



“Energy research for a sustainable future”

ELIGIBILITY STANDARDS FOR HYDROPOWER RESOURCES FOR THE NEW YORK STATE RPS

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1 Introduction

Hydropower differs in a number of ways from the other renewable resources available to New York State as it seeks to meet its goal of 25% renewables by 2013. These differences flow largely from the fact that, unlike other renewables:

- there exists a large stock of existing hydropower, both within New York State and in other jurisdictions that sell electricity into the New York market,
- hydropower development has substantial environmental consequences, some of which follow inevitably from the initial development and others that vary according to how the project is operated,
- many hydropower projects operate under authorizations issued many years ago, when environmental standards were far lower than they are today,
- hydro projects vary enormously from one to another, and the factors that determine the degree of their environmental impacts are complex and subtle, and
- the environmental community does not generally support the extensive development of new hydropower resources.

As part of efforts to develop a comprehensive RPS proposal that can be supported by a broad range of renewable energy producers and environmental advocates, we have been asked to suggest an objective framework that can be used to identify low-impact hydropower projects, based on criteria that are unambiguous and can be applied by a regulatory body or a state agency, without significant transaction costs. We assume that detailed examination of impacts of individual projects not an option, both because of cost and the need for public participation in any such evaluation.¹

¹ An unpublished benchmark assessment of the relicensing of some of the 157 individual licenses that expired at the end of 1993 showed that the average cost of the relicensing process increased from around one million dollars per license to double figures by the end of decade, with a number of project owners budgeting \$5-20 million for the reauthorization process. The evaluation process currently used by the Low Impact Hydropower Institute, while for the most part relying on environmental studies already carried out for state and federal regulators, is by its nature too complex to be readily applied in the context of an interim standard for the RPS. However those projects that have achieved LIHI certification would almost certainly meet or exceed eligibility requirements.

In many jurisdictions, facilities with installed capacity lower than a specified cutoff value are currently deemed to be environmentally preferable, or at least sufficiently benign to be accorded the same status as other renewables such as solar and wind power. This cutoff value ranges from 5 to 100 MW, with 30 MW being the most commonly used figure.

However, over the last decade it has become very clear that installed capacity is a poor indicator of the environmental impacts of a hydropower dam, particularly when it is the sole criterion. Small facilities that de-water river reaches and block fish passage may be more environmentally destructive than larger facilities designed and operated to reduce environmental impacts.

The irony of using a size criterion of 30 MW is that it automatically certifies the vast majority of hydropower dams in the U.S., even though they only produce a small percentage of the country's hydropower. Of the over 2,000 hydropower dams licensed by FERC, approximately 89% of the dams are less than 30 megawatts capacity, but together provide only 8% of the hydropower capacity. Thus, under a "small is good" approach, we would end up classifying as environmentally preferable a large number of dams but not a large amount of power, and we would be granting that preferred status without any examination of the particular impacts of those dams.

The Low Impact Hydropower Institute is a not-for-profit organization dedicated to identifying hydropower plants in the U.S. that effectively protect fishery, water, land and recreation resources. LIHI focuses on identifying low-impact hydro plants based on sophisticated criteria that go far beyond a simplistic comparison based on installed capacity. The LIHI certification criteria and certification process are open to public scrutiny, and public participation in the certification process is encouraged.²

The New York State government clearly cannot delegate its decision-making to a not-for-profit organization like LIHI. Furthermore, LIHI's certification process is not ideally suited to an RPS, and its certification criteria do not allow consideration of projects involving construction of new dams, or or projects located outside the U.S. Thus it is necessary to establish objective criteria that can be applied by the PSC or another state agency.

Preliminary work suggests that it is possible to devise a properly defined screening standard based on objective parameters related to the facility and its operating regime which would allow a regulatory body or a state agency to reliably identify low-impact hydropower, without carrying out detailed and costly studies. In our view, this is the most promising approach for identifying low-impact hydropower projects in the context of an RPS, but it is not possible to develop such screening criteria rapidly. Great care is needed in choosing and weighting the parameters to be used, in order that the results approximate as closely as possible the results one would obtain through scientifically based impact assessment for each project.

