

## Western Governors' Association

### Western Renewable Energy Zones Zone Identification and Technical Analysis (ZITA) Working Group August 1, 2008 10:00 – 11:30 MDT

## CALL SUMMARY GEOTHERMAL

#### Decisions & Next Steps

- The group will use the USGS maps and used the CA RETI process as an example for the WREZ process in determine geothermal resource zones.
- The criteria process will go from the specific to the general, drawing analogies from projects that are better developed to those that are less developed.
- Next Step: The ZITA Working Group will gather all available data, develop a screening process and decide what data to use for WREZ, and determine criteria from that data. Once criteria are determined, the group will develop high potential resource zones.
- Black & Veatch will come back to the group in 3-4 weeks with recommendations and methodologies.

#### Action Items

1. Karl Gawell to coordinate with Linda Davis in procuring additional geothermal resource information from agencies and developers.
2. Black & Veatch to develop geothermal resource criteria and a methodology for considering geothermal resources.
3. Linda Davis to send Martin Piszczalski Rick O'Connell's contact information.
4. Linda to ensure that GeothermEx and Black & Veatch can access information that has already been developed.
5. Linda to determine whether Black & Veatch is able to provide an ftp site for uploading data from agencies, states, labs, developers; and determine how NREL's GIS system works.
6. If group members have information to share or to incorporate, send they can send it to Linda.

#### CA RETI Process Overview

- Jim Lovekin (GeothermEx) presented potential criteria for geothermal zones, based on the CA RETI geothermal process. Copies of the draft work completed (map and spreadsheet of potential zones) were emailed to the group.
- The CA RETI approach gathered and considered public-domain information on MW potential in certain locations within a certain timeframe.
- Jim referenced the 2004 CA Energy Commission PIER Report for New Geothermal Site Identification and Qualification Project. (Report available here: <http://www.energy.ca.gov/reports/500-04-051.PDF>.) The report identifies remaining undeveloped geothermal resources in CA and western NV, and estimates the development costs of each. The report focuses on historically-defined geothermal resource areas and current heat plate activity. The PIER Report locates the resources as well as identifies

subsurface resource information gaps. Subsurface information is relied upon where it's available. Leasing or area-nomination information is also used to inform resource areas and estimate MW potential.

- **The RETI Phase 1B table** (distributed to the group) shows transmission groupings that are clustered in broad terms along the Interstate 80 corridor and the Dixie corridor. Resources would naturally fall along those lines. Clusters also exist in central NV and in Esmeralda County (NV). In CA, the resources tend to be concentrated in the Imperial Valley. Transmission planning can best inform how to maximize capacity in those clusters with other resource types.
- **The map distributed** shows incremental MW in CA, NV, OR and Southern BC, based on public information (e.g. lease positions and press releases). Some plants are running, and the circles indicate new lines. Public information is used to associate MW potential with zones.
- The RETI effort is a realistic look at the high numbers that are put forth by renewable advocates to ensure that resources are accessible on a side-by-side basis. RETI did not use a large scope to identify all areas of theoretical potential, as the process went from technical potential to developable potential. The discussion about technical potential for geothermal is uncertain until technologies can be better understood.
- GeothermEx is tuned to projects currently developed and in development, and tracks infrastructure costs. GeothermEx is expert in the resource-side analysis of pumping and drilling costs, and stays tuned to other peripheral costs. Although specific sites with geothermal resource information exist, prospect costs for determining more resources are much higher for geothermal than other resources.
- **Q:** How long did it take to collect RETI data?  
**A:** Work on RETI Phase 1A began in March. It included scoping work in OR and BC and considered NM and AZ. Work on RETI Phase 1B began in the spring (most intensely in the last 6 weeks) and involves making decisions about which states to include. UT and ID work will be broader than and not as detailed as the CEC PIER work, but under the same constraints.

### Geothermal Criteria

- When evaluating wind and solar resources, criteria were developed to assess the area, and then evaluated against representative technologies to determine costs. However, the methodology for wind and solar data is different from geothermal (heat-flow data). To stay consistent with other technologies, geothermal resources should also be evaluated against a set of criteria. However, geothermal resource assessment information is insufficient or not currently available to inform a set of criteria. Reliable information on flow and heat wells would help move forward. Heat source information is either outdated or being updated (e.g. Google.org grant to SMU to update heat source information).
- In measuring geothermal capacity, 10MW and 25MW are usual increments. This could inform criteria. The WREZ process should be specific in locating where sites are, but also looking beyond that, at all areas of potential.
- There is very broad information available, although some groups are working with detailed data. *How detailed should the process be at this stage? Does the WREZ process have enough information for a detailed analysis?*
- The resource overlays in the WREZ will justify large-scale transmission.
- Minimum MW, resource potential, temperature, mechanics, geology and permeability are potential criteria.
- **The criteria process will go from the specific to the general, drawing analogies from projects that are better developed to those that are less developed.**

