

**Nova Scotia electricity market**

**Green attribute administration**

**Discussion document.**

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# 1 Introduction

Nova Scotia participated with other Maritime provinces and with New England states in the 2001 Climate Change Action Plan, and adopted the goal of 20% reduction in emissions intensity by 2025. Nova Scotia energy policy was then set out in the Government's 2001 energy strategy document "Seizing the Opportunity." In accordance with that strategy, the Electricity Marketplace Governance Committee (EMGC) was established to provide recommendations on implementing the electricity sector strategy. The EMGC reported in 2003, and its recommendations were accepted by the Government of Nova Scotia. Progress has been made to implement these recommendations in a number of areas:

- ◆ Nova Scotia Power Inc. has established an open access transmission tariff which is approved by the Utility and Review Board, and which came into effect in 2005.
- ◆ The initial set of market rules to address the Nova Scotia wholesale electricity market has been drafted and has been the subject of stakeholder consultation. This initial set of market rules is planned to come into effect on 1<sup>st</sup> February 2007.
- ◆ The Government of Nova Scotia has indicated its plans to introduce a Renewable Portfolio Standard (RPS), and to undertake public consultations on draft RPS regulations in 2006.

In addition the Government of Nova Scotia published the Green Energy Framework "Smart Choices for Cleaner Energy" in 2005.

In moving towards implementation of the RPS recommendations, it became evident that there were a number of issues to be addressed with respect to the administration of the green or renewable electricity attributes. Should these be treated by the Government of Nova Scotia as being separable from electricity, or are they inextricably linked with such electricity? If the attributes are separable, then how will the "null" electricity (ie electricity without attributes) be administered? This report addresses the issues concerned with the green or renewable attributes and their linkage or separation. The terms of reference for this report are set out in appendix A.

The key statements of Nova Scotia policy, as expressed in the various documents discussed above, have been collected for ease of reference in Appendix B. In all of these policy documents, there is an implicit assumption that renewable generation projects are not price-competitive in relation to the embedded costs of existing electricity generation resources. Absent premium pricing of some sort, there will not be sufficient development of renewable generation resources to meet provincial policy objectives. This assumption underpins the thinking in this report. Absent the need for premium pricing, the issues discussed in this report would cease to be material issues.

The environmental drive for renewable energy sources is based in locally impactful emissions reduction (eg SO<sub>x</sub>, NO<sub>x</sub> & VOCs) which are solely a matter of provincial jurisdiction, and in globally impactful greenhouse gas reduction which has become a matter of federal policy. The provincial policy framework is reasonably well established

at this time. The federal policy is highly uncertain. As federal policy issues get resolved, there may be implications for provincial policy, which may need to evolve significantly. In discussing options for green attribute administration, this report therefore looks to resolve issues in a way that should be robust under a range of federal policy and implementation scenarios. While federal issues are discussed, the uncertainty of federal policy dictates that it not be used as a basis for the fine tuning of the provincial systems.

The Government of Nova Scotia has indicated its intent to initiate discussion of the issues addressed in this report. This document is therefore prepared to provide a basis for discussion of these issues in preparation for any government decision making. Policy options remain open at this time, and any proposals contained in this document are those of the consultant and have not in any sense been adopted by the Government of Nova Scotia.

Readers are also referred to the companion discussion document on contractual frameworks in the electricity sector, which addresses the EMGC recommendations relating to that issue (41, 51, 52, 63, 64, 65, 75 & 76).

## 2 Structure of this document

Section 3 of this document identifies and discusses the regulatory framework, and the range of regulatory constructs and concepts that underpin the later analysis. Discussion of issues such as the creation and recognition of Emission Reduction Credits (ERCs) is particularly important to that later analysis. This section is supplemented by a glossary in appendix C, which includes various definitions and references extracted from existing Nova Scotia electricity sector documentation.

In order to recognise the importance of the federal regulatory issues, these are discussed in a separate section, section 4.

Section 5 of this document is then used to identify and develop a number of scenarios for green / renewable attribute administration.

- ◆ Scenario 1 represents the present situation in which there is no RPS, but NSPI has made voluntary undertakings to procure a certain amount of renewable energy under long term contracts with independent renewable power producers.
- ◆ Scenario 2 represents an RPS in which renewable attributes are not recognised separately from the electricity generated by renewable resources.
- ◆ Scenario 3 represents an RPS in which the obligation can be fulfilled by acquiring and retiring attributes traded separately from the “null” electricity.

The implications of regulated “null” electricity purchase by NSPI are considered in each scenario; sub-scenario (a) is without regulated “null” electricity purchase; sub-scenario (b) is with such regulated “null” electricity purchase. The specific issues relating to pricing and terms for any such “null” electricity purchase are discussed in the companion discussion document on the contractual framework options.

Section 6 includes the analysis of each option, of the types of transactions possible, and their impacts.

Section 7 sets out some tentative conclusions.

In order to facilitate a focussed discussion this document section 8 identifies a set of suggested discussion topics. These are not intended to be exclusive.

Appendices A, B and C are used to provide easy access to certain reference materials. Appendix D sets out regulatory and Market Rules requirements.

### 3 Regulatory framework

#### 3.1 Renewable attribute constructs

Renewable electrical energy may be considered to possess a number of relevant attributes:

- It is by definition produced without depleting non-renewable fuel resources.
- It may displace electricity generated by other means. In Nova Scotia these other means would be the combustion of fossil fuels or the displacement of imports; many of the imports thus displaced would likely be derived from fossil fuels. This can result in the attribution to the renewable electricity generation of:
  - a reduction in the volume of Greenhouse Gas (GHG) emissions;
  - a reduction in the volume of air emissions of nitrogen oxides (NO<sub>x</sub>), sulphur oxides (SO<sub>x</sub>), volatile organic compounds (VOCs) and mercury; and
  - a reduction in other forms of pollution.

Particular attention is often paid to the reduction of GHG emissions and the reduction of NO<sub>x</sub>, and SO<sub>x</sub>. These may be recognised and quantified as “Emission Reduction Credits.” Absent a Nova Scotia system of cap and trade in NO<sub>x</sub> & SO<sub>x</sub> emissions, the focus of interest in tradable emission reduction credits is likely to be on GHG reductions, and it is with reference to GHG reductions that they are discussed in this report.

In this report therefore:

- the term “Renewable Attributes” means all attributes of renewable energy including any associated Emission Reduction Credits;
- the term “Emission Reduction Credits” refers to potentially trade-able certifications of emission reductions, particularly with respect to greenhouse gasses; and
- the term “Other Renewable Attributes” means all Renewable Attributes except any Emission Reduction Credits.

#### 3.2 Definition of “renewable” attributes

Environment Canada’s Environmental Choice Program provides a framework for the “Ecologo<sup>™</sup>” certification of a particular generating facility as being renewable. There are also several U.S. entities that have similar certification programs. Nova Scotia could adopt “Ecologo<sup>™</sup>” or one of those other existing program standards or develop an alternative definition and process.

The energy from a renewable generating facility is associated with the renewable attributes. These attributes may be recognised as tags. Each tag typically represents

the full set of renewable attributes associated with one MWh of electrical energy. This full set of renewable attributes would include any Emission Reduction Credits associated with that one MWh of electrical energy.

### **3.3 Creation, recognition and ownership of Emission Reduction Credits (ERCs)**

Emission Reduction Credits (ERCs) are quantified as the amount of GHG emissions (mass in CO<sub>2</sub> equivalent tonnes) or other emissions actually displaced by the relevant process. The relevant process in this case is the generation of electricity from renewable sources.

ERCs are discussed in this section in the way they exist today, absent any federally regulated offset credit program for greenhouse gas reduction. The proposed federal offset credit program is essentially an ERC program subject to particular regulation. The implications of a federal offset credit program are discussed in section 4.

The quantity of ERCs associated with each MWh of renewable energy depends on the context. In Nova Scotia, each MWh of renewable energy could typically displace from the system a MWh of coal, fuel oil, or gas fired generation (whichever is the most expensive variable generation source operating at the relevant time). If we assume that GHG ERC quantification in Canada will be done at the provincial pool level, then, given Nova Scotia's high dependency on fossil generation, each MWh of renewable energy could have an ERC value as high as 1 tonne CO<sub>2</sub> equivalent. This high level of GHG ERCs embedded in each MWh of renewable attributes would increase the GHG ERC content (and thus the potential \$ value) of Nova Scotia renewable attributes over those in some other jurisdictions.

Whereas a number of jurisdictions have established cap-and-trade regimes as a means to reduce SO<sub>x</sub> and NO<sub>x</sub> in the most economic way, there is not as yet the same degree of formalisation of a greenhouse gas reduction regime in North American jurisdictions.

