



# EcoLogo™

Environmental Standard - Certification Criteria Document

## CCD 003: Renewable Low Impact Electricity

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A terrachoice company

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## Introduction

The EcoLogo Program is pleased to publish the following Renewable Low-Impact Electricity Products Standard Draft 3.

The EcoLogo Program is designed to support a continuing effort to improve and/or maintain environmental quality by reducing energy and materials consumption and by minimizing the impacts of pollution generated by the production, use and disposal of goods and services available to North Americans.

Based on a review of currently available life cycle information of the production, use and disposal stages, and consideration of the markets and stakeholder input, products certified under this standard will produce an environmental benefit through:

- a) the displacement of non-*renewable* fuels by *renewable*, more sustainable fuel sources;
- b) the reduction of air emissions that contribute to climate change, smog, acid rain and air-borne particulate pollution;
- c) the reduction of solid wastes arising from both the mining and extraction of non-*renewable* fuel sources, and the disposal of toxic metal emissions and nuclear wastes; and;
- d) the reduction of impacts on aquatic, *riparian* and terrestrial ecosystems from electricity generating activities.

Standard development is an ongoing process. As information and technology change, the product category requirements will be reviewed and possibly amended. The EcoLogo Program anticipates that *generators* and *marketers* of electricity that conform to this standard will apply to the EcoLogo Program for verification and subsequent authority to label the qualifying products with the EcoLogo. The EcoLogo Program maintains verification protocols that clearly define the terminology and associated criteria limits of this standard.

## Notice

Throughout this document, any reference to a standard or guideline means to its latest edition. The EcoLogo Program reserves the right to accept equivalent test data for the test methods specified in this document. Equivalent test methods will be identified in interpretations appended to the end of the standard.

## Interpretation

1) In this standard, the defined terms are italicized. The definitions are:

***“authorized user”*** means a user that is licensed by the EcoLogo Program to use the EcoLogo symbol and/or the words “EcoLogo” and “EcoLogo Program” in their own marketing and communications materials;

***“biogas”*** means gaseous products (primarily methane and carbon dioxide) produced by the anaerobic decomposition of organic wastes. Facilities producing *biogas* include *inter alia*, sewage treatment plants, farm and food-based anaerobic digestion of plants and animal residue processing facilities;

***“biogas-fuelled electricity”*** means electricity generated from a system in which *biogases* are captured for combustion and conversion to electricity;

***“biogenic”*** means from recently living plants and animals that have died 80 or less years ago;

***“biomass-fuelled electricity”*** means electricity generated through the combustion of *biomass*. Biomass fuels eligible in this standard include organic materials as listed below that have, at no stage in their lifecycle, been treated with organic and/or inorganic substances to change, protect or supplement the physical properties of the materials (including *inter alia* synthetic chemical pest-control products, fungicides, wood preservatives, paints, varnishes or other surfaces coatings, halogenated compounds and/or compounds containing heavy metals). Specific types of *biomass* recognized under this standard include:

- a) solid biomass removed from fields and forests which are following sound environmental management practices either as whole plants, parts of plants, or as harvesting residues, and any industrial by-product residues arising from the harvesting and processing of agricultural crops or forestry products that would otherwise be sent to landfills and/or incinerated;
- b) *dedicated energy crops*;
- c) liquid fuels derived from biomass as defined in items (a) and (b), including *inter alia* ethanol, biodiesel, and methanol; and
- d) plant matter-based renewables that have been separated from municipal solid waste (MSW), and subsequently processed (e.g., pelletization, gasification) to serve as a combustion fuel.

Eligible biomass fuels do not include manufacturing process by-products that have been treated in the manners listed below. If the treated biomass types comprise 1% or less by weight of the total biomass used to generate electricity at a particular facility and the remainder is from eligible sources of biomass, all biomass-derived electricity may be eligible with prior approval from EcoLogo.

- a) wood coated with paint, plastics or formica;
- b) wood that has been treated with preservatives containing halogens, chlorine or halide compounds like chromated copper arsenate or arsenic; or
- c) wood that has been treated with adhesives resulting in toxic emissions (e.g. formaldehyde).

**“broker”** means an entity that puts a buyer of a REC or bundled electricity product in contact with a seller of these products. The broker is not an owner of REC(s) or bundled electricity products(s);

**“bundled renewable low-impact electricity”** means a combined transaction in which the *environmental benefits* and electricity are sold together;

**“bypassed reach”** means that area in the waterway between the initial point where water has been diverted through turbines or other mechanical means for water-powered electricity generation and the tailrace;

**“captive rate-based customers”** means utility clients who have no choice but to purchase electricity from their local utility;

**“CITES”** means the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES Secretariat, 15, chemin des Anémones, CH\_1219 Châtelaine-Genève, Suisse. Tel. (+4122) 979 9139/40, fax (+4122) 797 3417).

**“CO”** means carbon monoxide, and should be measured using the testing frequency, conditions and methods specified in Appendix 1 of this standard;

**“concentrating solar thermal technology”** means a system that concentrates the heat of the sun through collectors, and uses the collected heat to drive a generating system to produce electricity;

**“conventional hydro-powered electricity”** means electricity generated from a system or technology that uses a mechanical method to capture and convert the potential energy of water into electricity. Conventional hydropower facilities use one-way water flow to generate electricity. There are two categories of conventional plants, run-of-river and store and release. Not included in the definition of conventional hydropower are pump storage or instream-powered electricity;

**“Cumulative Effects Analysis”** means an analysis performed following the Council on Environmental Quality (1997) recommendations;

**“Cumulative Effects Assessment”** means a cumulative assessment performed following the *Cumulative Effects Assessment Practitioners Guide* (The *Cumulative Effects Assessment* Working Group, 1999);



**“dedicated energy crops”** means those non-food crops grown specifically for their fuel value, and in the case of this standard, for electricity generation. These sources include *inter alia* short-rotation woody crops (such as poplar trees) and herbaceous energy crops (such as switch grass);

**“de-inking sludge”** means solid material filtered out of the wastewater from the process used to remove ink and other undesirable materials from printed wastepaper;

**“diversion”** means the construction of works to divert water into a canal, tunnel, penstock or similar conduit to supply water for electricity generation purposes;

**“downstream sale”** means any other sale of RECs after an initial sale;

**“elemental chlorine bleaching”** means the chemical process of purifying and whitening pulp, specifically through the use of chlorine in its gaseous, elemental form (Cl<sub>2</sub>);

**“ecological values”**, in the context of forestry, means the ecological attributes that are maintained by following sound environmental practices;

**“end-user ”** means the final user of a REC or bundled electricity product. An end-user could be anyone who uses a REC or bundled electricity product (e.g. a retail, wholesale or commercial customer, a marketer or a generator). Additionally, an end-user could have an on-going contractual agreement for the delivery of a REC or bundled electricity product, or could be receiving a REC or bundled electricity product on a one-time use basis;

**“environmental attribute”** means an instrument used to represent the environmental costs or benefits associated with a fixed amount of electricity generation, usually from a specific generation facility; ;

**“environmental benefits”** means the *beneficial* environmental attributes of a generation facility. In the context of this standard, the environmental benefits result from the generation of renewable low-impact electricity. These benefits include *inter alia* the displacement of non-renewable fuels, the reduction of air emissions, the reduction of solid and nuclear wastes, and the reduction of impacts on aquatic, riparian and terrestrial ecosystems. For EcoLogo Renewable Energy Certificates, environmental benefits are a qualitative representation; exact quantities of benefits are not represented;

