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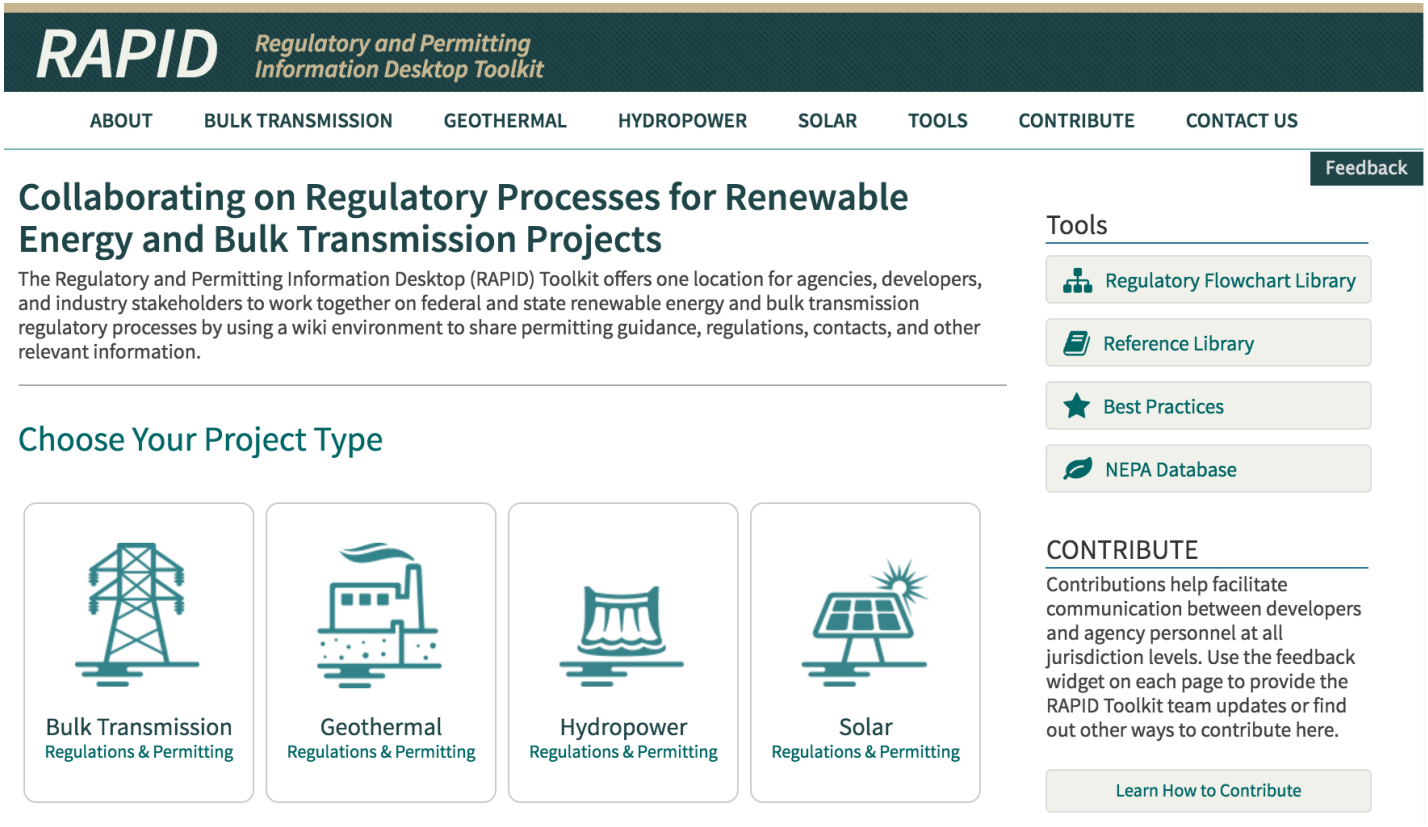

Hydropower Regulatory and Permitting Information Desktop (RAPID) Toolkit

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Project Overview

The Objective

- Develop an **online hydropower regulatory roadmap and related tools** for conventional hydro, micro hydro, and pumped storage development projects, **describing federal and state permitting and regulatory process.**
- The toolkit is aimed at regulatory agencies, consultants, project developers, the public, and any other party interested in learning more about the hydropower regulatory process.

The Challenge

- **Reduce the soft costs associated with hydropower development**.
- The goal of this project is to develop a product that increases transparency, decreases uncertainty, and reduces the time and cost associated with developing hydropower projects.