Under SO<sub>x</sub> and NO<sub>x</sub> cap and trade regimes the total emission cap for each pollutant is normally allocated among the individual controlled emitters, with each emitter being granted annual emission allowances (tonnes of pollutant) equivalent to their individual share of the total cap. In some regimes the annual allocation of allowances to capped emitters is by auction; but this is less common. Each controlled emitter is responsible for offsetting their actual emissions of a capped pollutant with either allowances or with ERCs created according to the criteria established by the cap and trade program. If a capped emitter's actual emissions are less than its cap, the surplus allowances it holds can be traded to other controlled emitters or in some regimes banked for future use or trade. Indirect contributors to SO<sub>x</sub> and NO<sub>x</sub> emission reductions in the same air shed as the regime (such as independent renewable electricity generators) can normally and subject to the rules of the program create SO<sub>x</sub> and NO<sub>x</sub> ERCs that can be traded to the controlled emitters in the regime or sometimes to other controlled emitters in the same air-shed.

Much of the greenhouse gas reduction market is driven at this stage by voluntary actions taken by parties as a matter of social responsibility or in the expectation that their “early mover” efforts will be recognised as regimes do get formalised. In this context the value of GHG ERCs depends on the buyers’ perception of their credibility and possible future value as a tradable commodity. Buyers typically look for GHG ERCs created within a reputable creation program, independent of the seller, and typically non-governmental. Such pilot creation programs have typically recognised the indirect greenhouse gas reduction impact of renewable electricity generation developed in a location where it would naturally displace fossil generation of electricity. In the Nova Scotia context, it would be expected that a reputable GHG ERC creation program would be able to estimate the annual average emission intensity of the primarily Nova Scotia generation displaced by the renewable generation and would likely be somewhat conservative in the estimating methodology. On this basis the emission reduction benefit of the the renewable energy could be quantified, thus creating a GHG ERC owned by the independent renewable generator or other entity that holds a contractual right to the ownership of the GHG ERC.

The sale of such a GHG ERC becomes an alternative source of revenue for the independent renewable generator; it is an alternative to the sale of the renewable attribute package in Nova Scotia or elsewhere. The materiality and viability of this alternative is discussed in subsequent sections of this document.

### **3.4 Other Renewable Attributes**

Absent any contract or regulation, the renewable generation owner or operator would own all the Other Renewable Attributes, and would be free to sell them or continue to own them indefinitely, independent of any electricity transactions.

Under the present NSPI PPAs covering renewable energy projects, NSPI acquires all renewable attributes including any ERCs, and would be free to sell them, use them to meet regulatory obligations, or continue to own them indefinitely, independent of any electricity transactions.

### **3.5 RPS implications**

A Renewable Portfolio Standard (RPS) is a regulatory framework in which all Load Serving Entities (LSEs) (or the loads themselves) are required to demonstrate that a certain percentage of the energy they provide to consumers (or consume) is derived from renewable generation sources. The particular recommendations of the EMGC in respect of an RPS for Nova Scotia were set out by the EMGC in its recommendations 40 to 45 and 50 to 52; these are quoted for ease of reference in appendix B, section 3, of this document. These recommendations included provisions for recognition of renewable attributes traded separately from energy. Those recommendations refer to “tags” which represent the set of renewable attributes.

Any RPS would normally only recognise Renewable Attributes as a complete package. There would be no separate recognition of ERCs or of Other Renewable Attributes. Any sale of ERCs by an owner would render the associated Renewable Attribute package incomplete, and of no value with respect to the RPS unless specifically provided for by regulation (and no such provision would be recommended).

Any Nova Scotia regulation to establish an RPS could define the RPS obligation in at least three ways:

- a) Conventional RPS regulation would require NSPI and other LSEs to “retire” the relevant number of renewable attributes; effectively to transfer them to the relevant provincial agency for cancellation.
- b) A small variation would be to require NSPI and other LSEs to transfer the relevant number of renewable attributes to the relevant provincial agency for retention. This agency would hold them in a “trust fund” or “pool” and might have the benefit of any future use, for sale or for fulfilment of federal or other obligations. It is possible however that such attributes would not hold any future value as a tradable commodity as their use to meet the RPS program regulation could make it impossible to meet the “surplus” criteria of a creation program such as a future federal offset program (see discussion in section 3.8 below).
- c) By simply requiring NSPI and / or any LSE to purchase renewable attributes as fulfillment of their RPS obligations, NSPI and / or the LSE would remain the owner of the attributes including any implicit or explicit ERCs. This applies whether or not the attributes are purchased bundled with, or unbundled from, the electricity. One might expect that the UARB would give consideration to the prudent management of such attributes including ERCs when reviewing rate applications.

### **3.6 “Surplus” attributes**

The above discussion (section 3.5) is relevant only to the attributes necessary to fulfill the RPS obligation.

When considering Renewable Attributes surplus to any RPS obligation, it is important to recognise that the ability of an attribute-owner to sell ERCs and Other Renewable Attributes is essentially dependent on the buyer’s willingness; this may depend on the extent to which the buyer can use such attributes to meet its regulatory obligations. If an attribute-owner has clear title, the buyer is willing, and the parties can agree terms, there is no known restriction on the sale and purchase transaction, irrespective of the location of the buyer. In this way surplus Renewable Attributes could be exported out of Nova Scotia.

### **3.7 Registry**

The construct of a centrally operated and transparent registry of attribute ownership and transfer has been widely adopted in jurisdictions having emissions cap & trade regimes or other attribute-specific regulation. Such a registry is not however essential, nor would it typically be required in a jurisdiction which did not recognise attributes separately from energy. Absent a registry, there is potentially a much greater need for audit of the attribute-owners' systems of attribute accounting.

A registry could be structured purely to address needs of the electricity sector for Renewable Attribute tracking; it could subsequently be expanded to include (say) ERCs in other sectors, pending any federal registry thereof.

### **3.8 Trust fund / pool**

This construct is introduced as one possible way to reconcile the more common concept of attribute "retirement" on use with the need to maintain and preserve the value of any ERCs in particular in the context of the uncertain regulatory framework for GHG reduction. The RPS attributes including any embedded ERCs would be assigned into the trust fund / pool without retirement, and would be released from such trust fund / pool under the control of (say) the provincial government to meet federal requirements that may be imposed or other export opportunities that might arise.

Given that the trust fund / pool would hold assets (the renewable attributes and any embedded ERCs) paid for by electricity consumers, it would most naturally be segregated from any equivalent arrangement relating to other sectors.

The value of such arrangement would be highly dependent on there being an explicit regulatory regime that would give them such value. Otherwise their use to meet the RPS program regulation would prevent them being classified as "surplus". Any current credible ERC creation programs include a criteria of the reductions being "surplus" to the regulated requirements. Such a surplus criterion normally requires ERC (or Tradable Renewable Credit ("TRC")) creations to be independent of any regulated compliance requirement such as a regulated emission limit or RPS requirement. This in effect offsets double counting of the compliance value of an ERC (or TRC). Thus it could only be in the context of a specific federal or other jurisdiction program that would theoretically recognise provincial retirements as attributes or ERCs held in a trust fund following use to meet an RPS obligation. This would be particularly so for GHG reductions under a provincial program which meet the requirements for what can be counted towards Canada's obligations under the Kyoto agreement.

### **3.9 Regional / inter-provincial issues**

This report focuses on Nova Scotia RPS and attributes administration. The principles apply equally to the case that some of the Maritime provinces might agree to the joint

development of an RPS, or to a common RPS framework that would permit the mutual recognition of renewable attributes.

## 4 Federal policy and its implications

### 4.1 Background

As part of its Climate Change Plan the federal government proposed an offset system for greenhouse gases that would allow the creation, trading, registration and retirement of greenhouse gas emission reduction credits (Offset Credits). The proposed system was a component of the overall plan designed to allow Canada to respond to its Kyoto commitment. As well as the offset system the Plan includes regulating emissions of large final emitters (LFEs) and incentive programs to encourage the development of technologies that could reduce or displace emissions.

The last version of the proposed offset system was released in a discussion paper in September 2005 ([www.climatechange.gc.ca](http://www.climatechange.gc.ca)) prior to the last federal election. There has been no public advancement of the offset program since the election, but it is anticipated that it will survive in some form as part of a revamped climate change program by federal government. Absent a clear alternative framework, the present framework provides the best information available on the features of a proposed offset system that may eventually come into effect. It is appropriate to consider how these features can influence provincial policy decisions on green attributes that include greenhouse gas reductions.

### 4.2 Offset system design

The proposed offset system was designed to allow cost effective domestic reductions or removals (carbon sequestration) of greenhouse gas emissions not covered by federal greenhouse gas regulation of LFEs. As proposed, the offset program would allow offset credits to be created from any activity that results in direct or indirect emission reductions or removals of greenhouse gases; subject to the program's technical requirements for creation and use of the offsets.

