Geothermal Resources and Transmission Planning

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Analysis, Data System and Education

Geothermal Resources and Transmission Planning

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- Organization: National Renewable Energy Laboratory
- Track: Analysis, Data System and Education

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Overview

This project addresses transmission-related barriers to utility-scale deployment of geothermal electric generation technologies.

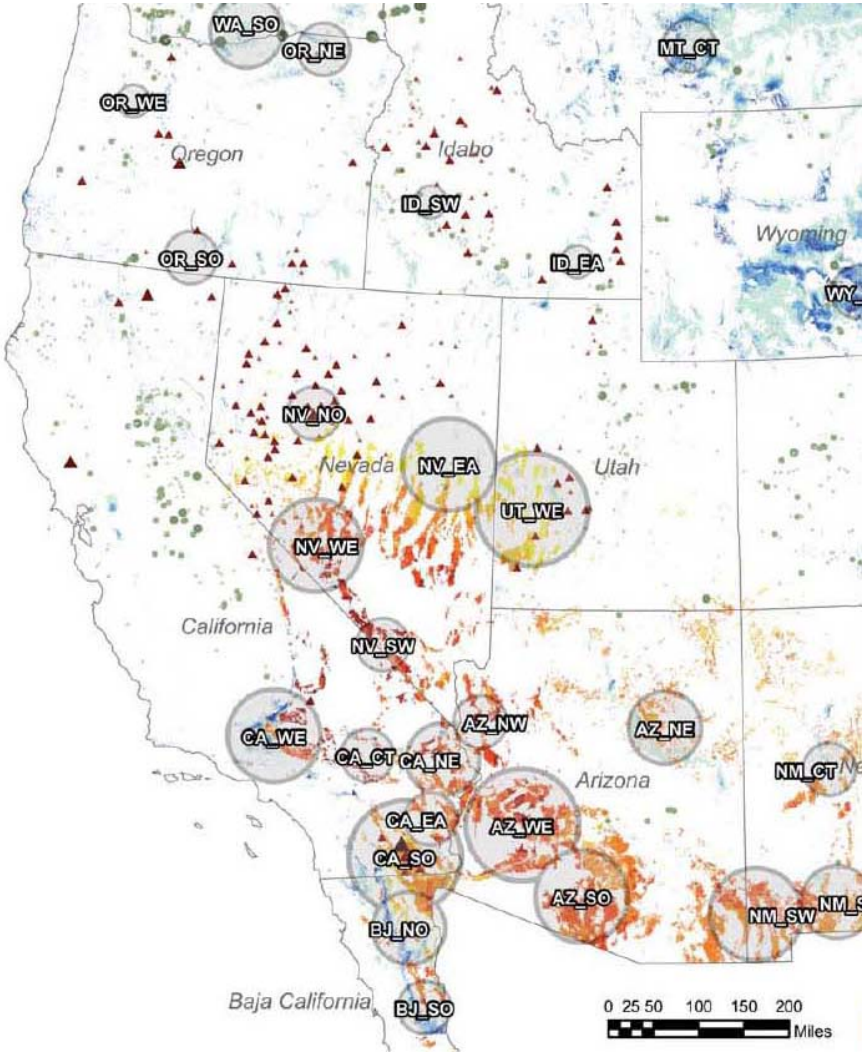
It is comprised of three tasks: assessment of the technologies' capacity and reliability value; engagement in planning; and an analysis of available transmission capability in geothermal-rich areas of the Western Interconnection.

Start – ***May 2010***
End date – ***October 2010***
Budget - ***$300,000***

Relevance/Impact of Research

- If geothermal resources are to play a role in transmission planning, transmission planners need to know what geothermal brings to the table
- Transmission costs are non-trivial; ultimately have to be justified to regulators and ratepayers on basis of cost effectiveness
  - Small line (230 kV single, 400 MW capability) = $1 million per mile
  - Large line (500 kV double, 3,00 MW capability) = $3 million per mile
- Results will help developers and transmission owners address “used and useful” regulatory criteria for siting and funding new lines to geothermal resource areas

Relevance/Impact of Research (continued)



- Timing of project is crucial
  - Western Governors' Association will soon begin next phases of Western Renewable Energy Zone Initiative
    - Load-serving entities (LSEs) will identify renewable energy zones of mutual interest to multiple LSEs
  - WECC stakeholders currently formulating high-penetration renewable energy scenarios for interconnection-wide modeling
    - Project will engage GTP in that work

