

**Geothermal Policymakers' Guidebook,  
State-by-State Developers' Checklist, and  
Geothermal Developers' Financing Handbook**

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Analysis, Data System and Education

- Greatest barriers to U.S. Geothermal development\*:
  - #1 – Financing
  - #2 – Permitting Obstacles
- Project aims to produce series of reports to address barriers to U.S. geothermal development
  - **Geothermal Policymakers' Guidebook:** Guide policymakers interested in addressing technical and/or non-technical deployment barriers
  - **State-by-State Developers' Checklist:** Guide geothermal development team through permitting process
  - **Developers' Financing Handbook:** Guide geothermal project investors/stakeholders with step-by-step guidance that facilitates the financing process

\*Source: Karl Gawell, Executive Director, Geothermal Energy Association

# Overview (continued)

|          |            | Policymakers' Guidebook   | State-by-State Developers' Checklist   | Developers' Financing Handbook           |
|----------|------------|---|--|--|
| Timeline | Start      | 08/01/09  | 12/01/09                               | 02/24/10                                 |
|          | End        | Report under GTP review   | 07/01/10                               | 9/30/10                                  |
|          | % Complete | 95%   | 55%                                    | 35%                                      |
| Budget   |            | \$58k   | \$114k                                 | \$120k                                   |
|          |            | <b>\$292k (total)</b>   |  |  |
| Barriers |            | Lack of understanding of current policies                           | Siting, Leasing, and Permitting Issues | Lack of understanding of market behavior |
| Partners |            | DSIRE<br>(Database of State Incentives for Renewables & Efficiency) | Sextant Research                       | Navigant Consulting                      |

## Objectives

- Create a series of reports (with accompanying Web content) that
  - Finance difficulty
  - Permitting obstacles
  - Coherent state and federal policies
- Will explore steps required for each report separately

## Policymakers' Guidebook

### Objectives

- Assist policymakers in identifying the niche they can fill to reduce barriers to geothermal energy development
  - Inform policymakers of the steps that must be taken to identify local opportunities and barriers
  - Inform and discuss how existing renewable energy policy may or may not serve geothermal technology needs, including examples of common state renewable energy policies
- Empower local leaders to develop policies that facilitate growth of geothermal energy and prepare the local workforce to serve geothermal industry needs
  - Articulate a widely applicable set of steps that policymakers can follow to institute policy that supports geothermal energy development

## Policymakers' Guidebook

- Interview and consult with NREL and DSIRE state and local renewable energy policy analysts to identify a standard set of steps that underlie sound clean energy policymaking
- Survey existing state and federal clean energy policies
  - Identify those relevant to geothermal technologies
  - Identify necessary actions that would allow existing state and local renewable energy policy to support geothermal technologies
- Utilize case study analysis from parallel work to inform key elements of the policy development and evaluation process
- Review literature to identify specific geothermal technology barriers not addressed by traditional renewable energy policies
- **Milestones:** Develop list of critical steps in policy development, survey existing state and federal policy, identify geothermal specific policy needs, compile and publish results

## Policymakers' Guidebook

Objectives have nearly been achieved:

- NREL and DSIRE State and Local Policy analysts agreed upon the process for policy development
  - Critical Steps :
    - An assessment of opportunity
    - Identification of local challenges
    - Scoping the existing policy landscape
    - Evaluating policy alternatives
    - Policy implementation and evaluation
- Existing state, federal, and local policies have been canvassed. Types of gaps include (1) lack of understanding of the opportunities, (2) exclusions from existing cross-cutting technology policies, (3) insufficient consideration of geothermal technology needs or risks
- The importance of program and policy evaluation and high level guidance on important data collection needs has been included in reports

Expect near-term completion and publication (with accompanying Web content) of three reports pending GTP review:

- *Technology Primer (briefly describes geothermal technologies)*
- *Geothermal Energy Policy Guidebook: Geothermal Heating & Cooling*
- *Geothermal Energy Policy Guidebook: Electricity Generation*

## State-by-State Developers' Checklist

### Objectives

- Clarify permitting and regulatory steps on state-by-state basis to increase speed of geothermal projects
  - Fewer surprises, fewer delays
  - Lower development costs
- Aid new geothermal entrants in planning for permitting
- Some government officials also need better understanding of permitting (especially multi-agency)

### Innovative Aspects

- Project will be first national effort at detailed coverage of geothermal permitting in multiple states, land ownerships

## State-by-State Developers' Checklist

- Collect and organize permit data by state, land ownership
  - Limit checklist to top eight geothermal states: CA, NV, UT, ID, HA, OR, NM, AK
  - Permit checklist for BLM and private land in each state
  - Whole lifecycle: from exploration to facility closure
- Interview both developers and government officials on needs
- Develop interactive website that developers can use to access checklist

## State-by-State Developers' Checklist

- Interviews with industry and government stakeholders nearly complete
- Several state draft checklists completed
- Expected products
  1. Interactive website with accompanying report
  2. High-level checklists that are state and ownership specific
  3. Links to relevant agencies and forms in checklist (e.g., well permits)
  4. Recommendations for how to conduct permitting process based on industry/government interviews, literature search, analysis of current permitting processes

## Developers' Financing Guidebook

### Project Objective

- To provide geothermal project stakeholders (developers, equity investors, debt providers, US Treasury Dept., etc.) with step-by-step guidance that facilitates the financing process, leading to development of more geothermal capacity in the U.S.

