Geothermal Regulatory Analysis

Project Officer: Joshua Mengers

Total Project Funding: $2.56M

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National Renewable Energy Laboratory

Track 1: Systems Analysis & LowTemp

Relevance/Impact of Research

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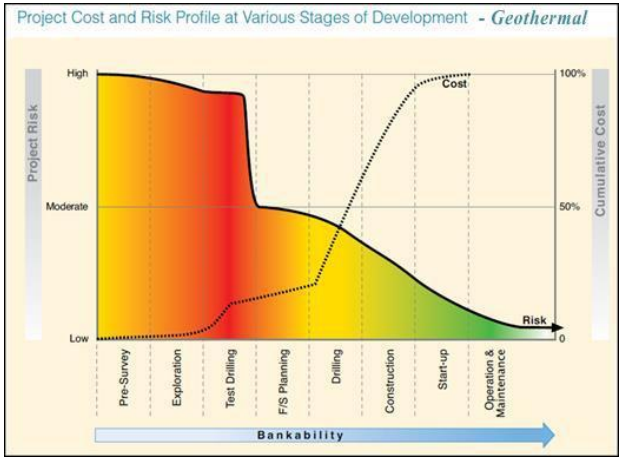
Challenges and Barriers

- The GTP Blue Ribbon Panel Report[1] 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 unprofitable.
- 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



[1]*Geothermal Technologies Program Blue Ribbon Panel Recommendations*, Sponsored by United States Department of Energy Office of Energy Efficiency and Renewable Energy (June 17, 2011)

Relevance/Impact of Research

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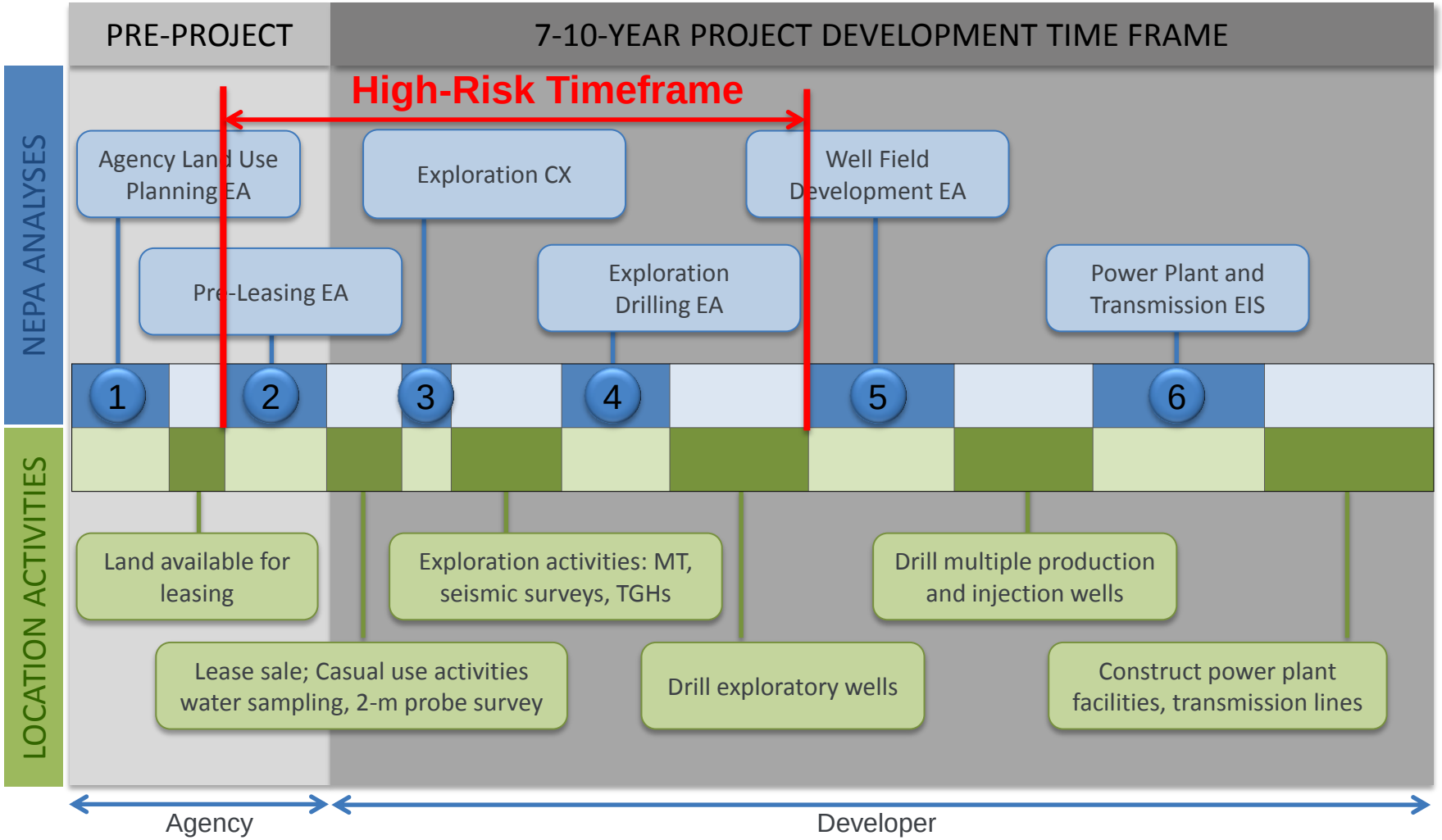
Geothermal development project can go through as many as six NEPA analyses, with interim activities providing the data required for future permit applications.



