



Rethinking Low Impact Hydropower and Renewable Energy Certificates

Thomas N. Russo

Wind and solar projects along with their related renewable energy certificates¹ (RECs) are on the minds of energy generators, consumers and policy makers. This begs the question as to why hydropower and specifically low impact hydropower are not eligible to receive the same attention. A closer look at the issue reveals both the states and consumers have much to say about the technologies that qualify for RECs. In fact, low impact hydropower projects may qualify for RECs under some individual State Renewable Portfolio Standards (RPS) or the US Environmental Protection Agency's (EPA) Green Power Partnership but not all.

¹ A renewable energy certificate or REC is a market-based instrument that represents the property rights to the environmental, social and other nonpower attributes of renewable electricity generation. One REC represents proof that 1 megawatt-hour (MWh) of electricity was generated from an eligible renewable energy resource. RECs are also known as Green tags, Renewable Energy Credits, Renewable Electricity Certificates, or Tradable Renewable Certificates.

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This places the burden on a hydropower developer who believes that their project qualifies for a REC to either work with the relevant state agencies to determine the project's eligibility and then with third-party validation organizations such as the Low Impact Hydropower Institute (LIHI) and the Center for Resource Solutions Green-e Standard (CRS)² to be eligible to receive a REC. That may be difficult and expensive, because a state's view of hydropower is based in part on past regulatory practices associated with the construction and operation of hydropower projects. Some states may understand this, but it may be difficult for them to make exceptions to existing rules and regulations even when a project's operation changes and benefits environmental resources.³

The process of obtaining RECs for a hydropower project is complicated because the definition of "low impact hydropower" is not defined by federal law. In fact, many states and consumers automatically exclude hydropower because

² The Low Impact Hydropower Institute (LIHI) is a nonprofit 501(c)(3) organization dedicated to reducing the impacts of hydropower generation through the certification of hydropower projects that have avoided or reduced their environmental impacts pursuant to the Low Impact Hydropower Institute's criteria. CRS is responsible for the implementation of the Green-e® Renewable Energy Standard for Canada and the United States, the Green-e® Climate Standard and all future standards.

³ Report On Permitting Small and Low Impact Hydropower Projects in Massachusetts, August 30, 2016 File No. 172618.00, prepared for: Massachusetts Department of Energy Resources Boston, Massachusetts. <https://www.mass.gov/doc/report-on-permitting-small-hydro-low-impact-hydropower-project/download>

of its reputation as being threatening to the environment and aquatic life. In contrast, states and consumers readily embrace wind and solar as projects that would qualify for RECs even though the effects of wind farms on bird and bat populations and the large environmental land requirements of solar projects are well known.

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This author believes that rethinking the definition of low impact hydropower is long overdue. States and most consumers fail to recognize the significant changes in law and the Federal Energy Regulatory Commission’s (FERC) regulatory program and case law regarding US hydropower that have occurred since the passage of the National Environmental Policy Act (NEPA) of 1969. When these factors are considered, this author believes there are large numbers of hydropower projects that would qualify as “low impact” and ultimately qualify for RECs. If that occurred, hydropower could be recognized for its contribution in various state RPS programs and in the EPA’s Green Power Partnership and play a

larger role in the nation’s energy transition away from fossil fuel generation. This would benefit hydropower owners and companies wishing to decarbonize their organizations.

RECONSIDERING THE DEFINITION OF LOW IMPACT HYDRO AND RECS

Table 1 lists several key reasons that warrant changing current attitudes regarding low impact hydropower and whether such facilities qualify for a REC. The most important are discussed in the following sections.

IN SEARCH OF A DEFINITION OF LOW IMPACT HYDROPOWER

The last time Congress passed comprehensive energy legislation was in 2005, when it passed the Energy Policy Act. The passage of the act did not include a definition of low impact hydropower. The lack of a definition contributes to very few hydropower projects qualifying for RECs and ignores what could be a larger contributor to decarbonization.

