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# Discovering and Connecting to the Right Customer for Your Power

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**Sextant Research**

***Keywords***

*Power Purchase Agreement, PPA, market analysis, electricity market, customer, bid solicitation, transmission market analysis, renewable energy credit, REC, transmission forecasting, risk, utility evaluation, investor owned utilities, IOU, wheeling, market power*

## ABSTRACT

Geothermal developers often focus primarily on the science and engineering aspects. Shortchanged in the process is understanding the market for a particular site's power. Prospecting, drilling and construction dominate most projects. Nevertheless, by far the largest financial transaction is the long-term, power purchase agreement (PPA) with the power buyer.

This paper advocates thoroughly assessing the electricity market for a particular site and doing so early in the process (Figure 1). This entails identifying and considering a larger number of prospective utility customers. In addition it is essential to assess the high-voltage, transmission networks since they define a site's reach and marketplace. Furthermore, each prospective customer should be profiled. This is to learn each prospect's renewable goals, power needs, pricing, current supply sources, regulatory constraints, and so forth. An additional part of this assessment is evaluating and comparing the utilities' requests for offers (RFOs) and PPAs. Altogether, taking these steps can add tens of millions of dollars to the total contract value that the geothermal developer may enjoy (Figure 2). These are all steps that precede the PPA negotiation process itself.

## Background

In the past, geothermal sites often were developed in relatively few clusters not far from cities, e.g., The Geysers and Salton Sea areas in California. Many future sites are likely to be located in more remote areas, far from "obvious" load-serving centers. The remoteness of a site opens up multiple potential customers; many of them may be up to several hundred miles away from a new plant. Likewise as distances increase, transmission plays a far greater role; this is to connect the plant to the customer, whether physically or virtually.

At the same time the nation's transmission infrastructure has not kept pace with demand shifts, regulatory changes and the power plant mix (Wiser, 2005). Congested transmission eliminates many delivery options from consideration by new power developers. This unavailability of transmission effectively cuts off large swaths of potential customers for a new power plant.

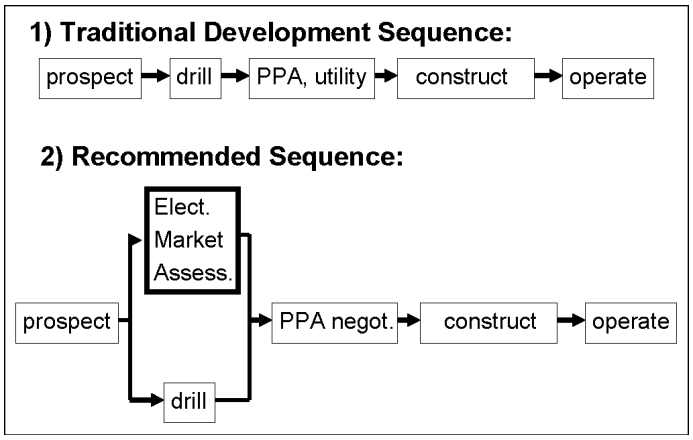


**Figure 1.** Source: Martin Piszczalski, 2008.

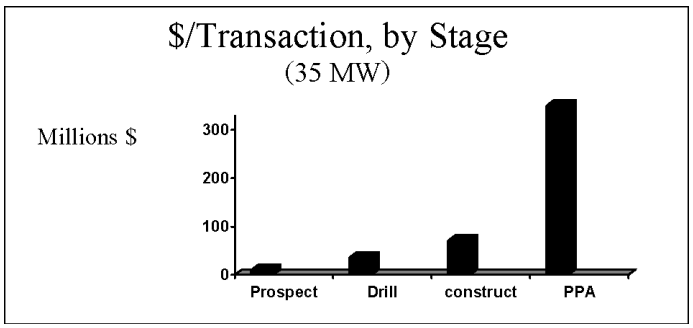


**Figure 2.** Shown are approximate transaction amounts for a 35 MW plant; 'PPA' is total contract value for 20 yrs. Sources: Martin Piszczalski; Glitnir Bank, 2008; Nevada Geothermal Power, Inc. (2008).

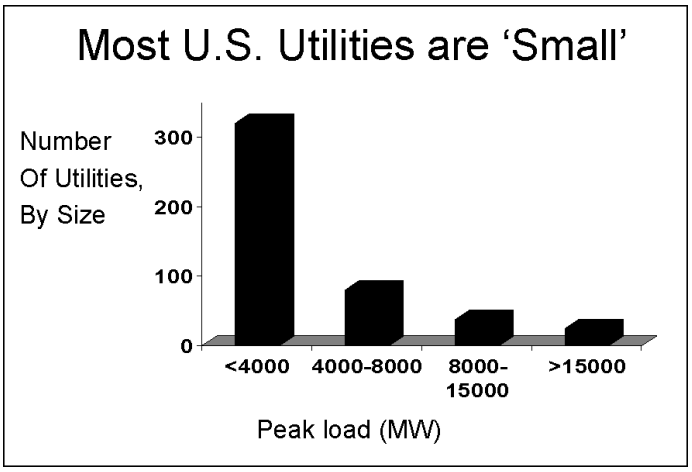


**Figure 3.** Source: Edison Electric Institute, FERC Form 1, 2007.

At the same time, identifying available transmission paths and pools can open the door to far more potential customers. These can include many smaller utilities, especially public utility districts (PUDs) and rural co-operatives (Figure 3). This group of utilities, furthermore, may have greater negotiation and price flexibility than more regulated investor owned utilities (IOUs).

