DECISION

NSUARB-BRD-E-R-10
2011 NSUARB 100

NOVA SCOTIA UTILITY AND REVIEW BOARD

IN THE MATTER OF THE *ELECTRICITY ACT*

- and -

IN THE MATTER OF a hearing to determine **RENEWABLE ENERGY COMMUNITY BASED FEED-IN TARIFFS**

BEFORE:	Peter W. Gurnham, Q.C., Chair Roland A. Deveau, Q.C., Member Murray E. Doehler, P.Eng., CA, Member
LIST INTERVENORS:	APPENDIX A
LIST OF WITNESSES:	APPENDIX B
BOARD COUNSEL:	S. Bruce Outhouse, Q.C.
HEARING DATE:	April 4-8, 2011
WRITTEN SUBMISSIONS:	May 6, 2011
DECISION DATE:	**July 4, 2011**
DECISION:	**The Board sets COMFIT Tariffs.**

Table of Contents

1.0 INTRODUCTION

[1] The Nova Scotia Utility and Review Board (the "Board") held a hearing to determine Renewable Energy Community Based Feed-in Tariffs ("COMFIT"), pursuant to recent changes to the *Electricity Act*, S.N.S. 2004, c. 25 (the "*Act*") and the *Renewable Electricity Regulations* (the "*Regulations*").

[2] The Board decided to follow a consultative process with Intervenors and Board Counsel Consultant, Synapse Energy Economics, Inc. ("Synapse") to set the COMFIT tariffs.

[3] In an Order dated October 22, 2010, the Board advised that the consultative process would be conducted according to the following schedule leading to the hearing:

Initial technical session with Synapse/Intervenors	Thursday, November 18, 2010
Written submissions from Intervenors	Monday, November 29, 2010
Draft tariffs proposed by Synapse	Monday, December 20, 2010
Information Requests to Synapse	Monday, January 10, 2011
Responses to Information Requests by Synapse	Monday, January 24, 2011
Second technical session with Intervenors	Monday, January 31, 2011
Final Submissions by Intervenors to Synapse	Thursday, February 10, 2011
Final tariffs proposals by Synapse	Monday, February 28, 2011
Intervenor Evidence	Thursday, March 22, 2011
Hearing Commences	Monday, April 4, 2011

[4] The provisions of the *Electricity Act* relevant to this matter provide:

> **4A (1)** A public utility shall
>
> (a) permit generators that qualify under this Section to connect a renewable low-impact electricity-generation facility to its electrical grid in the manner provided by the regulations; and
>
> (b) pay for the electricity generated in accordance with the tariff set by the Board pursuant to this Section.
>
> **(2)** When requested by the Governor in Council, the Board shall set the tariffs to be paid by a public utility pursuant to this Section.
>
> **(3)** In setting a tariff pursuant to this Section, the Board shall make allowance for the matters set out in the regulations.
>
> **(4)** In setting a tariff pursuant to this Section, the Board shall determine

(a) the class or classes of generation facility that qualify for a particular tariff;

(b) whether a tariff is to be adjusted periodically and, where it is to be adjusted, the basis for the adjustment;

(c) the effective date for commencement of a tariff;

(d) the duration of a tariff; and

(e) the terms and conditions under which payment is to be made by a public utility to generators.

(5) In setting a tariff pursuant to this Section, the Board may exercise the same powers and authority granted to it under the Public Utilities Act.

(6) A public utility is entitled to recover through its rate base the tariffs paid by it pursuant to this Section on the basis approved by the Board under the Public Utilities Act.

(7) The tariffs set pursuant to this Section apply to renewable low-impact electricity generated by the following classes of generation facilities:

(a) wind power;
(b) biomass, including the electricity produced from a combined heat and power plant;
(c) small-scale in-stream tidal;
(d) developmental tidal arrays; and
(e) other generation facilities as provided by the regulations.

(8) In order to qualify as a generator under this Section, the generator must be one of the following and comply with the requirements of the regulations:

(a) a council of a band for a band located in the Province as defined under the Indian Act (Canada);
(b) a municipality;
(c) a not-for-profit body corporate;
(d) a community economic-development corporation;
(e) a co-operative; or
(f) any other entity permitted by the regulations.

[5] A total of 35 formal intervenors responded to the Notice of Hearing (identified in Appendix A attached). A number of these parties were represented at the hearing by counsel. The following intervenors participated at the hearing: the Consumer Advocate (the "CA"); Alliance of Nova Scotia Sawmillers (the "ANSS"); Black River Wind Limited ("Black River"); Canadian Wind Energy Association ("CanWEA"); Cape Breton Explorations Ltd. ("CB Explorations"); Ecology Action Centre ("EAC"); Fundy Tidal Inc. ("Fundy Tidal"); Brian Giroux ("Mr. Giroux"); Halifax Regional Municipality ("HRM"); Johnson Controls L.P.; Kwilmu'kw Maw-klusuaqn ("KMKNO"); Lahave Renewables and Community Wind Fields Inc. ("Lahave"); Minas Basin Pulp & Power Company Limited; the Nova Scotia Department of Energy, the Department of

Natural Resources, and Nova Scotia Environment (collectively referred to as the "Province"); Nova Scotia Power Inc. ("NSPI"); Nova Scotia Sustainable Electricity Alliance ("NSSEA"); Quetta Inc. ("Quetta"); Scotian WindFields Inc. ("Scotian WindFields"); Seaforth Energy, Inc. ("Seaforth"); and St. Francis Xavier University ("St. FX").

[6] S. Bruce Outhouse, Q.C., acted as Board Counsel.

[7] The Notice of Public Hearing was published in the Chronicle Herald and the Cape Breton Post on Wednesday, October 27, 2010, Saturday, October 30, 2010, and Wednesday, November 3, 2010. The hearing was held over five days from April 4 - 8, 2011 at the Four Points Sheraton in Halifax, Nova Scotia.

[8] Various witnesses testified at the hearing, as described in Appendix B attached.

[9] The Board also received written submissions from Eon WindElectric Inc. respecting financing of wind projects; from the Municipality of Clare regarding labour costs for Biomass CHP related to the regulatory requirement for boiler engineers; and from the Wood Product Manufacturers Association of Nova Scotia in support of ANSS.

2.0 BACKGROUND

[10] In April 2010, the Province released its "Renewable Electricity Plan", which sets out a detailed program to move Nova Scotia away from carbon-based electricity towards greener, more local sources. That Plan includes conservation and efficiency programs as well as a transition to renewable energy sources.

