

Background Notes

EcoLogo™ Program Standard Review (Round 1)

May 14, 2009

CCD-003 Electricity-Renewable Low-Impact
(F) TIDAL & WAVE-POWERED ELECTRICITY

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1. Introduction

Tidal and wave-powered electricity is not currently included in the EcoLogo™ standard for renewable low-impact electricity (CCD-003), and therefore, no tidal and wave power electricity have yet been third-party certified by the EcoLogo™ Program. However, based on a preliminary review of life cycle information, it seems that tidal and wave-powered electricity products, if properly built, could offer considerable environmental benefits and meet strict requirements for a reduction in noxious air emissions, as well as for tidal and wave ecosystem and wildlife impacts amongst others.

During a preliminary research period, the EcoLogo™ Program engaged with stakeholders to narrow down the scope of environmental criteria categories as well as to begin to define environmental leadership for tidal and wave-powered electricity within these categories. This scope will be presented in this document. Moreover, the EcoLogo™ Program will propose environmental leadership criteria for further stakeholder review.

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. Definition of Tidal and Wave-Powered Electricity

[Addition]:

The EcoLogo™ Program proposes to add this definition within the Interpretation section of CCD-003:

“tidal & wave-powered electricity” means electricity generated from the kinetic energy delivered by tidal and river currents and from waves nearshore.

Rationale:

Following preliminary research and a discussion with tidal and wave power experts, it was confirmed that the primary ocean energy markets are in the kinetic energy delivered by tidal and river currents and in the waves near shore at this time.

2.2. Protection of Marine Mammals and Fish

[Addition]:

11. To meet the requirements of this standard, tidal and wave-powered electricity must be generated in such a manner that the generating facility:

- (a) does not operate under any authorization with terms and conditions allowing the harmful alteration, disruption or destruction of fish and marine mammal habitat unless such**

harmful alteration, disruption or destruction is not affecting the limiting factor controlling carrying capacity;

Rationale:

Following preliminary research and a discussion with tidal and wave-power experts, the risk to mammals and fish due to tidal and wave-powered electricity production seems low at the current time since fish and mammals have been shown to avoid tidal and wave power devices. However, since the knowledge base regarding impacts to mammals and fish due to wave and tidal-powered electricity production is small, as a precaution, the EcoLogo™ Program still wants to include criteria within CCD-003 that reflect concern for fish and marine mammals. The potential future tidal and wave-powered electricity licensees would have to demonstrate through a Cumulative Effects Assessment (CEA) that proper measures have been put in place to monitor impacts to fish and mammals identified to be of concern throughout the CEA process (The Cumulative Effects Assessment Working Group and AXYS Environmental Consulting Ltd, 1999).

2.3. Protection of Seabed

[Addition]:

11. To meet the requirements of this standard, tidal and wave-powered electricity must be generated in such a manner that the generating facility:

To meet the requirements of this standard, tidal and wave-powered electricity must be generated in such a manner that the generating facility:

(b) does not cause significant adverse effects on the fundamental hydrodynamic processes of a tidal or wave regime (energy flow, erosion, sediment transportation and deposition) or on biological processes

Rationale:

To protect marine ecosystems, the EcoLogo™ Program has decided to follow the recommendation of Offshore Energy Environmental Research Association (2008) that commercial application of marine renewable energy developments should go ahead only when a proponent can demonstrate that there will be no significant adverse effects on the fundamental hydrodynamic processes of a tidal regime (energy flow, erosion, sediment transportation and deposition) or on biological processes and resources. Moreover, after consultations with stakeholders, it seemed that the proper tool to verify potential impacts to fundamental hydrodynamic processes of a tidal or wave regime (energy flow, erosion, sediment transportation and deposition) or on biological processes is the Cumulative Environmental Assessment which is increasingly seen as representing best practice in conducting environmental assessments. This type of assessment is being proposed as a requirement elsewhere in the *General Considerations Background Notes*.

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

stakeholder will be presented below. A rationale explaining why we are proposing to keep statement unchanged is provided for those.

3.1. Greenhouse Gas Emissions

Rationale:

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

4. Considerations Withdrawn from Review

Following preliminary research and a discussion with stakeholders, 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. Renewability

Rationale:

According to the Centre for Energy (n.d.), tidal and wave-powered electricity is renewable due to the endless natural motion of waves and tides. Tides occur twice a day due to the gravitational pull of the moon. Waves are produced by the wind on the tidal and wave surface. Therefore, tidal and wave-powered electricity is considered renewable and therefore meets section 4 (e) of the current standard. Therefore, the EcoLogo™ Program does not think it necessary to further consider this issue during this review.