**“farm and food-based biogas systems”** means biogas-fuelled electricity systems in which biogases are based on the anaerobic digestion of plants and animal residues with no remaining food market value;

**“fish habitat”** means spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes;

**“fish passage”** means both the upstream and downstream migration of fish that can be ensured with the use of natural and/or human-made methods. Human-made methods include *inter alia* fishways, fish ladders, fish locks, fish elevators, powerhouse collection galleries, *diversion* screens, and by-pass facilities;

**“fossil”** means from coal, petroleum, natural gas or any derivative of coal, petroleum or natural gas;

**“generation facility”** means a power station designed and built to produce electricity;

**“generator”** means an entity that owns and operates a generation facility or multiple generation facilities;

**“geothermal-powered electricity”** means electricity generated from a system that uses hydrothermal steam or water;

**“greenhouse gas”** means a gas that is considered to contribute to global warming and includes, *inter alia*, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O);

**“grid”** means a network of wires and cables that transport electricity from generation facilities to establishments situated elsewhere;

**“habitat compensation”** means replacing habitat that has been subjected to *harmful alteration, disruption or destruction* with newly created habitat or improving the productive capacity of some other natural habitat;

**“harmful alteration, disruption or destruction”** means, in respect of *fish habitat*, any change to *fish habitat* that reduces, or eliminates, its productive capacity in relation to one or more life processes of fish;

**“harvesting and industrial by-product residues”** means a form of *biomass* and includes *inter alia*:

- a) mill residues (e.g. residual by-products associated with the processing of forest materials such as bark, sawdust, solid trim, shavings, veneer clippings, clarifier sludge, pulping liquors);
- b) silviculture and logging residues not needed to be retained for ecological values;
- c) crop residues with no remaining *human food market value* (e.g. materials not needed for soil re-incorporation such as straw, chaff, corn cobs, bean residues, and dried stalks of harvested grain), and
- d) untreated construction and demolition wastes that cannot be re-used;

**"head pond"** generally means the body of water immediately upstream of the intake structure of electricity generation facilities. *Head ponds* may be natural or human made (lands inundated and/or water bodies created as a result of the construction of the generation station and/or the associated *diversion* structure(s)), or a combination thereof. *Head ponds* may serve one or more purposes including, but not limited to: (i) providing the appropriate hydraulic characteristics, such as submergence, for the intake structure; (ii) increasing the available head of the *generation facility*; and (iii) storing water for subsequent discharge through the *generation facility*. *Head ponds* also include changes caused by the *diversion* of a portion of a river through a canal or penstock;

**"human food market value"** means food that could be reasonably expected to be environmentally and cost-effectively transported to a place where it could be used for commercial food purposes (e.g. is unspoiled, found in food markets);

**"hydro-powered electricity"** means electricity generated from a system or technology that uses a mechanical method to capture and convert the potential energy of water into electricity;

**"initial sale"** means the sale of a REC from the producer of electricity to another user;

**"instream flow"** means the water volume flowing in a waterway;

**"instream-powered electricity"** means non-conventional hydro-powered electricity generated from currents within a stream or river which has not been dammed or altered by a bypass reach;

**"islanded grid"** means a small grid system that is not connected to any of the large provincial power pools in Canada which are defined by their political boundaries;

**"ISO"** means International Organisation for Standardisation;

**"low net greenhouse gas emissions"** means producing mostly biogenic greenhouse gas emissions and/or lower life cycle greenhouse gas emissions than the best fossil fuel systems. Greenhouse gases include: CO<sub>2</sub>, C<sub>4</sub>H and NO;

**"marketer"** Marketers sell their REC(s) or bundled electricity products to interested buyers (e.g. retail, commercial or institutional buyers or other marketers). Note that a marketer possibly combines electricity from various sources and that in some cases, *marketers* may also be *generators*;

**"MW"** means megawatt or 10<sup>6</sup> watts, and a unit of electrical power;

**"MWh"** means megawatt-hour, and a unit of electricity equal to one megawatt of power produced, consumed or flowing for a period of 1 hour;

**“multi-sourced power product”** means a combination of electrical power that is offered by *marketers*, and is comprised of electricity from more than one source and/or *generator*, where the sources and/or *generators* may or may not be certified under this standard;

**“NO<sub>x</sub>”** means nitrogen oxides, and should be measured using the testing frequency, conditions and methods specified in Appendix 1 of this standard;

**“null electricity”** means electricity distributed on the grid from which RECs have been separated that has no associated *environmental benefits*. Once the *environmental benefits* or RECs have been separated from the *renewable low-impact electricity*, the electricity becomes “null”;

**“off-grid”** means a generation facility that is not connected to any islanded grid or large provincial power pools in Canada;

**“operational air emissions”** means the quantity of air-borne emissions of a specified substance or compound that is released as a result of the generation of electricity;

**“PCDDs and PCDFs”** means polychlorinated dibenzo-para-dioxins and polychlorinated dibenzo-furans, and is a family of chlorinated organic compounds formed as trace contaminants or by-products in industrial processes. This includes the undesirable toxic contaminants generated when chlorine is used in the bleaching of wood pulp and when *salt-laden wood* is combusted;

**“planned generation facility”** means a generation facility not yet producing electricity;

**“PM”** means particulate matter, including particulate matter less than or equal to 10 microns in size, and should be measured using the frequency and methods specified in Appendix 1 of this standard;

**“photovoltaic (PV) technology”** means a cell, module, panel, array and/or array field that directly converts light energy from the sun into electricity;

**“renewable”** means replenished through natural processes or through sustainable management practices so that a resource is not depleted at current levels of consumption;

**“renewable portfolio standard”** or **“RPS”** means a state, provincial or federal level policy that requires retailers to buy, or electricity suppliers to provide retail customers a minimum level of electricity generated from eligible renewable energy sources. A synonym of an RPS is a Renewable Electricity Standard (RES). The RPS usually specifies the minimum amount of electricity required (usually as a percentage) and those renewable resources that are eligible for inclusion (some examples can include solar photovoltaic, solar thermal electric, wind, wave, tidal, landfill gas, low-impact hydro, "low emission" biomass). Many such policies also specify, at least for a portion of the requirement, the date after which eligible generators must have begun operation.



**“retirement”** means the final disposition of a REC or bundled electricity product in the market and does not necessarily refer to the retirement of a REC in a particular tracking system for the purpose of trading across tracking systems. A REC or bundled electricity product is considered *retired* if:

- a) its entire environmental benefits have been used in whole or in part to meet a regulatory requirement;
- b) its entire environmental benefits have been used in whole or in part to meet a non-regulatory or voluntary mandate.

Examples of non-regulatory programs or standards or other non-regulatory or voluntary uses of RECs include but are not limited to:

- a) cap-and-trade programs;
- b) renewable portfolio standards;
- c) fulfilling non-regulatory institutional or company procurement policies;
- d) crediting a retail, commercial or institutional end-user with the REC or bundled electricity usage and/or rights of claim ownership; and
- e) in certain instances, participating in a voluntary GHG trading program.