Subcontractors

EMPSi: Environmental Management and Planning Solutions, Inc.—Logistics FY15

Kearns & West —Logistics FY16

Herrick Solutions—Legal review

Telluride Energy/Western Small Hydropower Association—Small hydropower review

Next Generation Hydropower (HydroNEXT)

Optimization

- Optimize technical, environmental, and water-use efficiency of existing fleet
- **Collect and disseminate data on new and existing assets**
- Facilitate interagency collaboration to increase regulatory process efficiency
- Identify revenue streams for ancillary services

Growth

- Lower costs of hydropower components and civil works
- Increase power train efficiency for low-head, variable flow applications
- Facilitate mechanisms for testing and advancing new hydropower systems and components
- Reduce costs and deployment timelines of new PSH plants
- Prepare the incoming hydropower workforce

Sustainability

- Design new hydropower systems that minimize or avoid environmental impacts
- Support development of new fish passage technologies and approaches
- Develop technologies, tools, and strategies to evaluate and address environmental impacts
- Increase resilience to climate change

Next Generation Hydropower (HydroNEXT)

Growth

- Reduce costs and deployment timelines of new PSH plants
- Prepare the incoming hydropower workforce

Optimization

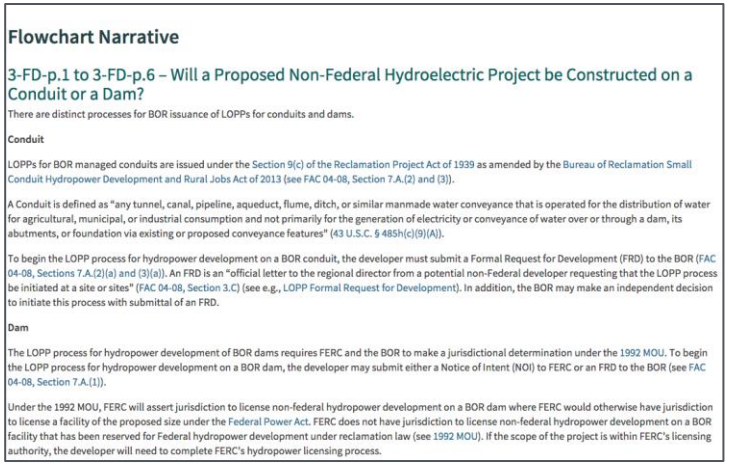
- Facilitate interagency collaboration to increase regulatory process efficiency

The Impact

- Increase transparency and understanding in the regulatory process via online interactive regulatory roadmap and related tools explaining the regulatory process
- Develop regulatory case studies and best practices that can assist in future hydropower licensing and permitting
- Train new industry employees and regulatory agency personnel
- Increase communication between regulatory agencies through a series of meetings and workshops.

Technical Approach

- Work with federal regulatory agencies and industry stakeholders to gain an understanding of need for the RAPID Toolkit and present how the tool has been used by other technologies
- Develop hydropower search capabilities on the website
- Research regulatory process and develop draft material based on publicly available information
- Review draft material with regulatory agencies and industry, including phone, email, and in-person workshops. Gain input on current barriers and best practices for hydropower permitting
- Review by legal subcontractor
- Analyze barriers and best practices for hydropower permitting to develop case studies or other publications to assist hydropower industry stakeholders.



Flowchart Narrative

3-FD-p.1 to 3-FD-p.6 – Will a Proposed Non-Federal Hydroelectric Project be Constructed on a Conduit or a Dam?

There are distinct processes for BOR issuance of LOPPs for conduits and dams.

Conduit

LOPPs for BOR managed conduits are issued under the Section 9(c) of the Reclamation Project Act of 1939 as amended by the Bureau of Reclamation Small Conduit Hydropower Development and Rural Jobs Act of 2013 (see FAC 04-08, Section 7.A.(2) and (3)).

A Conduit is defined as "any tunnel, canal, pipeline, aqueduct, flume, ditch, or similar manmade water conveyance that is operated for the distribution of water for agricultural, municipal, or industrial consumption and not primarily for the generation of electricity or conveyance of water over or through a dam, its abutments, or foundation via existing or proposed conveyance features" (43 U.S.C. § 485h(c)(9)(A)).