### Availability of Further Information and Data

- For WREZ, NREL geothermal maps can be used as a starting point for states that do not have as much public information, and NREL can summarize existing published data. Every state that falls under the WGA will have to be analyzed. Potential zones are being considered with transmission in mind.
- The zones identified could overlap with other renewables to maximize capacity.
- The group discussed additional information available that could contribute to the zone mapping. USGS could make available geothermal resource data, including the USGS Circular 790 (document assessing the potential of geothermal resources) and maps detailing the availability of geothermal resources in the entire West (Colin Williams, USGS). Developers, labs, state governments and agencies all have information that can be shared to inform potential criteria and provide a rational basis for determining zones (e.g. BLM-nominated areas). The screening data being used must be documents. Finding and bringing together this information is the biggest challenge.
- Geothermal information can be sent to NREL, especially if it's confidential. Linda will determine how to best send information.
- It is difficult to determine zones that come across with the credibility needed for transmission planning unless focal points within that broad region are supplemented by areas of active development, which provides a firm and specific position in justifying geothermal.
- Parity and transparency of methodology in determining viable MW production (between RETI, WREZ and other processes) is vital, as is allocation of resources to effectively determine the resources available. WGA has asked labs to provide recommendations on how to do resource assessments. There is currently no standard methodology. Documentation on the CEC PIER report was thorough in regards to heat plate opinion on how the estimates were derived. What is considered appropriate on project-by-project basis may not be warranted in an overview of transmission siting for another process. **There should be updates of the assessment effort to quantify assessment on regional basis.**

### Additional Discussion Items

- Black & Veatch will do the WREZ work for the entire Western Interconnect. The WREZ process will not extend RETI's work throughout the West, but will use RETI to inform the process. WREZ will have different criteria, screening and need, but data and intelligence will be reused.
- It was suggested to keep track of states that are not included in the current data being collected, and concentrate efforts on the states that are lacking data. Black & Veatch is focusing on UT and ID for WREZ. Within the timeframe of interest, it was determined that other states with little potential will not be able to contribute. Mary Ann Wright (UT) indicated that the Utah REZ draft report will be available by late October. Canada and Northern Mexico are not considered high potential. RETI determined that AZ, in the context of transmission planning, would not contribute enough MW to warrant review. Historically, WA has not been shown to have many geothermal sites. It is essential to document these assumptions in the final ZITA report.
- In NV, experts place resource dots on maps, then consider the aggregate of dots, and then draw dotted lines that define zones to determine whether the zone is big enough to justify a transmission effort.
- WGA will be using proxy projects for cost projections. Near- and long-term projects will be identified.
- The Technical Committee is discussing a timeframe for projects. It was indicated that lower temperature projects could come on in the short-term, but larger projects could take longer. There are many different prospects between 10 and 25 years.

- There is industry discussion and planned research on enhanced geothermal systems (EGS). A 10-year window for EGS is not realistic, and will be fall out of the planning potential for this process.
- The Working Group will determine what transmission and cost information to put forward, and with what level of confidence. Many new technologies could change the zone determination, but the confidence level of the recommendations would decrease as the group goes further in the future.
- The WREZ process is budgeted to a smaller degree than the 2004 CEC process, which will affect what can be done to within the areas of consideration. The description of methods to use in evaluating criteria is within GeothermEx's scope. It might not be feasible to evaluate all states to the fullest extent.

### **Next Steps**

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### **Administrative Items**

- The next call will be a summary of resource discussions, technical committee activities and upcoming meetings and webinars, to keep everyone abreast of the process, as well as continue to reach out to all stakeholders.
- Linda indicated that if anyone would like to get in touch with something on the call, to let her know and she will coordinate it.

### **Participants**

Charles Benjamin	Western Resource Advocates
James Campbell	PacifiCorp
Linda Davis	Western Governors' Association
Karl Gawell	Geothermal Energy Association
Ed Higginbottom	BC Transmission Corporation
David Hurlbut	National Renewable Energy Lab
Jim Lovekin	GeothermEx
John McCaull	Geothermal Energy Association
Christy Morris	State of Nevada, Division of Minerals
Rick O'Connell	Black & Veatch
Amanda Ormond	Ormond Group LLC
Martin Piszczalski	Sextant Research
Elaine Sison-Lebrilla	Sacramento Municipal Utility District
Ron Steinbach	Tri-State Generation and Transmission Association, Inc.
Liza Szot	New Mexico RETA
Mary Ann Wright	Utah Energy Advisor's Office
Morgan Poncelet	Kearns & West (Recorder)