**“renewable energy certificate”** or **“REC”** means an authorized electronic or paper representation of the *environmental benefits* associated with the generation of 1 MWh of *renewable* low-impact electricity. RECs allow the environmental, social and economic attributes of the electricity to be separated from the electricity itself, and passed on or sold as a separate product;

**“riparian”** means the land and habitat found along the banks of streams, rivers and lakes;

**“salt-laden wood”** means timber and forestry residues that have been impregnated with a high concentration of salt (NaCl), either from prolonged exposure to maritime air or from immersion in marine waters (generally for the purpose of transportation);

**“solar-powered electricity”** means electricity generated by converting the sun’s light energy and/or heat energy into electricity, and includes inter alia photovoltaic technologies and concentrating solar thermal technologies;

**“social impacts”** means effects on community values like, for example, heritage, culture, recreation, landscape aesthetics, noise and/or tourism;

**“sound environmental management practices”** means those practices and goals used to manage forest and/or agricultural products within a *sound environmental management system*, as defined in the definitions section of this standard, that have the objectives of maintaining environmental values of the surrounding ecosystem. At a minimum, these practices must address *inter alia*:

- a) species selection;
- b) soil structure, temperature and fertility;
- c) soil composition rates, compaction and conservation;
- d) erosion control;
- e) hauling distance from the harvesting site to the combustion/generation site;
- f) silvicultural practices and techniques;
- g) harvesting practices including techniques, rates and waste minimization;
- h) crop regeneration;
- i) road/trail construction and maintenance;
- j) protection of biodiversity, wildlife and rare, threatened and endangered species;
- k) *water quality* and quantity;
- l) watershed conservation and eutrophication control; and
- m) prior land use.

**“sound environmental management system”** means a system, including *inter alia* the ISO 14000 series of standards, used to manage forest and/or agricultural products that incorporates *sound environmental management practices*. At a minimum, system elements must include:

- a) planning elements such as: identifying forest and/or agricultural resources; identifying environmental aspects; assessing environmental impacts; identifying environmental governmental environmental policies, regulations and guidelines and committing to meeting or surpassing these within an adaptive management context; and defining and committing to environmental policies, objectives and targets;
- b) operational elements such as: defining roles and assigning responsibilities; providing adequate staff training; communicating environmental aspects and policies both internally and externally; implementing an environmental management program based on identified environmental

- aspects and impacts; documenting all policies, goals and procedures; periodically reviewing and, where necessary, revising the system; performing public consultation and/or outreach; and establishing an environmental emergency preparedness and response plan; and
- c) monitoring and measurement elements such as: monitoring and measuring key aspects of the system; evaluating and mitigating negative environmental impacts; correcting non-conformance with the management system; performing internal reviews; and having third party audits performed;

The Canadian Standards Association (CSA), the Forest Stewardship Council (FSC) and the Sustainable Forestry Initiative (SFI) forest management certification systems are also specifically recognized as *sound environmental management systems* used to manage forest products provided that their certified products meet these minimum requirements:

- a) full disclosure of certified content;
- b) harvest rates do not exceed growth rates unless an ecologically sound reason is provided;
- c) no new conversion of natural forest to plantations or to non-natural forest land;
- d) protection of high conservation value forest;

“SO<sub>x</sub>” means sulphur oxides, and should be measured using the testing frequency, conditions and methods specified in Appendix 1 of this standard;

“*species designated as endangered or threatened*” means any species that is listed as either “endangered” or “threatened” on recognized catalogues of such species. In Canada, the default listing shall be that of the federal Committee on the Status of Endangered Wildlife in Canada (i.e. COSEWIC). In the U.S, the default listing shall be that of the Endangered Species Act or relevant federal, provincial, territorial, state and/or local listings (e.g. Ontario’s Committee on the Status of Species at Risk in Ontario; i.e., COSSARO) that supersedes the former, where designations are more stringent;

“*tailrace*” means the point at which water is released back into the waterway below a generation station after being passed through turbines or other mechanical means to produce water-powered electricity generation;

“*TEQ*” means toxic equivalent, and is determined by multiplying the measured concentration level of a given congener by the appropriate I-TEF. By converting the measured concentration levels to a common basis, the *TEQ* quantities may be summed to provide a single representative quantity. For the purposes of this standard, *TEQs* are determined for 2,3,7,8-TCDD and 2,3,7,8-TCDF.

The seven congeners for which 2,3,7,8-TCDD TEQs shall be determined are 2,3,7,8-TCDD; 1,2,3,7,8-P5CDD; 1,2,3,4,7,8-H6CDD; 1,2,3,6,7,8-H6CDD; 1,2,3,7,8,9-H6CDD; 1,2,3,4,6,7,8-H7CDD; and OCDD. The ten congeners for which 2,3,7,8-TCDF TEQs shall be determined are 2,3,7,8-TCDF; 1,2,3,7,8-P5CDF; 2,3,4,7,8-P5CDF; 1,2,3,4,7,8-H6CDF; 1,2,3,6,7,8-H6CDF; 2,3,4,6,7,8-H6CDF; 1,2,3,7,8,9-H6CDF; 1,2,3,4,6,7,8-H7CDF; 1,2,3,4,7,8,9-H7CDF; and OCDF;

**"tidal-powered and wave-powered electricity"** means electricity generated from kinetic energy arising from tidal or wave action;

**"utility"** means any electricity service provider that has "captive" rate-based customers;

**"water-powered electricity"** means electricity generated from a system or technology that uses a mechanical method to capture and convert the potential or kinetic energy of water into electricity. This type of electricity includes "conventional hydro-powered electricity", "instream-powered electricity" and "tidal and wave-powered electricity";

**"water quality"** means characteristics of water, specifically including amount of dissolved oxygen, pH, total phosphorus, turbidity, transparency and chlorophyll, and any other item that is critical for ecosystem and human health;

**"wind-powered electricity"** means electricity generated from a *wind turbine* that converts the kinetic energy of the wind into electricity; and

**"wind turbine"** means a system that uses air foils or blades attached to a drive shaft in order to capture the kinetic energy of the wind. The wind pushes against the blades/foils and spins a drive shaft. The drive shaft, either directly or indirectly through a series of gears, moves the *generator* to produce electricity;

## Category Definition

- 2) This category comprises two renewable low-impact electricity products which are apt to impose relatively low impacts on the environment and produce potential benefits including, *inter alia*, low net greenhouse gas emissions, limited depletion of non-renewable resources, reduced emissions of other pollutants and reduced impacts on aquatic, riparian and terrestrial ecosystems and species.

These two products are:

### ***Bundled Renewable Low-Impact Electricity Renewable Energy Certificates***

The *bundled renewable low-impact* electricity and RECs recognized in this standard must come from these generation technologies:

- a) *biogas-fuelled electricity;*
- b) *biomass-fuelled electricity;*
- c) *geothermal-powered electricity;*
- d) *solar-powered electricity;*
- e) *water-powered electricity;*
- f) *wind-powered electricity*

The generating technologies from which the RECs and bundled electricity products come from must also meet the General Requirements outlined in this standard. Also, these products must meet Product Specific Requirements outlined in this standard.

