Additional information on Satria can be found on the company’s website at:  http://www.satriagroup.co.id/aboutus.html

TEG’s director and CEO, Muhammad Fahman, is a reservoir engineer educated at the Bandung Institute of Technology. He has nearly three decades of experience with oil and gas and geothermal operations. As an employee of Chevron Corporation, Mr. Fahman was responsible for all reservoir engineering issues for the Darajat geothermal project in West Java, which currently generates 271 MW of electrical power.
CIBUNI GEOTHERMAL RESOURCE

The Cibuni geothermal project occurs at the west end of a single, very large, vapor-dominated geothermal resource currently under development by PT Geo Dipa Energi at the Patuha project. A total of 15 wells have been drilled and completed at the combined Patuha and Cibuni projects. At the eastern end of this resource, nine wells drilled for the Patuha project have achieved 72 MW of steam at the wellhead. These wells will supply Geo Dipa’s 55 MW Patuha plant which is currently under construction by Marubeni and scheduled to commence operations in June 2014.

At the Cibuni project site, exploratory drilling conducted in the 1990’s has proven the existence of a commercially productive, vapor-dominated resource with a temperature of 240°C and pressure of 500 psi. A carefully-documented, long-term test of well CBN-1 has demonstrated a stabilized output of about 4.3 MW of electrical power. This well was completed with 7-inch slotted liner, and significantly higher outputs would be expected for a larger diameter well completed with 9 5/8-inch slotted liner. CBN-1 produces steam with low gas content and a small liquid fraction at the wellhead (~5%), and the chemistry of liquid is benign with neutral pH and low total dissolved solids. A second Cibuni well (CBN-3) appears to have intersected the same steam reservoir but testing was hampered by improper cementing and completion operations during drilling.

TEG has completed a feasibility study for the Cibuni resource which includes a detailed resource assessment and development plan. 3-D modeling of magnetotelluric resistivity data, combined with the data from 4 deep temperature gradient coreholes and the two production test wells, has defined a 3.6 square-kilometer area of proven and probable resource. A “most likely” resource capacity of 33 MW (25 years) was estimated by stored heat methods. A capacity range of 34-48 MW was estimated by analogy with the productive area size at the nearby 200 MW Kamojang project, another vapor-dominated resource. A 3-D numerical simulation study of the Cibuni reservoir conducted by GeothermEx, Inc. concluded that the reservoir could support 30 MW generation for 30 years with only modest pressure declines.

TEG’s development plan for the 30 MW facility includes the drilling of five new production wells and one new injection well. For the initial two MW pilot unit, well CBN-1 will supply steam and well CBN-3 may be used as an injector well.

POWER PURCHASE AGREEMENT STATUS

TEG is currently in negotiations with the Indonesian state utility PLN regarding the purchase of electricity generated by the Cibuni project. An existing power purchase agreement (PPA) for the Cibuni project was executed in 1995 between PLN and the former project operator, PT Yala Tekno Geothermal (YTG). PLN and TEG recognize this old agreement is out of date and intend
to enter into a new PPA that better reflects the current power market conditions. TEG has submitted documentation to PLN which demonstrates that YTG (and YTG’s creditor, PT Inti Alam Energi) have no further interest in the Cibuni project.

Due to Cibuni’s status as a legacy project initiated prior to the 2003 Geothermal Law, TEG is not required to negotiate PPA terms with the local West Java province government.

**EXPRESSION OF INTEREST**

**Equipment to be supplied:** TEG hereby requests an EOI from your firm to supply the following major equipment items for the Cibuni 30 MW project:

- Turbine-generator, 30 MW net output
- Condenser
- Cooling tower
- Circulating water pumps
- Non-condensable gas extraction system
- High-voltage switchgear train
- Motor control center
- Other ancillary equipment

While the turbine-generator is the primary major equipment item to be addressed by this EOI, we hope that your firm can supply as many of the above equipment items as possible. Additional details regarding the equipment to be supplied are given in Appendix 1.

**Cibuni resource parameters:** The equipment to be supplied should be matched to the following Cibuni resource parameters:

- Steam pressure at turbine inlet: 100 psig
- Total non-condensible gas content in delivered steam: 1.20 weight %
- Hydrogen sulfide content in delivered steam: 190 ppm

**Requested documentation to be included in the EOI:** The EOI should include the following information:
1) **Technical capability:** Evidence of the technical capability of your firm to supply the above listed equipment items, or portions thereof;

2) **Specifications:** Technical specifications for each of the equipment items to be supplied by your firm;

3) **U.S. Content:** The approximate percentage of U.S. content in each of the equipment items to be provided. To clarify, TEG *does not require* that equipment to be supplied have significant U.S. content. This information will be used to help TEG determine whether USEXIM financing is a viable option for the project;

4) **Supplier financing options:** Information on direct financing options that your firm may be able to provide to TEG for purchase of the equipment to be supplied. TEG expects that such financing would take the form of a direct loan from your firm to TEG to be repaid from power sales revenues generated by the project. Such a loan would likely be part of a package of loans assembled for the project, including loans from multilateral banks such as the Asian Development Bank and/or export credit agencies.