We have in fact begun a process to develop such criteria, in a pilot project sponsored by the North American Fund for Environmental Cooperation.³ However, the results of this pilot project will not be

² Information on the LIHI program and evaluation criteria is available on its web site: www.lowimpacthydro.org.

³ NAFEC is the funding arm of the Commission for Environmental Cooperation, created under the environmental side agreement to NAFTA.

available until January 2004, and even then they will be far from definitive. Considerable additional work will be required to develop screening criteria sufficiently precise to be of use to the New York State RPS.

In the short term, we propose instead developing transitional screening criteria based in large part on the regulatory process. Section 2 provides some background on the regulation of hydropower in the U.S. Section 3 draws upon these most important features of FERC regulation to propose a transitional standard that could also apply to other projects in the U.S. and Canada. Finally, section 4 explores further the steps needed to develop a final standard which would be based on objective parameters related to the facility and its operating regime.

2 Regulatory standards for hydropower in the U.S.

2.1 Evolution of the regulatory process

In the United States, the construction and operation of most hydropower facilities other than those built by the federal government are authorized by the Federal Energy Regulatory Commission (FERC) under 30- to 50-year licenses. Federal hydropower projects are authorized by Congress and constructed primarily by the U.S. Department of the Interior (Bureau of Reclamation), the U.S. Army Corps of Engineers, and federal agencies such as the Tennessee Valley Authority or the Bonneville Power Authority.

For projects under FERC jurisdiction, when a license expires, the process for renewing it is in essence identical to that required for issuing an original license. Indeed, FERC is not obliged to grant the new license to the entity the held the original license, if it finds it to be in the public interest for another party to operate the facility.

Over the years, there has been considerable evolution in the licencing and relicencing process and in the criteria FERC applies, due both to statutory changes and to a gradual evolution that reflects the growing importance of environmental concerns in society at large. The main steps of this evolution over the last 20 years are described in detail in Appendix I. Briefly, they include:

- 1984: Three-stage consultation process required;
- 1986: Congress passed the Electric Consumers Protection Act (ECPA), which amended the Federal Power Act, to require, among other things, that FERC to give the same level of consideration to the environment, recreation, fish and wildlife, and other nonpower values that it gives to power and development objectives in making a licensing decision;
- 1992: The National Energy Policy Act led to important changes in FERC procedures, eventually resulting in the development of an alternative license process (ALP). Since then, an increasing number of licenses are granted that in effect endorse a settlement agreement made between the operator and all interested parties. There is a growing consensus within the hydropower community that these settlement agreements are superior to licenses granted by FERC under the traditional process, in terms of guaranteeing that the license conditions reflect the public interest.

There is no doubt that approval under each one of these regimes is a guarantee of a higher level of environmental protection than those that came before, allowing us to distinguish four distinct “grades” of FERC authorization:

- a) post-1993 license with all-party settlement agreement,
- b) ECPA-based license (post 1987) without all-party settlement agreement,
- c) pre-ECPA license with 3-stage consultation (post 1984),
- d) pre-ECPA license without 3-stage consultation (pre 1984).

The most significant of these changes was the adoption of ECPA in 1986, because this Act fundamentally altered the standard against which FERC must measure a proposed license. For this reason, we propose making authorization under ECPA (or, in other jurisdictions, under legislations that guarantees a similar degree of environmental protection, due process and an equal consideration approach to power and nonpower resources) the centerpiece of the transitional standard. Thus, with certain exceptions to be detailed below, we suggest that, for the purposes of this transitional standard, only those projects in categories a) and b), above, be deemed “low impact”.