## Generation Requirements

### **General Generation Requirements**

- 3) To meet the requirements of this standard, the *renewable* low-impact electricity products must:
  - a) meet or exceed all applicable governmental, industrial safety and performance standards; and
  - b) be generated in such a manner that all steps of the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the Fisheries Act and the Canadian Environmental Protection Act, 2010, (CEPA, 2010).
- 4) To meet the requirements of this standard, the *renewable* low-impact electricity products must:
  - a) be accompanied by evidence that appropriate consultation with communities and stakeholders has occurred, that issues of concern have been reasonably addressed, that reasonable mitigation of negative social and environmental impacts, where applicable, has been carried

- out, and that unmitigated or unmitigable social and environmental impacts, if they exist, are of limited scale and scope;
- b) be accompanied by evidence that prior or conflicting land use, biodiversity losses and scenic, recreational and cultural values have been addressed during project planning and development;
  - c) be generated in a manner that is reliable and practical (e.g. not in research and development stages, actually generating electricity);
  - d) be generated by that proportion of fuel heat input attributed to eligible *renewable* sources in order to be designated as EcoLogo -certified;
  - e) be generated in a manner such that it will not jeopardize the survival or recovery of any species designated as endangered or threatened;
  - f) meet the criteria and associated definitions in this standard that are applicable to the generation technology employed;
  - g) demonstrate that cumulative effects have been considered following best practices of *Cumulative Effects Assessment* in Canada or of *Cumulative Effects Analysis* in the United States;
  - h) demonstrate that appropriate waste management plans are in place for the proper waste minimization, re-use, sorted recycling and safe disposal of all solid waste resulting from the construction, generation and end of life phases of the electricity generation;
  - i) show that a water management plan is in place which includes, where appropriate, water conservation and/or water quality considerations; and
  - j) be accompanied by evidence that a monitoring plan has been put in place to monitor all of the environmental impacts addressed by this standard.

### Technology-Specific Generation Requirements

- 5) To meet the requirements of this standard, **biogas-fuelled electricity** must be generated in such a manner that:
  - a) the total of load points assessed for *operational air emissions* of carbon monoxide (CO), particulate matter (PM), nitrogen oxides (NO<sub>x</sub> measured as NO<sub>2</sub>) and sulphur oxides (SO<sub>x</sub> measured as SO<sub>2</sub>), as determined in Appendix 2, does not exceed 6.
  - b) for *farm and food-based biogas systems*:

- i) best practices applicable to local conditions for nutrient management of agricultural materials must be followed;
  - ii) the project's nutrient management plan must show how by-product P and N will be beneficially used, and not allowed to contribute to eutrophication where eutrophication could become an adverse effect.
- 6) To meet the requirements of this standard, **biomass-fuelled electricity** must be generated in such a manner that:
- a) the total of load points assessed for *operational air emissions* of carbon monoxide (CO), particulate matter (PM), nitrogen oxides ( $NO_x$  measured as  $NO_2$ ) and sulphur oxides ( $SO_x$  measured as  $SO_2$ ), as determined in Appendix 2, does not exceed 6;
  - b) if generated from *harvesting and industrial by-product residues*:
    - i) use only *harvesting and industrial by-product residues* that have been sourced from operations that have implemented a *sound environmental management system* and are adhering to *sound environmental management practices*;
    - ii) ensure the rate of harvest does not exceed levels that can be sustained, and
    - iii) not use *harvesting and industrial by-product residues* from species that are listed in the *CITES Appendices*;
  - c) if generated in recovery or power boilers from biomass fuel containing salt-laden wood, deinking sludge or spent pulping liquors, the facility must not emit, in the exhaust gases, polychlorinated dioxins and/or furans in excess of the following the limits for new or rebuilt pulp and paper boilers burning salt-laden wood as specified in the Canada Wide Standards for Dioxins and Furans (Canadian Council of Ministers of the Environment);
  - d) if generated from *dedicated energy crops*:
    - i) use only *dedicated energy crops* that have been sourced from operations that have implemented a *sound environmental management system* and are adhering to *sound environmental management practices*;
    - ii) ensure the rate of harvest does not exceed levels that can be sustained;
    - iii) at least 5% of the energy crops must be grown organically following the Canadian National Organic Production Standard specified in the Organic Products Regulations (SOR/2006-338) in Canada and the United States Department of Agriculture Organic Standard in the U.S.;

- iv) if generated from non-woody dedicated energy crops no land was deforested and peatland was drained for the purpose of growing energy crops;
  - e) genetically modified products cannot be used.
- 7) To meet the requirements of this standard, **geothermal-powered electricity** must be generated in such a manner that:
- a) the relevant parts of sections 1.1, 1.3 and 2.1 of the International Finance Corporation's Environmental, Health and Safety Guideline for Geothermal Power Generation are applied to the local context such that:
    - i) if a facility does not re-inject all spent geothermal fluids underground, best practices applicable to effluent management and discharge quality must be followed;
    - ii) if a facility re-injects spent geothermal fluids underground, it does not contaminate the surrounding surface water and groundwater outside of the well waters;
    - iii) all discharges to surface water must meet drinking water quality guideline levels;
    - iv) during acid treatment of wells, incorporates engineered solutions to avoid the leakage of acidic fluids to groundwater;
    - v) mercury and hydrogen sulfide air emissions must be controlled following best practices and not exceed applicable health standards;
    - vi) hazardous solid waste must be properly stored on-site and contained before final treatment and disposal at an appropriate hazardous waste facility;
    - vii) recoverable solids such as sulfur cake should be recycled to the extent feasible if environmental and/or health benefits are determined through such a practice;
    - viii) drill cutting and fluids:
      - (1) must be stored in tanks or sump lines with an impervious membrane; and
      - (2) must be re-used where feasible; or
      - (3) disposed at appropriate hazardous waste sites;
    - ix) the facility must not be sited in a way that creates unacceptable health risks due to air or water emissions to nearby communities.
- 8) To meet the requirements of this standard, **water-powered electricity** must be generated in such a manner that:



- 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;
- b) 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 of fish;
  - 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 has been demonstrated to effectively replace 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.

- c) incorporates engineered solutions (including *inter alia* intake structures providing fish-friendly velocity profiles, tailrace barrier, trash racks, oversized intake structures designed to slow intake velocities, underwater strobe and sound, fish screens) that would be effective in minimizing fish mortality that could occur through fish entrainment and/or impingement;
- d) if generated from conventional hydro-powered electricity:
  - i) operates in such a way that the hydrological and ecological components key to sustainability of the surrounding watershed are maintained such that:
    - (1) prior to the addition of the facility's generating capacity, the existing dam, diversion, or impoundment at the facility was not recommended for removal or decommissioning by a provincial or federal departmental authority or by a broad representation of interested persons and organizations in the local and regional community;
    - (2) the flow characteristics of the generation facility are such that:
      - (a) inflows to the facility are unaltered, and the facility lacks a bypass reach and its operation cannot alter river flows in any manner save for incidental evaporation, transpiration, and groundwater seepage in the reservoir; or
      - (b) inflows to and out of the facility are altered by no more than +/- 10%, and the facility has a bypass reach; or

- (c) If the facility is on a river with no other previously built hydro projects, the following characteristics of the river's flow are maintained within a range of 60% or more at all times:
  - (i) magnitude of natural discharge; and
  - (ii) frequency of natural discharge occurrence; and
  - (iii) duration of natural discharge; and
  - (iv) timing and predictability of natural flows; and
  - (v) rate of change or flashiness of natural flows;
  
- (d) If the facility is on a river with other previously built hydro projects, the following characteristics of the river's flow are maintained within a range of 60% or more at all times:
  - (i) magnitude of pre-project discharge; and
  - (ii) frequency of pre-project discharge occurrence; and
  - (iii) duration of pre-project discharge; and
  - (iv) timing and predictability of pre-project flows; and
  - (v) rate of change or flashiness of pre-project flows;

In this case, expansions must use the pre-project baseline of the entire project on which the extra capacity is added.