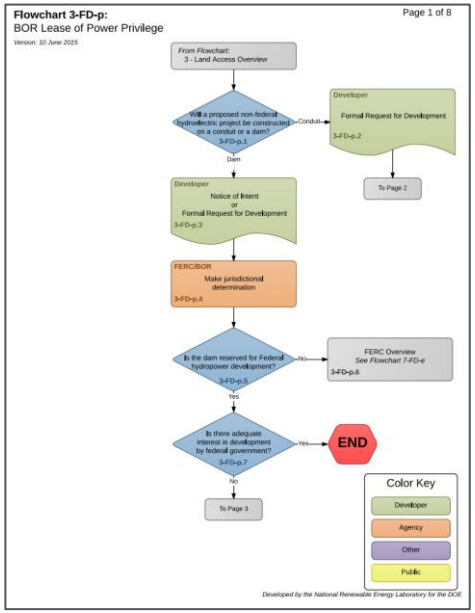
To begin the LOPP process for hydropower development on a BOR conduit, the developer must submit a Formal Request for Development (FRD) to the BOR (FAC 04-08, Sections 7.A.(2)(a) and (3)(a)). An FRD is an "official letter to the regional director from a potential non-Federal developer requesting that the LOPP process be initiated at a site or sites" (FAC 04-08, Section 3.C) (see e.g., LOPP Formal Request for Development). In addition, the BOR may make an independent decision to initiate this process with submittal of an FRD.

Dam

The LOPP process for hydropower development of BOR dams requires FERC and the BOR to make a jurisdictional determination under the 1992 MOU. To begin the LOPP process for hydropower development on a BOR dam, the developer may submit either a Notice of Intent (NOI) to FERC or an FRD to the BOR (see FAC 04-08, Section 7.A.(1)).

Under the 1992 MOU, FERC will assert jurisdiction to license non-federal hydropower development on a BOR dam where FERC would otherwise have jurisdiction to license a facility of the proposed size under the Federal Power Act. FERC does not have jurisdiction to license non-federal hydropower development on a BOR facility that has been reserved for Federal hydropower development under reclamation law (see 1992 MOU). If the scope of the project is within FERC's licensing authority, the developer will need to complete FERC's hydropower licensing process.

Best Practices



Technical Approach

Key Issue: Website Usability

After the initial version of the Hydropower RAPID Toolkit (including federal regulations and regulations for California and Vermont) was uploaded to the website, members of industry and agencies had concerns about navigation and usability of the website.

Solution: New User Interface

- National Renewable Energy Laboratory (NREL) staff utilized "Loop 11" and screen-sharing software to conduct beta-testing with regulators, consultants, the National Hydropower Association, and other industry stakeholders to gain a better understanding of how the industry views terminology and where users would expect to find information on the toolkit. General feedback on the user interface also was collected.
- NREL then utilized internal front-end web designers and back-end web developers to create a new user-friendly interface to navigate through the toolkit.

Federal Collaboration

Federal regulators from the Federal Inland Hydropower Working Group were brought together to review content developed for RAPID and provide feedback on the user interface, including:

- Federal Energy Regulatory Commission
- U.S. Army Corp of Engineers
- Bureau of Reclamation
- Fish and Wildlife Service
- National Oceanic and Atmospheric Administration Fisheries
- U.S. Forest Service
- National Park Service
- Bureau of Indian Affairs
- Bureau of Land Management.