Scientific/Technical Approach

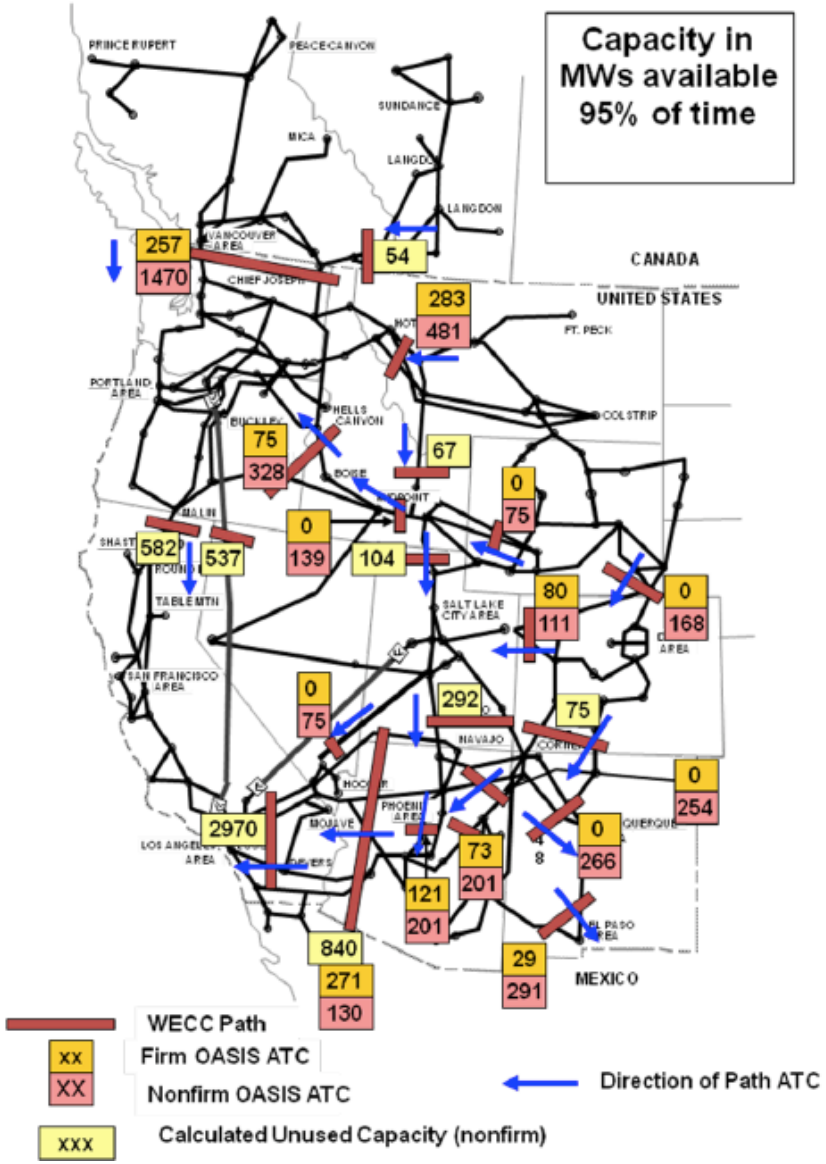
- Task 1: Capacity and reliability value
  - Categorize different geothermal technologies by their reliance on the transmission system (distance from load, need to interconnect at 67kV or higher)
  - Summarize generator capabilities required by grid operators to maintain reliability
  - Assess ability of utility-scale geothermal plants to perform to requirements

Scientific/Technical Approach (continued)

- Task 2: Planning in the Western Interconnection
  - Provide objective, credible input on geothermal resources to WGA WREZ development, especially through technical support provided by national labs
  - Provide input to WECC subregional planning groups

Scientific/Technical Approach (continued)

- Task 3: Capability on existing lines
  - Begin with current WECC analysis on line congestion and available transmission capability (ATC)
  - Asses ATC on existing lines near WGA renewable energy zones with significant geothermal resource potential
  - Analyze general costs and benefits of line upgrades, including the value of base load capacity



Accomplishments, Expected Outcomes and Progress

- Funding finalized in April 2010
- Detailed project scoping in May 2010
  - Staffing will include experts from NREL's Systems Integration Group, Strategic Energy Analysis Policy Group, and NREL geothermal specialists
- Final reports for Tasks 1 and 3 expected by October 2010
- Outcomes for Task 2 will be in the context of broader WREZ work being conducted by Western Governors; will be summarized in a management memorandum

Project Management/Coordination

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Task	Milestone	Status
Funding	12/28/2009	Complete
Detailed work plan	5/31/2010	In progress
Final report, Task 1	10/31/2010	
Management memorandum, Task 2	10/31/2010	
Final report, Task 3	10/31/2010	

Synergies with other GTP programs

Analysis tasks (resource assessment, policy analysis, exploration success rate)

Low Temperature Geothermal, Unconventional Exploration resource assessment and exploration

Future Directions

- As geothermal resource assessment methodologies improve, outcomes will be used to guide utility resource planning

- Geothermal resources will be analyzed as part of the resource portfolio, not in isolation from other grid issues

Summary

- This project will provide an objective assessment of the value geothermal resources can bring to the grid, from the perspective of transmission planners and grid operators

- Project tasks will engage current interconnection-wide planning activities in the West to ensure accurate evaluation of geothermal resources