- (3) To protect riparian and shoreland ecosystems, the generator established:
  - (a) a protected riparian buffer zone dedicated to the protection water quality and of fish, wetland and wildlife habitat extending 61 meters (200 feet) from the high water mark in an average water year around 50-100% of the impoundment, and for all of the undeveloped shoreline; or
  - (b) an approved watershed enhancement fund that could achieve within the facility's watershed the ecological equivalent of a protected riparian buffer zone; or
  - (c) an appropriate shoreland buffer or equivalent watershed land protection plan, with which it is in compliance, for conservation and mitigation purposes (to protect fish and wildlife habitat and water quality) through an agreement with interested provincial and federal departments and stakeholders.
  
- (4) 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 such that:
  - (a) 100% upstream and downstream fish passage survival rates for migratory fish at the dam has been documented using a generally accepted monitoring methodology; or



- (b) other than for species designated as endangered or threatened, 90% or more of individual fishes per species are maintained *in situ* after 5 years compared to pre-project ranges; and
  - (c) the appropriate provincial and federal departments have not declined to issue a recommendation for fish passage because of the technological infeasibility of passage; and
  - (d) there is no absence of habitat upstream of the facility due at least in part to the facility.
- (5) other than for species designated as endangered or threatened, operates such that:
- (a) reduced water flows in the *bypassed reach* and reaches downstream of *diversion* dams and/or dykes do not pose significant adverse impacts to indigenous aquatic and *riparian* species such that at least 90% of individuals per species are maintained *in situ* after 5 years compared to pre-project ranges;
  - (b) *instream flows* downstream of the *tailrace* are adequate to support downstream indigenous aquatic and *riparian* species at at least 90% of pre-project ranges after 5 years;
- (6) 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 does not pose significant adverse impacts to biological processes such that *inter alia*:
- (a) methylmercury levels in fish found at the headpond or other upstream reservoir must not exceed 0.5 ppm, unless it can be demonstrated the methylmercury level in fish has not changed compared to pre-project levels;
  - (b) any changes in water temperature caused by the *generation facility* in the *head pond* or in reaches downstream of the *tailrace* or downstream of any *diversion* dams and/or dykes do not pose significant adverse impacts to indigenous aquatic species;
- ii) if generated after 2000, the generator must demonstrate that they have adopted and applied the Criteria Guidelines from the World Commission on Dams and Development: A New Framework for Decision-Making;
- e) if generated from *tidal, wave, and in-stream-powered electricity*:
- i) 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 such that:

- (1) other than for species designated as endangered or threatened, at least 90% of the pre-project marine dwelling individuals per species in the project area included are not lost; and
  - (2) impacts on biological processes are ecologically compensated for to the extent feasible;
- f) if generated from a facility on a natural lake ecosystem (reservoirs not included):
- i) the fluctuations of the lake must be within the range of +/- 10% of the natural lake fluctuations and operated in a range that protects and enhances indigenous lake species
- 9) To meet the requirements of this standard, **wind-powered electricity** must be generated in such a manner that:
- a) other than for species designated as endangered or threatened, the generation facility and its structures do not pose significant adverse impacts to indigenous and migratory avian and bat species such that no more than 10% of individuals per species are lost due to project activities after 5 years in the project area compared to pre-project levels;
  - b) the *generation facility* and its structures are not located in an area that is protected for avian and bat species designated as endangered or threatened;
  - c) the wind power generator is required to conduct bird studies to evaluate the location of their facility in relation to migratory avian and bat species. When it is determined that the facility poses a reasonable risk to these animals, the facility owner shall test methods to protect such animals (e.g. acoustic "nets") or protect such animals through engineered methods that would be effective in minimizing bird mortality;
  - d) the generator must demonstrate that they are engaging in compensation activities to prevent the decline of populations of bird and bat species; and
  - e) if generated onshore:
    - i) construction activities or routine turbine operations do not cause excessive soil erosion such as silting of nearby drainage, streams, ponds, or lakes that would be harmful to aquatic or riparian species and/or increase erosion from steep slopes, plateau edges, or access roadways; and
    - ii) excavated soil is replaced, and uprooted vegetation replanted, after construction or scrapping, where this can be done without interfering with the operation and servicing of the wind *generation facility*.
  - f) if generated offshore:



- iii) other than for species designated as endangered or threatened, the generation facility and its structures must not pose significant adverse impacts to indigenous or migratory marine mammal, fish, and shellfish species such that 90% or more of individuals per species are not lost in situ compared to pre-project levels due to project activities;
- iv) the *generation facility* and its structures are not located in an area that is protected for marine mammal, fish and shellfish designated as endangered or threatened;



## Product Specific Requirements

### General Product Requirements

Both REC and bundled renewable low-impact electricity products must meet all of the following general requirements:

- 10) A REC or a bundled electricity product that was initially generated by facilities generating renewable low-impact electricity receiving or obtaining tax incentive payments are eligible to be designated as an "EcoLogo REC" or an "EcoLogo bundled electricity" product to the extent possible under laws, regulations and contractual arrangements governing the tax incentive programs.

### Aggregation of Environmental Benefits

- 11) A REC or a bundled electricity product must include all of the environmental benefits, including greenhouse gas emissions benefits, attributable to the renewable low-impact generation from which it was derived to the full extent possible based on current regulatory and legal requirements.

### Electricity Delivery to the Grid

- 12) Electricity products complying with this standard cannot comprise of electricity products from *planned generation facilities*.
- 13) An EcoLogo REC or bundled electricity product must be sold in blocks of at least 0.1 megawatt-hours per month. This minimum quantity represents approximately 17% of the electricity used by an average household. An EcoLogo REC or bundled electricity product may be sold in blocks larger than this minimum.

### Double Counting

- 14) The end-user can use and *retire* or use and have a REC or bundled electricity product retired on its behalf s one time only.
- 15) In no way can a REC or a bundled electricity product be used and/or retired more than one time:
  - a) The same REC or bundled electricity product must not be sold to multiple buyers to be retired as either as a REC or as part of a bundled electricity product. Once a REC has been separated from the electricity with which it was generated, this null electricity may not be use to make claims regarding a REC or bundled electricity use nor does it possess any benefits that are contained in a REC.
  - b) The same REC or bundled electricity product can either be used and/or automatically retired to meet certain regulatory requirements or for voluntary purposes, but not for both.



- The potential regulatory uses include:
- i) cap-and-trade programs;
  - ii) renewable portfolio standards;
  - c) The potential voluntary uses include:
    - i) fulfilling non-regulatory institutional or company procurement policies; and/or;
    - ii) crediting a retail, commercial or institutional customer with the REC or bundled electricity product usage; and
    - iii) in certain instances, participating in a voluntary GHG trading program.

Only the product owner is allowed to use a REC or a bundled electricity product to fulfill one of the regulatory or non-regulatory mandates above.