[11] On May 11, 2010, amendments to the *Electricity Act* received Royal Assent. This was followed by draft regulations and public consultations leading to a proclamation of the amended *Electricity Act* and enactment of the *Renewable Electricity Regulations* in October 2010. The *Regulations* establish a provincial target of supplying at least 25% of electricity sales with renewable electricity by the year 2015. The Renewable Electricity Plan also identifies a goal of increasing the supply of renewable electricity to 40% by 2020.

[12] In October 2010, the Province released the "Update and Preliminary Guide on Renewable Electricity in Nova Scotia" (unless the context requires otherwise, the Plan and Update are referred to collectively in this Decision as the "Plan"). One of the initiatives is to allow a variety of community organizations (including municipalities, universities, band councils, cooperatives and others) to connect different classes of renewable low-impact electricity generation facilities to a public utility's electrical grid and to be paid for the electricity in accordance with the associated COMFIT tariff set by the Board.

[13] Under the amended *Electricity Act* and the new *Regulations*, the COMFIT tariffs must be set by the Board.

3.0 RENEWABLE ELECTRICITY REGULATIONS

[14] Under s. 2 of the *Regulations*, the "feed-in tariff program" is defined as:

> "feed-in tariff program" means the program established by Section 4A of the Act under which a public utility permits a generator to connect an electricity generation facility to the public utility's electrical grid;

[15] The public utility referred to above may be NSPI or a municipal electric utility.

[16] The Board is required to set tariffs for the following classes of renewable low-impact electricity:

> **18 (1)** For the purposes of clause 4A(7)(e) of the Act, a run-of-the-river hydroelectricity generation facility is a class of generation facility to which a tariff applies.
>
> **(2)** Subject to subsections (3) and (4), the Board must set a tariff for all of the following classes of electricity generation facility:
>
> (a) all of the following, as required by clauses 4A(7)(a) to (d) of the Act:
>
> (i) wind power,
> (ii) biomass,
> (iii) small-scale in-stream tidal arrays,
> (iv) developmental tidal arrays;
>
> (b) run-of-the-river hydroelectricity.
>
> **(3)** The Board must set separate tariffs for wind power with a capacity greater than 50 kW and wind power with a capacity of 50 kW or less.
>
> **(4)** The tariff for biomass must apply only to the electricity produced from a combined heat and power plant.

[17] In this Decision, the Board will also refer to wind projects greater than 50kW as "large wind" and those of 50 kW or less as "small wind". Biomass Combined Heat and Power Plant will be referred to as "Biomass CHP" or "CHP".

[18] The *Regulations* also contain the following provisions relating to the generation capacity of various facilities:

> **3(1)** In the Act and these regulations,
> "developmental tidal array" means a generation facility that consists of 1 or more tidal generation devices with a capacity of greater than .5 MW each and that is capable of being interconnected with the electrical grid through a transmission system;
>
> "small-scale in-stream tidal" means a tidal generation device with a capacity of .5 MW or less that is capable of being interconnected with the electrical grid through a distribution system.
>
> **8(1)** No more than 500,000 dry tonnes annually of primary forest biomass over the average amount of primary forest biomass consumed annually in the Province for the years 1995 to 2005 may be used to attain any renewable electricity standard.
>
> **28(2)** For wind power generation facilities with a capacity of 50 kW or less, feed-in tariff approvals must be issued for no more than a maximum of 5 mW [5 MW] total capacity.

[19] While there is no overall limit expressed in the *Regulations*, the Province indicated in its Renewable Electricity Plan that it expects about 100 MW of distribution grid capacity will be used by COMFIT projects.

[20] It is noted that developmental tidal arrays are not under consideration in this hearing. They must interconnect with the electrical grid through a transmission system (voltages of 69 kV or more) and will be the subject of a future proceeding.

[21] All other classes of electricity generation facilities to which the COMFIT applies must interconnect with the electrical grid through a distribution system.

[22] In the Board's setting of COMFIT tariffs, s. 19 of the *Regulations* provides:

> **19(1)** In this Section and in Section 20, "community feed-in tariff" means a tariff set by the Board for any class of generation facility referred to in Section 18 except for a developmental tidal array.
>
> **(2)** In setting a community feed-in tariff, the Board must determine, for each class of generation facility, the cost of the physical assets of a facility and may make allowances for any of the following matters:
>
> (a) depreciation;
> (b) cost of labour and supervision;
> (c) necessary working capital;
> (d) organization expenses;
> (e) overhead costs for engineering, superintendence, legal services, taxes and interest during planning and construction, and similar matters not included in the cost of the physical assets;
> (f) costs in whole or in part of land acquired in reasonable anticipation of future requirements;
> (g) costs to interconnect the generation facility with the electrical grid;
> (h) return on investment;
> (i) additional matters that the Board considers appropriate.

[23] Section 20 sets out the qualifications for COMFIT generation facilities:

> **Community feed-in tariff qualifications**
> **20(1)** For the purposes of clause 4A(8)(f) of the Act, in addition to the entities listed in clauses 4A(8)(a) to (e) of the Act, each of the following entities qualifies as a generator that may participate in the feed-in tariff program:
>
> (a) a university
> (b) a wholly owned subsidiary of a municipality;
>
> **(2)** To qualify for a community feed-in tariff, a generation facility must be owned by one or a combination of any of the following:
>
> (a) a municipality or a wholly owned subsidiary of a municipality;
> (b) a Mi'kmaq [Mi'kmaw] band council;

(c) a cooperative of which a majority of members reside in the Province and at least 25 members reside in the municipality where the generation facility is located;
(d) a not-for-profit body corporate of which a majority of members reside in the Province and at least 25 members reside in the municipality where the generation facility is located;
(e) a community economic-development corporation of which at least 25 shareholders or members reside in the municipality where the generation facility is located;
(f) a university.

(3) In addition to the ownership requirements in subsection (2), to qualify for a community feed-in tariff, a generation facility must meet all of the following requirements:

(a) it must be a generation facility in a class to which a community feed-in tariff applies in accordance with subsection 19(1);
(b) if it uses biomass, it must be a combined heat and power generation facility;
(c) it must interconnect with the electrical grid through a distribution system;
(d) subject to clauses (e) and (f), it must be located in the Province;
(e) if it is wholly owned by a municipality or a wholly owned subsidiary of a municipality, it must be located within the boundaries of that municipality or the boundaries of an immediately adjacent municipality;
(f) if it is wholly owned by a Mi'kmaq [Mi'kmaw] band council, it must be located on reserve lands or lands leased or owned by a band-controlled entity;
(g) it must have been issued a feed-in tariff approval.

