



## Geothermal Regulatory Roadmap

Project Officer: Jay Nathwani  
Total Project Funding: \$2.56M  
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Track: Policy and Regulatory Analysis

## Challenge

- The GTP Blue Ribbon Panel Report<sup>1</sup> stated a need for a more streamlined geothermal permitting process.
- Geothermal industry stakeholders have identified the permitting process as one of the most significant barriers to geothermal power project development.
- Potential bottlenecks in the permitting process increase the cost and financial risk of a project. The impact of a single permitting delay may be small, but the cumulative impact of multiple, often independent, and sometimes conflicting regulations on geothermal power development projects can hinder new projects, or make them non-commercial.
- Other subsurface developers, notably oil and gas, appear to have a far more efficient regulatory and permitting process than geothermal.
- On Mar 22, 2012 , President Obama signs Executive Order - Improving Performance of Federal Permitting and Review of Infrastructure Projects

## GTO Goals

### Accelerate near-term hydrothermal growth by:

- Lowering risks and costs of development and exploration
- Lowering levelized cost of electricity (LCOE) to 6 ¢/kWh by 2020
- Accelerating development of 30 GWe of undiscovered hydrothermal resources



<sup>1</sup>Geothermal Technologies Program Blue Ribbon Panel Recommendations, Sponsored by United States Department of Energy Office of Energy Efficiency and Renewable Energy (June 17, 2011)

## Knowledge Gaps

- Though some states have guidebooks for geothermal permitting, no document had the entire permitting process outlined.
- There have been anecdotal reports of permitting issues, a collection of real permitting data is needed to support change.
- Understanding best practices –
  - What has been effective in other industries, such as oil and gas and mining and other renewables, that could be adapted to geothermal?
  - What has been effective in geothermal in some areas that could be expanded into additional areas?

## Objectives

- To develop the permitting roadmap for geothermal power projects at the federal, state and local level to understand what the current process looks like;
- To convene industry stakeholders, both agencies and industry, involved in the permitting process to validate the process and identify potential bottlenecks and inefficiencies; and
- To work with all stakeholders to optimize and streamline the regulatory process to the benefit of all.

## Who's on First?

Agencies are very good at what they do, but aren't always aware of what other agencies do.

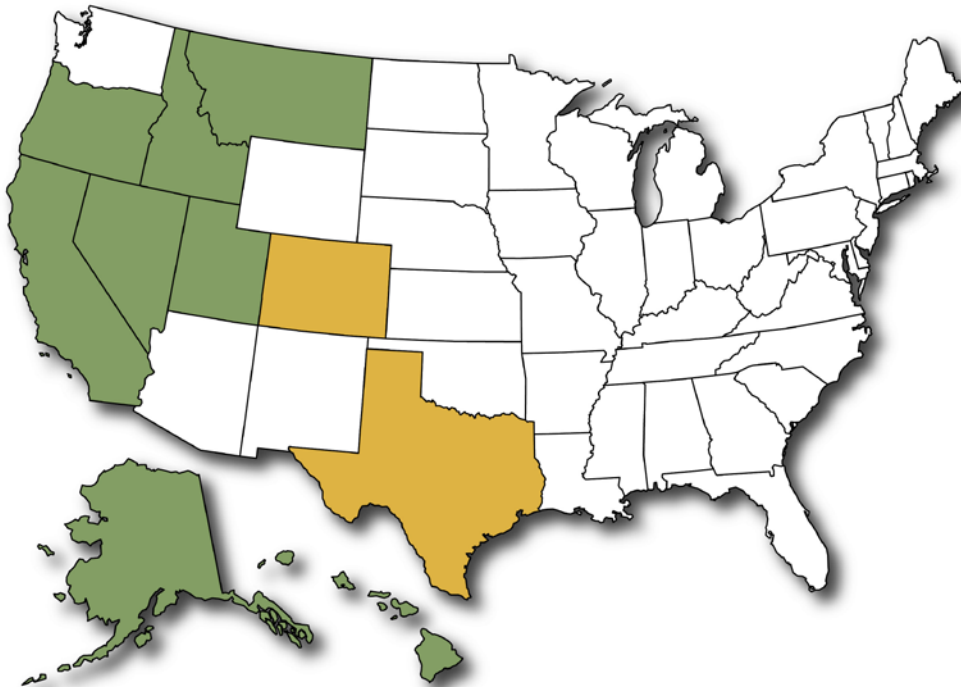


<sup>1</sup>Geothermal Technologies Program Blue Ribbon Panel Recommendations, Sponsored by United States Department of Energy Office of Energy Efficiency and Renewable Energy (June 17, 2011)