The FERC has issued 619 exemptions for conduit and 10-MW exemption projects with an installed capacity of 883 MW.⁴ The following

⁴ See FERC website for list of active exemptions at <https://www.ferc.gov/sites/default/files/2020-04/ActiveExemptions.xls>

Table 1. Major Reasons for Reconsidering the Definition of Low Impact Hydropower

- 1 The Federal Power Act requires that projects must be relicensed every 30 to 50 years depending on the project’s license term. This means that every project is subjected to a NEPA environmental review and that federal and state agencies and stakeholders can mitigate impacts to acceptable levels and decide whether the project should continue to operate.
- 2 States have authority to include mandatory conditions in FERC licenses to protect water quality, fish and wildlife and other water uses under Section 401 of the Clean Water Act (CWA) and in coastal areas under the Coastal Zone Management Act (CZMA). These conditions are made a part of the new license.
- 3 Federal agencies have authority to require FPA section 18 fishway prescriptions in any license issued. These conditions are made a part of the new license.
- 4 Federal land management agencies have authority to set mandatory conditions in any license issued when projects are located on federal lands and reservations. These conditions are made a part of the new license.
- 5 Dam Owners and Environmental Groups have signed an agreement to work together to identify sustainable hydropower. There are over 90,000 dams without power that could contribute to the energy transition. Also, closed-loop pumped storage projects and projects that are a part of a comprehensive settlement agreement might also provide evidence that could be used by certification organizations of a project’s low impact qualities.

Source: Russo on Energy LLC

projects are referred to as Low Impact Hydropower on the FERC website:

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1. **Conduit Exemption** — a small hydroelectric facility up to 40 megawatts (MW) using a man-made conduit operated primarily for nonhydroelectric purposes may be eligible for a conduit exemption. The applicant must have all the real property interests necessary to develop and operate the project or an option to obtain the interests; and
2. **10-MW Exemptions** — a small hydroelectric project of 10 MW or less may be eligible for a 10-MW exemption. Federal and state fish and wildlife agencies provide mandatory conditions that the operator must comply with. FERC has no discretion to modify the conditions and must enforce them. The applicant must propose to install or add capacity to a project located at a nonfederal, pre-2005 dam or at a natural water feature. The project can be located on federal lands but cannot be located at a federal dam.

In addition, the FERC website lists Qualifying Conduit Hydropower Facilities located on non-federally owned conduits with installed capacities up to 5 MW as low impact hydropower. The applicant must file a Notice of Intent to Construct a Qualifying Conduit Hydropower Facility with FERC and show that the conduit is not primarily for the generation of electricity and was not licensed or exempted on or before August 9, 2013. These projects are not required to be licensed or exempted by FERC.

According to FERC's active licenses database,⁵ the agency regulates 1,036 hydropower licensed projects with a total installed capacity of 56,294

⁵<https://ferc.gov/sites/default/files/2020-04/CompleterlistofActiveLicenses.xls>

MW. Not all these projects would be characterized as low impact hydro. For example, projects that affect federally listed endangered and threatened species would not be considered low impact. However, many projects have been relicensed since 1993 and have undergone a NEPA environmental review and include CWA state 401 water quality certificate conditions to protect the environment. Therefore, many of these projects could qualify as low impact hydro and possibly RECs. This author identified 903 licensed projects⁶ with a total installed capacity of 6,519 MW from FERC's database that may qualify for RECs. Hydropower licensees of these projects should analyze and discuss them further with State RPS officials and certifying organizations such as the LIH and CRS regarding whether they qualify for RECs.

US HYDROPOWER REGULATION IS VERY DEMANDING

Over the last 100 years, FERC's regulation of hydropower has dramatically changed in the US. Most hydropower developers characterize the guiding regulations and process as demanding and comprehensive, independent of the size of the project.⁷ When FERC's predecessor, the Federal Power Commission, licensed the first hydropower projects prior to the passage of NEPA, the Clean Water Act and other environmental laws, very little consideration was given to FERC's mandate under section 10(a) of the Federal Power Act (FPA) to consider the developmental and nondevelopmental benefits of a proposed project on the waterway or river basin. As a result, many hydropower projects adversely affected fish and wildlife, water quality, recreation, scenic views and cultural resources to promote power benefits. As time and environmental laws and policies have changed, the reverse is generally happening today. Simply put, states and other federal agencies and environmental considerations largely determine

⁶The projects have installed capacity ranging from 1 to 50 MW.

⁷Hartman, D. and Russo, T.N. (2017, Aug. 24). *Ebbing the flow of hydropower red tape*. R Street Institute, see <https://www.rstreet.org/2017/08/24/ebbing-the-flow-of-hydropower-red-tape/>

whether FERC will issue a license and the conditions that it will include in the license.