(4) For the purposes of subsection (3) [(2)], an entity owns a generation facility if it holds at least a majority ownership interest in the generation facility or in an entity that owns the generation facility.

(5) The ownership requirements in subsection 4A(8) of the Act and in subsection (2) do not apply to a combined heat and power generation facility described in clause (3)(b) if the heat is consumed or used by the renewable electricity generator or an affiliate of the renewable electricity generator.

[24] While the Board sets the COMFIT tariffs, the *Regulations* provide that it is the Minister who approves the applications by electricity generation facilities to participate in the feed-in tariff program: see ss. 23 - 28.

[25] NSPI and any other participating utility will pay generators who qualify to participate in the feed-in tariff programs the rates as determined by the Board in this proceeding. The cost NSPI incurs will in turn be recovered from its customers through the Board approved fuel adjustment mechanism in the same way fuel and other purchased power costs of NSPI are recovered. In the event the interconnection occurs

in the service territory of a municipal electric utility, the utility may apply to the Board for a pass-through Order similar to those issued in relation to the FAM.

[26] The Board's powers are set out in the *Regulations*:

> **Board powers**
> **49** The powers of the Board respecting a hearing or an appeal under the Utility and Review Board Act and the Public Utilities Act and regulations made under those Acts apply to hearings and appeals under the Act and these regulations.

[27] As noted earlier in this Decision, s. 4A(5) of the *Act* provides:

> **4A(5)** In setting a tariff pursuant to this Section, the Board may exercise the same powers and authority granted to it under the Public Utilities Act.

[28] However, the *Electricity Act* prevails in the event of a conflict with the *Public Utilities Act*:

> **2A** Notwithstanding Section 117 of the Public Utilities Act, where there is a conflict between this Act and that Act, this Act prevails.

4.0 ADOPTION OF MODEL BY CONSULTATIVE PROCESS

4.1 Synapse Model

[29] Synapse led the consultative process with the formal intervenors. Synapse proposed the adoption of a discounted cash flow model used to set feed-in tariffs in Vermont, USA in 2009. Under this model (the "FIT model"), it entered assumptions about the costs of typical COMFIT projects into the discounted cash flow model and calculated the COMFIT rate that would provide the target, after-tax, return on equity to project owners.

[30] Synapse explained how it developed the spreadsheet model used in this proceeding:

> The project team reviewed the various models used in other jurisdictions. We began with the discounted cash flow model developed in the proceeding to establish FIT rates in Vermont in 2009. In our judgment this model offered a good level of detail, and most importantly provided for a very open process in which stakeholders could review and

> comment on any and all inputs, or even run their own calculations if desired. This model was provided to stakeholders for review shortly after the first Technical Session on November 18, 2010. During the stakeholder consultations, we adjusted the model to better suit Nova Scotia as we researched input assumptions for each technology.
>
> [Synapse Report, Exhibit B-1, p. 9]

[31] While some of the intervenors challenged a number of the specific input assumptions made by Synapse, the FIT modeling adopted by Synapse was generally viewed favourably by all intervenors.

[32] At the conclusion of Synapse's consultative process, it filed its evidence setting out its recommendations for the COMFIT tariffs:

SYNAPSE RECOMMENDED TARIFFS	
CLASS	**AMOUNT**
Wind power projects 50 kW or less	$452 per MWh
Wind power projects greater than 50 kW	$139 per MWh
Biomass CHP projects	$156 per MWh in year 2012, composed of a fixed component of $94 per MWh and an escalating component of $62 per MWh representing the cost of fuel
Run-of-river hydro projects	$140 per MWh
In-stream tidal projects	$652 per MWh

[Synapse Report, Exhibit B-1, p. 5]

[33] The above recommended tariffs are all in 2012 Canadian Dollars.

4.2 Findings

[34] Based on the Board's review, and the model's universal acceptance by the parties in this proceeding, the Board accepts the adoption of the FIT model to determine COMFIT tariffs in Nova Scotia.

[35] A number of intervenors filed evidence providing comments on Synapse's proposed tariffs, including their views on changes that should be made to various inputs

used in the FIT model. These comments will be canvassed throughout the remainder of the Decision.

[36] To the extent that no intervenor has materially challenged several of the numerical inputs suggested by Synapse and there is no specific discussion of the point in this Decision, the Board has accepted those inputs, as proposed by Synapse, and has incorporated them into the respective FIT model to calculate the tariff for each class of generation facility.

5.0 PRINCIPLES UNDERLYING THE FIT MODEL

5.1 Overview

[37] While much of the evidence during the hearing focused on a review of several numerical inputs to be used in the FIT model to calculate COMFIT tariffs for the various classes of generation facilities, there was also evidence about the principles which should guide the Board in its application of the FIT model for the setting of tariffs. These principles are discussed below, in turn.

5.2 Affordability provisions in the Renewable Electricity Plan

[38] The *Renewable Electricity Regulations* direct the manner in which the COMFIT tariffs are calculated based on estimated cost. It is important to remember, however, that the rates paid to the COMFIT projects will be recovered from the electricity ratepayers of this province. The Board, as always, is concerned with the impact of any decision it makes on electricity rates.

[39] In the Province of Nova Scotia's Renewable Electricity Plan, Government discusses the cost associated with implementing the Plan, of which COMFIT forms a part:

> There are costs associated with moving in this direction - especially upfront. Adding renewables may add an average of one to two percent per year on electricity bills in the short term.
>
> [Exhibit B-23, p. 3]
>
> . . .
>
> How hard is that bullet? Government estimates that measures in this plan will result in a 1-2% increase annually on electricity bills. To reach 2015, this would add an average of approximately $10-$20 annually to the average single family home electricity bill (closer to $20-$40 if electricity is used for heating).
>
> [Exhibit B-23, p. 26]

[40] In achieving the objectives set out in the Plan, at the costs estimated, the Plan outlines a balanced approach:

> This plan takes a balanced approach to the challenging task of transforming our electricity system - a direction critical to the province's economic and environmental future - with opportunities for all Nova Scotians to participate.
>
> [Exhibit B-23, p. 3]

[41] The Board believes it is important to keep in mind the expectations as to ratepayer costs communicated in the Plan as a consideration in determining rates.