The technical criteria proposed for creation of an offset credit were very similar to the creation criteria used in most pilot programs in Canada and to emission reduction credit creation programs in other countries. These criteria are expected to exist in any future federal offset program; and are as follows:

- **Quantifiable;** The reduction or removable must be measurable in accordance with acceptable or specified quantification methodologies.
- **Real;** The reduction or removal must result from a specific and identifiable action (not the result of emissions moving to another source or location).
- **Surplus;** The reduction or removal is not the result of a specific federal greenhouse gas regulation, program or incentive (In a future offset program this might be extended to a greenhouse gas regulation, program or incentive in other

jurisdictions as this is how the surplus criteria is normally applied in other programs. See the implication of this for Nova Scotia in point (c) below).

- **Verifiable;** The reduction or removal and its creation methodology must be verified to conform to the program technical requirements by an accredited third party verifier.
- **Unique;** The reduction or removal can only be used once to create an offset credit in the offset program (This criterion could be extended to credits created once in any program and not just the federal offset program. See implication for Nova Scotia in point (c) below).

Other creation criteria included limiting the offset creations to activities that occur in Canada (some specific exceptions where proposed) and occur after January 1, 2000, the credit creation window being 8 years from the date the activity or project is registered under the program, and that clear legal ownership to the credits must be demonstrated.

Once an offset credit is created under the proposed program it would reside in a proposed national registry in the owner's account. The owners of offset credits in the national registry could monetize the value of the credit in one of two ways; by selling to an LFE where it could be used (retired) to meet the LFE's regulated greenhouse gas emission obligation or to a proposed federal Climate Fund where it could be retired and count as part of Canada's Kyoto target. The proposed program did not allow trading of the offset credits outside of the federal program. However it was anticipated that such a program would also result in brokering and speculative trading activities that would likely add value to the credits; and thereby increase the incentive for additional reduction and removal activities.

### **4.3 Implications for Nova Scotia**

With respect to provinces like Nova Scotia that are considering their own programs for green attributes that would implicitly include greenhouse gas reductions, their consideration of the impacts of a future federal greenhouse gas offset program should include the following:

- a) Any future federal program will likely have credit creation criteria similar to those already proposed as these are similar to programs in other jurisdiction, including other Kyoto signatories, and to US programs.
- b) Even if a new "made in Canada " greenhouse gas plan puts more emphasis on technology development and less on an offset program, its likely that the role of the offset program will grow with time as it is one of the few means to ensure that the most economic activities occur first and can be undertaken with private sector capital.
- c) Any federal offset program should increase the monetary value of tradable offset credits created from activities undertaken inside Canada. Early effort provincial programs that involve greenhouse gas reductions need to be

structured so that they will be recognized for creation of federal offset credits. This should be possible as they are likely to fit the accounting of Canada's Kyoto commitment. It will also be necessary to ensure that the final creation criteria in any future federal offset program; particularly the Surplus and the Unique criteria, are not too restrictive in this regard.

- d) Although the federal greenhouse gas program efforts were initially heavily weighted on greenhouse gas removal activities, there appears to be growing recognition that the potential contribution of removal activities is likely to be more limited and that the role of renewable electric generation may become a more significant contributor.

## 5 Framework options

A number of principles were followed in selecting and evaluating the alternative scenarios that are believed to be already soundly established as guiding principles for any jurisdiction seeking to establish policies governing green attributes. These are as follows:

- Any premium paid for green power justifies a claim to the green attributes, but such claims should be contractually documented and registered.
- Green power attributes can only be claimed by a jurisdiction as part of its environmental accounting if the green attributes reside or were retired inside the jurisdiction, recognising the possibility provincial collaboration to establish regional jurisdiction.
- Separation of the different green attributes from electric power supplied is possible, but will increase complexity of accounting for ownership and use of the different attributes, but can increase value to the supplier and can provide for more flexible and therefore more economic fulfillment of RPS criteria.

### 5.1 Study Scenarios

Three basic scenarios are defined:

- Scenario 1: present case
- Scenario 2: Nova Scotia RPS with non-separable attributes
- Scenario 3: Nova Scotia RPS with separable attributes

The operation and impact of each scenario depends strongly on whether NSPI has an obligation to purchase null energy. Each scenario is therefore broken into two sub-scenarios: (a) without provisions for NSPI purchase of null energy; (b) with provisions for NSPI purchase of null energy.

Regional as opposed to Nova Scotia RPS could be contemplated, but is beyond the scope of this study.

These scenarios are described below:

### 5.2 No RPS; procurement-driven renewable implementation

#### 5.2.1 Scenario 1(a), present case; no null energy purchase

- Provincial objectives are fulfilled through NSPI (or in future, Board overseen) procurement processes that specify renewable generation, and that assign all renewable attributes to NSPI under the long term PPAs. NSPI effectively becomes

the holder of such mandated renewable attributes in trust for the consumers who have shared the cost premium. *This is effectively the situation today. The green power premium is the excess of the PPA price over a notional cost of null energy.*

- There is no recognition of renewable attributes associated with generation located outside Nova Scotia. *No change from today.*
- There are no provisions to permit in-province retail sales of renewable energy or attributes to in-province consumers. *No change from today.*
- Wholesale buyers (and potentially in future, eligible retail buyers) of electricity may contract for attributes with the purchase of energy from an Independent Renewable Power Producer, and would then be in a position to sell-on such renewable attributes including ERCs in the open market. *No change from today.*
- Attribute tracking and accounting are internalised by NSPI and by any other buyers.

Within scenario 1(a), there is no provision for purchase by NSPI of null energy.

### **5.2.2 Scenario 1(b); addition of NSPI null energy purchase**

It would be possible to add an arrangement / requirement for the purchase by NSPI of null energy. This would require the creation of an “avoided null energy price” from NSPI, which would likely take the form of a UARB-approved rate and could be related to the existing marginal energy prices used in certain NSPI rates. See more extensive discussion in the discussion document on contractual arrangement options. Independent renewable power producers would be able to sell null energy to NSPI at NSPI’s avoided null energy rate, and to sell ERCs and / or Renewable Attributes in the open market within or outside Nova Scotia, subject to buyer acceptance.

Absent a Nova Scotia RPS which would recognise separable attributes (ie scenario 3) it is likely only the GHG ERCs that might have material value. A project selling its null energy output to NSPI and its ERCs to others (presumably for export and retirement outside the province) is referred to below as operating on a “null energy and export ERCs” basis.

Migration of an existing project from “null energy & export ERCs” basis to a PPA basis could be possible, depending on the terms of RFPs issued by NSPI or others. Migration from a PPA to a “null energy & export ERCs” basis would only be possible at the end of the PPA term unless mutually agreed to by the contracting parties.

The implementation of a federally regulated offset credit program would not impact this arrangement in principle. It would probably add to the value of the ERCs in the form of offset credits.

### **5.3 Nova Scotia RPS with non-separable attributes**

#### **5.3.1 Scenario 2(a); no null energy purchase**

- RPS-mandated renewable attributes are retired by the power purchaser (NSPI or other LSE or future retail) or assigned to the relevant agency on sale of energy for consumption in Nova Scotia.
- Attributes are non-separable, and therefore cannot be banked by generators or LSEs with respect to future use in Nova Scotia or, from the perspective of the government of Nova Scotia, for resale.
- Null energy is not independently purchased by NSPI.
- In theory, under a 5% RPS, the buyer of 100% renewable energy could hold itself out as the owner of the attributes including any recognised ERCs corresponding to 95% of its use, and could transfer or resell this 95% outside Nova Scotia, subject to buyer acceptance.
- Nova Scotia requires compliance monitoring of attribute retirement and potentially audit of LSE attribute accounting, but probably no registry requirement.
- Externally sourced renewable electricity (eg on a Maritime region basis) with fully bundled renewable attributes could optionally be recognised as contributing to fulfillment of the RPS.

#### **5.3.2 Scenario 2(b); addition of NSPI null energy purchase**

As in scenario 1, it would be possible to add an arrangement / requirement for the purchase by NSPI of null energy. The implications would be similar to those under scenario 1, except that a project could migrate either way between a sale to fulfill the Nova Scotia RPS requirement and “null energy & export ERCs” basis.

Once again, the implementation of a federally regulated offset credit program would not impact this arrangement in principle. It would probably add to the value of the ERCs in the form of offset credits.

### **5.4 Nova Scotia RPS with separable attributes**

#### **5.4.1 Scenario 3(a); no null energy purchase**

- Renewable attributes are not automatically attached to the initial power sale (to NSPI / other LSE or future retail).
- RPS-mandated renewable attributes retired by power purchaser (NSPI / other LSE or future retail) or assigned to the relevant agency on sale of energy for consumption in Nova Scotia.

