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May 14, 2009

1. Introduction

Water-powered electricity is currently considered in the EcoLogo™ standard for renewable low-impact electricity (CCD-003). Ninety six water-powered generating facilities amounting to a total capacity of 1417.80 MW have already been third-party certified by the EcoLogo™ Program. The largest hydro project ever certified by the EcoLogo™ Program was of 192MW.

Water-powered electricity products can sometimes offer considerable environmental benefits, and meet strict requirements for the conservation of aquatic and riparian ecosystems.

During a preliminary research period, the EcoLogo™ Program engaged with stakeholders to narrow down the scope of environmental criteria categories needing revision or to be added to the standard. As such, the EcoLogo™ Program was able to narrow down its criteria scope. This scope will be presented in this document. Moreover, the EcoLogo™ Program will propose environmental leadership criteria for further stakeholder review as well as outline unresolved questions for further consideration by stakeholders.

2. New Criteria Statements to the Current Active Standard

Following preliminary research and a discussion with stakeholders, the EcoLogo™ Program will address the following environmental impact categories and related stressors by proposing to add new criteria statements to the current active standard. Each proposed criteria statement is followed by a rationale explaining why we are proposing the addition to the standard. Only those topics that were discussed with stakeholders will be presented below.

2.1. “Hydro” instead of “Water”

[Addition]:

Following a discussion with stakeholders, it was agreed that since the EcoLogo™ Program is including tidal and wave-powered electricity within CCD-003, and since the type of electricity currently covered under the “water-powered” category in the active standard is generally known as “hydro-powered” electricity in the market, we should substitute “water-powered electricity” for “**hydro-powered electricity**” from now on throughout EcoLogo™ documents for the sake of clarity.

2.2. Mercury Emissions

[Addition]:

9. To meet the requirements of this **standard**, **hydro-powered electricity** must be generated in such a manner that:

(I) **mercury levels at 100m or less of the generating facility must not exceed 0.001 ppm**

Rationale:

Once and if vegetation is submerged in a reservoir, “bacteria present in decaying vegetation can change mercury, present in rocks underlying a reservoir, into a form that is soluble in water. The

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mercury accumulates in the bodies of fish and poses a health hazard to those who depend on these fish for food” (Environment Canada, 2006). According to Health Canada(2008), for young children (12 years of age and younger), regular consumption of fish that contain on average 0.3 ppm or more total mercury (assumed to be 100% methylmercury) could result in the Provisional Tolerable Daily Intake being exceeded. Moreover, according to them, mercury is a toxic element and serves no beneficial physiological function in man. In fact, they’ve established a maximum acceptable concentration of 0.001 mg/L (1 µg/L) [0.001 ppm] in drinking water (Health Canada, 2009). This later limit is the one the EcoLogo™ Program suggests for its standard.

2.3. Alternative Uses and/or Other Energy Options

Rationale:

According to Batrich et al. (2004), the World Commission of Dams recommends that an individual assessment is needed to evaluate new construction options, and non-dam options should be preferred wherever possible. The EcoLogo™ Program agrees that, lower impact alternative power options should be preferred when possible. To address this, the EcoLogo™ Program is proposing to require that all EcoLogo™ Program renewable low-impact electricity facilities pass a Cumulative Impact Assessment. This proposed addition can be found elsewhere in the **General Considerations Background Notes**. This type of assessment includes an analysis of alternatives uses and is therefore sufficient to address this concern.

2.4. Cumulative Effects of Multiple Projects on a River

Rationale:

See **General Considerations Background Notes** presented elsewhere for the review of CCD-003.

3. Unchanged Criteria Statements in the Current Active Standard

Following preliminary research and a discussion with stakeholders, the EcoLogo™ Program proposes to keep certain criteria statements intact. Only those criteria statements that were discussed with stakeholders will be presented below. A rationale explaining why we are proposing to keep statement unchanged is provided for those.