5.3 Typical costs for most likely developments

[42] In its Closing Submission, the Consumer Advocate characterized the task before the Board in this hearing:

> The Board has been given a difficult and challenging assignment. It has been instructed to set tariffs for wind, biomass, hydro and tidal power generation where the identity and characteristics of the potential owner generators and the components of the potential generation facilities will vary widely. *The challenge facing the Board is to identify what rate for each class of power generation will provide a reasonable inducement for the defined owner generators to participate and yet still be a reasonable and just rate to be paid by ratepayers.* [Emphasis added]
>
> [CA Closing Submission, April 29, 2011]

[43] Synapse described its overall approach to balancing the issue of costs and the policy objectives of the *Regulations*:

> The regulations governing the development of the COMFIT rates clearly call for them to be cost-based. However, the development of such rates requires the exercise of judgment. Our approach has been to balance the impact of the COMFIT program on the cost of electricity against the desire to foster the development of COMFIT projects. To balance the two we have proposed the lowest rates that we believe will result [in] a reasonable level of development activity in each resource class.
>
> [Synapse Report, Exhibit B-1, p. 7]

[44] The determination of one fixed tariff for each resource class requires assumptions to be made respecting a number of the inputs to be incorporated into the COMFIT model:

> There are large, intrinsic uncertainties involved in setting these rates. In assessing the cost of projects in each resource class, we have had to make assumptions about various parameters for a "typical" project. This includes making assumptions about project size and capacity factor, the specific equipment used, the project owner and the way it is financed...
>
> [Synapse Report, Exhibit B-1, p. 7]

[45] Synapse added that a number of these assumptions may have a large impact on the resulting COMFIT tariff.

[46] Section 20(2) of the *Regulations* provides that in order to qualify for a COMFIT tariff, a generation facility must be majority owned by one or a combination of any of the following types of entities, namely, a municipality, a Mi'kmaq band council, a university, a cooperative or a not-for-profit body corporate of which a majority of members reside in the Province and at least 25 members reside in the municipality where the generation facility is located, or a community economic-development corporation ("CEDIF") of which at least 25 shareholders or members reside in the municipality where the generation facility is located. The Board notes, however, that this community-based ownership requirement does not apply to Biomass CHP.

[47] There was evidence at the hearing about potential barriers that might prevent one or more of the ownership structures from pursuing COMFIT projects or, at least, require higher tariffs for some types of ownership structures. The concerns which were identified ranged from lack of expertise of community-based groups, to the inability by some to obtain financing from lending institutions (notably First Nations), or to raise capital from local investors. Black River also noted some of the challenges faced by CEDIFs. On the other hand, in its evidence and Closing Submission, the CA suggested that community-based groups may benefit from certain advantages in developing COMFIT projects, including the ability, in some cases, to avoid debt financing (i.e., universities), or the likelihood that some members of the community may be satisfied with a lower return on equity in return for the provision of renewable energy in the community.

[48] In developing proposed tariffs under the respective COMFIT models for each resource class, Synapse did not make any specific assumptions about the type of project ownership. Synapse developed one tariff for each class of generation facility.

[49] As noted earlier in this Decision, s. 4A(5) of the *Act* provides that in setting a COMFIT tariff, the Board may exercise the same powers and authority granted to it under the *Public Utilities Act*. However, in the event of a conflict with the *Electricity Act*, the *Electricity Act* prevails [s. 2A].

[50] Section 44 of the *Public Utilities Act* provides:

> **44** The Board may make from time to time such orders as it deems just in respect to the tolls, rates and charges to be paid to any public utility for services rendered or facilities provided, and amend or rescind such orders or make new orders in substitution therefor.

[51] By extension, the Board considers that just and reasonable rates also apply to the tariffs payable by NSPI and other participating utilities for COMFIT projects, which eventually are incorporated into the rates and charges paid by ratepayers.

[52] Moreover, the Board considers that the intent of the *Electricity Act* and the *Regulations* is to encourage a reasonable level of development activity for COMFIT projects.

[53] In its testimony, Synapse witnesses explained its approach of developing one tariff for each resource class, identifying the costs of "typical" COMFIT projects in each class of generation facility and inserting each input assumption into a discounted cash flow model. The intent of this approach is to determine a reasonable tariff which will facilitate a reasonable level of development activity for typical projects in that resource class.

[54] The Board is mindful that different ownership structures or different projects (in terms of size, location, financing, or other factors) may indeed have an impact on the input assumptions used in the COMFIT modeling for each respective class of generation facility. However, the Board's legislated mandate in this proceeding is to set one tariff for each resource class that will apply to projects in that category (e.g., small wind, large wind, hydro, etc.).

[55] Taking into account the legislative scheme established under both the *Public Utilities Act* (i.e., just and reasonable rates for ratepayers) and under the *Electricity Act* and *Regulations* (i.e., to ensure a reasonable level of development activity of COMFIT projects), the Board finds that it is appropriate to adopt an approach which determines a tariff for each class of generation facility that will achieve the lowest

possible tariff, while at the same time encouraging a reasonable level of development activity in that generation class. In the view of the Board, the "typical cost" approach provides an appropriate balance of these legislative objectives.

[56] Thus, the Board concludes that it is appropriate to adopt a methodology under the COMFIT modeling that identifies the "typical cost" for the input assumptions of each generation class in order to determine reasonable COMFIT tariffs.

5.4 Whether all potential projects should be economically feasible

[57] The Board refers again to the general approach adopted by Synapse in developing COMFIT tariffs for the respective classes of electricity generation facilities. Synapse stated:

> The regulations governing the development of the COMFIT rates clearly call for them to be cost-based. However, the development of such rates requires the exercise of judgment. Our approach has been to balance the impact of the COMFIT program on the cost of electricity against the desire to foster the development of COMFIT projects. To balance the two we have proposed the lowest rates that we believe will result [in] a reasonable level of development activity in each resource class.
>
> [Synapse Report, Exhibit B-1, p. 7]

[58] As noted earlier in this Decision, the Board considers this an appropriate approach to the setting of COMFIT tariffs. Implicit in this approach, however, is that some projects will not be economically feasible at the COMFIT tariff approved by the Board for that class of generation facility.

[59] If the Board were to set tariffs that are high enough to ensure that all projects were financially feasible, ratepayers would be paying rates that would be higher than they otherwise would need to be, to ensure a reasonable level of development of COMFIT projects. In the view of the Board, such a result would offend the legislative scheme set out under both the *Public Utilities Act* (i.e., just and reasonable rates for

ratepayers) and under the *Electricity Act* and *Regulations* (i.e., to ensure a reasonable level of development activity of COMFIT projects).

[60] Accordingly, the Board finds that it is appropriate to adopt the "typical cost" approach, as noted earlier, recognizing that not all potential projects will be economically feasible under the proposed tariff in each resource class.