- Extra renewable attributes may be banked by attribute owner or sold.
- Option for full recognition (subject to acceptable certification) of externally sourced renewable attributes (eg on a Maritime regional basis) as contributing to fulfillment of provincial objectives, subject to confirmation that ALL attributes are included (ie no severance of ERCs).
- Attribute registry would be required by Nova Scotia to track trading and retirement / pool assignment inside Nova Scotia.

Within scenario 3(a), there is no provision for purchase by NSPI of null energy. The small scale of the wholesale market for null energy would effectively make this scenario untenable.

#### **5.4.2 Scenario 3(b); addition of NSPI null energy purchase**

As in scenarios 1 and 2, it would be possible to add an arrangement / requirement for the purchase by NSPI of null energy. This is indeed essential in order to make this scenario tenable.

In scenario 3(b) the electricity and attributes would be valued separately, yielding somewhat greater transparency to the true costs of RPS compliance.

A project could migrate either way between an attribute sale to fulfill the Nova Scotia RPS requirement and an export ERC sale.

Once again, the implementation of a federally regulated offset credit program would not impact this arrangement in principle. It would probably add to the value of the ERCs in the form of offset credits.

## 6 Implications of options

### 6.1 *Transaction perspective*

In each scenario, it is necessary to identify the transactions that would be possible, and the issues around each transaction, and the consequences.

#### 6.1.1 NSPI bundled PPA purchase

- This is possible in all scenarios.
- This is likely to provide the greatest certainty to investors in independent renewable generation projects.
- Excess attributes (and any associated ERCs) over the RPS requirement will belong to NSPI.
- This does not facilitate the opportunity for competitive entry into an electricity market with an RPS.
- Implications for policy objectives:
  - To the extent that attributes are retired by NSPI in fulfilment of RPS obligations or on a voluntary basis, they unequivocally support Nova Scotia policy objectives.
  - To the extent that NSPI operates under a federally regulated LFE cap on greenhouse gas emissions, GHG offset credits created under the federal program from this renewable generation could be accounted as contributing to NSPI's fulfillment of its cap, and thus to provincial objectives. There would likely be no separate offset credits created in respect of such contracted renewable generation.
  - To the extent that NSPI sells attributes or ERCs outside the province, the localised physical benefits still arise in the province. However, any associated emission reductions would no longer be accounted as attributable to the province.

#### 6.1.2 Independent bundled purchase

- This is possible in all scenarios.
- The market scope is limited to those customers eligible to purchase renewable electricity under physical bilateral contracts (export, wholesale and any eligible retail).
- This provides a reasonable degree of certainty to investors in independent renewable generation projects.

- Attributes in excess of the RPS requirement will belong to the purchaser.
- Implications for policy objectives:
  - To the extent that attributes are retired by electricity purchasers in fulfilment of RPS obligations or on a voluntary basis, they unequivocally support Nova Scotia policy objectives, and perhaps may be able to account for provincial efforts under a future federal greenhouse gas program.
  - To the extent that there is a federal offset credit program, any offset credits would accrue under bundled purchase arrangements to the electricity purchasers. Surplus offset credits not included in mandated attribute retirements would appear to bring value to the electricity buyer. They would only be accounted as attributable to the province if retired to a federal Climate Fund.
  - To the extent that purchasers re-sell or retire attributes or ERCs outside the province, the localised physical benefits still arise in the province. However, any associated emission reductions (ERCs) would no longer be accounted as attributable to the province.

### **6.1.3 NSPI null energy purchase**

- This is included in all (b) scenarios.
- The significance is in the enablement of independent transactions in attributes.
- This allows independent renewable power producers to sell renewable attributes into any jurisdiction willing to recognise them. Absent any Maritime regional RPS or equivalent, GHG ERCs are likely to be the only elements with material value.
- In scenario 3(b) this also allows for the sale of attributes in Nova Scotia in support of a purchaser's RPS obligations.
- Implications for policy objectives:
  - The direct impacts of null energy purchases are neutral with respect to policy.
  - The indirect impacts of null energy purchases are realised through the separate attribute purchases as discussed below.

### **6.1.4 Separate attribute purchases for RPS compliance**

- This is included in scenario 3 only.
- This is likely to be associated most often with null energy purchase by NSPI, but could theoretically be coupled with null energy purchase by eligible (ie wholesale market) customers. Given a limited expectation of exports, and the small eligible wholesale market, scenario 3(a) is unlikely to provide any tenable opportunity for renewable project development in the absence of null energy purchase by NSPI.

- This may (when coupled with NSPI null energy purchase) provide a reasonably sustainable revenue stream capable of providing some degree of support to renewable generation investment.
- Implications for policy objectives:
  - To the extent that the attributes are sourced in Nova Scotia and are retired by purchasers in fulfilment of RPS obligations, they unequivocally support Nova Scotia policy objectives, and perhaps may be able to account for provincial efforts under a future federal greenhouse gas program.

### **6.1.5 Separate ERC / offset credit or attribute sales and purchases outside the RPS**

- This is possible scenario 1, but is unlikely to have material scope in that scenario. It has more potential in scenarios 2 and 3, limited by the value placed on attributes or ERCs / offset credits.
- Implications for policy objectives:
  - To the extent that the attributes and ERCs / offset credits are sourced in Nova Scotia and are retired by in-province purchasers on a voluntary basis, including to a federal Climate Fund, they unequivocally support Nova Scotia policy objectives.
  - Trading of attributes and ERCs / offset credits within Nova Scotia is policy-neutral.
  - To the extent that generators sell, or purchasers re-sell ERCs / offset credits or attributes outside the province, the localised physical benefits still arise in the province. However, any associated emission reductions would no longer be accounted as attributable to the province.

## **6.2 Implications of transactions**

All Nova Scotia renewable generation investments yield certain localised physical benefits in the province.

Export of renewable attributes or ERCs / offset credits could however result in those attributes or ERCs / offset credits being accounted as attributable to others, and not to the Province of Nova Scotia. If those attributes or ERCs / offset credits are truly surplus to fulfilment of Nova Scotia obligations and policy objectives, then the export sale is economically beneficial to the province, and should be encouraged.

To the extent that parties have the opportunity for export sales of attributes or ERCs / offset credits that are required for fulfilment of Nova Scotia obligations or policy objectives, then the export price available for such attributes or ERCs / offset credits effectively sets a minimum Nova Scotia renewable attribute premium.

All contemplated scenarios contain mechanisms whereby such export could take place. These mechanisms are enumerated below:

- Under scenario 1, NSPI and independent renewable generators can export electricity bundled with renewable attributes. In addition NSPI can re-sell or retire out of the province any renewable attributes that are not required to be retired in fulfilment of RPS obligations and that are recognised by the buyer as having value. Absent certification of associated ERCs, the attributes are however unlikely to have significant value. Without an RPS or equivalent explicit requirement, all attributes or ERCs are in a sense surplus, and there is no obligation on NSPI not to export them. The obligation to minimise net cost of electricity to consumers would argue for NSPI to monetise attributes or ERCs by such export. Federally recognised offset credits would likely not be tradeable outside Canada. So once a federal regime is in place, or in the earlier expectation of early-mover recognition, ERCs / offset credits would likely have greater value within Canada.
- Under scenario 2, all the processes of scenario 1 continue in effect, except that the RPS requirement imposes an obligation for Nova Scotia retirements. The surplus available for export is much reduced relative to scenario 1.
- Under scenario 3, all the processes of scenario 2 continue in effect, supplemented by the opportunity for separate export of the broader set of attributes as an alternative to the ERCs or offset credits. The available surplus remains the same as in scenario 2. The mechanisms are easier and more flexible.

### **6.3 Options for mitigating negative impacts**

#### **6.3.1 Reducing the “surplus”**

The most comprehensive means to capture the complete set of benefits (physical as well as attributed) is to increase the RPS progressively to the level at which it requires the development and commitment of substantially all renewable resources that are economical from an electricity system perspective. If policy objectives can be fulfilled at a lower level of renewable investments, then this lower level is sufficient, and the export of surplus attributes does not impact fulfilment of policy.

The use of an RPS as opposed to mandated NSPI performance is in keeping with the EMGC recommendations and the stimulation of independent investment. This argues for one of scenarios 2 or 3.

A negative impact of increasing the RPS is that more green attributes effectively become retired from future use or resale. This effectively retires the value that could be derived from the customer resources used to procure the green attributes. This could be a significant rate-payer issue if the RPS adds materially to customer costs and exceeds the accepted level required for environmental policy reasons. Green attributes that are surplus to the regulatory obligation would escape this impact. There is therefore a strong argument to create a framework in which renewable energy or its attributes have

high credibility, so that consumers will voluntarily exceed the mandated requirements and still contribute to provincial policy objectives.