Most significantly, the impact of uneven geographical availability is that electricity prices are extremely location sensitive. Retail and wholesale prices in one location can be double those of another nearby location. Transmission prices at a particular location can fluctuate every five minutes under Locational Marginal Pricing (LMP) (Hausman, 2008).

At the same the regulatory climate is in a state of flux. Multiple government agencies have jurisdiction over transmission and distribution. Their shifting directives toward de-regulation (or re-regulation!) make the electricity market complicated to enter, understand and master. Because the owner of a new geothermal power plant may only sign a few PPAs over decades, the smaller independent power producer typically does not have a large, dedicated staff for interfacing to the complex electricity industry (Figure 4). This is especially challenging with market power shifting among the various segments in the generation/delivery chain.

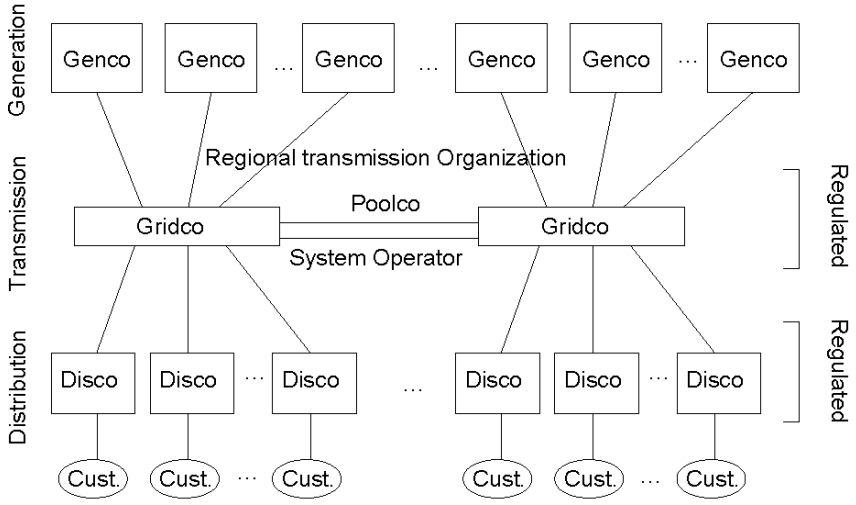


**Figure 4.** Source: "Market-Based Transmission Investments and Competitive Electricity Markets," by Wm. Hogan, edited by A. Kleit, 2006.

## Utility Evaluation

In order to identify the best potential prospective customers, it is necessary to profile them. Key characteristics include the utility's:

- renewable goals/mandates
- electricity prices
- capacity
- current sources of power (e.g., percent hydro, percent purchased, etc.)
- most recent regulatory rulings
- new power plants coming on line in the service territory
- plant decomissionings
- transmission plans and upgrades
- energy forecasts and population growth in the service region, and so forth.

Utilities vary enormously. For instance, some utilities generate more power than they consume. As net sellers they are in a far greater position to enjoy spot-market profits, for instance. This contrasts with the concerns of another utility that could see an entire year's profit wiped out by buying power at these critical peak times. Each utility, therefore, could view the same geothermal offer through much different eyes.

In addition to profiling prospective power buyers, is the need to profile potential third-party transmission providers.

## Power Purchase Agreements

Utilities rely on competitive solicitations for long-term power contracts. Their ultimate goal of the PPA is to "get the best deal for electric-utility customers." However, PPAs vary enormously from utility to utility. These differences have substantial financial impact to the power seller. Significant elements to a PPA include:

- power sale/purchase terms
- completion timetables
- posted security (bid, develop, operate)
- non-performance (financial penalties, remedies)
- green tags, salable attributes
- utility's solicitation process itself

Fundamental to PPAs are the obligations to deliver and buy power. This includes the number of years in the contract, annual price increases (if any) and so forth. For a 35 MW plant, the total contract value for a 20-year PPA can easily exceed $375 million (Figure 2).

In general, regulatory commissions expect the utility to select the least-cost/best-fit choice among potential power providers. Furthermore, utilities will not sign contracts unless they have deep confidence that the power producer will deliver the contracted power by the in-service date. This is a big issue for renewable PPAs since the track record for comple-

tions of renewable projects is less than stellar. Examples of never-finished projects include at Bridgeport, CA (geothermal) and Flint Hills, Kansas (wind). Causes can be a dry hole, permits denied or perpetually pending, inadequate financing, and other factors.