4.2. Specific Impacts on Birds

Rationale:

Following preliminary research and a discussion with tidal and wave-power experts, it is safe to assume that there will be very little impact from ocean energy on birds. If impacts are to occur, these will permeate through the Environmental Assessment process. Therefore, the EcoLogo™ Program does not think that there is a need to require criteria statements on this point in CCD-003.

4.3. Aesthetic Impacts

Rationale:

The EcoLogo™ Program thinks that visual impacts are adequately addressed in section 4. a), b), c) of the current active standard. Therefore, there is no need to require additional criteria statements on this issue.

4.4. Criteria Air Emissions (NOx and SOx Emissions)

Rationale:

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

4.5. Reducing in CO and Particulate Air Emissions

Rationale:

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

4.6. Efficiency

Rationale:

According to the Ocean Energy Council (2008), wave energy contains roughly 1000 times the kinetic energy of wind, allowing much smaller devices to produce the same amount of power in a fraction of the space. Moreover, they argue that wave power production is more consistent than wind or solar, resulting in higher overall capacity factors. Furthermore, because wave energy varies according to the square of wave height, a much higher power production from waves (averaged over time) results. Therefore, tidal and wave-powered electricity already seems to represent environmental leadership in the domain of efficiency. There is thus no need to require additional criteria statements on this issue.

4.7. Improving Water Availability

Rationale:

According to Thorpe (2007), within 5 to 10 years' time, wave energy could start to make a significant contribution to the provision of potable water. Some companies are hoping to use wave technology to create potable water through reverse osmosis, which may address some water shortages. Although the EcoLogo™ Program recognizes that improving water availability is an environmental benefit, we do not think that, at this time, it is necessary to include such consideration to achieve environmental leadership in the wave and tidal-powered electricity sector. Therefore, there is no need to require additional criteria statements on this issue.

4.7.1. Tidal Barrages

Rationale:

The EcoLogo™ Program thinks that the concerns regarding tidal barrages have been addressed in the proposed criteria statements 11 a) and b) above. Therefore, we think there is no need to require additional criteria statements on this issue.

5. References

Centre for Energy. (n.d.). *Tidal and Wave Energy*. Retrieved June 19, 2008, from <http://www.centreforenergy.com/outsideNav.asp?href=http://www.essentialtalk.com/public/sales/see ds/tidal/index.html&template=0>

Conference Board of Canada. (2003). *Renewable Energy in Canada*. Retrieved March 24, 2008, from http://www.conferenceboard.ca/pdfs/Renewable_Energy_Canada.pdf

Energy Systems Research Unit of the University of Strathclyde. (n.d.). *Tidal Power*. Retrieved August 25, 2008, from http://www.esru.strath.ac.uk/EandE/Web_sites/01-02/RE_info/Tidal%20Power.htm#envirob1

Ocean Energy Council. (2008b). *Wave Energy*. Retrieved May 2, 2008, from <http://www.oceanenergycouncil.com/index.php/Wave-Energy/Wave-Energy.html#6>

Offshore Energy Environmental Research Association. (2008). *Fundy Tidal Energy Strategic Environmental Assessment Final Report*. Retrieved June 18, 2008, from <http://www.offshoreenergyresearch.ca/OEER/SEAHome/tabid/1117/Default.aspx>

Pembina Institute. (n. d.). *Energy Source: Tidal Power*. Retrieved March 19, 2008, from <http://re.pembina.org/sources/tidal>

The Cumulative Effects Assessment Working Group and AXYS Environmental Consulting Ltd. (1999). *Cumulative Effects Assessment Practitioners Guide*. Retrieved March 2, 2009, from http://www.ceaa.gc.ca/013/0001/0004/Cumulative-Effects_e.pdf

U. S. Department of Energy (DoE). (2005). *Ocean Tidal Power*. Retrieved March 24, 2008, from http://apps1.eere.energy.gov/consumer/renewable_energy/ocean/index.cfm/mytopic=50008

Thorpe, T. (2007). *Wave Energy Technologies*. Retrieved March 19, 2008, from http://www.worldenergy.org/publications/survey_of_energy_resources_2007/wave_energy/762.asp