5.5 Consideration of tariffs in other jurisdictions

[61] In assessing whether the proposed COMFIT tariffs are reasonable, Synapse, in addition to considering stakeholder feedback, compared the proposed tariffs "...to FIT prices adopted in other jurisdictions and...considered the market responses in those jurisdictions" [Exhibit B-1, p. 8].

[62] In most cases, Synapse was able to compare the proposed COMFIT tariffs with rates in Vermont and Ontario, as well as in some other jurisdictions.

[63] However, in making any comparison, Synapse took into account material distinctions between the Nova Scotia COMFIT model and FIT models in other jurisdictions.

[64] Generally, there were three significant differences. First, in the United States such renewable energy projects are eligible for a grant or investment tax credit equal to 30% of installed costs. The result is that, all else being equal, a higher tariff will be needed in Nova Scotia to produce similar development activity of such projects. Second, there is no requirement in Vermont that projects be majority owned by community-based groups (the possible impact of this requirement is discussed elsewhere in this Decision). Third, Synapse also took into account the eligible size of

projects in other jurisdictions. In a few jurisdictions, larger projects are contemplated in some categories, meaning that the corresponding Nova Scotia tariff should be higher to compensate for the inefficiencies inherent in smaller projects.

[65] Moreover, with respect to Biomass CHP, projects in Ontario have no CHP requirement whatsoever. In Vermont, the CHP projects must meet a "design system efficiency" of 50%. A more detailed discussion follows later in this Decision about the comparison of the proposed Nova Scotia tariff for Biomass CHP with corresponding tariffs in other jurisdictions.

[66] After submitting that it considered Synapse's cost based approach as appropriate, the Province supported the need to benchmark proposed tariffs in Nova Scotia with those existing in other jurisdictions:

> 17. ...NSDOE and NSE further submit that while the approach taken by Synapse to develop cost based rates is appropriate, it is important to recognize as Synapse does, that considerable uncertainty exists around the development of average project costs and in respect of a whole host of other issues relating to what are only notional COMFIT projects at this stage.
>
> 18. Given this uncertainty, the benchmarking exercises engaged in by Synapse, comparing the rates that it developed to market information available within this province and in other jurisdictions are vital. NSDOE would urge considerable caution in respect of any suggestion of rates that depart significantly from the benchmarks applied by Synapse ...
>
> [Province Closing Submission, April 29, 2011]

[67] While some other intervenors challenged Synapse's witnesses during cross-examination respecting their comparisons to FIT rates in other jurisdictions, no one dismissed the utility of this approach.

[68] The Board observes that the setting of FIT tariffs, generally, and COMFIT tariffs, specifically, is a relatively recent exercise in North America. There is little in the way of context in which to assess the reasonableness of COMFIT tariffs. Given this backdrop, the Board considers it appropriate to assess the reasonableness of COMFIT

tariffs by comparing them with benchmarks in other jurisdictions. As noted above, however, it is important to distinguish any differences in other FIT rates.

6.0 COMMON ASSUMPTIONS AND INPUTS OF THE FIT MODEL

6.1 Overview

[69] While the FIT model is applied to each different class of renewable low-impact electricity generation facility (e.g., wind power greater than 50 kW, Biomass, in-stream tidal, etc.), some of the numerical inputs may have a common application across all generation types. In other words, the assumptions or factors to be considered in setting a numerical input may be identical or similar across most, or all, the generation facility classes.

[70] At this point, the Board will canvass some of the common inputs or assumptions that will be applied across some or all of the different classes. To the extent that there may be any material disagreement relating to a particular class of generation facility (e.g., Biomass), that discussion will be deferred to that class of generation facility canvassed later in this Decision.

6.2 Project ownership

6.2.1 Submissions

[71] In developing proposed tariff rates under the COMFIT models, Synapse did not make any specific assumptions about the project ownership. As noted earlier in this Decision, the approach that was adopted was to determine a tariff for each class of generation facility that will achieve the lowest possible tariff, while encouraging a

reasonable level of development activity in that generation class. Thus, an attempt was made to identify the "typical cost" for each input assumption of every generation class.

[72] Different ownership structures may indeed have an impact on the input assumptions used in the COMFIT modeling for each respective class of generation facility. However, as noted above, the Board approved the "typical cost" approach in determining a reasonable tariff for each resource class.

[73] Nevertheless, Synapse attempted to balance the impact of different ownership types on project costs in two respects, namely cost of capital and income tax treatment:

> Regarding the cost of capital, we believe that our assumptions regarding these costs will support the successful development of COMFIT projects. Projects with a strong private sector partner may be in a better position to raise capital, but we do not feel that our cost of capital assumptions will exclude projects without private sector partners. [Synapse's conclusions on the cost of capital to COMFIT projects are discussed later in this Decision.]
>
> Income taxes affect a project in two ways. Taxable projects incur both the cost of the taxes and the benefit of accelerated depreciation. We find that typically projects are likely to enjoy tax benefits in the early years and liabilities in the later years. The period of liabilities is longer, but it is further out in time, so it is more heavily discounted in the calculation of the IRR [Internal Rate of Return]. Importantly, we have found the net impact for most resource classes to be quite small. For wind, hydro and biomass, the effect on the COMFIT rate of moving from taxable to non-taxable status ranges from +2.9% for hydro projects to -4.2% for large wind projects. For tidal projects, the impact is larger: -13%...(To calculate the rate for a non-taxable entity in the final models, one simply changes the income tax rates to zero and finds the new levelized rate that achieves the target after-tax ROE.)
>
> For wind, hydro and tidal projects, the COMFIT rates we have proposed are the average of the rates calculated assuming a taxable project and a non-taxable project. For biomass CHP projects we have proposed the rate calculated assuming a taxable owner...
>
> [Synapse Report, Exhibit B-1, p. 10]

6.2.2 Findings

[74] The Board concluded above that it is appropriate to adopt a methodology under the COMFIT modeling that identifies the "typical cost" for the input assumptions of each generation class in order to determine reasonable COMFIT tariffs.

[75] In these circumstances, the Board finds that the treatment of project ownership adopted by Synapse in the COMFIT modeling is reasonable. The Board is satisfied that no other adjustment should be made for the ownership structure of projects in each generation class.

6.3 Financing

6.3.1 Submissions

[76] In developing the model to determine the COMFIT rates, Synapse considered financing. Financing has three main costing components, the debt to equity ratio ("D/E ratio"), cost of debt and a return on equity ("ROE"). Synapse used a D/E ratio of 50/50 for wind projects, 60/40 for hydro and Biomass CHP projects, and 100% equity for in-stream tidal.