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Newly proposed hydropower projects undergo an environmental review pursuant to the NEPA that is very transparent. Also, the Clean Water Act (CWA), Coastal Zone Management Act (CZMA) and amendments to the FPA have given environmental and land management agencies a large say in how a new project would be constructed and operated. Also, FERC's policy is not to issue a license until it has the required conditions or permits from the state and federal agencies.

RELICENSING HYDROPOWER PROJECTS IS MORE THAN CHECKING THE BOXES

While the licensing process for newly proposed hydropower projects is important, what is unique about US hydropower regulation is that projects can only operate for a maximum term of 50 years under the FPA. Prior to the expiration of a license, the dam owner or licensee must state whether it intends to apply for a new license. Most licensees do and they begin a lengthy process that can last up to 5 years prior to filing an application to relicense the project with FERC. Also, the majority of work of FERC's hydropower program is devoted to relicensing and enforcing the conditions in original and new licenses issued.

Hydropower relicensing essentially entails a shared regulatory decision by FERC, State Water Quality Certification agencies and federal agencies on whether the project should continue to operate and if so under what constraints. Most projects that are relicensed have a plethora of environmental conditions in the form of mitigation measures that they must implement as a part of their new license. FERC's Division of Administration and Compliance enforces all conditions

in the license including CWA section 401 water quality conditions and the CZMA in coastal zones. Also, the Departments of the Interior and Commerce have authority to mandate the construction of fishways to safely pass resident and anadromous fish. FPA section 4(e) also allows other federal agencies such as the US Forest Service, Bureau of Land Management, Army Corps of Engineers and Bureau of Reclamation to require mandatory mitigation in any license issued when the hydropower project is on federal land or a reservation. The latter includes lands held under trust for 574 federally recognized Indian tribes by the Bureau of Indian Affairs.

Given the comprehensive review and inclusion of these conditions in a license, this author believes that the projects are operating in a more sustainable manner after relicensing. If they were not, states could have denied the water quality certificates for said projects and/or called for their removal. The fact that states have not denied water quality certificates and have instead issued conditions to allow these projects to continue to operate for an additional 40–50 years is evidence that the projects might likely be deemed low impact hydropower and qualify for a REC.

ABILITY FOR LARGE HYDROPOWER PROJECTS TO QUALIFY AS LOW IMPACT HYDRO

Low impact hydropower is generally thought to pertain only to relatively small projects that don't affect natural waterbodies. However, this author believes that some large hydro projects may qualify, especially if they don't adversely impact endangered species and other beneficial uses or don't affect natural water bodies.

Two good examples of large hydropower projects are those that have undergone relicensing and are located on international boundary waters such as the 912-MW St. Lawrence-FDR Project and the 22,755-MW Niagara Project. These two projects have undergone an extraordinary and successful relicensing process that included comprehensive NEPA reviews on a boundary river and have received state CWA water quality certificates and determinations of whether the projects were consistent with CZMA. The New Power Authority (NYPA)

also consulted extensively with US Indian tribes and Canadian federal and provincial agencies, the International Joint Commission and First Nations during the relicensing. In addition, NYPA and many stakeholders developed comprehensive settlement agreements for each project that contained extensive environmental mitigation measures that would be implemented over the new license term that FERC determined was 50 years for each project.

A number of projects licensed at existing Army Corps of Engineers dams on the Ohio, Allegheny, Monongahela and Mississippi Rivers may qualify as low impact as well since they operate in a manner consistent with the purposes to provide navigation on those rivers.

Finally, closed-loop pumped storage projects recently licensed or under review by FERC that don't affect riverine resources may also qualify as low impact hydro and for RECs. These include the 400-MW Gordon Butte Project in Montana, 393.3-MW Swan Lake Project in Oregon and the proposed 1,200 MW Project in Washington.

CAN DAM OWNERS AND ENVIRONMENTAL GROUPS SUPPORT LOW IMPACT HYDROPOWER?

On October 13, 2020, the National Hydropower Association, some member companies and nationwide environmental organizations⁸ signed a Joint Statement of Collaboration⁹ entitled *U.S. Hydropower: Climate Solution and Conservation Challenge*, which was a part of the Stanford University Uncommon Dialogue. The Low Impact Hydropower Institute was a signatory to the agreement that might be helpful since it is a third-party validation organization familiar with RECs as they apply to hydropower.