## FY12 Scope

Document the regulatory process for geothermal development for:

- Federal and 8 states (green): California, Nevada, Hawaii, Oregon, Utah, Idaho, Alaska, Montana.
- Meet with state agencies and industry to identify concerns



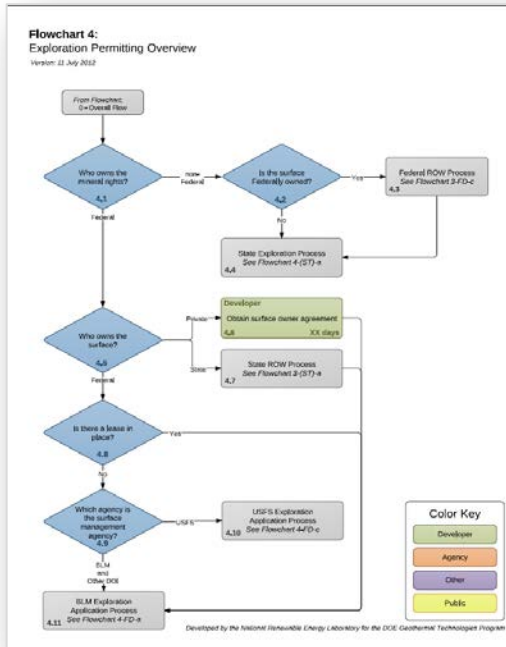
## FY13 Scope

- 2 additional states (gold): Colorado, Texas
- Develop database of geothermal NEPA documents
- Work with industry and agencies on implementing collected recommendations

## Intended Outcomes

- Assembling industry and agencies helps identify issues, concerns, overlaps and unknowns prior to future development
- Roadmap vetted with industry and agencies will provide more certainty for future project developers and investors
- Identification of issues and concerns in FY12 directs future analysis for potential changes in legislation and rulemaking.
- Streamlined permitting will reduce time and cost of geothermal development and financing costs.
- Reduced time and cost may lead to increased deployment of geothermal.

## PART 1: Develop Regulatory Roadmap



### Actions:

- Research permitting regulations to develop first draft of flowcharts and supporting written documents
- Interact with agency personnel via phone and OpenEI for initial review of documents
- Convene key permitting agency officials, industry personnel and stakeholders to review and comment on the draft documents
- Integrate comments and updates into regulatory roadmap documents

### Goals:

- Enhance transparency and understanding by all stakeholders involved in the permitting process
- Facilitate communication between agencies
- Save agencies time in explaining permitting process to industry and to its own personnel
- Help in training new staff and in documenting procedures
- Serve as a model for states that have yet to develop geothermal permitting regulations
- Provide a living document for maintaining and communicating permitting processes, and for making documents available.

“The less people know,  
the more people yell.”

-Seth Godin  
American entrepreneur,  
author and public speaker

## FY12 Project Schedule

Flowcharts	April				May				June				July				August				September							
Federal	█	█	█	█	█	█	█	█																				
California									█	█	█	█																
Nevada													█	█	█	█												
Hawaii													█	█	█	█												
Alaska														█	█	█	█	█	█	█								
Idaho															█	█	█	█	█	█								
Utah																	█	█	█	█	█	█						
Oregon																		█	█	█	█	█						
Montana																					█	█	█	█				
GRC Workshop																												█

## OpenEI (Open Energy Information)

### History

- Gives public access a collaborative, knowledge-sharing platform
- Provides free and open access to energy-related data, models, tools, and information
- Developed in 2009 by the National Renewable Energy Laboratory
- Sponsored by the U.S. Department of Energy in support of the White House's Open Government Initiative

### Wiki Platform

- Utilizes same underlying technology as Wikipedia
- Enables users to view, edit, add and download, data – all for free
- Allows the assignment of queryable properties via semantic links
- Creates relationships automatically between pages
- Permits querying and exporting of data, similar to a database, in universal formats such as RDF and CSV
- Includes a variety of data display formats including maps, charts, graphs, and timelines