This is a graphic is for illustrative purposes only. Not all projects will go through the all of these phases, and the order may change.

Relevance/Impact of Research

Knowledge Gaps

- Though some states have guidebooks for geothermal permitting, no document had the entire permitting and regulatory process outlined from land use planning through well abandonment for federal and state permitting requirements.
- 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

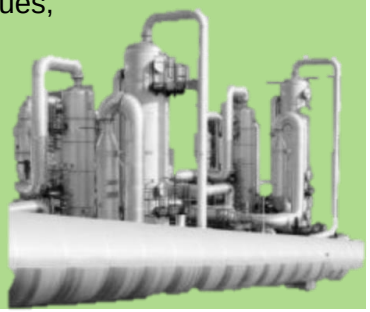
- To develop the permitting roadmap for geothermal power projects at the federal and state level to understand the current process;
- To convene industry stakeholders involved in the permitting process to identify potential regulatory barriers, inefficiencies, and best practices;
- To develop work with geothermal stakeholders to develop analysis that could support the optimization and streamlining of permitting.

Who's on First?

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

"With no permit issues, a geothermal project could be developed (from start of exploration to power online) in 3-3.5 years"

-Industry



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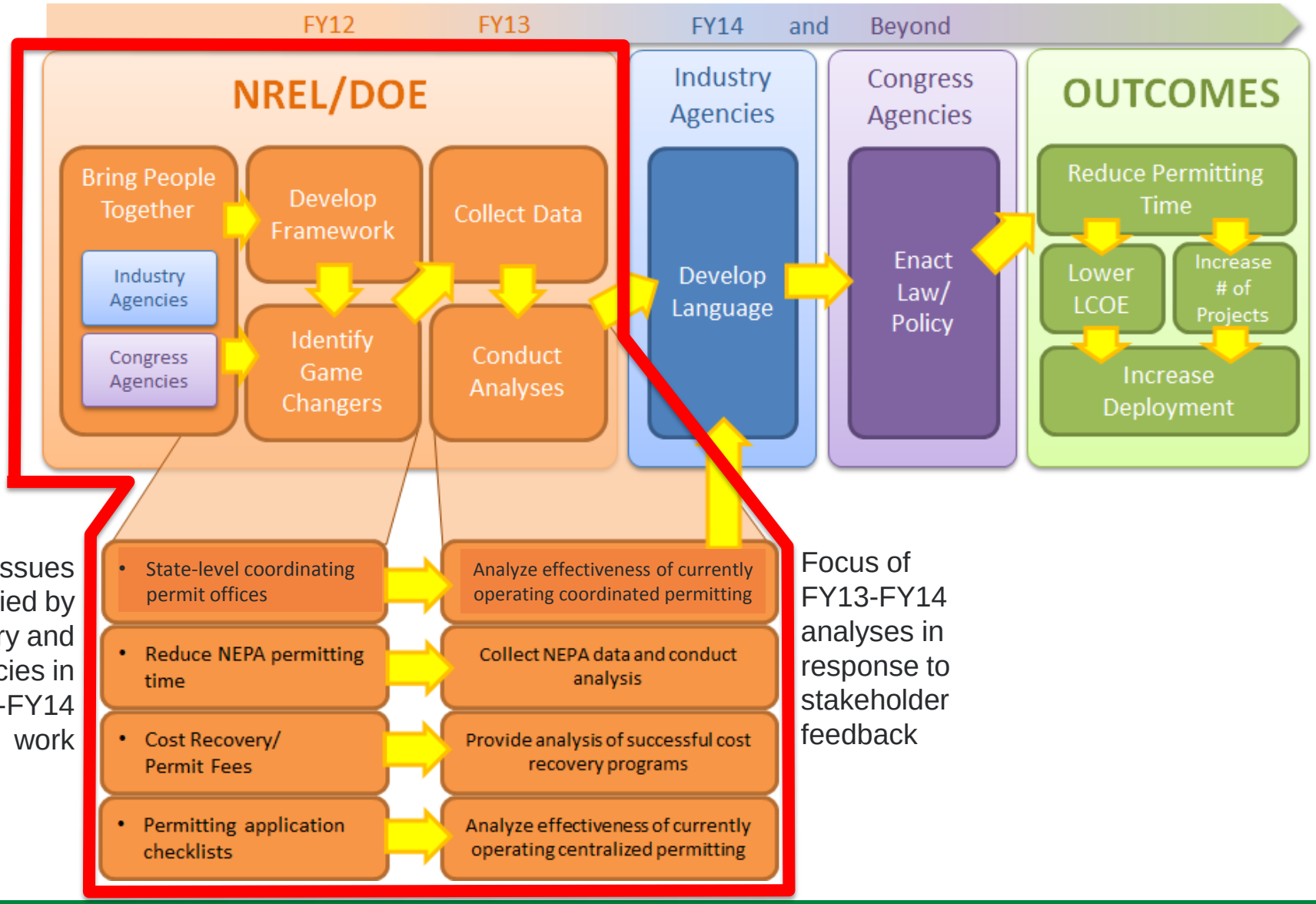
Technical Approach



