Geothermal Energy in Texas - Important Factors to ERCOT Market Participants

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Geothermal Energy in Texas Deregulated Electric Market

Important Factors to Wholesale & Retail Market Participants

1. **Scale** – Wholesale power marketers prefer large enough scale to make it worth their time, effort and risk to market power to other marketers and retail electric provider's (REP's). Aggregated geothermal generation fields in excess of 25 MW shorter term. Longer term in excess of 50 MW.
2. **Transmission/Accessibility to Grid** – Geothermal energy supply will require access to power Transmission lines and the ERCOT grid. Lack of transmission infrastructure in parts of west Texas has delayed some wind power from access to the grid.
3. **Reliability** – Base load (7x24)generation with over 95% reliability will be advantageous compared to wind power which is significantly less reliable generation.
4. **Pricing** – Long term (10-year +) power purchase agreements (PPA) priced in the $0.050 to $0.065 per kWh range.
5. **Incentives** - What incentives (tax credits, REC's, etc.) are available, and for what period of time to create incentives for investment and growth?
6. **Renewable Energy Credits & Carbon Credits** – The volume of renewable energy credits has increased significantly since the Texas electric market deregulated in 2002. SB-7 requires REP's to have at least 1% renewable energy generation by volume of supplier's portfolio. In addition, the trend of renewable energy purchases by large end-users has increased dramatically in the past couple years.
7. **Location** – The current ERCOT "zonal" market design will change to a "nodal" market design in 2008 or 2009 (most likely '09). Power generators will be treated as a node with pricing based on locational marginal pricing. Zones will still exist, but there will be multiple nodes (hundreds or thousands) in each zone. Congestion in particular areas of zones such as the D/FW Metroplex are expected to be burdened with higher power costs due to congestion. However, it is difficult to predict what the future LMP prices for loads and generators will be until we get to that point in time.

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Important Factors to End-Users

1. **Pricing** – Long term (5+ year term) retail electric pricing (including margin) in the \$0.060/kWh (without REC's) to \$0.080/kWh (incl REC's).
2. **Renewable Energy** – The trend of renewable energy purchases by medium and large end-users has increased dramatically in the past couple years. The trend will continue to grow and will begin to permeate to greater number of smaller end-users. Geothermal energy as a reliable base load form of renewable energy could be viewed positively by end-users if marketed properly throughout the value chain (from generator – wholesaler – retailer – end-user). A number of corporate and government entities have longer term carbon neutral goals and requirements that will need to be satisfied by sources of renewable energy.
3. **Availability of Supply** – Large end-users will want to get comfortable that geothermal energy generation will provide long-term security of supply, particularly if a large percentage of the end-user's supply is from renewable energy sources.
4. **Location & Access to Grid** – Most end-users in the deregulated areas of ERCOT that have all or a portion of their retail electric supply from renewable energy sources are not directly connected to the renewable source, but instead have electric supply contracts structured to off-set equivalent amount of consumption of power with renewable energy credits. Oil and gas producers or petro-chemical facilities located near the geothermal energy source may find it attractive to directly connect to generation, assuming the economics favor the option.

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