### **Preventing Double Claims**

- 16) Only the owner of a REC or bundled electricity product can make any claims about having a REC or using a bundled electricity product. This includes in any printed, electronic or broadcast materials.
- 17) A REC marketer is permitted to own a REC or a bundled electricity product and to sell these products while passing along their ownership to a buyer. The marketer is permitted to make claims about their ownership of these products while marketing them to potential buyers. This includes in any printed, electronic or broadcast material. A REC marketer cannot market a REC or a bundled electricity product that has already been retired.
- 18) A REC or bundled electricity product broker is permitted to make claims about these products for the purpose of passing on the ownership of these products from a buyer to a seller. This includes in any printed, electronic and broadcast materials. A broker, however, is not permitted to broker a REC or bundled electricity product that has already been retired.
- 19) An EcoLogo REC must only be claimed as owned and a bundled electricity product must only be claimed as used by the owner. The decision to claim ownership of the REC or the use of the bundled electricity product must only be made or agreed to by the owner.
- 20) Only an owner can promote themselves in relation to the use of a bundled electricity product or the purchase of a REC. Once claimed as used or claimed for promotion purposes, these products must not be, sold or donated to another player. In other words, the rights of ownership of these products can no longer be transferred.



## Ownership Transfer

- 21) For an electricity product to meet the requirements of this standard, the ownership rights of a REC or a bundled electricity product must either be:
- passed on, transferred and/or sold to a REC or bundled electricity product end-user as part of an ongoing or temporary service provision of a REC or a bundled electricity product or;
  - on a one-time basis, be retained by the REC or bundled electricity owner in cases where the end-user did not choose to use the REC or bundled electricity product (e.g. at a one-time public event).

## Product Information Disclosure Requirements

- 22) An EcoLogo REC or bundled electricity product must be accompanied by product disclosure information that includes, as a minimum, the following information:
- a description of what a REC or bundled electricity product is;
  - the age of the electricity facilities from which the REC or bundled electricity product was derived;
  - the quantity of renewable low-impact electricity from which the EcoLogo REC or bundled electricity product was initially derived (i.e. the number of megawatt-hours);
  - the physical location where the REC or bundled electricity product was initially produced (i.e. province/state and country of the renewable low-impact electricity facility); and
  - the resource(s) used to generate the REC or the bundled electricity product and the percentages of each used in the initial renewable low-impact generation.
- 23) Product disclosure information must be delivered with the EcoLogo REC or bundled electricity product to the final owner with each contract. Note: This information may also be included in billing invoices.
- 24) The product disclosure information can be presented as a label, official certificate, information pamphlet and/or website information. A copy of all product disclosure and/or explanatory wording (in its final format for release or publication) must be provided to the EcoLogo RECs Program upon request.



## Sales

- 25) An EcoLogo REC and a bundled electricity product may include only the RECs that are generated in the same calendar year in which the RECs are sold, the first three months of the following calendar year and/or the last six months of the previous calendar year.
- 26) An EcoLogo REC and a bundled electricity product may be sold on a one-time basis so long as the block size is a minimum of 0.1 megawatt-hours. These one-time bases include *inter alia* general usage, trade shows, conferences, receptions and other events.
- 27) Only EcoLogo licensees have the authority to sell or market EcoLogo REC(s) or bundled electricity product(s). This includes both initial and downstream sales.
- 28) End-users and other players who are not marketers or generators do not have to be licensed by the Program.

## Bundled Renewable Low-Impact Electricity Product Requirements

Along with all General Product Requirements outlined above, to meet the requirements of this standard, a *bundled renewable low-impact electricity product* or "green electricity" product must also meet the following requirements:

- 29) Once an end-user has consumed the bundled electricity product, the associated *REC* product is automatically considered *retired*. Once retired, a particular REC may no longer be used as part of a bundled electricity product, sold or donated.
- 30) A bundled electricity product can only be sold or otherwise represented as "renewable low-impact electricity" or "green" electricity if the initial electricity from which its associated REC products were derived was part of the same *provincial power pool* as where the end-user is using the bundled electricity product. In such a case, the REC product is attached to average provincial power pool electricity.



## Renewable Energy Certificates (RECs) Product Requirements

Along with all General Product Requirements outlined above, to meet the requirements of this standard, a REC product must also meet the following requirements:

31) One REC unit must have the associated environmental benefits of one megawatt-hour of electricity.

### Electricity Delivery to the Grid

32) Because it is null electricity, the initial electricity from which an EcoLogo REC product has been separated and sold separately can in no way be represented or sold as "green", as renewable low-impact or as having low environmental impacts.

33) An EcoLogo REC product amount must be based on the actual associated amount of electricity which was initially generated and delivered to the grid, and not the generation facility's capacity.

34) The generation facility that generated the null electricity and associated EcoLogo REC product can be off-grid or part of an islanded grid.

### Product Information Disclosure Requirements

35) RECs sold outside of a particular provincial power pool cannot be attached to a different provincial grid mix and sold as renewable low-impact electricity;

36) Information clearly explaining what EcoLogo RECs are must be provided to any and all customers and end-users prior to their subscription for EcoLogo RECs. This applies to all kinds of subscription programs including those that are internet-based.

## Verification Requirements

37) The EcoLogo Program, TerraChoice and their representative agents shall not, without the Licensee's prior written consent, or except as may be required by law, voluntarily disclose any information obtained that the Licensee advises (in writing at the time such information is obtained) is confidential, unless such information is:

- a) previously known by the EcoLogo Program, TerraChoice or their representative agents;
- b) otherwise available to the public; or



c) subsequently legally acquired from other sources without any such restriction.

38) To verify that RECs or bundled electricity product meets the criteria stipulated in this standard, the EcoLogo Program will require access, as is its normal practice, to relevant quality control, production and transactional records and the right of access to electricity generation facilities on an announced basis.

It is the responsibility of the applicant to provide sufficient information to allow verification that the REC or bundled electricity product is in conformity with this standard. In particular, all documentation produced in the context of the environmental assessment of a *generation facility* for whose electricity certification is sought shall be made available to the EcoLogo Program.

39) The Chief Executive Officer or the equivalent officer of the Licensee (*marketer or generator*) must sign an Attestation of Compliance that states:

- a) all steps of the process required to generate RECs or bundled electricity products meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the *Fisheries Act* and the *Canadian Environmental Protection Act* (CEPA);
- b) the RECs product to be certified presently meets all applicable criteria as defined in this standard; and
- c) compliance with sections 3(b), 8(a) and 8(b) shall be attested to by a signed statement of the Chief Executive Officer or the equivalent officer of the licensee. Compliance with sections 8(a) and 8(b) shall also be confirmed by additional evidence including *inter alia* correspondence from the authorized representative of each applicable government body that has issued a license and/or operating permit for the *generation facility*.

The EcoLogo Program must be advised in writing immediately by the licensee of any noncompliance, which may occur during the term of the license. On the occurrence of any noncompliance, the license may be suspended or terminated as stipulated in the license agreement. In the event of a dispute related to the suspension or termination of the license, the license agreement provides for arbitration.

40) To meet this criteria, a REC and bundled electricity product must demonstrate that it initially came from a generation facility that was verified and audited as meeting the Generation Requirements in this standard. If the *generation facility* has already been verified to meet the Generation Requirements of this standard, this initial verification and audit procedure is not required. However, a proponent seeking certification of a REC or bundled electricity product must still demonstrate that they meet the Product Specific Requirements of this standard to gain certification for either their REC or bundled electricity product.