Major issues identified by industry and agencies in FY12-FY14 work

Focus of FY13-FY14 analyses in response to stakeholder feedback

Technical Approach

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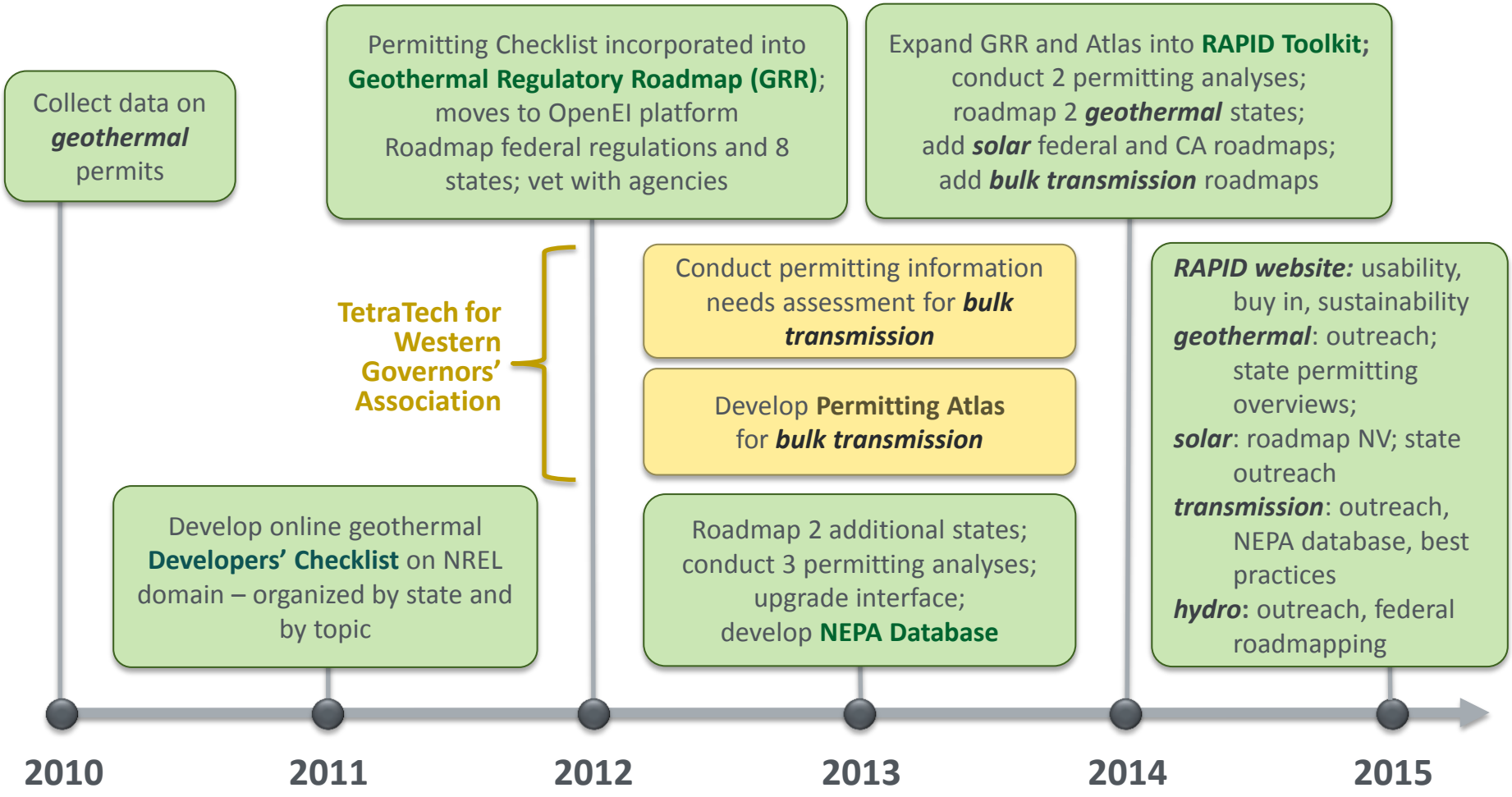
	Actions	Goals
STEP 1: Develop Regulatory Roadmap	• Research permitting regulations to develop first draft of flowcharts and supporting written documents • Interact with agency personnel via phone and e-mail for initial review of documents • Convene key permitting agency officials, industry personnel and stakeholders to review and comment on the draft documents • Integrate comments and updates into regulatory roadmap documents • Review with regulatory attorneys (subcontracted) for final accuracy and possible omissions.	• Enhance transparency and understanding by stakeholders involved in the geothermal permitting process • **Facilitate communication** between regulatory 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.
STEP 2: Identify Existing Concerns	• 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 barriers and to optimize the regulatory process	• Assemble a list of the biggest concerns from industry and agency to help guide future analyses *http://en.openei.org/community/files/iii-grr_at_grc_-_issue_identified.pdf* • Brainstorm potential solutions with all stakeholders • **Identify the potential game changers** in permitting
STEP 3: Gather Data and Conduct Analysis	• 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.	• Provide the data and background analysis needed to **inform policymakers and stakeholders** in developing new geothermal regulations, policies and rules.