2.2 Significant impacts not captured by regulatory process

While approval under the current regulatory environment for FERC-jurisdictional projects represents a far more significant “vote of confidence” than did approval under the earlier legislative regime, it is not sufficient to conclude that a project is in fact low impact. We say this for several reasons:

- the (re)licencing process focuses on operational impacts, i.e. those that can be mitigated by modifying the plant’s operating regime. Severe non-mitigable impacts caused by the plant’s original construction (including reservoir impoundment) generally do not impede relicensing, but they should impede low-impact certification and RPS eligibility.
- FERC’s decisions represent a compromise between economic and environmental interests. While FERC has issued licenses that are “uneconomic” because of significant costs of protection, mitigation, and enhancement (PM&E) measures, they have also accepted an environmental harm if they consider the cost of PM&Es to the operator and ultimately the rate payer to be excessive.

Thus, FERC authorization to operate, even under the current legislative regime, is not in itself adequate to define low impact facilities. For this reason, the transitional standard proposed in the following section includes a number of environmental exclusions (detailed below) to ensure that the projects that meet this standard are not responsible for grave environmental impacts.

3 Transitional standard

In this section, we propose a standard which, on a transitional basis, could be used to identify low-impact hydropower projects for:

1. U.S. projects under FERC jurisdiction,
2. Other types of projects in the U.S. which do not require FERC authorization, and
3. Projects outside the U.S.

The standard includes three components: regulatory, compliance and environmental exclusions.

In each case, certification would be based on the submission of an affidavit from the project owner, with supporting documentation as appropriate, attesting to the project's conformity with the applicable standard. In order to ensure transparency, we recommend that these applications be posted for public comment.

3.1 *Regulatory criteria*

3.1.1 Projects requiring FERC authorization

For projects requiring FERC authorization, we distinguish between those authorized before or after the implementation of the Energy Consumers' Protection Act of 1986.

Post-ECPA licenses

Criteria A) Projects authorized by FERC **after** the implementation of the Energy Consumers' Protection Act of 1986 should be considered eligible if they meet the compliance and environmental criteria described below. Projects which have been certified by the Low Impact Hydropower Institute should be deemed in conformity with these criteria.

Compliance criteria

Since licensing, the project's record of compliance with its licensing conditions and timely implementation of settlement terms is exemplary, with few violations which are self-reported by the licensee.

Environmental criteria

Because some hydro projects have significant environmental impacts which are not captured by the regulatory process, as described in section 2.2, above, no projects are eligible which:

- do not provide safe and timely passage for migrating fish,
- contribute to extirpation of fish or other species,
- result in taking of rare, threatened, or endangered species,

- contribute to non-attainment of water quality standards,
- provide flows which are insufficient for the protection of aquatic and terrestrial resources, or attainment of resource agency management goals;
- fail to protect, manage, and /or preserve cultural and historic resources affected by the Project,
- have unresolved issues involving aboriginal peoples,
- fail to provide protection against erosion or mitigation/enhancement for inundated, degraded or lost habitat, or
- fail to provide adequate public access or recreational facilities.

As the Low Impact Hydropower Institute certification process addresses these and other issues, it is proposed that LIHI-certified projects be deemed in conformity with the compliance and environmental criteria.

It should be noted that projects requiring construction of new dams are not eligible for LIHI certification. If the project requires construction of a new dam, it must also:

- provide for fish passage equivalent to pre-project conditions,
- not require displacement of any dwellings,
- not infringe on aboriginal treaty rights or aboriginal subsistence, cultural or spiritual activities,
- operate on a strictly run-of-river basis, and
- mitigate for any habitat damaged or destroyed by the project with similar habitat at or near the development site.

Pre-ECPA licenses

Criteria B) Projects authorized (or relicensed) by FERC **prior to** the implementation of the Energy Consumers' Protection Act of 1986 should be considered eligible if they meet the compliance and environmental criteria mentioned above, and if their operators:

- i) have executed a comprehensive settlement agreement for which the participation of all interested parties has been solicited and which:
 - was achieved through an open and transparent process open to all interested parties;
 - addresses or resolves all issues identified in a public scoping process;
 - includes measurable milestones and schedules for implementation of protection, mitigation, and enhancement measures; and,
 - has an active dispute resolution process which may include a third party neutral decision-maker, or
- ii) can provide written affirmations from relevant state agencies and interested parties that the operating regime set out in the project's current permits or licenses is entirely adequate.