- 41) An audit and verification of all EcoLogo RECs and bundled electricity product transactions must be performed on an annual basis:
  - a) *Generators* producing an EcoLogo REC or bundled electricity product must provide proof to the EcoLogo Program of the amount of EcoLogo certified electricity generated and sold in quantitative units (e.g. kWh or MWh); and
  - b) *Marketers* must provide proof to EcoLogo of the amount of EcoLogo certified RECs or bundled electricity products received from *generators* and supplied to *buyers* in quantitative units (e.g. kWh or MWh);
- 42) Through a verification and auditing process, reconciliation measures will be implemented to ensure that sales levels of complying RECs or bundled electricity products do not exceed production/supply levels.
- 43) This audit and verification must be performed by an accredited third party. Internal audits performed by certified internal auditors will not be accepted as ongoing proof of compliance.
- 44) EcoLogo Program audit checklists, Sufficient Evidence Documents and other verification process documentation must be followed for all verification procedures.
- 45) The EcoLogo Program may perform random surveillance verification of electricity generation facilities and/or the RECs and bundled electricity transactions.

## Licensing

- 46) The Chief Executive Officer or the equivalent officer of the Licensee *marketer or generator* must sign a License Agreement for participation in the EcoLogo Program.
  - a) *Generators* who are generating the renewable low-impact electricity from which a REC or bundled electricity product is initially derived and who are keeping their products for their own use must sign a Primary Use License Agreement;
  - b) *Marketers* who are also *generators* and who are generating the renewable low-impact electricity from which the REC(s) or bundled electricity product(s) is derived must also sign a Primary Use License Agreement; and
  - c) *Marketers* who are not generating the renewable low-impact electricity from which the REC(s) or bundled electricity product(s) is derived but who are buying and marketing EcoLogo certified REC(s) or bundled electricity product (s) must sign a Secondary Use License Agreement.

It may be that a particular marketer may need to sign multiple license agreements.



47) The Licensee must pay annual fees to the EcoLogo Program as outlined in their agreement with EcoLogo.

### Conditions for EcoLogo Use

48) Where compliance with this standard is established under the EcoLogo Program, EcoLogo may appear in association with a product, subject to the following conditions:

- a) Only a REC or a bundled electricity product that fully satisfies all pertinent EcoLogo Program certification and licensing criteria are allowed to be identified as "EcoLogo certified" and to carry the EcoLogo mark; and
- b) All licensees must conform with the license agreement and the most recent edition of the EcoLogo Brand Guide.

49) The final owner of a REC or bundled electricity product is eligible to become an Authorized User and use the EcoLogo mark and/or the words "EcoLogo", "EcoLogo RECs", "EcoLogo Certified Renewable Low-Impact Electricity" in their own marketing and communications materials if all of the following conditions are met:

- a) Regarding, bundled electricity products, the estimate of the percentage of total load must be accurate;
- b) The REC and/or bundled electricity product owner must have signed an Authorized Use License Agreement with the EcoLogo Program;
- c) The EcoLogo mark and/or the words "EcoLogo", "EcoLogo RECs" or "EcoLogo bundled electricity" must be accompanied by a criteria statement indicating the total electricity load of this owner per unit time, and in the case of a bundled electricity product, the percentage of the total electricity load per unit time represented by this bundled electricity product compared to the total load of electricity usage per same unit time of this owner;
- d) The EcoLogo Program retains the right to review and approve marketing and communications materials using the EcoLogo mark and/or the words "EcoLogo", "EcoLogo RECs" or "EcoLogo bundled electricity";
- e) The EcoLogo mark and/or the words "EcoLogo", "EcoLogo RECs" or "EcoLogo Renewable Low-Impact Electricity" must not be used in a manner that misrepresents either the Program, the reasons for certification or what these products are.

### **Grandfathering**



50) If the already certified electricity products cannot meet the new standard requirements and are bound to contracts, they will be grandfathered under version 1 (2006) of the standard for the length of the contract provided that:

- a) they can demonstrate that they can't meet the requirements of CCD-003 version 2 (2010)
- b) the CCD-003 version under which the product was certified is included in the product disclosure information, and
- c) the contract is no longer than 30 years.

### Revisions to this Standard

51) This standard is considered a dynamic document and may change over time to accommodate changes in the electricity marketplace, policy changes that affect electricity products, and/or innovations in electricity technology. For any substantial changes to the standard, the EcoLogo Program commits that:

- a) stakeholders will be solicited regarding substantive policy change issues; and
- b) at least one year of notice will be granted to utilities, green power marketers and other stakeholders before substantive changes go into effect, unless a more timely change is necessary to respond to a significant and imminent problem threatening the integrity of green power markets.

For additional copies of this standard or for more information about the EcoLogo Program, please contact:

**TerraChoice Group**

Toll Free: 1-800-478-0399, Telephone: (613) 247-1900, Email: [ecoinfo@terrachoice.ca](mailto:ecoinfo@terrachoice.ca)

## Appendix 1: Air Emissions Testing Frequency, Conditions and Methods

Compound / Pollutant	Testing Conditions and Frequency
Carbon monoxide (CO) Nitrogen oxides (NO <sub>x</sub> ) Particulate matter (PM) Sulphur oxides (SO <sub>x</sub> )	<p>Frequency: As determined in the verification protocol negotiated between the EcoLogo Program and the <i>generator</i> specifically for each <i>generation facility</i>.</p> <p>Conditions: Testing must be performed at operational load. Emissions for load point values must be determined from the concentration measurements (ppm (v/v) converted to mg/m<sup>3</sup> at 25°C) and flow rate (dry basis at 101.3 kPa and 25°C) in the duct or stack.</p>

Compound / Pollutant	Testing Methods
Carbon monoxide (CO)	<ol style="list-style-type: none"> <li>i. <i>Reference Method for the Monitoring of Gaseous Emissions from Fossil Fuel-fired Boilers</i>, Reference Method EPS 1/RM/15, September 1990; or</li> <li>ii. Continuous Emissions Monitoring (CEMS) Code (REF. 107), Alberta Environment; or</li> <li>iii. <i>Reference Method for Source Testing: Measurement of Releases of Carbon Monoxide from Stationary Sources</i> (EPS 1/RM/4, 1990) in conjunction with <i>Reference Method for Source Testing: Measurement of Release of Particulate from Stationary Sources</i> (EPS 1/RM/8, 1993), both from Environment Canada; or</li> <li>iv. Method 10, Determination of Carbon Monoxide Emissions from Stationary Sources, in the Alberta Stack Sampling Code (REF. 89), Alberta Environment</li> <li>v. EPA Method 10 - Determination of carbon monoxide emissions from stationary sources, August 2006; or</li> <li>vi. EPA Method 10A - CO for Certifying CEMS, Determination of carbon monoxide emissions in certifying continuous emission monitoring systems at petroleum refineries, February 2000; or</li> <li>vii. EPA Method 10B - CO from Stationary Sources, Determination of carbon monoxide emissions from stationary sources, February 2000; or</li> <li>viii. State of California Air Resources Board (CARB) Reference Method 10 for the Determination of Carbon Monoxide Emissions from Stationary Sources, July 1999.</li> </ol>
Nitrogen oxides (NO <sub>x</sub> ) measured as NO <sub>2</sub>	<ol style="list-style-type: none"> <li>i. <i>Reference Method for the Monitoring of Gaseous Emissions from Fossil Fuel-fired Boilers</i>, Reference Method EPS 1/RM/15, September 1990; or</li> <li>ii. Method 7E, Determination of Nitrogen Oxide Emissions from Stationary Sources, in the Alberta Stack Sampling Code (REF. 89), Alberta Environment; or</li> <li>iii. Continuous Emissions Monitoring (CEMS) Code (REF. 107), Alberta Environment; or</li> <li>iv. EPA Method 7 - Nitrogen Oxide (NO<sub>x</sub>), Determination of nitrogen oxide emissions from stationary sources, February 2000; or</li> <li>v. EPA Method 7A - NO<sub>x</sub>, Determination of nitrogen oxide emissions from stationary sources (Ion Chromatographic Method), February 2000; or</li> <li>vi. EPA Method 7B, Determination of nitrogen oxide emissions from stationary</li> </ol>