### Data Quality

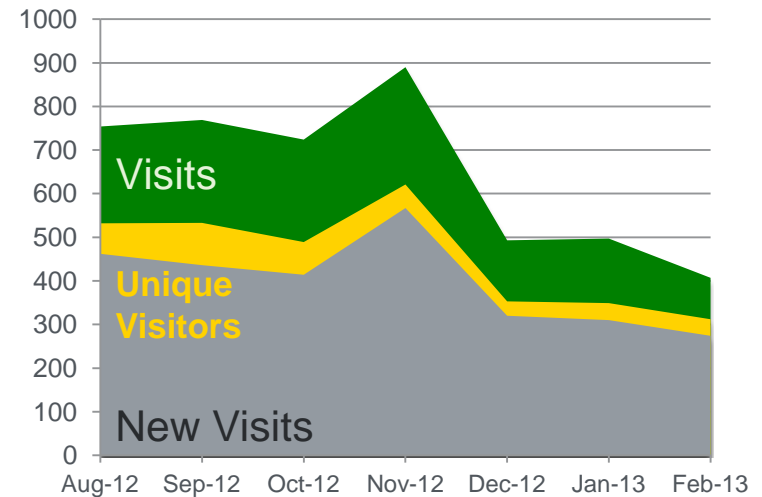
- Forms often requires references be cited
- Pages can be “watched” for changes, updates
- User community can help expand the data and increase accuracy

### OpenEI Statistics \*

- 1,239,000+ visitors from 200+ countries
- **Over 840 datasets**
- Creation of **over 56,000 content pages**
- Upload of over 7,500 images and files
- More than 620,000 contributor actions
- Over 939,000 unique
- visitors
- More than 5,000 registered users
- Over 8,000 Twitter followers
- More than 600 Facebook likes
- **Over 19 million RDF triples**

*\*per Google Analytics as of March 5, 2013*

### GRR OpenEI Google Analytics



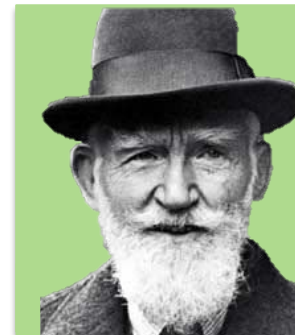
## PART 2: Identify existing concerns in regulatory authority

### Actions:

- Convene key agency representatives (at all levels) and stakeholders to identify areas of concern, issues, overlaps, differences in implementation, and difficulties in the permitting process
- Engage with all stakeholders, including NGOs, in developing optimal solutions
- Facilitate collaboration among agencies to overcome bottlenecks and to optimize the regulatory process

### Goals:

- Assemble a list of the biggest concerns from industry and agency to help guide future analyses
- Brainstorm potential solutions with all stakeholders
- Identify the potential show-stoppers in permitting



“The single biggest problem in communication is the illusion that it has taken place.”

-George Bernard Shaw



## PART 3: Collect Data and Conduct Analyses

“In God we trust.  
All others must  
bring data.”

– W. Edwards Deming,  
statistician, professor, author,  
lecturer, and consultant



### Actions:

- Based on feedback received from industry, agencies and other stakeholders at the state-level meetings, develop targeted analyses to better understand permitting barriers.
- Identify current best practices in a variety of industries that could be adopted by the geothermal industry. Collect resources, data and industry interviews to develop analytical reports outlining these best practices.
- Facilitate collaboration among agencies to discuss the analyses and potential implementation of these best practices.

### Goals:

- Provide the data and background analysis needed to inform policymakers and stakeholders in developing new geothermal regulations, policies and rules.

# Accomplishments, Results and Progress

Original Planned Milestone/ Technical Accomplishment	Actual Milestone/ Technical Accomplishment	Date Completed	Comments
Complete roadmapping for regulations at the federal level and in 8 western states	Roadmapping for federal agencies and 8 states (over 250 flowcharts)	9/30/2012	Target originally included county-level flowcharts; incorporated pointers to county permits
	Post online for public access	9/30/2012	Available at: <i>en.openei.org/wiki/GRR</i>
	Industry and agency review and feedback	9/30/2012	Held 15 federal and state meetings in 6 months
	Present results	10/2/2012	At all-day side meeting GRC, and booth at GEA tradeshow Well-attended: >100 attendees
	Legal review	12/31/2012	Original Target: 9/30/2012
	Quarterly Meetings	9/30/2012	Well-attended in person and via phone/webinar in D.C.