[77] For the cost of debt, Synapse used 8% for wind and hydro, and 9.5% for CHP. The ROE, defined as the projects' calculated Internal Rate of Return ("IRR"), was set at 13% for wind, hydro and CHP projects and 15% for in-stream tidal.

[78] The Synapse model assumed that all loans could be obtained with a 15 year amortization, except for small wind which could only be amortized over 10 years. As a constraint the model assumed that the Debt Service Coverage Ratio would have to be at least 1.5:1.0. Synapse discovered that with the high D/E ratios, used in the model, this constraint did not become an issue in determining the rates.

[79] Synapse included fees and reserve accounts as follows:

> ... We assume that lenders charge an up-front fee equal to 1% of the loan value, and that closing costs (including legal and other consulting fees) total 5% of the loan value. We also assume that three reserve accounts are required by lenders: a maintenance reserve, debt service reserve and a working capital account. ...
>
> [Synapse Report, Exhibit B-1, p. 13]

[80] Finally, Synapse assumed that all capital projects would require interim financing:

> ... We estimate interest during construction by making the simplifying [assumption] that 100% of the construction financing is outstanding for half of the construction period. So the formula is: (Construction Loan Amount) × (construction period/2) × (annual interest rate/12), where the construction period is stated in months. We assume a one-year loan is needed for large wind, tidal and biomass CHP projects; an 8-month loan is needed for small wind projects and a 1.5-year loan is needed for run-of-river hydro projects. We assume a 10% interest rate for the construction loan.
>
> [Synapse Report, Exhibit B-1, pp. 13-14]

[81] The only evidence led by the parties was to challenge the D/E ratios, the cost of debt and its amortization period, and the ROE. All were specific to the proposed tariffs by resource class. The evidence on these financial parameters, except for Biomass CHP, which is discussed separately in this Decision, is outlined below.

[82] Mr. Chernick, witness for the CA, challenged the cost of debt and the ROE. As stated in his evidence:

> My second major concern, discussed in Section IV, is that Synapse interpreted the concept of "community" to exclude any real community support for the projects and assumed that community ownership could only be a detriment to project development. Consequently, Synapse overstates financing and other costs of community projects...
>
> [Chernick Report, Exhibit B-4, p. 5]

> As I explain in Section IX, I recommend the COMFIT rates shown in Table 1, based on combining the effects of the following adjustments and considerations:
> ...
> • lower-cost capital for wind and hydro due to community support,
> ...
> • lower expected return for demonstration tidal projects.
>
> [Chernick Report, Exhibit B-4, p. 6]

[83] Mr. Chernick is concerned about a community benefitting from "Wall Street" returns:

> So it might make sense to start by seeing whether communities can finance these projects without turning them into stalking horses for commercial investors.

> And the -- I don't see anything in the Regulations or anything in the Act that says -- or in the energy plan, renewable energy plan, that says that this program is supposed to be providing a way for the capital markets to make a lot of money off of Nova Scotia ratepayers.
>
> [Transcript, April 7, 2011, pp. 946-947]

[84] In answer to Board Counsel's question about using a weighted cost of capital of 8.5% (close to NSPI's figure), Mr. Chernick stated:

> Well, again, not necessarily if you are going to the capital markets and asking them to finance these projects. If they're community projects largely financed with municipal, university and community funds, then that return may be -- I think would be quite reasonable.
>
> [Transcript, April 7, 2011, p. 1010]

[85] The Board asked about the reduced ROE:

> Q: ... On page 25 on lines 17 through 19, you talk about operating at a known feed-in tariff should reduce the risk of development comparing the proposal.
>
> Was this part of your analysis of why the 11 percent rather than 13 percent suggested by Synapse? Because you're taking some of the risk out, is what you're saying here.
>
> A: Yes. I guess conceptually it could be, although the context here is in terms of comparing the previous bids that were based on getting an ecoenergy credit to the -- to what you might get under a COMFIT. And all else equal, you'd expect that it would be somewhat less expensive to develop a project where you know at least the price you will get if you can get over the hurdles of inter-connection and the other development issues.
>
> [Transcript, April 7, 2011, p. 1016]

[86] This was explored by Keith Towse, who in his reply argument stated:

> ...However, in cross-examination, (transcript of Hearings April 7th, 2011, pages 946-947), the Consumer Advocate was unable to provide any evidence as to the existence of institutions or mechanisms which might provide capital on the scale required for large wind projects at less than market rates. I would assert that in the absence of any mechanism which might provide capital at less than market rates, the rates proposed by Synapse (and supported by their evidence) should be accepted.
>
> [Lahave Reply Argument, p. 3]

[87] When Toby Couture, of E3 Analytics, was questioned about the appropriateness of the ROE he stated:

> Now we could quibble about whether it should be 11 or whether it should be 15 but I do believe that 13 is in the right ballpark. And that the tariffs, as they're currently structured, they should be adequate to attract investors to the market, both community-based and other individuals in municipalities.
>
> [Transcript, April 7, 2011, pp. 1142-1143]

6.3.2 Finding

[88] The Board finds the basic financial parameters as outlined by Synapse to be reasonable and agrees they should be incorporated into the COMFIT model.

6.4 Taxes and depreciation

6.4.1 Submissions

[89] With respect to income taxes, Synapse made the following assumptions:

> When analyzing a taxable entity, we apply a federal tax rate of 15%. Information from the Canada Revenue Agency shows that the corporate income tax rate is currently 16.5% but will be falling to 15% on January 1, 2012. Based on information from the Nova Scotia Department of Finance, we apply a Provincial tax rate of 4.5% to the first $400,000 of taxable income and a rate of 16% to taxable income in excess of $400,000.
>
> [Synapse Report, Exhibit B-1, p. 17]

[90] With respect to tax depreciation, Synapse concluded:

> We have assumed that 95% of the installed cost of projects in all five resource classes is eligible for depreciation at an accelerated rate consistent with the Class 43.1 rules laid out in Schedule II of the Income Tax Regulations. Plant eligible for this treatment is depreciated on a 50% declining balance basis, except for the first year of operation. In the first year, only half this amount of depreciation (25%) is allowed. Project development costs, reserve accounts and closing costs and fees are not depreciable.
>
> Based on our reading of these tax regulations, we assume that any interconnection equipment owned by a COMFIT project will not be depreciable for tax purposes.
>
> [Synapse Report, Exhibit B-1, p. 17]

6.4.2 Findings

[91] While there was some comment at the hearing about the continuation of reductions in federal income tax, the Board understands that the reduction remains in effect. The Board accepts the above assumptions on income taxes and depreciation as reasonable and approves them for incorporation into the COMFIT model.