3.1. Protection of Aquatic and Riparian Species (e.g. Fish)

[Current]:

9. To meet the requirements of this standard, hydro-powered electricity must be generated in such a manner that the generating facility:

(a) operates in compliance with all regulatory licenses, regulatory requirements and/or other authorizations pertaining to fisheries (including, for facilities located in Canada, the *Fisheries Act*), without regard to waivers or variances that may be granted or authorized;

(c) does not operate under any authorization with terms and conditions allowing the harmful alteration, disruption, or destruction of fish habitat unless:

- i) such harmful alteration, disruption, or destruction is not affecting the limiting factor controlling productive capacity,
- ii) loss of the affected habitat is compensated by the creation of similar habitat, supporting the same stock, at or near the development site within the same ecological unit, such that the created habitat replaces lost productive capacity, within an approved safety factor.

For facilities located in Canada, these conditional authorizations include those issued under Section 35(2) of the *Fisheries Act*, by the Minister of Fisheries and Oceans or under regulations made by Governor in Council under the *Fisheries Act*.

(f) operates such that reduced water flows in the bypassed reach and reaches downstream of diversion dams and/or dykes are not detrimental to indigenous aquatic and riparian species;

(g) operates such that instream flows downstream of the tailrace are adequate to support downstream indigenous aquatic and riparian species at pre-project ranges;

(i) operates such that any changes in water temperature caused by the facility in the head pond in reaches downstream of the tailrace, or downstream of any diversion dams and/or dykes are not detrimental to indigenous aquatic species;

(j) where a human-made structure is placed across a waterway where no natural barriers exist, provides fish passage when necessary for the purpose of maintaining pre-existing migration patterns for fish communities both upstream and downstream; and

(k) provides any measures (including *inter alia* trash racks, oversized intake structures designed to slow intake velocities, underwater strobe and sound, fish screens) necessary to minimize fish mortality that would occur through impingement and entrainment.

Rationale:

The EcoLogo™ Program thinks that the current criteria statements sufficiently protect aquatic and riparian species. Therefore, we do not think it necessary to further consider this issue during this review of CCD-003.

3.2. Water Quality

9. To meet the requirements of this **standard, hydro-powered electricity** must be generated in such a manner that the generating facility:

(h) operates such that water quality in a head pond, a bypassed reach, reaches downstream of the tailrace and reaches downstream of any diversion dams and/or dykes remains comparable to pre-project quality in unaltered bodies of water or waterways within the local watershed;

Rationale:

Besides for potential mercury emissions which are being addressed in a separate section in this document, the EcoLogo™ Program thinks that the current active standard adequately addresses water

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quality issues. Therefore, the EcoLogo™ Program does not think it necessary to further consider this issue during this review.

3.3. Impacts due to Changes in Water Flow

[Current]:

(b) operates in compliance with all regulatory licenses, regulatory requirements and/or other authorizations regarding water levels and flows, without regard to waivers or variances that may be granted or authorized;

(e) as a maximum, causes as much water to flow out of the head pond as is received in any 48-hour period;

In cases where this particular criterion cannot be met, the ECP will none-the-less consider certification if the applicant submits evidence that indicates those hydrological and ecological components key to sustainability of the surrounding watershed are maintained. As a minimum, this evidence must include environmental impact assessments and documentation from a formal public consultation process.

In cases where neither of the above conditions is met, the applicant can opt to apply to a multi-stakeholder and public Electricity Review Process to demonstrate equal or lower adverse environmental impacts.

Rationale:

According to the International Hydropower Association (2004):

*Changes in water quality are likely to occur within and downstream of the development as a result of impoundment. **The residence time of water within a reservoir is a major influence on the scale of these changes**, along with bathymetry, climate and catchment activities. Major issues include reduced oxygenation, temperature, stratification potential, pollutant inflow, propensity for disease proliferation, nutrient capture, algal bloom potential and the release of toxicants from inundated sediments.*

Also,

*The loss of rare and threatened species may be a significant issue arising from dam construction. This can be caused by...**altered downstream flow patterns**...*

Futhermore,

*In some regions a significant long-term issue with reservoirs, irrespective of their use, is the introduction of exotic or native pest species. **The change in environment caused by storage creation** often results in advantageous colonization by species*

Since adverse changes in aquatic ecosystems are likely to be caused by changes in water flow due to prolonged storage, the EcoLogo™ Program maintains that the current 48-hour shaping of river flows criterion in the current standard, is an appropriate safeguard for the protection of river ecosystems affected by hydro power developments.