The agreement focused on the 90,000+ existing dams throughout the US, of which about 2,500

⁸ The parties to the agreement included American Rivers, World Wildlife Fund, Union of Concerned Scientists, Great River Hydro, American Whitewater, Natel Energy, National Hydropower Association, Eagle Creek Renewables, Low Impact Hydropower Institute, Rye Development, Hydropower Reform Coalition and Hydropower Foundation

⁹ Joint Statement of Collaboration: U.S. Hydropower: Climate Solution and Conservation Challenge, Stanford University Uncommon Dialogue, October 13, 2020. See <https://woods.stanford.edu/research/hydropower>

have hydropower facilities for electricity generation. In the next decade, close to 30 percent of US hydropower projects will be up for relicensing. The parties focused on the following three Rs and development of closed-loop pumped storage projects.

- **Rehabilitating** both powered and nonpowered dams to improve safety, increase climate resilience, and mitigate environmental impacts;
- **Retrofitting** powered dams and adding generation at nonpowered dams to increase renewable generation; developing pumped storage capacity at existing dams; and enhancing dam and reservoir operations for water supply, fish passage, flood mitigation, and grid integration of solar and wind; and
- **Removing** dams that no longer provide benefits to society, have safety issues that cannot be cost-effectively mitigated, or have adverse environmental impacts that cannot be effectively addressed.

The dam owners and environmental organizations involved agreed to help foster the development of closed-loop pumped storage projects to increase grid reliability.¹⁰ Taken together, the effort to identify and facilitate FERC licensing with appropriate mitigation at some of the 90,000 non-power sites could result in some being classified as low impact hydropower by the states and electricity consumers. This author also believes the LIHI and CRS, third-party certification organizations, should give additional weight to hydropower projects that enter into comprehensive settlements, especially closed-loop pumped storage projects.

RENEWABLE ENERGY CERTIFICATES, RENEWABLE PORTFOLIO STANDARDS AND GREEN POWER

RECs are important because they help distinguish renewable energy from nonrenewable generating resources on a contractual basis. RECs are market instruments also used by State PUCs and other organizations to quantify, identify, track and

¹⁰ Russo, T.N. Pumped Storage Hydro: Reliable Choice for New Electric Storage Era, *Natural Gas & Electricity Journal*, October 26, 2020 see <http://www.russoonenergy.com/content/pumped-storage-hydro-reliable-choice-new-electric-storage-era>

allocate sources of electricity generation across a shared electric grid. RECs are used by regulated electric utilities to substantiate claims of compliance towards a State's RPS or goals (Figure 1).

Nonregulated entities also use RECs to prove that they are purchasing renewable energy or green power. A REC is a tradable market instrument that represents the generation of 1 megawatt-hour (MWh) of electricity from a renewable energy resource. A hydropower developer that has received a REC may keep it to demonstrate the project is generating renewable energy or sell it to someone else. RECs also have legal standing in the market and in power purchase agreements.

Navigating the world of RECs for a hydropower developer or licensee can be confusing. There is a mandatory and a voluntary means to obtain RECs. The mandatory track is tied to the State Renewable Portfolio Standards (RPS), which exist in over 30 states (Figure 2). The voluntary track includes green power, which is defined by the market as a subset of renewable resources that offer the highest environmental benefit. This includes low impact hydro as well as wind, solar power, biogas and some biomass projects.

According to US EPA's James Critchfield,¹¹ if a hydropower owner wants their power to qualify under mandatory requirements (e.g., state Renewable Portfolio Standard), the project would need to register in a regional tracking system, report generation and be issued RECs. After that the RECs could be monetized by the hydropower owner to a buyer who is held to the Renewable Portfolio mandate. In this case, the states set the requirements for what is eligible for the mandate through their RPS or other programs.

EPA's Critchfield also provided an example of the voluntary track. If the hydropower plant meets national voluntary standards for green power, which reflect a narrower set of eligible resources based on the resource's environmental profile, then the hydropower project could register in a regional tracking system, report generation and be issued a REC, which could then be monetized by the hydropower owner to a voluntary (nonregulated) buyer who is interested in purchasing green power to meet the buyer's renewable energy or greenhouse gas reduction goals. Voluntary buyers tend to buy RECs

¹¹ Written communication on January 24-25, 2021 between James Critchfield, Office of Air and Radiation | Energy Supply & Industry Branch, EPA Green Power Partnership | www.epa.gov/greenpower and Thomas N. Russo