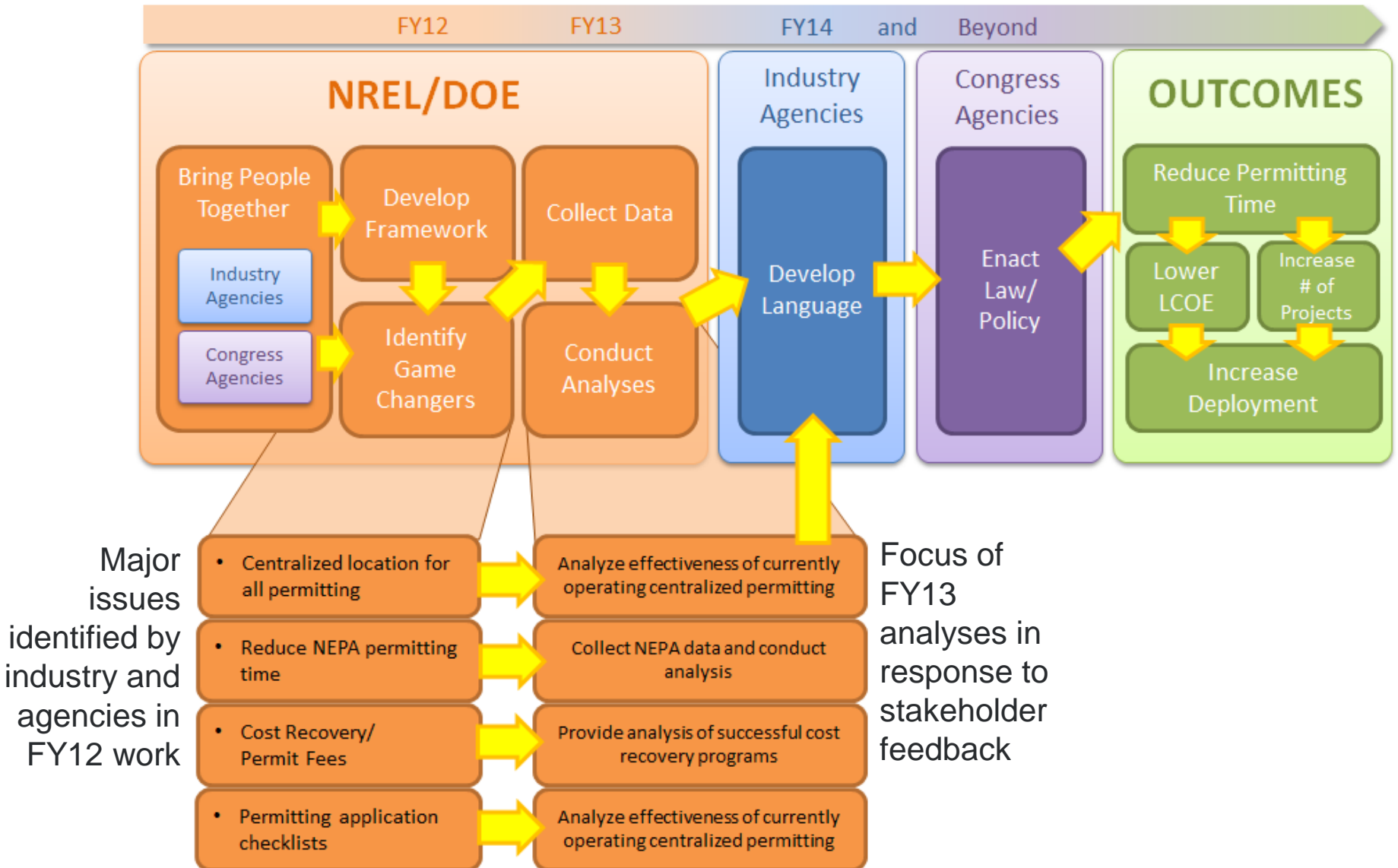


## Roadmap Development Process

- “I learned new things coming to these meetings – every project teaches me something new” (industry)
- “The objective of creating this ‘roadmap’ is absolutely necessary. I would encourage you to continue the project.” (industry)
- “Flowcharts are very clear and accurate. Process end-product will add value to a variety of audiences.” (agency)
- “Keep up the momentum to see and cross the finish line – really need this tool!” (industry)
- “It was great meeting with other agencies to understand their processes and priorities” (agency)
- “I can’t wait to use these flowcharts to train my newer employees!” (multiple agencies)
- It would be great to have these developed for other renewables, too! (industry, agencies)

## Online tool

- “Please get this website out to as many agencies as possible for them to link directly to your websites – it’s a great tool!” (agency)
- “Contact GRC to get 5-10 min. in opening session to describe these products on OpenEI” (industry)
- “Flowchart detail and layout is very good, but the number of flowcharts is overwhelming. Developing into a web application would improve usability, particularly if it’s used to track schedules and accountability.” (industry)