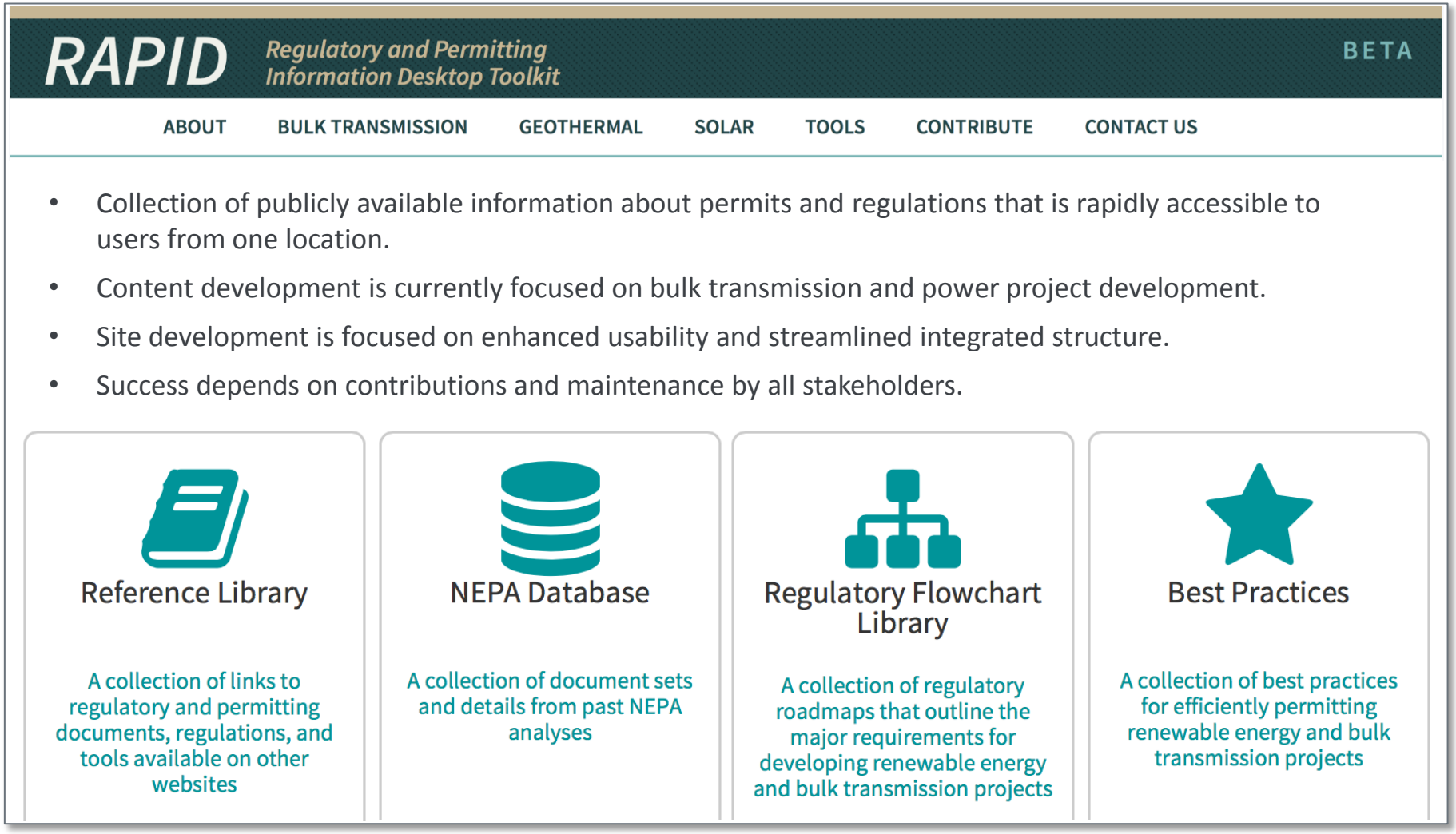
Project History



OpenEI: *Open Energy Information website, developed in 2008 as part of the open government initiative (http://en.openei.org)*
RAPID Toolkit: ***R****egulatory* ***a****nd* ***P****ermitting* ***I****nformation* ***D****esktop Toolkit (http://en.openei.org/wiki/RAPID)*

Technical Approach

http://en.openei.org/wiki/RAPID



Library includes links to and metadata for over 2,500 geothermal permitting references

catalogs documents and metadata for over 150 geothermal NEPA-related analyses

Includes over 500 roadmaps for federal and state regulatory processes for 12 western states

Products include 5 best practices online, 5 published papers, and 4 white papers

Feedback

http://en.openei.org/wiki/RAPID

Website Usability Report

"Users consistently validate the potential value of a comprehensive resource on permitting renewable energy projects.

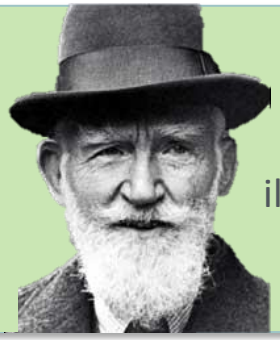
- **Federal and state permitting agencies** are especially excited about maintaining a central reference for processes, documents, and best practices as agency staff change over time and over the course of a project. They see the RAPID Toolkit as an invaluable resource to help improve the permitting process in partnership with other jurisdictional agencies.
- **Industry stakeholders** see value in having a reference library to understand processes in different states, access templates and sample documents to follow, and access key contacts within agencies. "

RAPID Toolkit Website Review (March 2015)

http://en.openei.org/wiki/RAPID

Benefits

- Enhance transparency and understanding by all stakeholders involved in the permitting process
- Facilitate communication among agencies
- Save agencies time in explaining permitting process to industry and to its own personnel
- Help in training new staff and in documenting procedures



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

-George Bernard Shaw

- Help to provide consistency among an agency's multiple offices
- Serve as a model for jurisdictions that have yet to develop permitting regulations
- Provide an online forum for maintaining and communicating permitting processes and for making documents available
- Provide the data and background analysis needed to inform policymakers and stakeholders in developing new regulations, policies, and rules
- Provide service to agencies in times of continually decreasing budgets
- Decrease project risk by reducing delays and costs and eliminating uncertainties
- Provide greater assurance to stakeholders that the project will be conducted in a technically, environmentally, and socially responsible fashion.