Please feel free to contact me with any questions or comments on the EOI via e-mail at laymanenergy@charter.net or by phone at +1-805-541-6939 (office) and +1-805-215-3021 (mobile). We look forward to receiving your EOI and to discussing the project with you.

Sincerely,

Erik B. Layman
President
APPENDIX 1
ADDITIONAL DETAILS FOR REQUIRED EQUIPMENT

- **Turbine-generator, 30 MW net output**
  - Steam Turbine:
    - 13 Cr Rotor blades
    - 13 Cr Diaphragm blades
    - 2205 fins (or higher nickel alloy) for outboard steam packing on glands
    - Inconel 825 overlay for outboard steam packing on rotor.
    - Stellite HF for last (3) stages
      - Stellite length = 1/3 blade length
    - 2205 Gland seal steam piping.
      - 316L Valves and fittings is ok
    - Exhaust configurations in order of preference:
      - Axial exhaust
      - Top exhaust
      - Bottom exhaust
  - Condenser-Turbine Expansion Joint:
    - 2205 Duplex
    - Supplied by condenser supplier
  - Turning gear is required.
  - 304 L Stainless steel lube oil system;
    - Piping
    - Pumps
    - Valve
    - Tank
  - Woodward Governor control system.
  - Generator:
    - 35 MW gross generation maximum
      - 13.8 KV output voltage
- 33 MW gross generation for design conditions
- 38 MVA Generator
  - 50 Hz
  - .85 PF
  - Air cooled
  - Outdoor rated
  - Brush Electric or approved equal

- **Condenser**
  - Direct contact condenser (bottom exhaust configuration only)
    - 316L stainless steel piping and nozzles
    - SA 516 Grade 70 carbon steel shell
      - 1/8” Corrosion Allowance
  - Surface Condenser (Top exhaust and axial exhaust)
    - 316L stainless steel tubes and tube sheets.
    - SA 516 Grade 70 carbon steel shell
      - 1/8” Corrosion Allowance
    - Water box
      - Epoxy coated carbon steel.
      - Galvanic corrosion prevention system.
    - Single pass design
    - Quote all 316L construction as an option.

- **Cooling tower**
  - Counterflow design
  - Low clog / cleanable packing
  - VFD driven fans
  - Fiberglass frame construction

- **Circulating water pumps**
  - CF3M or CF8M castings
    - Quote carbon steel with epoxy coating as alternative
  - 316L SS impeller
- 316L SS shaft
- Variable frequency drive pumps.
- (2) 50% pumps capable or running up to 65% when one pump is down based on reduced backpressure on the pump curve, at 50 Hz operation.
- When running on one pump, VFD can up to 60 Hz on VFD for increased flow.

- **Non-condensable gas extraction system**
  - 85 psig motive steam pressure
  - (2) stage jets in series.
    - Single train
  - (1) Stage Vacuum pump.
    - (2) 65% pumps, capable or running from 50% to 80% using VFD drive on motor.
    - 316L for all wetted part of the system.
  - 316L SS jets
  - 316L SS shell and tube inner condenser and after condenser
  - 316L SS piping from the 1st stage jet inlet strainer (also 316L) to the last stage after condenser

- **High-voltage switchgear train:**
  - 13.8 KV to 210 KV (???) step up transformer system to line.

- **Motor control center**
  - (2) MCC required
    - MCC to be 100% fabricated off site, fully tested and certified prior to shipping.
    - (1) MCC for the circulating water pumps, cooling tower fan, and gas removal system requirements
    - (1) MCC for condensate hotwell pumps, lube oil, and other ancillary equipment.

- **Other ancillary equipment**
  - Trip event recorder
  - Control system interface to plant control and monitoring system.
  - Please add as needed or desired for greater detail.
Cibuni Geothermal Project
Project Location in West Java with Other Geothermal Areas
Isotherms at 1000 meters Elevation and Resistive Area Boundary, Patuha-Cibuni Geothermal Area, West Java

FIGURE 2
Cibuni Geothermal Project
Teknosa Concession Area
Proposed Layout - 30 MW Project

- Existing production test well
- Temperature gradient corehole
- Fumarole
- Hotspring
- Village

- Major access road
- Other road
- Brine injection line
- Condensate injection line
- Steam production line
- Existing wellpad
- Proposed wellpad

= Power Plant 30 MWe

WELL CLUSTER “A” (± 2MW Power Plant Site)
WELL CLUSTER “B”
WELL CLUSTER “C”

INJ = proposed injector

1 kilometer

Contour interval = 50m / 10m

1000 meters