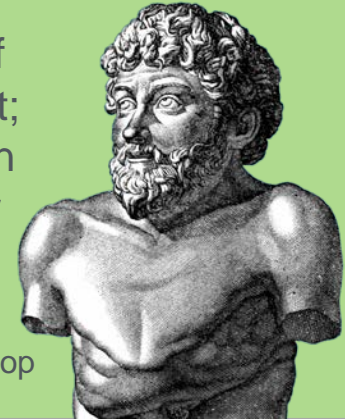
Milestone	Status	Expected Completion Date
2 Additional States	Colorado	March 15, 2013
	Texas	June 30, 2013
4 Additional States	Washington, Wyoming, Arizona, New Mexico	FY14
Improved User-Friendly Interface	Mock up Functional Requirements Document Demo Interface Final Interface	2/28/2013
NEPA Database 150 BLM/USFS 10 DOE 100 oil and gas (for comparison)	Framework developed	2/28/2013
	Population has started	4/30/2013
	Interface Mock-up, functional requirements Coding	2/28/2013 4/30/2013
Analyses Categorical Exclusions Centralized Permitting Cost Recovery	Literature and Data collection started Literature collection started Not started	12/30/2013
Quarterly Meetings (including GRC)	In Progress	10/2//2012

## FY14 Directions

- Develop more user-friendly interface
- Use input from stakeholders in directing analyses; Industry and agencies use analyses in developing future regulations, policies and rules.

“Affairs are easier of entrance than of exit; and it is but common prudence to see our way out before we venture in.”

-Aesop



OpenEI | OPENENERGYINFO



## Long-Term Stretch Goals

- Develop an online permitting tool for submission of all federal permits, and tracking of all permits through the system.
- Identify a champion of this project to carry it forward

## Outside Actions

- Use of these flowcharts by federal and state agencies as models in developing geothermal regulations in new areas
- Adoption of the roadmap (via OpenEI) by stakeholders to update and maintain the living nature of the document
- Potential expansion of roadmap to additional technologies (BLM, White House Rapid Response Teams)

<b>Technical Approach</b>	<ul style="list-style-type: none"> <li>• Research regulations and develop roadmap</li> <li>• Engage industry repeatedly throughout process for feedback and input</li> <li>• Use feedback as the basis of future analyses</li> <li>• Develop an exit strategy for the end of funding - OpenEI</li> </ul>
<b>Accomplishments, Results and Progress</b>	<ul style="list-style-type: none"> <li>• Developed and vetted with industry and agencies, over 300 flowcharts at the federal and state level for 9 states</li> <li>• Addressed key county-level permits within the roadmap</li> <li>• Developed online access to roadmap and provided training and tutorials for agencies, industry and others for future maintenance of the roadmap</li> </ul>
<b>Project Management/Coordination</b>	<ul style="list-style-type: none"> <li>• Develop timeline for roadmap development and meetings with industry –</li> <li>• Adhered to agenda an</li> <li>• Managed coordination of input from countless federal and state agencies, developers and permitting contractors</li> <li>• Completed FY12 project deliverables on time and within budget, despite condensed timeframe</li> <li>• Published on OpenEI - encouraging adoption by stakeholders so the document will live on when funding is discontinued</li> </ul>
<b>Impact of Research</b>	<ul style="list-style-type: none"> <li>• Project has been well-received by industry and agencies who have urged us to continue with the project</li> <li>• State meetings have been well attended, and GRC summary meeting had well over 100 attendees</li> <li>• Meetings have highlighted best practices, and areas of overlap that are now being addressed</li> <li>• Agencies have asked to use the roadmap as guidance for developers and as training materials for new employees</li> <li>• Highlighted areas of interest in FY12 is directing FY13 analysis</li> </ul>

Planned Start Date	Planned End Date	Actual Start Date	Current End Date
March 1, 2012	September 30, 2013	March 1, 2012	September 30, 2013

Federal Share	Cost Share	Planned Expenses to Date	Actual Expenses to Date	Value of Work Completed to Date	Funding needed to Complete Work
\$2,540,000	\$0	\$1,792,788	\$1,778,767	\$1,651,000	\$761,233

Project results are made possible by active partnerships and contributions from many organizations, companies, and individuals including:

- Bureau of Land Management
- U.S. Fish and Wildlife
- Multiple state organizations from Alaska, California, Hawaii, Idaho, Nevada, Oregon, Utah, Colorado and Montana
- The Geothermal Energy Association and individual member companies