### **6.3.2 Emission Reduction Credit (ERC) regulation and a federal offset credit program**

Any regulation should address renewable attributes as a complete package, and should not refer to ERCs separately. Any registry system should be clearly limited to recording as a single unit the complete set of renewable attributes associated with renewable generation in Nova Scotia, but without any determination of ERCs. Any electricity in respect of which ERCs had been separately transacted would be disqualified from the registry, and in any case would be expected to be registered elsewhere as part of the buyer's requirement for the ERC transaction.

The federal program treatment of offset credits associated with renewable generation under an RPS is a matter for the detailed design of that federal program. This issue is identified in section 4.3 (c) above.

### **6.3.3 Bundling or separation of renewable attributes, and 6.3.4 Null energy purchase provisions**

These two considerations are closely related. Null energy purchase has little place in a fully bundled system, so within scenario 2 the natural option is 2(a). A system for separate trading of attributes is seriously handicapped if there is no opportunity for null energy purchase, so within scenario 3 the natural option is 3(b). The impacts of these two options need to be considered. In general, the greater flexibility offered by scenario 3(b) over 2(a) will be beneficial with respect to the investment needed to fulfill Nova Scotia policy objectives, but could be somewhat counterproductive in that it might facilitate attribute exports, and thus increase the premium payable in Nova Scotia for renewable attributes.

If the fulfillment of obligations and policy objectives is arduous and is likely to require development of extensive renewable generation resources, the premium attached to renewable development in Nova Scotia is likely to be high, independent of any export opportunities. In this case it will not be impacted materially by any ERC export market opportunities or offset credit value that may exist. Transparency and economic efficiency would argue strongly for the most flexible system possible, namely scenario 3(b).

If the fulfillment of obligations and policy objectives is not arduous, and can be achieved by the development only of the most economic subset of renewable generation resources, then scenario 2(a) should be considered. Absent a federal offset credit program the adoption of scenario 2(a) would make ERC export transactions more onerous, but would not preclude them entirely, particularly with respect to electricity consumers. By making them more onerous, this would tend to reduce the value that a renewable generator could realise thereby, and thus reduce any export underpinning of the Nova Scotia renewable premium. On the other hand, adoption of scenario 2(a)

would make Nova Scotia compliance more onerous and less efficient, adding to the cost. And adoption of scenario 2(a) would tend to reduce the scale of economically beneficial investment in renewable generation supported by export sales in the Maritime region or more widely.

By its very nature, the federal recognition of separately tradeable offset credits would effectively open up the opportunity for separate trading in the value of renewable generation in excess of the RPS requirement. This eliminates the barriers inherent in scenario 2(a), as discussed immediately above. The potential arguments in favour of scenario 2(a) seem to vanish on the introduction, or in the expectation of, a federal offset credit program of the type previously proposed.

The final decision will depend on the expectations of how arduous the compliance obligation is in the first place, and possibly on the relative importance attached to the two perspectives of the impact of scenario 2(a) and expectations with respect to a federal offset credit program. Subject to appropriate resolution of other issues, the balance would appear to be in favour of scenario 3(b).

### **6.3.5 Addressing the limitations of the transmission system and ancillary services requirements**

Most but not all renewable generation is intermittent, meaning that it is almost instantaneously dependent on weather conditions or other non-controllable parameters. This means that the dependable capacity of renewable generation is only a small percentage of its total capacity (eg 10% to 30%). This also means that other, controllable, generators must be available to offset the variation in renewable energy output, ie to supplement the load-following and operating reserve ancillary services. While intermittent generation is only a small percentage of total system capability, this generally has minimal impact; the reserves required for other reasons can also be made available to balance the output variations of intermittent generation. After a certain point the variability of intermittent generation can impose extra costs on the system; the reserve requirements may be increased in total, or in certain categories. The system impacts are specific to the particular system, to the generation mix, and to the location on the system of the intermittent generation and of other generation resources; they vary over time. In some sense when the existing system capability to accommodate intermittent generation is limited, then there is a system cost of increasing the intermittent generation beyond this point. While some jurisdictions have talked about the capability to accommodate 20% intermittent by capacity, this may not be applicable in Nova Scotia with its relatively low proportion of controllable storage-based hydraulic generation. And the 20% by capacity corresponds to a lower % by energy.

There is thus a potential that additional intermittent generation would result in incremental system costs. It would be appropriate that NSPI be requested to initiate a study to assess when the impacts become tangible, how they would be expected to manifest, and how their costs would progressively increase.

There is thus a conceptual risk that the construction of intermittent renewable generation, associated with export of attributes or ERCs / offset credits, could deplete the limited system capability to support Nova Scotia intermittent renewables, and thus increase the cost of Nova Scotia policy fulfillment. It is proposed in the companion discussion paper on electricity contractual frameworks that the null energy price be calculated as the true avoided cost of the generation displaced by renewable generation. In that framework, the incremental system cost to accommodate new intermittent renewables would offset the cost savings of the generation displaced, and so would reduce the null energy price (probably the capacity element of such price)<sup>1</sup>. The total returns to an exporter would be reduced, while it would be expected that the attribute value within Nova Scotia would tend to increase to preserve the total revenues of a Nova Scotia renewable supplier.

## **6.4 Implementation Issues**

### **6.4.1 Accounting period**

It is necessary to define the accounting period for RPS compliance. Typically this is a calendar year. Under this arrangement the RPS requires retirement of attributes in respect of a given year equal to the RPS% of the total electricity consumed in that year. Time of use within the year is not deemed relevant.

This annual accounting period is well suited to scenario 3.

In scenario 2, the use of an annual accounting period is somewhat at odds with the physical linkage of attributes to electricity, which would theoretically seem to require hourly compliance. Use of annual (or even monthly) accounting under scenario 2 does however need careful consideration of how the attribute accounting interacts with electricity top-up and spill transactions or partially unbundled service and spill transactions.

### **6.4.2 Restrictions on attribute life or use**

Under scenario 2, the physical linkage of attributes to electricity seems to preclude recognition of any attribute other than in the year it was generated. Careful consideration is required of how to address the year-to-year variability of renewable output and system demand.

Under scenario 3, the separate existence of attributes allows banking. EMGC recommended limited banking, so that any attribute would have a life of 18 months. Part-year time limits are difficult to match with annual accounting periods. This could however be interpreted to imply that any attribute generated in year 1 (ie average

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<sup>1</sup> See section 5.5 of the contractual framework discussion document.

creation date at mid year) would not qualify for RPS-retirement beyond the end of year 2. An alternative and more arduous approach would be to specify that

- all attributes to be retired in respect of a given year must be created either in that year or the previous year, and
- at least 50% of attributes to be retired in respect of a given year must be created in that year.

In other programs where ERCs are tradable, it has been recognised that the ability to bank ERCs is a requirement for creating the market value and liquidity necessary to underpin investment. Banking periods are typically 5 to 10 years.

### **6.4.3 Retail access scope**

Under scenario 2, the retail access scope is limited to customers who are able to contract for physical delivery of electricity. In keeping with the EMGC recommendations, this would indicate that all transmission-connected customers should be eligible transmission customers and market participants only in respect of renewable (and potentially cogeneration) electricity and the associated NSPI backup / top-up and spill arrangements. Extension beyond the transmission-connected customers would be problematic, as it would effectively require open-access distribution tariff development.

Under scenario 3, there would be no need in respect of renewable electricity to extend transmission customer or market participation eligibility. All renewable attributes could be traded on a financial basis. The inclusion of physical transmission access (per scenario 2) would be an optional enhancement.

## 7 Conclusions

Any of the scenarios could be implemented in such a way as to achieve investment in renewable electricity generation, consistent with provincial policy objectives. The choice of scenario depends on expectations of the extent of investment required relative to system capability, on priorities within provincial policy, on expectations of market and investor behaviour, and to a certain extent on expectations for federal greenhouse gas emission reduction policy.

On balance however, the discussion in earlier sections of this document points to scenario 3(b) as the most economic framework to achieve environmental policy objectives. The province would establish an RPS regulation recognising separately traded renewable attributes to fulfill compliance obligations. NSPI would establish a regulated null energy purchase price. The province may also wish to establish an attribute registry and trading record as a means of establishing ownership and compliance records and providing a basis for early-mover actions to be recognised under a federal greenhouse gas reduction program.

An RPS will provide the financial incentives to ensure the development of a minimum planned (policy) level of renewable generation in Nova Scotia. An RPS-based system can mobilise competitive forces. However, if attributes can only be transacted while bundled with electricity, the system will be relatively hard for participants to navigate and the full economic benefit of attribute trading is unlikely to be realised. Separate trading of attributes is likely to result in more economic fulfillment of policy objectives.

The recognition and registration of separate attribute trading is also likely to add significantly to the credibility of attribute sales in excess of RPS requirements. This can encourage voluntary exceedance of the specific policy requirements, or it can facilitate achievement of specific policy objectives with less burden on default-supply consumers. It could also provide the opportunity for a regionally based RPS that would facilitate the development of the most economic renewable resources in the Maritime region.