### Project Focus

- Utility-scale projects (10 MW or larger)
- Conventional geothermal electricity-producing technologies

### Impacts on the Market

- Improve the quality of market information available for new entrants to geothermal project financing
- Inform developers about sources of capital at each stage of project development

### Innovative Aspects

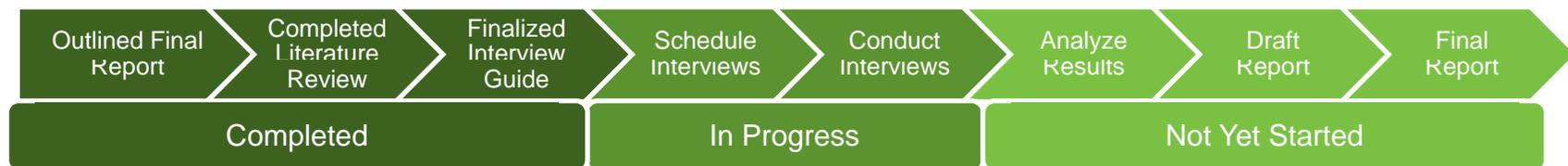
- Examine project development through the lens of an investor
- Describe market drivers for financing conventional geothermal projects

## Developers' Financing Guidebook

- Industry Experts
- Investors
- Developers



- Recent reports on project finance
- NREL/LBNL/DOE publications
- Relevant presentations



## Developers' Financing Guidebook

The final guidebook will have the following characteristics

- 20 pages of core text
- Supplemental appendices to cover important issues in further depth
- Concise, easily accessible text and graphics

### Key target audiences

- **Primary audiences**
  - New investors in geothermal projects
  - Developers
- **Secondary audiences**
  - DOE Program Managers
  - Offtakers and regulators
    - Utilities will be considered offtakers unless interviews reveal that utilities are considering or engaging in project development

## Plans

- Each report has own team with special qualifications
  - Policy – NREL State & Local Policy Analysts/DSIRE
  - Permitting – Sextant Research
  - Finance – NREL Finance Analysts/Navigant
- Teams coordinating with NREL Geothermal Technology Analyst

## Milestones and Schedule

| Milestone    | Policymakers' Guidebook | State-by-State Developers' Checklist | Developers' Financing Handbook |
|--------------|-------------------------|--------------------------------------|--------------------------------|
| Draft Report | 11/15/09                | 5/30/10                              | 7/15/10                        |
| Final Report | Under Review            | 07/01//10                            | 9/30/10                        |

- **Policy**
  - Resolution of context specific challenges
  - Innovative approaches to regional challenges
  - Geothermal deployment impacts analysis (e.g., job creation, emissions offsets, or displacement of conventional fuels)
- **Permitting**
  - Expansion to additional states
- **Finance**
  - Guidebook to financing smaller (< 10 MW) or unconventional geothermal electricity projects
  - Guidebook to financing conventional geothermal electricity projects on tribal lands
  - Describe recent financing of EGS technology companies
  - Perform quantitative financial analysis of geothermal project drivers

- Produce series of reports to address barriers to U.S. geothermal development
  - **Geothermal Policymakers' Guidebook:** Guide policymakers interested in addressing technical and/or non-technical deployment barriers
  - **State-by-State Developers' Checklist:** Guide geothermal development team through permitting process
  - **Developers' Financing Handbook:** Guide geothermal project investors/stakeholders with step-by-step guidance that facilitates the financing process
- Reports developed by teams each specially qualified in its area of interest, coordinating with NREL Geothermal Technology Analyst

# Supplemental Slides

## Presentations by Sextant Research

- Project leader worked for geothermal developers, World Bank's geothermal program
- "Successful Permitting & Licensing" at Geothermal Finance and Investment Summit, Las Vegas, Mar. 2010
- "Permitting Pitfalls & Checklists" Geothermal Resource

# Team Qualifications - Finance

In previous projects, Navigant Consulting staff have developed these qualifications:

## Geothermal Facility Financial Analysis

- Conducted due diligence on The Geysers geothermal facility
- Modeled financials of both the facility and western renewable energy credit markets

## Geothermal Economic Potential Modeling

- Assessed the market for geothermal energy in Southern California
- Assessed financial viability

## Geothermal Project Development Feasibility Analysis

- Projected revenue potential, investment, and O&M requirements for several potential geothermal plant investments
- Conducted sensitivity analyses to assess relative impact of price projections and other key factors

The final report is intended to reach specific audiences with targeted messages:

| Audiences           | Audience Member                      | Main Messages  |
|---------------------|--------------------------------------|--|
| Primary Audiences   | New investors in geothermal projects | <ul style="list-style-type: none"> <li>▪ Financing geothermal projects relies on the <b>same principles</b> as other types of renewable energy project finance</li> <li>▪ Aspects of project finance must reflect the <b>unique risk profile</b> associated with geothermal, relative to other RE resources</li> <li>▪ A <b>variety of finance structures are available</b> to meet the needs of project partners</li> <li>▪ Evolving project finance structures <b>can be replicated</b></li> </ul> |
|                     | Developers                           | <ul style="list-style-type: none"> <li>▪ A variety of finance structures are available to meet the needs of project partners</li> <li>▪ Developers should consider both their own goals (and resources) and the needs of investors early in the project development process</li> <li>▪ Evolving project finance structures can be replicated</li> </ul>  |
| Secondary Audiences | DOE Program Managers                 | <ul style="list-style-type: none"> <li>▪ Barriers to financing: what are they and how are they being overcome</li> <li>▪ Main financing models: what are they and how do they work</li> <li>▪ Key assumptions for project financing that can be used in modeling (e.g., target rate of return)</li> <li>▪ Evolving project finance structures can be replicated</li> </ul>   |
|                     | Offtakers and Regulators             | <ul style="list-style-type: none"> <li>▪ Financing geothermal projects relies on the same principles as other types of energy project finance</li> <li>▪ There are different types of investors interested in financing geothermal than in other renewable energy technologies</li> <li>▪ Evolving project finance structures can be replicated</li> </ul>   |