In the event that the operator is unable to obtain either the participation of interested parties in discussions that might lead to such an agreement or their written affirmations as described above,

he may in the alternative submit evidence of his attempts to obtain such participation or affirmation.

Projects certified by the Low Impact Hydropower Institute should be deemed in conformity with these criteria.

3.1.2 U.S. projects that do not require FERC authorization

U.S. projects that do not require FERC authorization include the following types of projects:

1. Projects which are not under FERC's jurisdiction. These are usually older projects that predate the Federal Power Act and received their authorization directly from Congress or projects that have been determined to be non-jurisdictional for reasons of that include no post-1935 construction, located on a non-navigable stream, and not affecting interstate commerce. The second group tends to be either very old (pre-1935) or very small projects that are geographically isolated.
2. Exempt Projects - During the hydro power "gold rush" of the late 1970s and early 1980s FERC issued regulations that simplified the filing and review requirements for certain types of projects. These types of applications are submitted for "exemptions." Getting an exemption is a simpler process than applying for a license. Those receiving an exemption are exempt from the requirements of Part I of the Federal Power Act. Exemptions are issued in perpetuity, are made subject to mandatory terms and conditions set by federal and state fish and wildlife agencies and by the FERC, and they do not convey the right of eminent domain.
3. Projects built by the federal government, which are authorized by Congress and in most cases constructed by the U.S. Department of the Interior (Bureau of Reclamation), the U.S. Army Corps of Engineers or the Tennessee Valley Authority.

In order that these types of projects not be *a priori* excluded from eligibility, objective and unambiguous criteria are required to demonstrate that they are, in practice, environmentally no worse than those certified by FERC in the post-ECPA period. For the first two of these categories, we propose that they be deemed low-impact if they meet **criteria B**, described above.

Some projects in the third category (built by the U.S. government) may be legally enjoined from entering into settlement agreements. We propose that such projects be deemed low-impact:

Criteria C) Projects where the owner is legally enjoined from entering into settlement agreements should be considered eligible if decisions regarding continuing operations are based on a consultation process that:

- o was open to state and federal resource agencies and all interested parties,
- o included the public scoping of issues,
- o allowed interested parties to submit study requests and information needs, with joint-fact finding funded by the project owner, and
- o a dispute resolution process,

Projects with unresolved or outstanding issues with state/provincial or federal resource agencies should not be considered eligible.

Federal projects that have been certified by the Low Impact Hydropower Institute should be deemed in conformity with these criteria.

3.1.3 Projects outside the U.S.

For New York State, the only likely non-US source of hydropower inputs in the foreseeable future are from eastern Canada (primarily the provinces of Ontario and Quebec, but possibly also the Maritimes and Newfoundland and Labrador). In Canada, hydropower is for the most part under provincial jurisdiction, and so the laws, regulations and procedures related to licensing vary from province to province.

We propose that projects outside the U.S. be deemed to be low impact, under this transitional standard, if they were approved under a regulatory regime which, like that created by ECPA:

- 1 requires that approval to build or continue to operate be reached in a transparent and inclusive public process,
- 2 gives equal consideration to power and non-power uses,
- 3 requires that conditions recommended by provincial resource agencies be accepted and implemented unless it can be demonstrated that they are inconsistent with the purposes of the applicable laws and that the license conditions adequately protect fish and wildlife, and
- 4 provides procedural safeguards and incorporates a public scoping process.

If the legal and regulatory framework does not provide these assurances, then criteria **B** or **C** (in the event that it is legally impossible to execute a settlement agreement) will apply.