Separate attribute provisions have the potential to be structured in a defined form that clearly specifies the emission reduction benefits that the renewable generation provides in Nova Scotia and the utilization objectives for the attributes. Objectives of the defined form can extend beyond the RPS and wholesale/retail values outlined above to include:

- A means of documenting and banking the environmental benefits of renewable generation, that in future may be convertible to specific emission reduction credits for compliance or broader market purposes (ie. conversion of the greenhouse gas reductions to federal offset credits).
- A means of facilitating accounting and verification of specific green attribute credits and their environmental benefits from source to retirement.

While NSPI would be required under this scenario to establish a regulated null energy price (see separate discussion paper), NSPI would still be capable of contracting for long term renewable supply on a bundled basis, subject to the normal oversight of the UARB.

This could provide developers a choice of development forums, depending among other things on their risk profiles and financing arrangements. Long term PPAs may for example allow the mobilisation of lower cost financing than the combination of null energy sales and attribute values.

Scenario 3(b) also provides for the widest consumer access to renewable energy in excess of mandated RPS obligations:

- Scenario 1 does not allow for any retail access for renewables.
- Scenario 2 could extend renewable retail access to transmission-connected customers (requires to be combined with equivalent extension of transmission tariff and market rules applicability)
- Scenario 3 could, without tariff or rules impact, cover wider renewable retail access for attribute sales only. The tariff and rules extensions required under scenario 2 would be optional enhancements to scenario 3; their merit depends on the extent to which users would prefer the ability to establish a complete price hedge for electricity over the potential to secure benefit from the somewhat uncertain excess of marginal price over average price<sup>2</sup>.

Whichever scenario is chosen, there will be a number of implementation issues. The key issues are enumerated in section 6 of this report. None of the scenarios presents insurmountable implementation issues. Appendix D summarises the regulatory and market rules implications of each scenario.

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<sup>2</sup> See the contractual frameworks discussion document, section 5.3.5, for discussion of this issue.

## **8 Suggested discussion topics**

The following list of potential discussion topics is not intended to be exclusive.

### **Section 3, Regulatory framework**

This section is intended to be largely descriptive

Q 3.1, Are the discussions of renewable attributes clear and adequate? What other questions have relevance to policy development and implementation?

Q 3.2, Are the discussions of Emission Reduction Credits (ERCs) clear and adequate? What other questions have relevance to policy development and implementation?

Q 3.3, What other RPS issues require to be addressed here (as opposed to in the context of a draft regulation)?

### **Section 4, Federal policy and its implications**

Q 4.1, While federal policy on greenhouse gas reduction is uncertain, are there any other material scenarios that would impact Nova Scotia policy and should be considered?

### **Section 5, Framework options**

Q 5.1, Do the study scenarios considered cover all options that generation developers, NSPI and other interested parties would contemplate? What other options should be considered?

Q 5.2, Is each scenario adequately described? Do any scenarios / options have significant features that are not identified here? What are these?

### **Section 6, Implications**

Q 6.1, Are the transaction descriptions in section 6.1 adequately described? Are there any other transaction types that should be considered?

Q 6.2, Are there any issues arising from section 6.2 on implications of transactions?

Q 6.3, Are there any other potential impacts that need to be considered for mitigation? What are these, and what mitigation measures would be appropriate?

Q 6.4, Are there any other implementation issues that need to be considered? What are these, and how should they be addressed?

### **Section 7, Conclusions**

Q 7.1, Do you agree with the conclusions, and if not, with what aspects do you disagree?

## Appendix A, Terms of reference

### Proposal for consulting services Robert Cary & Associates Inc with North American Carbon Canada Inc 16<sup>th</sup> May, 2006

#### 1 Introduction

Under the current NS Energy Strategy, Independent Power Producers (IPPs) supplying energy from renewable sources are actively promoted in Nova Scotia. This is leading to the development of an initial limited open access electricity market, the adoption of electricity market rules and a Renewable Portfolio Standard (RPS).

Renewable IPPs produce electricity (null energy) and green attributes, and under the existing energy model, sell through power purchase agreements (PPAs). With the opening of the N.S. electricity market, renewable IPPs will be able to sell directly to wholesale Load Serving Entities (LSEs) using existing PPAs or financial bilateral contracts, which can include energy, green attributes and financial considerations/ arrangements. However, there is interest from renewable IPPs to only contract the null energy and keep the green attributes for possible resale to other interested third parties. In this situation there is no assurance from IPPs that the benefits of the green attributes will remain in Nova Scotia to benefit the short and long-term Nova Scotia emissions strategy.

Creating opportunities for IPPs to independently market green attributes separate from electricity provides another alternative for developing renewable resources in Nova Scotia. However, it may negatively impact NSP's costs and/or ability (and in-turn impact Nova Scotia's ability) to meet any federal and provincial air emissions targets by a made in Nova Scotia solution.

The Government of Nova Scotia needs to establish its policy with respect to separation of green attributes from null energy sales and energy price hedges. This policy needs to be established as a basis for implementation of the RPS and for ongoing development of renewable energy generation projects.

This study is designed to provide the Government of Nova Scotia with an assessment of the implications of policy options for the Province, for customers of renewable projects, for other electricity consumers, for the developers of independent power projects, and for Nova Scotia Power Inc.

#### 2 Provincial objectives in the context of the Energy Policy

Within the context of the provincial energy policy, the policy with respect to green attributes must support:

- a) creation of opportunities for IPPs to control the process of initiating and developing projects
- b) fulfillment of the long-term Nova Scotia provincial and federal air emissions strategy targets
- c) Nova Scotia securing the benefits of valuable green attributes created in the province
- d) Fulfillment of the Nova Scotia provincial air emissions strategy at minimum cost

### **3 Issues to be addressed**

The Electricity Marketplace Governance Committee recommended that independent renewable power project developers should have retail (to consumer) as well as wholesale (to LSE) access to the market. In order to accommodate retail access, it was recommended to allow financial bilateral contracts. Such financial bilateral contracts naturally lead to a degree of separation of attributes from null energy sales. Parties have raised a number of issues or concerns:

- a) Potential developers see financial advantage in being able to trade green attributes or “tags”, including to parties outside the province, and suggest that this could lead to a reduction in the net cost to the province of renewable energy
- b) Within the provincial context, the green attributes or “tags” need to be tracked and to be retired on consumption of the energy with which they are re-attached.
- c) If the green attributes or “tags” can be traded outside the province and potentially outside Canada, they may have a higher value outside the province than inside. Leakage would occur, requiring yet more investment in renewable generation to fulfill the provincial air emissions strategy. Such additional generation could be less economic, and would result in greater costs.
- d) In addition to the additional direct costs of such generation, there would likely be system impacts from the non-dispatchable nature of renewable generation and particularly wind generation. Nova Scotia Power Inc could be required to incur extra costs to mitigate these impacts, and such costs would normally flow to consumers though impact on regulated rates and tariffs.

Green tags attest to freedom from toxic air emissions (NO<sub>x</sub>, SO<sub>x</sub>, Hg) as well as greenhouse gas emissions. Given the difference in regulatory framework, trading regimes and airshed impacts, it will be necessary to address the relationships of green tags to the recognition of both toxic emission reduction and greenhouse gas reduction benefits, as well as to the null energy produced. In the context of greenhouse gas emissions, the interaction with the federal offset program needs to be considered.

### **4 Study methodology**

In order to discuss and evaluate the risks and benefits associated with impact of renewable IPPs marketing electricity (null energy) and green attributes independently, under a financial bilateral contract model, it is necessary also to develop a comparison baseline.

The first steps in the study will be to define a base regulatory regime in which there is no ability to trade green tags independent of the energy generated, and then to define one or more alternatives providing for separation of tags. These test regimes will be reviewed with the Department of Energy.

It will be necessary to define study parameters for quantities and costs of renewable investments, for NSPI avoided and incremental costs, and alternative market values of tradable tags and emission reduction credits.

The study will identify the potential impacts on project development, and on the developers or project owners.

The study will identify potential implications on the Electricity Market Rules.

The study will identify the potential impacts on the environment and the electricity system, and the costs and risks associated therewith. Electricity system impacts may include reliability, ancillary service requirements including load following, transmission implications, stranded assets and the uncertainties associated therewith.

The study will then assess potential impacts (costs & risks) on others including:

- a) Nova Scotia Power Inc
- b) Other IPPs
- c) Renewable customers
- d) LSEs
- e) Other energy consumers

Results will be summarised and the report will address the opportunities for transferring these impacts (costs and risks), where appropriate, back to the renewable IPPs.

## **5 Deliverables**

The first stage will be the preparation of a draft report for review with the Department of Energy. This draft report will then be used as a basis for discussion with Nova Scotia Power Inc, and potentially with other stakeholders identified by the Department of Energy.