Figure 1. Renewable Energy Credits Demonstrate Power Production and Consumption from Low Impact Hydropower

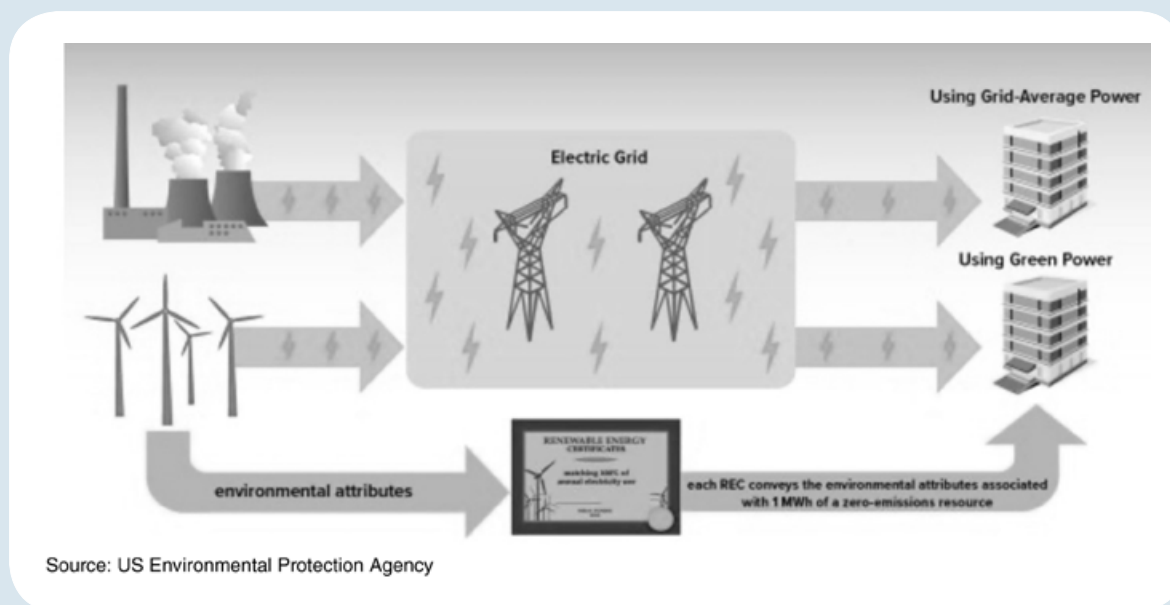


Figure 2. States with Renewable Portfolio Standards and Goals



that meet national standards for green power and often with third-party certification and validation as meeting the national standard.

Green-e is a third-party certification program administered by the Center for Resource Solutions, the single and only third-party certification body of retail generation in the US. Green-e recognizes hydropower projects that are certified by the Low Impact Hydropower Institute (LIHI). EPA's Green Power Partnership recognizes hydropower as eligible for our program when it is LIHI certified and green power in general when it is Green-e certified, assuming the green power also meets additional requirements.

CONCLUSION

Low impact hydropower is not defined by federal law but is left to the states and energy consumers. As currently used today, the few projects that qualify as low impact hydro and RECs are “no impact hydro.” This is inconsistent with wind and solar farm projects that qualify for RECs even though they adversely affect birds, bats, and other environmental resources.

FERC's hydropower program has changed dramatically since the passage of NEPA, the Clean Water Act and other laws. States, electricity consumers, and certification organizations

such as LIHI and CRS should recognize this and broaden their definitions of low impact hydropower. If they did, a subset of the FERC hydropower projects that undergo relicensing may be categorized as “low impact hydropower” for purposes of obtaining RECs. Also, new closed-loop pumped storage projects and larger projects that enter into comprehensive settlement agreements may also qualify for RECs.

The signatories to the Joint Statement of Collaboration entitled *U.S. Hydropower: Climate Solution and Conservation Challenge* are in the best position to lead or support an effort to redefine low impact hydropower for what it represents today as opposed to how state RPS programs and electricity consumers traditionally perceive hydropower or how FERC used to license projects. Such an effort might incentivize developers to site hydro at some of the 90,000 US dams that don't have power. Finally, licensees of existing hydropower projects would be wise to examine their projects and determine if they may qualify as low impact hydropower and RECs, while those who are developing mitigation for new hydropower projects should consider RECs when developing mitigation measures for projects.