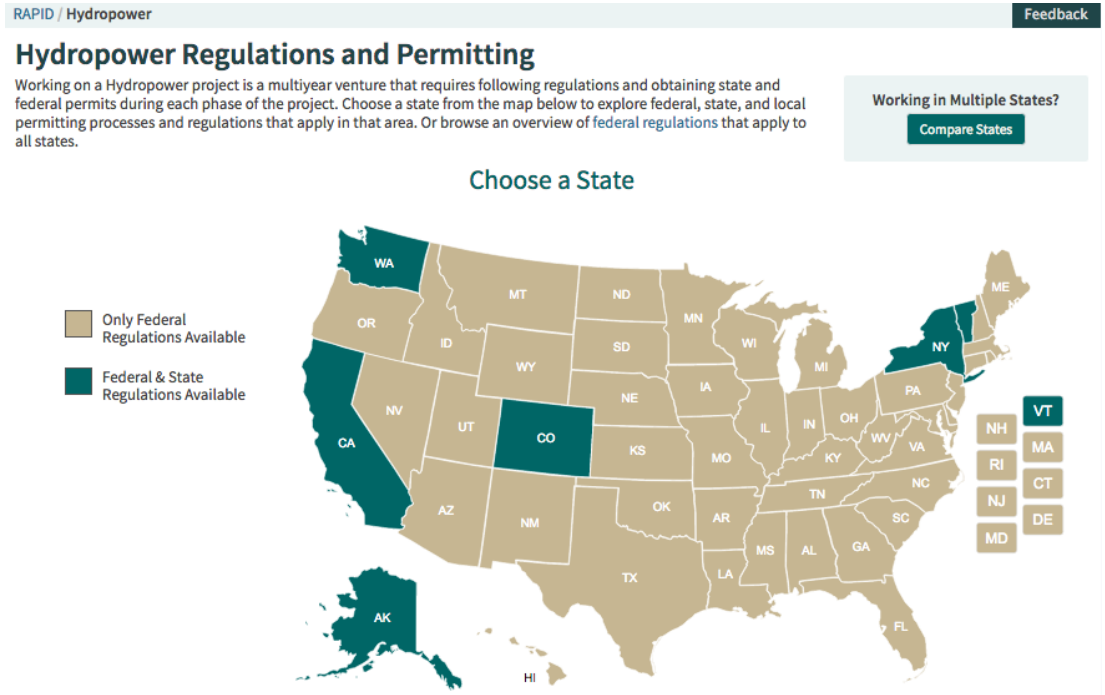
Awards

2016 NREL President's Award from Director Dr. Martin Keller

Accomplishments and Progress

Jurisdictions Roadmapped

- Federal
- Alaska
- Colorado
- California
- New York
- Vermont
- Washington



User Statistics

In the **first quarter** after launching the Hydropower RAPID Toolkit at HydroVision International 2016 (FY16 Q4), NREL estimates that **roughly 280 users entered the hydropower landing page 434 times, viewing a total of 1,800 pages of content**. This will serve as a baseline moving forward as we aim to increase use of the website in FY2017.

Project Plan & Schedule

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All milestones and deliverables met on time and on budget

Continue to maintain dialogue with all interested agencies and stakeholders including receiving and utilizing feedback from and training users in use and maintenance of the toolkit

Gain Hydropower Industry Buy-In

Roadmap federal regulations and two states; continue to meet with agencies and other stakeholders

Evaluate Hydropower Vision data for issues of concern in regulatory and permitting arena

- **Continue roadmapping individual states based on developed criteria (4 additional states).**
- **Evaluate regulatory best-practice component with stakeholders and work with stakeholders to populate best practices and case studies.**
- **Continue to develop RAPID Toolkit website for usability, including new user interface.**
- **Evaluate NEPA Database Component via Go-No Go (Determined No-Go).**

Maintain and curate RAPID website

2015 2016 2017 2018

Project Budget

Budget History					
FY2014		FY2015		FY2016	
DOE	Cost-Share	DOE	Cost-Share	DOE	Cost-Share
		$800K		$800K	

- NREL has kept the RAPID Toolkit project on budget throughout FY15 and FY16. NREL maintained a carryover percentage of roughly 25%–30% as requested by DOE.

- Entering FY17, NREL has exhausted $1,239.805k (77%) of the $1,600k in funding received for the project.

Research Integration & Collaboration

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Subcontractors

- EMPSi—Logistics FY15
- Kearns & West—Logistics FY16
- Herrick Solutions—Legal review
- Telluride Energy/Western Small Hydropower Association—Small hydropower review

Communications

- Created a quarterly e-newsletter to provide interested parties with frequent project updates
- Created promotional material, including business cards, bookmarks, and factsheets
- Held demonstration and launch events at HydroVision International and Water Week in Washington, D.C.
- Published two articles in *Hydro Review* (an introductory article in July 2015 and a follow-up article before the official launch in June 2016
- Posted project announcements and updates via NREL and DOE websites and social media platforms
- Began search engine optimization to more easily find the RAPID Toolkit through commercial search engines (i.e., Google, Bing, Yahoo).

Communications Material

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RAPID *Regulatory and Permitting Information Desktop Toolkit*

Hydropower RAPID Toolkit Progress Update

July through September 2016 (Fiscal Year 2016, Fourth Quarter)

To those of you with whom we have met and everyone with an interest in the hydropower Regulatory and Permitting Information Desktop (RAPID) Toolkit, the U.S. Department of Energy and National Renewable Energy Laboratory (NREL) team is pleased to provide you the latest news, events, and other information in this quarterly progress update.

The hydropower RAPID Toolkit presents federal and state permits and regulatory approvals required for the development of hydropower projects in a user-friendly way. The toolkit's goal is to provide transparency to stakeholders and help improve regulatory processes for hydropower projects.
Through the process of developing regulatory roadmaps for inclusion in the Regulatory Flowchart Library, RAPID:

- Brings together both state and federal agencies
- Engages these agencies in reviewing and coordinating the permitting process for conventional hydropower, micro hydropower, and pumped storage projects
- Ultimately seeks to help reduce developers' costs and time for hydropower development.

