



Hydropower projects—like Freedom, Maine’s Freedom Falls, pictured here—account for about 7% of total U.S. electricity generation, providing clean, renewable, affordable energy to every state except Delaware and Mississippi. While complex regulations help protect local ecosystems, they can also impede hydropower development. *Photo from Andy Baumgartner, U.S. Department of Energy*

# NREL Helps Hydropower Projects Navigate Complex Regulatory Currents

Hydropower accounts for about 37% of U.S. renewable electricity generation. But before industry members can license and construct new projects or relicense existing projects, they must navigate complex approvals from federal, state, and tribal authorities. These regulations provide critical protections for water quality, species, cultural resources, and recreation, but they can also increase a project’s costs, risks, and uncertainties. Researchers at the National Renewable Energy Laboratory (NREL) are analyzing these processes to assist decision makers in identifying areas in need of reform.

Ultimately, the lab’s research could help the hydropower industry build cheaper projects faster. In Fiscal Year 2021, NREL researchers provided two valuable resources, the [Hydropower Regulatory and Permitting Information Desktop \(RAPID\) Toolkit](#) and a new report titled *An Examination of the Hydropower Licensing and Federal Authorization Process*.

## RAPID Changes: Hydropower’s Regulatory Road Map Stays Up to Date

In the next 2 decades, the licenses of more than 600 hydroelectric projects will expire. If those projects fail to relicense, the country will lose the amount of clean energy needed to power about 5.5 million homes—equivalent to the entire state of Pennsylvania. To help the hydropower industry navigate the complex policy and regulatory process to license new and relicense existing projects, NREL created the [Hydropower RAPID Toolkit](#), an interactive, searchable online database of federal, state, and tribal regulations.

## What Is RAPID?

Launched in 2015 and funded by the U.S. Department of Energy’s Water Power Technologies Office, the Hydropower RAPID Toolkit collects and organizes the latest regulations that protect air and water quality, preserve wildlife habitats, prevent soil erosion, and shield valuable cultural and recreational resources. Hydropower developers can search by state or type of regulation or project.

In short, the Hydropower RAPID Toolkit:

- Offers easy access to permit application links, processes, and manuals
- Outlines regulatory requirements and clarifies the permitting process
- Provides best practices, case studies, and how-to information
- Facilitates communication among stakeholders.

## What's New in 2021?

To keep the toolkit up to date, NREL researchers track rule and regulation changes, add new regulations and policies published by agencies like the Federal Energy Regulatory Commission, and curate the massive RAPID library so users can find pertinent information—fast.

This year, NREL researchers monitored the Biden administration's regulatory changes, so they could ensure the RAPID Toolkit stays up to date. The team identified revisions to:

- The Clean Water Act
- The National Environmental Policy Act
- The Endangered Species Act
- State regulations in Vermont, New York, and Oregon.

These changes could enhance protections for U.S. waterways and water quality, increase state and tribal authority to protect their waters, and provide further protections for endangered species and migratory birds, like eagles, falcons, and hummingbirds.

## Report Examines How Hydropower Regulations Can Staunch a Project's Flow

Hydropower provides clean, renewable, and affordable electricity to communities, but projects can also impact freshwater ecosystems and the communities that depend on them. While the licensing process helps protect these ecosystems, the time and cost of licensing or relicensing can vary dramatically, creating uncertainty that could disincentivize developers from launching or completing projects.

## Benefits and Barriers

A recent NREL report titled *An Examination of the Hydropower Licensing and Federal Authorization Process* examines the factors that impact the time, cost, benefits, and associated risk and uncertainty of the hydropower permitting and federal authorization process.

Although the report does not propose any specific recommendations to alter the current hydropower licensing and authorization process, the findings will aid decision makers in identifying areas that need reform. And, the analysis will help policymakers and regulators, including the Federal Energy Regulatory Commission, U.S. Army Corp of Engineers, federal land management agencies, federal and state resource agencies, and Native American tribes, and engage in informed discussions with hydropower industry stakeholders, like utilities managers, developers, consultants, trade associations, and nongovernmental organizations.

## A Foundation for Reform

The report's key findings are:

1. Greater environmental complexity can lead to longer licensing timelines, challenging all stakeholders.
2. Licensing costs often disproportionately impact smaller projects and those seeking original licenses.
3. Disagreements in negotiations over environmental studies can prolong licensing timelines.
4. Incomplete and/or inadequate information for authorization processes results in longer licensing timelines and disagreements among stakeholders.
5. Different license processes have different timelines; the Integrated Licensing Process may minimize time and variability.
6. U.S. hydropower licensing includes more agencies and opportunities for public and tribal engagement than other national energy and water infrastructure projects and international hydropower projects.
7. The licensing process can result in important environmental measures for ecosystems and stakeholders.

## More Information

**Aaron Levine**  
[Aaron.Levine@nrel.gov](mailto:Aaron.Levine@nrel.gov)