Most utilities require geothermal developer/operators to post substantial deposits or securities across the lifecycle of a project. These may include a bidder's deposit, a developer's deposit and/or an operator's deposit. For instance, one utility may require collateral of one year of operating revenue from the geothermal owner/operator. Another utility may require only one-tenth of this amount.

Most PPAs devote considerable language to non performance or under performance of the power supplier. For instance, under-delivery of power by the plant incurs different penalties based on how the utilities calculate a charge per lost MWh.

Green tags, especially renewable energy credits (RECs) and production tax credits (PTCs) could become the property of the power buyer in some PPAs. Indeed, the buyer could require that all future environmental benefits flow to the buyer. These could be air-quality credits, emission-reduction incentives, offsets, avoidance of a gas, future carbon taxes, cap-and-trade instruments and so forth. Alternately some states and utilities allow the power producer to sell the green attributes independently.

In addition, utilities vary significantly in the solicitation process itself. For instance, some utilities prohibit a bidder from pursuing other customers for that same power during the bid process. This preclusion makes it far more difficult to assess the market value of a plant's power, for instance. A utility may discourage any language change in the PPA and, in effect, discourage broader negotiations as well (EPSA, 2004).

While long-term contracts through PPAs have dominated geothermal power procurement, other financial options are getting increased attention. Hedges, especially electricity futures, are being used in other renewable sectors such as in the wind industry. A difficulty with futures is that trading becomes very thin for futures more than three or four years out. Furthermore, with high, up-front capital costs in geothermal, obtaining financing can be much more difficult without a long-term contract (e.g., 20 years) from the utility as in traditional PPAs.

Another option is that some of the largest traditional power producers are selling new power only on the spot and short-term markets. With real-time, on-peak prices currently hitting up to $300 MWh in some locations, this is an extremely attractive short-term option. However, these companies can self-finance a project, making it unnecessary for them to raise $100+ million, for example, in external markets as is done typically for a PPA (Hausman, 2008).

## Transmission Analysis

Transmission is probably the area where the renewable-energy industry most falls short. At the same time it is among the most complex challenges facing a new power business developer. As stated earlier, the transmission networks heavily define what the potential market place is for power from a particular site. Having existing high-voltage lines nearby does not at all guarantee availability to markets and customers. Critical is Available Transfer Capability (ATC).

Furthermore, current transmission prices, congestion charges, grid access, and so forth are generally not public information (FERC Order 890 notwithstanding). This information, instead, is typically part of private, bilateral agreements only (with the exception of RTO/ISO areas). Transmission costs and risks can jump when spanning multiple transmission operators; it can lead to "pancaking" of transmission costs.

Mandatory in almost all new power projects is a new interconnection between the plant and a "nearby" transmission provider. Over 100 interconnection requests from many companies (especially renewables) may be queued at any one time, all to connect to a same transmission provider. This mountain of pending interconnection requests can add considerable uncertainty for completing even the most basic transmission work.

A lack of transmission-price stability and predictability can knock out many prospective utility customers from consideration. Unfortunately, securing firm transmission from third parties for 20 years out, (i.e., to match the duration of the PPA) is generally not an option. Financial Transmission Rights (FTRs) can hedge against some of the uncertainties (Hausman, 2006).

Upgrading the transmission network to handle new capacity is an option. However, attaining regulatory approval, rights of way, cost allocation/cost recovery, and so forth for the upgrade can take far longer than completing the geothermal facility itself.

Forecasting where future transmission lines and upgrades will go can be even more daunting. Initiatives from many entities have overlapping spheres of influence and authority, thereby making business planning a high-risk, expensive guessing game. A few of the relevant initiatives include

- California's Renewable Energy Transmission Initiative (RETI),
- Western Governors' Renewable Energy Zones,
- Texas' Competitive Renewable Energy Zones (CREZ),
- Nevada Renewable Energy Transmission Access Advisory Committee (RETAAC), and so forth.

Furthermore, much new transmission investment is simply the traditional industry playing catch for years of underinvestment in transmission. Congestion relief, not renewables is a prime concern here. Even where renewables are the focus, transmission for wind farms dominate, not transmission for geothermal.

Under all circumstances, the geothermal developer must have a rock-solid transmission roadmap to the point of delivery of the power buyer by the in-service date. Uncertainty here routinely has a utility reject a potential power seller. Despite these hurdles, a new power developer will be well rewarded for finding the full suite of wheeling options surrounding a particular site.

## Summary

The goal behind developing geothermal facilities is to sell power economically. With electricity sales in the U.S. at about $200 billion/year, it is critical for the relatively small geothermal industry to thoroughly analyze how to best fit into this far vaster industry profitably. Most important is to assess for each site its potential customers and delivery options. This more formal, rigorous approach should be done early in the development process. Such work can have greater financial impact than almost any other step in the lifecycle of the project.

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