7.0 WIND PROJECTS GREATER THAN 50 kW

7.1 Submissions

[92] Synapse proposes a tariff of $139 per MWh for wind projects greater than 50 kW.

[93] This proposed tariff is based on a single turbine 1.5 MW in size. Synapse assumed total project costs of $3.8 Million or $2,520 per kilowatt, based on its consultation with various wind farm developers involved in this proceeding.

[94] Synapse assumed $55,000 per year in routine operating and maintenance costs ("O&M"), with periodic major maintenance included in the routine O&M. Synapse also assigned $1,000 per year for general and administrative expenses.

[95] The Synapse FIT model assumed financing for these projects at 50:50 debt/equity, with a 13% return on equity and debt at 8%. They assumed a 15 year amortization period for repayment of debt.

[96] The capacity factor for both small wind and large wind projects was the topic of contested evidence in this proceeding. For wind projects greater than 50 kW, Synapse assumed a capacity factor of 31%. In its pre-filed evidence, Synapse concluded:

> We assume a capacity factor of 31% for wind >50 kW. Wind developers participating in this proceeding have consistently stated that 30% was the appropriate assumption, however the Consumer Advocate and others have argued for a higher capacity factor, based on Nova Scotia's wind resources. In the 2008 Nova Scotia Wind Integration Study prepared for the NS Department of Energy, Hatch Energy states that the capacity factors in four of the six zones studied range from 31% to 35%, and that in two zones the capacity factors are higher. However, Hatch conservatively uses a capacity factor of 32% for their energy estimates. We have used 31%, representing the midpoint between the wind developers suggestion and the data assumption used by Hatch.
>
> [Synapse Report, Exhibit B-1, p. 23]

[97] In terms of benchmarking its proposed tariff, Synapse considered Vermont and Ontario:

> We have proposed a flat rate of $139 per MWh. In Vermont, the FIT for wind between 100 kW and 2.2 MW starts at $112 per MWh in 2010 and escalates to $124 per kWh in 2029. On the date of this evidence, there were nine projects in this queue. As noted, the 30% grant/ITC available to projects in the U.S. and the COMFIT requirement that projects be majority owned by a community-based group both suggest a COMFIT rate higher than the Vermont rate.
>
> The FIT rate for on-shore wind in Ontario is $135 per MWh. On the date of this evidence, contracts had been signed with 49 projects (1,228 MW) and additional 165 projects (7,228 MW) had applications pending. This is an extremely robust response, and we are comfortable proposing a rate only slightly higher than $135 for COMFIT projects.
>
> [Synapses Report, Exhibit B-1, p. 23]

[98] Mr. Chernick, on behalf of the Consumer Advocate, recommended a tariff of $102 per megawatt hour. He assumed debt financing at 6%. His assumptions also included a capacity factor of 37%, based primarily on his view that Synapse misinterpreted the Hatch Report prepared in 2008 on behalf of the Nova Scotia Department of Energy.

[99] Mr. Chernick referred to Synapse's review of the Hatch analysis:

> ...Synapse notes that Hatch reported that "capacity factors in four of the six zones studied range from 31% to 35%, and that in two zones the capacity factors are higher" (but strangely fails to note that the higher capacity factors are nearly 44%), and describes the Hatch estimate as "conservative."
>
> ...
>
> The range of capacity factors that Synapse cites are from Hatch's Table 4-2, which reports annual capacity factors as follows:
>
> - West: 33.35%
> - Valley: 34.59%

- Truro: 31.86%
- Pictou: 31.86%
- Canso Strait: 43.59%
- Sydney: 43.59%

> Hatch's Table 4-3 shows Hatch's estimates of capacity factors of various levels of future wind power. It applies those zonal capacity factors and finds average capacity factors for future wind resources varying from 33.4% for the lowest penetration scenario...with development concentrated toward Pictou and Truro, to 36.71% with 961 MW of wind and development concentrated toward the Valley zone.
>
> [Chernick Report, Exhibit B-4, pp. 8-9]

[100] Mr. Chernick challenged Synapse's characterization of their 31% assumption as "conservative". He said their assumption was "intentionally biased" to provide a "margin of safety", but, in his view:

> Selecting a low estimate of capacity factor does not protect consumers; it unnecessarily increases prices.
>
> The only sense in which this particular decision could be considered to be conservative...would be from the perspective of developers.
>
> [Chernick Report, Exhibit B-4, p. 10]

[101] He stated that a more realistic estimate of the capacity factor for large wind projects would be 37%. In support of this opinion, he referred to the 37% average implied from NSPI's reported energy output forecasts for the distribution-connected wind plants installed after 2007. He noted that only two of those 11 plants are expected to have capacity factors smaller than Synapse's 31% estimate. Mr. Chernick added that substituting the 37% capacity factor into Synapse's spreadsheet model reduces the proposed COMFIT tariff from $139/MWh to $117/MWh [Chernick Report, Exhibit B-4, p. 10].

[102] The EAC and Scotian WindFields agreed with Synapse's assumed capacity factor of 31%, while CanWEA suggested that a capacity factor of 33% was a more realistic assumption. In its modeling, Black River used an assumption of 31%.

[103] However, Scotian WindFields submitted that there should be a 6% deduction to account for reduced output resulting from availability and electrical losses for both large and small wind classes. On this point, the Board accepts Synapse's evidence that the capacity factors are expressed as net amounts.

