



Terra-Gen Power, LLC

New York Canyon Simulation

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Principal Investigator

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Engineered Geothermal Systems Demonstration
Projects

- Timeline
 - Project start date: October 1, 2009
 - Project end date: January 1, 2013
 - Percent completed as May 19, 2010: 3%
- Budget
 - Total project funding: \$15,658,693
 - DOE share: \$8,940,000
 - 2009 \$221,255
 - 2010 \$1,340,156
 - 2011 \$6,045,565
 - 2012 \$1,333,024
 - Awardee share: \$6,718,693
- Program Objectives Supported by this Funding:
 - Validation of Innovative Exploration Technologies
 - Confirmation of geothermal energy capacity
 - Validation of new exploration methods
- Lead: TGP Development Company (“TGP”)
- Partners: Array Information Technology, Inc., GeothermEx, Lawrence Berkeley National Laboratory

Project Objectives:

- To update the geologic model of New York Canyon with the assistance of state-of-the-art geophysical logs in new full-diameter wells and sub-surface microseismic monitoring in new slim holes to be drilled in a ring around the EGS stimulation area;
- To create an exploitable geothermal reservoir through fracturing induced by long-term injection at moderate wellhead pressures;
- To establish a commercially viable injector-producer doublet, in which the production well is targeted with the assistance of high-resolution microseismic data; and
- To generate commercial amounts of electricity from the project.

Project Advantages

- High temperature gradients at shallow depths;
- Reported steam production near the center of TGPDC's lease position;
- A location on the opposite side of the Stillwater Range from Dixie Valley, suggesting a possible common heat source underneath the Stillwater Range, with potential for expanded geothermal development in the future; and
- A large lease position in a contiguous block along the northwestern Stillwater Range front, in an area where TGP plans to drill several full-diameter exploration wells, which could complement the EGS stimulation effort with logistical support.

Milestones and Go/No Go Decisions

- **Phase I – Pre-Stimulation**
- **Objective 1.1 – Site/Wellbore Readiness**
- Go/No-Go Decision: *Well EGS-I-1 encounters sufficient temperature and permeability to support commercial production without an EGS stimulation*
- **Objective 1.2 – Development of Stimulation Plan**
- **Objective 1.3 – Planning and Permitting**
- Go/No-Go Decision: *The project may be suspended or re-structured if Phase I results indicate that the NYC site is not suitable for EGS.*

- **Phase II – Reservoir Creation and Characterization**
- **Objective 2.1 – Stimulation**
- Go/No-Go Decision: *If there is insufficient evidence that a viable EGS reservoir has been created, the drilling of EGS-P-1 may be postponed or cancelled.*

Milestones and Go/No Go Decisions (continued)

Phase II – Reservoir Creation and Characterization (continued)

- **Objective 2.2 – Post-stimulation Data Collection**
- Go/No-Go Decision: *If there has been insufficient success through the stimulation phase, the long-term follow-up testing of the doublet may be modified or cancelled.*

Phase III – Validation and Power Generation

- **Objective 3.1 - Long-term Data Collection and Monitoring**
- Go/No-Go Decision: *If produced fluids cannot be used economically, construction of new surface facilities for electrical generation may be cancelled, and testing of the EGS reservoir may be terminated.*

Reporting and Publications throughout all phases

Progress to date:

- Pre- award received February 2010
- Award expected mid May 2010
- Permitting activities for drilling of injector and producer well near completion
- Other permitting activities in progress

Near-Term Activities

- Drilling of first well (injector) expected Q3 2010
- Seismic Array (surface) expected Q3 2010
- Seismic monitoring (sub-surface) Q4 2010

Team Qualifications

- TGP leader in geothermal: COSO, Dixie Valley and Beowawe. Industry leaders on Advisory Panel: Array Technologies, GeothermEx and LBNL

- TGP operates three major geothermal projects: COSO in California and Dixie Valley and Beowawe in Nevada
- Project Consultants and Advisors (Advisory Panel)
 - Array Information technology
 - GeothermEx
 - Lawrence Berkley National Laboratory (Technical Advisor)
- Project Manager: Dennis Kaspereit, TGPNYC
- TGP non-proprietary information to NGDS: short- and long-term flow test reports; summary of all Phases of the cost-shared project
- Economic viability to be assessed based on project capital and operating costs

Phase	DOE	TGP	Total Cost
I. Pre-Stimulation	\$1,752,020	\$4,162,861	\$5,887,881
II. Reservoir Creation & Charac.	\$7,827,795	\$986,379	\$8,814,174
III. Validation, Power Generation	\$914,778	\$41,960	\$956,738
	\$10,467,593	\$5,191,200	\$15,658,793

Key Milestones FY10 and FY11

- Drilling of first well (injector) expected Q3 2010
- Seismic Array (surface) expected Q3 2010
- Seismic monitoring (sub-surface) Q4 2010
- Drilling of second well (producer) to be defined, but as early as Q1 2011

Expected outcome

- Long-term injection at moderate wellhead pressures for strategic fracturing supporting doublet production
- Effective EGS “tool” supporting future commercial geothermal production

- Project support's DOE GTP's objective of producing energy from geothermal resources deficient in water and/or permeability
- TGP and its team members offer experience, expertise and resources to investigate, and validate the proposed demonstration
- The New York Site offers demonstration and expansion potential