View the RAPID Toolkit.

Contact Aaron Levine, NREL Principal Investigator, or Elise DeGeorge, NREL Project Team member, for additional information.

News and Events

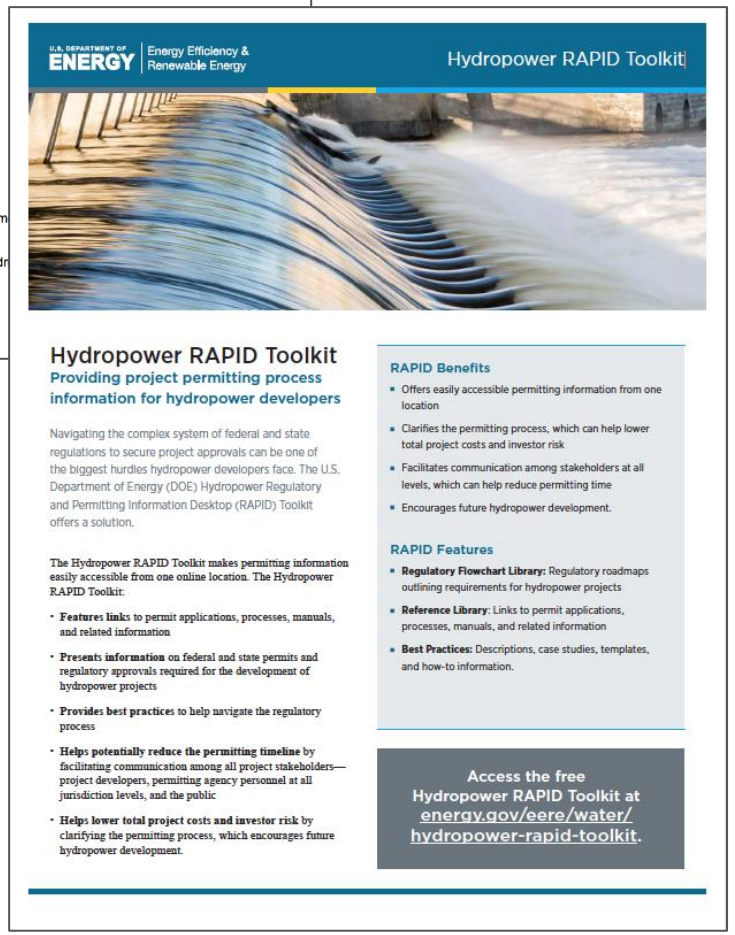
Past Quarter:

Hydropower RAPID Toolkit Launched at HydroVision International
The RAPID team officially launched the Hydropower RAPID Toolkit in July at HydroVision International in Minneapolis, Minnesota. The team also demonstrated and discussed the toolkit at multiple m

Alaska Now Featured in Hydropower RAPID Toolkit
The RAPID team has completed an Alaskan hydropower regulatory roadmap following a well-attended meeting held in August in Anchorage, Alaska. The RAPID Toolkit now features permitting roadr and Vermont. The completed permitting roadmaps graphic at the bottom of this newsletter shows regional accomplishments to date.

Upcoming:

Washington State Permitting Roadmapping Workshop
The RAPID Toolkit project team has scheduled a Washington state workshop on October 19 in Bellevue, Washington. To register, contact Kearns & West at knave@kearnswest.com.



Next Steps and Future Research

FY17 / Current Research

- In FY17, the RAPID Toolkit team is roadmapping two U.S. Army Corp of Engineers (USACE) Divisions (Mississippi and Ohio River Valley) to provide key state regulations that are required in addition to Federal Energy Regulatory Commission (FERC) and USACE approvals.
- Develop case studies and regulatory best practices for developing different types of hydropower projects (requiring varying levels of approval)
- Add website functionality ("Save my project")
- Continue robust outreach effort and collect user feedback via website metrics, individual case studies, and broad feedback mechanisms.

Proposed Future Research

- **National Environmental Policy Act Database—**Create ability to query the RAPID Toolkit NEPA Database to find projects' NEPA documents in FERC's eLibrary by location, resources impacted, and other search criteria not currently available
- **Regulatory Review and Best Practices—**Continue to analyze regulatory best practices and analyze barriers or other inefficiencies in the regulatory process
- **Website Maintenance—**Continue to maintain RAPID platform and update regulatory information.