4 Steps for developing a facility-based standard

The transitional screening criteria proposed above, based as they are on the regulatory process that has been applied to a project rather than on its physical characteristics, is in our view sufficiently objective and robust to be used on an interim basis for the New York State RPS. It should, however, eventually be replaced with criteria based on the physical characteristics of each hydropower facility. We suggest that the NYSERDA be mandated to develop such criteria over a two- or three-year period. Once such a standard has been approved, projects with interim certification should be given 24 months to obtain certification under the new standard.

To date, the most fully elaborated low-impact hydropower standards are those of the Low Impact Hydropower Institute (in the U.S.) and the draft EcoLogo guidelines, in Canada. LIHI's impact-based certification program has garnered significant support in the United States, but the program is not readily transferable to other countries because of its reliance on positions taken publicly by state resource agencies in the FERC hearing process. of U.S. In Canada, hydropower projects may be

certified as low-impact by the government-sanctioned EcoLogo program, but EcoLogo's draft guidelines, released in 2001, never obtained government approval. Furthermore, EcoLogo is not recognized by independent certifying organizations in the U.S. and, due to its lack of transparency, is unlikely to be so recognized unless there are major modifications to its program.

The authors of this paper have been involved in efforts to move forward in developing facility-based standards that could be applied on both sides of the border. As noted above, in 2002 LIHI received a grant from the North American Fund for Environmental Cooperation (NAFEC) to do a pilot project to try to identify a green standard for small scale hydro that could be applied in the US and Canada. LIHI teamed with the Helios Centre of Montreal for the project.⁴

We convened a cross section of individuals with considerable expertise in hydropower, drawn from governmental, environmental and industry sectors in the US and Canada. This group, the Green Hydro Working Group ("GHWG"), has undertaken detailed review of a dozen small-scale hydro projects, along with some sixty hypothetical variants, and ranked them based on their environmental qualities. Unlike the theoretical approaches that are often used, this exercise has the advantage of facing head-on the real-world complexity that is an essential feature of even the most straightforward hydropower project.

Based on the rankings, our objective is to point the way toward an impact-based, objective standard. For example this might include parameters related to:

- dam size (height, length);
- size of impoundment (area, area/MWh/yr);
- storage time (zero = pure run-of-river versus weekly, seasonal or inter-annual storage);
- reservoir fluctuations (vertical and horizontal; amplitude and frequency);
- bypassed reaches⁵ (length; required flows);
- fish passage (type and quality in relation to need);
- interbasin diversions;
- downstream modifications (flow regime; water temperature and quality)
- indicators of impacts on recreation and on indigenous and non-indigenous communities.

While this pilot project will not in itself result in a full-fledged facility-based standard, it should provide a solid basis on which to move forward. The report on this pilot program is not scheduled to be completed before January 2004.

It is hoped that this work will provide a valuable starting point for NYSERDA to use in developing a permanent facility-based standard for use by New York in the RPS program. If successful, this standard could be of considerable interest in other jurisdictions struggling with the same issues.

⁴ A description of the project can be found at <http://www.cec.org/grants/projects/details/index.cfm?varlan=english&ID=171>.

⁵ Some but not all hydropower projects involve one or more "bypassed reaches", i.e. sections of the river from which all or part of the flows are bypassed as they pass through turbines and related works. License conditions often specify required flows within the bypassed reach(es).

APPENDIX I

Hydropower regulation in the U.S.

In the United States, the construction and operation of most hydropower facilities other than those built by the federal government are authorized by the Federal Energy Regulatory Commission (FERC) under 30- to 50-year licenses. Federal hydropower projects are authorized by Congress and constructed primarily by the U.S. Department of the Interior (Bureau of Reclamation), the U.S. Army Corps of Engineers, and federal agencies such as the Tennessee Valley Authority or the Bonneville Power Authority.

For projects under FERC jurisdiction, when a license expires, the process for renewing it is in essence identical to that required for issuing an original license. Indeed, FERC is not obliged to grant the new license to the entity that held the original license, if it finds it to be in the public interest for another party to operate the facility.