Following such review, the draft report will be updated as a final report.

This final report will include

- a) an executive summary suitable as a basis for policy discussions within government.,
- b) a summary of recommendations / conclusions, and
- c) an appendix setting out provisions that would need to be addressed in the RPS regulation

## Appendix B, Documentation of policy framework

The Nova Scotia policy framework has been developed and documented over a number of years, as indicated by the following records. The following documents are referenced:

- B.1, Climate Change Action Plan, 2001
- B.2, Energy Strategy, 2001
- B.3, Electricity Marketplace Governance Committee recommendations, 2003
- B.4, Green Energy Framework, 2005

Italics are used to indicate direct quotes from the source documents.

### B.1, Climate Change Action Plan, 2001

In 2001, the Conference of New England Governors and Eastern Canadian Premiers adopted the Climate Change Action Plan. With respect to the electricity sector, this plan established a goal and a recommended action:

#### *Goal*

- *By 2025, reduce the amount of CO<sub>2</sub> emitted per megawatt hour of electricity use within the region by 20% of current emissions. [It is noted that this complements a conservation goal.]*

#### *Recommendation*

- *Achieve the above-noted goal through a combination of new renewable energy sources including solar, wind, and bioenergy among others, by using lower carbon fuels, increasing the efficiency of the electricity generation and transmission system and the use of new, efficient distributed generation.*

The 2006 discussion paper on the action plan notes a number of actions taken by a number of jurisdictions for the purpose of achieving this goal. The governors of seven US states indicated their intent to support an initiative for a CO<sub>2</sub> cap-and-trade program. Canadian provinces are observing the process.

### B.2, Energy Strategy, 2001

Part 3 of the Energy Strategy, 2001, addressed electricity. It defined strategy objectives:

- *To maintain access to secure, reliable, and affordable electricity produced in an environmentally responsible manner,*

- *To phase in competition in the Nova Scotia electrical industry,*
- *To create the regulatory and business environment that will encourage independent producers of wind energy and other renewable resources,*
- *To develop the policy framework that will encourage cogeneration opportunities, and to introduce competition for the construction of new generation capacity,*
- *To reduce the environmental impacts of electricity production, and to increase efficiency and demand management.*

In the context of the electricity chapter, and with respect to renewable energy, the Energy Strategy defined certain actions for the immediate (2001 to 2005) timeframe:

- *Implement new renewable energy policies that allow independent power producers (IPPs) to have open access to NSPI's transmission system and, if the IPP chooses, to market green power directly to retail customers.*
- *Create a short term, voluntary, renewable energy target for new IPPs totalling 2.5% of NSPI's generation capacity, or approximately 50 MW. The government and NSPI will monitor the voluntary process for three years and then establish a longer-term renewable energy portfolio standard (RPS) target. [that 50 MW was additive to the 50 MW already covered by NSPI's program at that time.]*

and longer term (2006 & beyond):

- *Determine the long term RPS strategy.*
- *Continue to improve generation efficiency and reduce overall emissions in the electricity sector.*

Part 4 of the Energy Strategy, 2001, addressed renewable energy sources. It defined strategy objectives:

- *To encourage the growth of a renewable energy industry in Nova Scotia*
- *To increase renewable energy-based generation capacity and ensure open and fair access to the NSPI transmission system*
- *To increase public awareness concerning the opportunities and benefits of using renewable energy sources.*

In the context of the renewable energy chapter, the Energy Strategy defined certain actions for the immediate (2001 to 2005) timeframe. The actions relevant to this report included the two quoted above from the electricity chapter, plus:

- *Establish through the UARB and NSPI a green power purchase rate structure for all NSPI rate classes. This rate will apply to sales by NSPI but not necessarily to IPP sales direct o customers.*

### **B.3, Electricity Marketplace Governance Committee recommendations, 2003**

Relevant recommendations include:

- *Recommendation 40; The EMGC recommends that the province of Nova Scotia adopt a mandatory RPS to take effect in 2006.*
- *Recommendation 41; the EMGC recommends that electricity from renewable resources have RPS tags that can be created and traded separately from the electricity itself. The RPS tag is a certificate that a quantity of electricity has the attribute of coming from a certified renewable resource within Nova Scotia.*
- *Recommendation 42; The EMGC recommends that entities responsible for acquiring electricity from renewable resources can acquire RPS tags by contracting directly with a certified generator or by purchase from other tag holders.*
- *Recommendation 43; the EMGC recommends that the province of Nova Scotia require each LSE to obtain RPS tags certifying that the fraction of its electric energy from renewable resources by 2010 is equal to the actual base of renewable electric energy at 2001 plus 5.0%*
- *Recommendation 45; The EMGC recommends that “RPS tags”, obtained from certified Nova Scotia renewable generators, carry an expiry date set 18 months from the date of generation, by which time they will have been used by an LSE to meet an RPS requirement, or they will have lapsed.*
- *Recommendation 50; The EMGC recommends that new renewable generators within Nova Scotia, on-line after December 2001, be eligible to sell RPS tags to LSEs as the method of meeting the RPS targets.*
- *Recommendation 51; The EMGC recommends that any seller offering electricity from renewable resources using facilities constructed in Nova Scotia after 2001 be able to sell directly to electricity customers.*
- *Recommendation 52; The EMGC recommends that sellers of electricity from renewable resources sell to electricity customers in Nova Scotia preferably on the basis of financial contracts, although physical contracts are certainly acceptable where the contracting parties can and choose to do so.*

In this context “LSEs” should be construed to comprise NSPI, the six municipal distribution utilities, any competitive agent/broker/marketer supplying an electricity consumer in Nova Scotia, and any consumer purchasing direct.

## B.4, Green Energy Framework, 2005

In October 2005, the Nova Scotia Department of energy published “Smart Choices for Cleaner Energy” setting out its Green Energy Framework. This framework addresses parallel challenges of rising world demand for fossil fuels (with cost impact) and increasing global greenhouse gas emissions (with environmental impact). These challenges are particularly relevant to the electricity sector, where fossil fuels account for about 90% of Nova Scotia electricity production.

The Green Energy Framework identifies specific measures as well as establishing a flexible framework for encouraging the technological development and innovation that will help Nova Scotia’s economy to adjust to the rapidly changing circumstances. With respect to the electricity sector, the framework document identifies a guiding principle:

- *Nova Scotia’s electrical generation system must dramatically increase its use of renewable energy and more efficient, cleaner generation technology.*

And steps relevant to the electricity sector to achieve this principle include:

- *Transforming Nova Scotia’s electrical system by*
  - *maximising the use of Nova Scotia’s diverse renewable energy resources,*
    - 280 MW of new wind power in addition to the 100 MW under development
    - 20 MW + other opportunities
    - Low impact tidal power
    - Efficiency improvements at existing hydraulic facilities
  - *reducing emissions from conventional coal-fired generation,*
    - Potential reductions under proper incentives and federal GHG offsets program (now in question) of 1 million tonnes per year
  - *capitalizing on opportunities to increase generation efficiency through projects like Halifax Community Energy project,*
    - 50 MW combined heat and power
    - 50 MW Tufts Cove waste heat recovery
  - *applying technology and innovation to make tomorrow’s energy supply cleaner and more sustainable,*
    - sequestration developments
    - clean coal technologies, including biomass co-firing (addresses SO<sub>x</sub>, NO<sub>x</sub> & Hg as well)
  - *improving our environment by reducing all emissions*
    - FGD and other stack-based technologies to mitigate SO<sub>x</sub>, NO<sub>x</sub> & Hg emissions pending longer term changes.
- *Electrical energy efficiency and conservation by consumers (paraphrasing and summarising a number of items), and*

- *Increasing the use of renewable energy by individual Nova Scotians and Nova Scotia businesses, industry and institutions.*

## Appendix C, Glossary of regulatory and related concepts

This appendix provides explanations of some terms and acronyms used in the text of this document and in the complementary contractual frameworks discussion document.

Acronym or term	Definition
Ancillary Service	In accordance with the Transmission Tariff section 1.0 “Those services that are necessary to support the transmission of capacity and energy from resources to loads while maintaining reliable operation of the Transmission Provider's Transmission System in accordance with Good Utility Practice.”
Attribute	Used in these documents to represent the attributes, typically renewable electricity attributes, associated with electricity by virtue of its means of generation.  <i>Related definition: Tags</i>
Back-up service	The provision of capacity and energy to a market participant to replace the output of a facility that becomes unavailable.  <i>Related definition: Top-up service</i>
Board or UARB	The Nova Scotia Utility and Review Board
Bundled Service	In accordance with the Transmission Tariff section 1.0. “Electrical service taken from NSPI under Rates and Regulations approved by the Board. This takes the form of having generation, transmission, distribution, ancillary services and all other items associated with the provision of such service blended or bundled within the rate.”  As used in the Market Rules, the term refers to the service provided at a Transmission System Point of Delivery, exclusive of use of a Distribution System.  <i>Related definition: Partially Unbundled Service</i>
Capacity	Capacity is the capability of a generating facility or group of generating facilities to produce energy. Within these documents it is also used in a more generic sense to refer to capacity service. Payment may be made by NSPI to recognize the contribution of a facility to the overall adequacy of the integrated electricity system. Payment may be made to NSPI in respect of a market participant's ability to call on the capacity of the integrated electricity system to secure firm delivery of energy.