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Moreover, because of uncertainty, the EcoLogo™ Program recognizes that exceptions to this rule might occur although this has never been proven as of yet. Because of this, the program has included the possibility for a public electricity review process to demonstrate equal, or lower adverse environmental impacts in the case where the 48-hour shaping criteria cannot be met. This, we believe, addresses the issue of scientific uncertainty.

4. Considerations Withdrawn from Review

Following preliminary research consultations, the EcoLogo™ Program has withdrawn the following environmental considerations from this review. Below, we provide a rationale explaining why we have decided not to address these considerations further during this review. Only those topics that were discussed with stakeholders will be presented below.

4.1. Greenhouse Gas Emissions

Rationale:

See *General Considerations Background Notes* presented elsewhere for the review of CCD-003.

4.2. Criteria Air Emissions (NOx and SOx Emissions)

Rationale:

See *General Considerations Background Notes* presented elsewhere for the review of CCD-003.

4.3. Hazardous Waste

Rationale:

According to Bratrich et al. (2004), no hazardous waste is produced during the decommissioning of a plant. Therefore, the EcoLogo™ Program does not think it necessary to further consider this issue during this review of CCD-003.

4.4. Helping the Design of Plants

[Proposal]:

A stakeholder has proposed that:

A project should be evaluated on a case by case basis. EcoLogo™, or a 3rd party consultant, should be involved in the design stage to point out alternative design ideas. It would be useful for developers if projects could, at the beginning stages of their design, state their intention for EcoLogo™ status, and have consultation or resources by which to guide their design towards status. (i.e. a personalized checklist for the project of what must be done, in the design, to guarantee EcoLogo™ status).

Rationale:

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Background Notes: CCD-003 Standard Review

The EcoLogo™ Program thinks that CCD-003 and the sufficient evidence verification checklist already adequately address the concerns raised by this stakeholder. Therefore, the EcoLogo™ Program does not think it necessary to further consider this issue during this review of CCD-003.

4.5. Restoration

Rationale:

According to Bratrich (2004), “the certification of green hydropower should *not* subsidize new facilities but should be linked to money invested for restoration activities.” The EcoLogo™ Program disagrees that subsidies related to the certification of green hydropower should not only be put aside for restoration activities that do not include new facilities. Instead, we think that investing in new renewable low-impact facilities could help displace more polluting fossil fuel forms of power, and could therefore be considered a form of restoration.

4.6. Applying the International Hydropower Association’s Sustainability Protocol and Guidelines

Rationale:

During preliminary research consultations, it was suggested that the EcoLogo™ Program should take into consideration during this review tools like the International Hydropower Association’s (2004; 2006) Sustainability Assessment Protocol and Sustainability Guidelines. We have reviewed these documents and recognize that they cover all of the same environmental issues under discussion for this review, or covered in the current active standard (CCD-003), albeit using different wording. Therefore, we do not see how these documents could be further applicable at this time. We also recognize that the International Hydropower Association has demonstrated that it might develop a certification scheme based on these guidelines and protocol (Scanlon et al. n.d.). Since this scheme does not appear available at this time, the EcoLogo™ cannot consider its content at this time.

4.7. Pumped Storage Hydro

Rationale:

The EcoLogo™ Program does not think that pumped storage should currently be considered within CCD-003 because this type of technology is a net consumer of electricity overall and not a net producer. The current standard only applies to power generators.

4.8. Land Use

See *General Considerations Background Notes* presented elsewhere for the review of CCD-003.

5. References

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