Success Stories

Reducing Duplication

An Example of Impact in Nevada

Concern: Water monitoring was required at the federal, state, and locals levels - different sets of design and reporting requirements

Action: Agencies agreed to coordinate: create one set of requirements incorporating needs of all agencies; develop one reporting form; establish a single agency as point of contact

Outcomes: Saves developers time and effort and makes agencies more aware of the concerns and requirements of other jurisdictions; increases communication among agencies.

Providing Certainty in Uncharted Territory

Development of the Regulatory Roadmap for Colorado

Concern: Because no geothermal power had yet been developed in Colorado, investors were worried about funding a project that would be the first to test the permitting landscape in this state

Action: Worked with local, state, and federal agencies to roadmap the regulatory and permitting process for geothermal development in Colorado

Outcomes: Provided more confidence to investors; state agencies used for training employees in new regulations.

Facilitating Communication

Providing Clarity Among Agencies in California

Concern: Understanding authority in California is difficult; jurisdictional authority changes from county to county

Action: Development of roadmaps and meetings with agencies/industry. The roadmap outlines nuances, leading developers/agencies to better understand permitting in California

Outcomes: Roadmaps indicating appropriate contacts for each permit by jurisdiction. Roadmaps are helpful not only to developers, but also to agency personnel when navigating complex permitting structures.

Providing Guidance for New States

Development of Geothermal Regulations in New Mexico

Concern: In 2014, New Mexico was in the midst of developing geothermal regulations and determining the division of state authority among agencies

Action: The RAPID Team met with NM agency personnel to review the current NM regulations and information on geothermal regulations in other states

Outcomes: The information in the RAPID Toolkit served as a valuable resource to NM state agency personnel working to develop regulations to understand how geothermal was managed in other states and what might work best for NM.

Identified Game Changers

Increase Use of Categorical Exclusions (CX)

- Categorical Exclusions are used for actions that the agency or Congress has determined does not have a significant effect on the quality of the human environment (individually or cumulatively).
- A CX does not require NEPA analysis. A CX can be established administratively through agency rulemaking or legislatively through congressional action.
- CX processing times average 2 months – compared to 10 months for an Environmental Analysis

Progress:

- Recent legislation proposed by Senator Dean Heller's office, citing NREL analysis from this project (legislative option)

  http://www.heller.senate.gov/public/index.cfm/2015/2/heller-seeks-to-simplify-geothermal-exploration-review-process
- Discussions with BLM to define a class of geothermal wells (resource confirmation) that could be CX'ed through agency rulemaking)

For more information, see: project published papers, presentations, and posters

Workflow Management System

- NEPA is a process – no one thing causes delays in all projects
- ***Need to address process efficiencies***
- Well designed and implemented workflow management software tools:
  - Reduce costs for processors (i.e. agencies) by 30-40%
  - Increase compliance by 40-50%
  - Reduce errors and process timeframes
- Poorly designed/implemented systems:
  - Are overly costly and time-consuming to develop
    Effective systems often use agile development – implementing useful features one at a time so that the tool is immediately useful
  - Unjustifiable deployment and maintenance costs
    Effective systems are designed to reduce overall company costs – so costs for the software are offset by realized savings
  - Overly complicated processes
    Effective systems should reduce work effort, be intuitive, and need minimal (if any) training

For more information, see: project white paper and presentation

Centralized Geothermal Permit Office

- Have all the -ists in the central office
- Keep a staff trained up on geothermal and not be so diluted (e.g. at field offices, one person handles all: sand and gravel, oil and gas, mining, geothermal, etc.)
- Potentially have a staff from each agency (e.g. USFS, BLM, etc.) for easier coordination and to save on costs.