CO <sub>2</sub> equivalent	Different greenhouse gasses (GHGs) have different ozone and global warming impacts per unit. In order to provide a common basis for measurement, the amounts of different GHGs are generally quantified in terms of the tonnes of CO <sub>2</sub> emissions that would have the same impact.
Default regulated supply	The regulated service taken by an electricity customer who does not elect any other form of supply. Default regulated supply is a bundled service.
EMGC or Electricity Marketplace Governance Committee	The committee of this name established in 2002 by the Nova Scotia Department of Energy. The EMGC's final report is posted on the Department of Energy's website.
Embedded cost	The total cost of electricity production from the existing fleet of generation assets. This includes the variable operating costs as well as the appropriately allocated fixed operating costs, G&A costs, and asst amortization and financing. <i>Related definition: Marginal cost</i>
Embedded generation	Generation that is not directly connected to the transmission system, and is usually within a distribution system, but may be within a load facility.
ERC or Emission Reduction Credit	Emission Reduction Credits are a form of recognition of a reduction in emissions (eg of GHGs) beyond reductions required of the relevant party by regulations such as emissions caps. Emission reduction credits become tradable when certified by an independent or governmental agency under a recognised program. Emission reduction credits can be created by the emitter whose actions reduce emissions, or by another party whose actions demonstrably reduce emissions of one or more emitters. Emission reductions created by the action of a non-emitter are also referred to as offset credits.
Energy price hedge	A financial contract for electricity price whereby the two parties establish a "strike price" and agree to make payments one way or the other to compensate for any differences between a defined (eg market) price for electricity and the strike price. It is a form of derivative contract around the electricity price.
Financial contract	A form of contract in which the settlement is independent from the physical delivery of electricity. This includes an energy price hedge for electricity and an attribute contract for delivery of attributes independent of electricity. <i>Related definition: physical contract</i>

Firm	Firm service is service backed by the full capability of the Nova Scotia integrated electricity system, including where appropriate control actions by the Nova Scotia Power System Operator.
GHG or Greenhouse Gas	Carbon dioxide and other gasses recognised under the Kyoto protocol etc as impacting global warming.
Intermittent Generating Facility	An intermittent generating facility is one whose output at any time is determined by uncontrollable factors such as wind, uncontrolled river flows, etc. Many but not all renewable energy resources are also intermittent.
LFE or Large Final Emitter	A large emitter of (typically) greenhouse gasses, that would be subject to an emissions cap under a federal or provincial program.
LSE or Load Serving Entity	A wholesale purchaser of electricity with an obligation to supply retail customers. In Nova Scotia there are seven LSEs, being NSPI and the six municipal distributors. In some other jurisdictions a retail customer may also qualify as an LSE in respect of its own use, but this is not applicable in Nova Scotia at this time.
NOx	Oxides of nitrogen, particularly NO and NO <sub>2</sub> , generally quantified in equivalent tonnes of NO <sub>2</sub> .
Non-firm	Non-firm service is service contingent on the availability of sufficient system resources, typically without control actions by the Nova Scotia Power System Operator, and possibly subject to an economic test.
NSPI	Nova Scotia Power Inc.
Null energy	Electrical energy with no attributes attached.
Offset credit	Offset credits are a form of ERC for greenhouse gasses recognised in the draft federal program.
Partially Unbundled Service	Service provided by NSPI to wholesale customers and electricity consumers for the supply of a portion of the electricity supplied from the Transmission System, in accordance with rates and regulations approved by the Board  <i>Related definitions: Bundled Service; Unbundled Service</i>
Physical contract	A physical contract for electricity is one in which the delivery of the electrical energy commodity is unbundled from transmission services and is effected in accordance with the terms of the transmission tariff.  A physical contract for attributes is one in which the attributes are associated with electricity delivered under a physical contract for electricity.  <i>Related definition: Financial contract</i>

PPA or Power Purchase Agreement	An agreement between NSPI and an independent power producer for the purchase by NSPI of all the capacity and energy of one or more Generating Facilities owned or to be developed by the independent power producer, such that title to the purchased capacity and energy is transferred to NSPI at the Generating Facility.
RPS or Renewable Portfolio Standard	A policy that requires that at least a certain minimum proportion of electricity used be from approved renewable generation sources.  Typically this is implemented as a regulatory framework in which all Load Serving Entities (NSPI and municipal utilities in Nova Scotia) are required to demonstrate that a certain percentage of energy that each provides to consumers is derived from renewable energy sources.
Retail	A retail electricity customer is a purchaser of electricity for its own consumption.  <i>Related definition: Wholesale</i>
Scheduled	Energy scheduled for delivery in accordance with the market rules.
Spill service	The purchase by NSPI of output scheduled from an intermittent facility that is surplus at a particular time to the scheduled requirements of load served from that facility. Spill service is normally coupled with top-up service.  <i>Related definitions: Top-up service</i>
Stranded assets	Assets that have, as a result of other actions such as new investments, ceased to have economic purpose, and whose costs therefore would normally be excluded from the revenue requirement to be recovered through regulated rates.
SO <sub>x</sub>	Oxides of sulphur, generally quantified in equivalent tonnes of SO <sub>2</sub> .
Tag or Green Tag	A term used to describe the set of environmental attributes associated with renewable energy generation.  Same as TRC.
Tariff imbalance	Energy Imbalance Service under the transmission tariff is an ancillary service to provide correction for any hourly mismatch between scheduled energy flows and actual energy flows.
Time of Use	Time of Use rates are regulated rates for electricity that vary depending on the time of day that the electricity is used.

Top-up service	<p>The provision of energy and possibly capacity to a market participant to complement the scheduled output of an intermittent facility in order to fulfil the customer's scheduled load requirement. Top-up service may be firm, in which case it includes a sale of capacity, or non-firm in which case it does not include capacity. Top-up service is normally coupled with spill service.</p> <p><i>Related definitions: Back-up service and spill service</i></p>
TRC or Tradable Renewable Credit	<p>A term used to describe the set of environmental attributes associated with renewable energy generation.</p> <p>Same as Green Tag.</p>
Transmission Provider	The NSPI Customer Operations division, including the Nova Scotia Power System Operator.
Transmission System	In accordance with the Transmission Tariff section 1.0 "The facilities owned, controlled or operated by the Transmission Provider that are used to provide transmission service under Part II and Part III of the Tariff".
Transmission Tariff	The NSPI Open Access Transmission Tariff approved by the Board.
UARB or Board	The Nova Scotia Utility and Review Board
Unbundled Service	<p>Service to a Transmission Customer for Network Integration Service or Point to Point Service, separately from any provision of energy by NSPI PP.</p> <p><i>Related definitions: Bundled Service; Partially Unbundled Service</i></p>
Wholesale	<p>A wholesale electricity customer is a purchaser of electricity for re-sale, and not for its own consumption.</p> <p><i>Related definition: Retail</i></p>

## **Appendix D, Regulatory and Market Rules Implications**

### **D.1, Regulations**

Scenario 1, no change.

Scenarios 2(a) and possibly 3(b), legislation to permit widening of tariff eligibility to include all transmission-connected customers in respect of renewable and potentially co-generated electricity.

Scenarios 2(a) and 3(b), RPS regulations to be developed, including definitions of “renewable” and creation of any registry.

### **D.2, Transmission Tariff and Electricity Market Rules**

Scenario 1, no change.

Scenario 2(a), change to eligibility to allow physical sales of renewable electricity to all transmission-connected customers

Scenario 3(b), no change necessary from pure considerations of renewable attributes, but the enablement of physical sales of renewable electricity<sup>3</sup> may be beneficial and would require the same change as 2(a).

### **D.3, Regulatory oversight by the UARB**

Scenario 1, no change.

Scenario 2(a) and possibly 3(b), change to reflect widened tariff eligibility and any role in oversight of the RPS and / or registry.

Scenario 2(a) and 3(b), retail licensing to the extent retail access is permitted, particularly if retail access extends beyond transmission-connected customers.

Scenario 2(a) and 3(b), regulation of spill price and back-up and top-up prices.

Scenario 3(b), regulation of null energy price.

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<sup>3</sup> See Contractual arrangements discussion document, section 5.3, as indicated by footnote.