Over the years, there has been considerable evolution in the licensing and relicensing process and in the criteria FERC applies, due both to statutory changes and to a gradual evolution that reflects the growing importance of environmental concerns in society at large. The main steps of this evolution over the last 20 years include:

- 1984: Three-stage consultation process instituted. In stage one, beginning five years before the license expires, the dam owner files a notice of intent to seek a new license and prepares a consultation package containing information about the project. FERC provides public notice of this intent. Dam owner conducts formal consultation with federal and state resource agencies regarding project design, studies and alternatives. Dam owner holds meeting with resource agencies and receives their comments 60 days later.

During the second stage, the dam owner conducts studies needed for the relicense application (which often are conducted over several years) and prepares a draft application. Study results and the draft application are distributed to resource agencies for comment. A meeting may be held with resource agencies.

The third stage of consultation begins two years before the license expiration date, when the dam owner submits a formal application for a new license, after having considered and addressed agency comments from the second stage. For 45 days after the application is filed, anyone can recommend that additional studies be conducted by the applicant. FERC's licensing process completes the third stage.

- 1986: Congress passed the Electric Consumers Protection Act (ECPA), which amended the Federal Power Act.⁶ Major changes to the FERC's licensing and compliance program included:

⁶ Its implementing regulations were adopted over the next few years and were fully in place by 1989.

- (1) requiring FERC to give the same level of consideration to the environment, recreation, fish and wildlife, and other nonpower values that it gives to power and development objectives in making a licensing decision;
- (2) requiring FERC to base its recommendations for mitigating adverse effects of a licensing proposal on the recommendations of federal and state fish and wildlife agencies and to negotiate with the agencies if disagreements occur;
- (3) eliminating municipal tie-breaker preference in relicensing and establishing new procedures for processing relicense applications to increase opportunities for agencies, interested organizations, and the public to participate in the process; and
- (4) giving authority to issue compliance orders and assess civil penalties up to \$10,000 per day for violations of rules, regulations, and terms and conditions of license or exemption.

- 1992: Congress passed the National Energy Policy Act, which opened the door for reformists in the broader hydropower community (licensees, state and federal agencies, tribes, and NGOs) to push FERC for a better relicensing process. This effort led to a number of experimental alternatives to the traditional relicensing process as well as a proposed rulemaking by FERC, which after an extensive outreach effort became a Final Rule in 1997 and allowed licensees, in cooperation with stakeholders, to use alternative approaches to combine pre-filing consultation, §401 water quality certification,⁷ license preparation, and environmental review into one process. This new rule allowed Licensees to choose between two pre-filing consultation processes in applying for a new license: traditional license process (TLP) or alternative license process (ALP).

While opinions vary, many groups find that alternative license process to be much more transparent and inclusive than the traditional one. Perhaps FERC's own description of the differences between the processes, best defines the evolutionary path of hydropower regulation in the U.S. over the last 20 years.⁸

Traditional	Alternative
Regulatory design	Flexible design
Much work post-filing	Most work pre-filing
Letters	Meetings
Applicant/agency driven	Locally Driven
Settlement not likely	Settlement more likely
Process redundancies	Process efficiencies
Benefits likely delayed	Benefits likely sooner
No FERC participation	FERC participation

⁷ Under Clean Water Act section 401, a state certification, or waiver of certification, is required before any federal agency issues a permit or license that involves a discharge to waters.

⁸ The comparison Table of TLP and ALP attributes was developed by FERC staff and presented during outreach workshops held throughout the U.S in 1998 and 1999.

Since 1993, an increasing number of licenses are granted that in effect endorse a settlement agreement made between the operator and all interested parties — usually the result of an alternative license process. There is a growing consensus within the hydropower community that these settlement agreements are superior to licenses granted by FERC under the traditional process, in terms of guaranteeing that the license conditions reflect the public interest.