Benefits include:

- Create efficiencies by repetition and development of expertise
- Allow for efficient use of BLM resources by reducing duplication of staff capabilities
  Instead of training 1 person in 5 areas (mining, geo, petro, etc.), train few on geothermal only.
- Less competition for staff's time
  if staff at centralized office were dedicated to geothermal permitting

Examples:

- BLM oil and gas pilot offices
  Consultation time frames went from 7-9 months down to weeks and days
- BLM solar and wind pre-application process (IM 2011-061,062)

No specific project analysis yet conducted

Non-Technical Accomplishments

Awards	• Awarded the GEA Outstanding Achievement Award (12/2013)
Recognition	• Recognized in a White House Report to President Obama as being a leader in efforts to streamline permitting for federal infrastructure projects.
Adoption	• Agencies have asked to use the roadmap as guidance for developers and as training materials for new employees. • White House Implementation Plan Team has requested inclusion of the roadmap in the Federal Permitting Dashboard
Expansion	• Geothermal efforts have been leveraged in the expansion to the RAPID Toolkit – a comprehensive tool (roadmap, library, NEPA database, best practices) for multiple technologies including solar (Solar Energy Technologies Office), hydropower (Water Power Program), and bulk transmission (Western Governors Association) due in large part to GTO's innovation and development of the Geothermal Regulatory Roadmap. Wind may be added in FY16.
Requests	• From BLM to work with industry to develop a new category of wells (i.e. resource confirmation wells) that would allow developers to confirm the resource, with minimal environmental impacts, to allow for a potential categorical exclusion
Legislative Impact	• Analysis has provided background data and information cited in recent federal legislation that proposes new categorical exclusions for geothermal development projects (Geothermal Exploration Opportunity (GEO) Act of 2015). **A KEY OBJECTIVE OF THE PROJECT.**

Challenges Faced	
Direct Impact	DOE/NREL does not have the ability to directly change or streamline the current regulatory process for geothermal exploration and power production. These changes require action from policymakers and regulators. • The regulatory roadmap and associated analysis can provide assistance in strategies to navigate the current process (“best practices”) and identify the regulatory barriers that may require streamlining.
Collaboration	The regulatory process involves multiple agencies at the federal, state and local level. Success of the RAPID toolkit and permit streamlining efforts will require continued cooperation, collaboration, and maintenance support.

Future Directions

FY15 …

- Improvements to the website will continue through FY15 based on feedback from website monitoring and testing and from interviews with over 60 users.
- All other activities for FY15 have been completed.

… and Beyond

With funding from GTO:

- Provide maintenance of the RAPID Toolkit, including:
  1. Use subject matter experts to monitor and curate content on the RAPID Toolkit website.
  2. Maintain the functionality, usability, and security of the site and provide regular reports on usage metrics and trends.
  3. Engage agency and industry stakeholders through ongoing collaboration and outreach to ensure relevance and value of RAPID.
  4. Continue to raise awareness as agency and industry personnel change over time.
- Provide support to/work with agencies in implementing the listed game changes *(if funded to do so).*

With funding from other sources (proposed):

- Web improvements based on 2015 Usability Report (and future feedback from users).
- Expand roadmap library to include additional technologies (hydropower, solar, maybe wind).
- Identify additional best practices; conduct analyses for use by others in implementing these strategies.
- Build out NEPA Database to support ease in referencing mitigation strategies and resource studies.

Summary Slide

"To make a message stick in the head of a future consumer, you need to deliver the message seven times, using seven different channels."

- Jeroen De Flander
International Strategy Execution Expert

- Though DOE/NREL **does not have the ability** to directly change or streamline the current regulatory process for geothermal exploration and power production, **successes include**:
  - Development of Geothermal RAPID Toolkit for 12 western states
  - Encouraging "soft" changes (as outlined in "Success Stories" slide)
  - Identifying barriers and key game changers, and conducting analyses to better understand these concepts.
  - New geothermal categorical exclusions proposed, citing these analyses
  - Adoption of the tool by other technologies
- The project has **spurred large stakeholder momentum** – facilitating discussions and collaboration among those who can affect change.
  - Project has been successful due to the participation and cooperation from key agency personnel
  - It is important to continue this motivation – working to support agencies as changes are implemented and kinks are ironed out in each process.
- **Continued maintenance is key** to future success of this tool
  - Monitor and curate content
  - Maintain the functionality, usability, and security of the site
  - Engage agency and industry stakeholders through ongoing collaboration and outreach to ensure relevance and value of RAPID
  - Continue to raise awareness as agency and industry personnel change over time.