	<ul style="list-style-type: none"> <li>vii. sources (Ultraviolet spectrophotometric method), February 2000; or</li> <li>viii. EPA Method 7C, Determination of nitrogen oxide emissions from stationary sources (alkaline permanganate/colorimetric method), February 2000; or</li> <li>ix. EPA Method 7D, Determination of nitrogen oxide emissions from stationary sources(alkaline-permanganate/ion chromatographic method), February 2000; or</li> <li>EPA Method 7E, Determination of nitrogen oxides emissions from stationary sources (instrumental analyzer procedure), August 2006.</li> </ul>
Particulate matter (PM)	<ul style="list-style-type: none"> <li>i. <i>Reference Method for Source Testing: Measurement of Releases of Particulate from Stationary Sources</i>, Reference Method EPS 1/RM/8, December 1993; or</li> <li>ii. <i>Method 5, Determination of Particulate Emissions from Stationary Sources</i>, in the Alberta Stack Sampling Code (REF. 89), Alberta Environment; or</li> <li>iii. EPA Method 5, Determination of particulate matter emissions from stationary sources, February, 2000</li> </ul>
Sulphur oxides (SO <sub>x</sub> ) measured as SO <sub>2</sub>	<ul style="list-style-type: none"> <li>i. <i>Reference Method for the Monitoring of Gaseous Emissions from Fossil Fuel-fired Boilers</i>, Reference Method EPS 1/RM/15, September 1990; or</li> <li>ii. Continuous Emissions Monitoring (CEMS) Code (REF. 107), Alberta Environment; or</li> <li>iii. <i>Reference Method for Source Testing: Measurement of Releases of Sulphur Dioxide from Stationary Sources</i>, Report EPS 1-AP-74-3, September 1975; or</li> <li>iv. (<i>Method 6C, Determination of Sulphur Dioxide Emissions from Stationary Sources</i>, in the Alberta Stack Sampling Code (REF. 89), Alberta Environment; or</li> <li>v. EPA Method 6, Determination of sulfur dioxide emissions from stationary sources, February 2000; or</li> <li>vi. EPA Method 6C, Determination of sulfur dioxide emissions from stationary sources (instrumental analyzer procedure), August 2006; or</li> <li>vii. EPA Approved alternative method Alt-001, SO<sub>2</sub> interference in methods 7 and 7A, May 1998.</li> </ul>
Velocity and Volumetric Flow Rate	<ul style="list-style-type: none"> <li>i. Method B - Determination of Velocity and Volumetric Flow Rate of Flue Gases, from <i>Reference Method for Source Testing: Measurement of Release of Particulate from Stationary Sources</i> (EPS 1/RM/8, 1993); or</li> <li>ii. Method 2, Determination of stack gas velocity and volumetric flow rate (types pitot tube), February 2007; or</li> <li>iii. Method 1, Sample and velocity traverses for stationary sources, February 2007.</li> </ul>

## Appendix 2: Load Point Determination

The process used to determine the load points for *operational air emissions* in this standard is based on a matrix of four environmental air emission parameters, each with a range of values based on actual industry performance. Each level of performance is assigned a specific load point value, and points are then totalled over all parameters. Products with different environmental profiles will thus be able to qualify under this standard. The allowable number of points has been set such that, while tradeoffs between parameters is possible, very poor performance in any one parameter will disqualify a *generation facility* as a supplier of electricity meeting the requirements of this standard.

The four parameters used to evaluate electricity generation under this standard for EcoLogo Program-certification are carbon monoxide (CO), particulate matter (PM), nitrogen oxides (NO<sub>x</sub>) and sulphur oxides (SO<sub>x</sub>). Load point calculations will be based on measured air emissions quantities of these compounds released as a result of only those operations directly used to generate electricity. The air emission measurements must represent annual emissions normalized to a per MWh basis, and include more than one datum point.

Measured emissions data and the quantity of annual electricity generated must be documented in Part 1: Measured Data, and load points must then be determined by using Part 2: Load Point Calculation. The load point for each compound must be taken from the top of each column corresponding to the emissions range for that compound's kilogram per MWh value.

### **PART 1: MEASURED DATA**

Using the table provided:

Enter the Annual Quantity of Electricity Generated (in MWh) by the *generation facility*. This quantity must be measured net of all parasitic loads from the *generation facility*, and net of transformer and line losses up to the point of connection to the *utility* grid or the *user's* system (if directly connected).

Enter the Annual Measured Quantity of CO, PM, NO<sub>x</sub> (measured as NO<sub>2</sub>) and SO<sub>x</sub> (measured as SO<sub>2</sub>) emitted (in kilograms), noting that appropriate test methods and the prescribed frequency and conditions of testing are provided in Appendix 1 for each compound.

Determine the Annual Measured Quantity per MWh of CO, PM, NO<sub>x</sub> (measured as NO<sub>2</sub>) and SO<sub>x</sub> (measured as SO<sub>2</sub>) emitted (in kilograms per MWh). These values will be used in the Load Point Calculations in Part 2.



Annual Electricity Generation (in MWh)	Compound	Annual Measured Quantity (in kg)	Annual Measured Quantity per MWh (in kg/MWh)
	CO		
	PM		
	NO <sub>x</sub> (as NO <sub>2</sub> )		
	SO <sub>x</sub> (as SO <sub>2</sub> )		

## PART 2: LOAD POINT CALCULATION

Assign the load point value to each compound by taking the value at the top of each column corresponding to the emissions range for that compound's kilogram per megawatt-hour value determined in Part 1.

Determine the Total Load Points by summing the four individual load point values.

Compound	Load Points					Assigned Load Points
	0	1	2	3	8	
CO	≤ 0.75 kg/MWh	0.76 – 1.1 kg/MWh	1.2 – 1.5 kg/MWh	1.6 – 1.9 kg/MWh	> 2.0 kg/MWh	
PM	≤ 0.23 kg/MWh	0.24 - 0.39 kg/MWh	0.40 - 0.52 kg/MWh	0.53 - 0.65 kg/MWh	> 0.66 kg/MWh	
NO <sub>x</sub> (as NO <sub>2</sub> )	≤ 0.77 kg/MWh	0.78 - 1.2 kg/MWh	1.3 - 1.5 kg/MWh	1.6 - 1.9 kg/MWh	> 2.0 kg/MWh	
SO <sub>x</sub> (as SO <sub>2</sub> )	< 0.14 kg/MWh	0.15 - 0.21 kg/MWh	0.22 - 0.28 kg/MWh	0.29 - 0.35 kg/MWh	> 0.36 kg/MWh	
<b>TOTAL LOAD POINTS</b>						