[104] On behalf of the EAC, Mr. Couture advocated a cautious approach in the selection of a capacity factor:

> 11. A final concern that has been raised is the assumption of a 31% capacity factor for larger wind projects. Available data from turbine output...throughout the region (e.g. PEI, NB, and NS) suggest that a higher capacity factor may be warranted, such as 33-36%, with some suggesting potential capacity factors upwards of 40%.
>
> A few points need to be made here. Experience around the world suggests that only larger wind projects are able to consistently maintain such high capacity factors. There are a number of reasons for this: first, larger turbines have a greater hub height, benefiting from higher average wind speeds; second, larger wind farms (e.g. >50MW) spread the wind output variability over a larger number of turbines, and over a larger swath of land, both of which contribute to statistical smoothing; and third, when one turbine in a large wind farm comprising 25 turbines needs maintenance, the whole wind site experiences a 4% decline in output, all else being equal; however, when a single wind turbine in a two-turbine site needs maintenance, the project experiences a 50% decline in output. These different factors explain why it is investors are often cautious about relying too much on forecasted capacity factors, particularly in small projects with few turbines.
>
> In fact, initial capacity factor forecasts have become notorious for overestimating the wind resource. Awareness has grown of unpredictable and idiosyncratic maintenance problems, such as the freezing rain that recently halted a wind farm in northern New Brunswick. Also, average wind speeds do vary from one year to the next, leading to above-average as well as below-average years...
>
> As a result, most experienced investors have taken the habit of rounding down by 10% as a rule-of-thumb, and support the project only if it can be demonstrated that it will be profitable at that lower capacity factor. In other words, an expected capacity factor of 35% would be rounded down by 3.5% to 31.5%. This suggests that while the 31% number used by Synapse appears low, it may not be significantly so for the average COMFIT project being built in Nova Scotia.
>
> [E3 Analytics, Exhibit B-14, pp. 9-10]

[105] CanWEA initially proposed a capacity factor of 33% based on field data collected in a sensitivity study conducted by Helimax in Quebec. More importantly, in the Board's opinion, CanWEA later presented data collected by Natural Resources Canada ("NRCan") across Canada, including data specific to the Maritime Provinces

and Nova Scotia. Wind projects that receive ecoEnergy funding from NRCan are required to submit annual energy output information, which allows NRCan to calculate the capacity factor for those projects.

[106] In an Undertaking, CanWEA filed information received from Jimmy Royer, Senior Technical Advisor, NRCan, who provided more insight into this issue based on the most current preliminary data for Nova Scotia for modern, utility scale wind plants:

> Preliminary data based on 5 projects in Nova Scotia shows that performance of wind projects are on average likely to be much higher than the 30% CF assumed by Hatch in their analysis. I do not have sufficient projects nor a large period of operational time for each of these sites but given that 2009 was a low wind year all across Canada and that 2010 is indicative of a more normal wind speed year, I estimate that the average performance of wind farms in Nova Scotia would likely be higher than 32 % CF and may reach 33%.
>
> [Undertaking U-15(i), p. 1]

7.2 Findings

[107] The major point of contention for large wind projects related to the assignment of a capacity factor.

[108] The estimates for the capacity factor ranged from 31% (Synapse, Scotian WindFields, Black River, and the EAC) to Mr. Chernick (on behalf of the CA) suggesting that 37% is more realistic. CanWEA recommended a capacity factor of 33%.

[109] In the Board's view, Synapse's assumption is too conservative in favour of developers, while Mr. Chernick's proposed capacity factor could potentially eliminate a significant number of "typical" large wind projects. However, Mr. Chernick's evidence raises a legitimate concern that Synapse may have underestimated the Hatch Report's findings. Mr. Couture suggested a cautious approach and warned about setting the capacity factor too high.

[110] CanWEA's proposed figure is supported by NRCan preliminary data experienced in the field by large wind operators and appears to be reasonable in the context of the totality of the evidence on this point.

[111] Taking into account all of the evidence, the Board concludes that a capacity factor of 33% is appropriate for wind projects greater than 50 kW.

[112] Accordingly, for wind projects greater than 50 kW, the Board approves the tariff as submitted by Synapse, with the change noted in the above findings respecting the capacity factor which is to be addressed through a Compliance Filing outlined later in this Decision.

8.0 WIND PROJECTS OF 50 kW OR LESS

8.1 Submissions

[113] Synapse assumed a tariff of $452 per MWh for wind projects of 50 kW or less. This proposed tariff is based on a model project with a single 50 kW (0.05 MW) turbine.

[114] Synapse assumed an installed cost of $268,000, including project development costs but not interconnection costs. They determined the installed cost as follows:

> We assume a total installed cost of $268,000, including project development costs but not interconnection costs. This assumption is based on information provided by project developers with experience in Nova Scotia and Canada, manufacturers with the same experience and from conversations with the Canadian Wind Energy Association (CANWEA). We spoke to Seaforth, Entegrity (acquired by Seaforth), Endurance, Atlantic Wind, Juwi Wind, Northern Power Systems, SED, EAPC Wind, Community Windfields, and Scotian Windfields. We received actual installed cost data from more than installations of 50-kW turbines in Canada. We then compared these costs to a database of 50-kW projects in the U.S. Aggregated data were used to determine average costs. The installed costs used in the model are within the range of figures reported to us by these developers, manufacturers and CANWEA.
>
> [Synapse Report, Exhibit B-1, pp. 20-21]

[115] Further, Synapse assumed total project costs of $321,674 or $6,427 per kilowatt.

[116] Synapse assumed $1,642 per year in routine O&M costs, with periodic major maintenance included in the routine O&M. Synapse did not assign any amount for general and administrative expenses nor for land lease costs.

[117] The Synapse FIT model assumed financing for these projects at 50:50 debt/equity, with a 13% return on equity and debt at 8%. They assumed a 10 year amortization period for repayment of debt.

[118] For wind projects of 50 kW or less, Synapse assumed a capacity factor of 23%. In its pre-filed evidence, Synapse concluded:

> We have assumed that small wind projects achieve an annual capacity factor of 23%. This is based on conversations with developers, manufacturers and CANWEA, and on Nova Scotia wind resource maps. While CANWEA suggests using a 20% capacity factor, at least one Canadian project developer has indicated that 25% could be possible in Nova Scotia. The general consensus we found among developers and manufacturers is that 20% is reasonable, perhaps conservative, and that 25% would be on the high-end of expected capacity factors. Therefore we believe that 23% is an appropriate assumption.
>
> [Synapse Report, Exhibit B-1, p. 21]

[119] In terms of benchmarking its proposed tariff, Synapse stated in its pre-filed evidence:

> In Vermont, the FIT rate for wind projects 100 kW or under starts at $208 per MWh and escalates to $230 per MWh over the contract period. As of February 26, 2011, there was one project (100 kW in size) in the queue for this FIT. This is not a particularly robust response. Moreover, three factors suggest that the COMFIT rate for small wind should be significantly higher than the Vermont tariff. First, the Vermont rate is open to projects up to 100 kW, while the COMFIT rate is open to projects up to 50 kW. There are likely to be some economics of scale between 50 kW and 100 kW. Second, projects in Vermont are eligible for either a grant or investment tax credit (ITC) equal to 30% of installed costs. Finally, there is no requirement in Vermont that projects be majority owned by community-based groups. In Ontario, there is no FIT specifically for small wind, and the wind rate has clearly been set at the estimated cost of wind projects well over 50 kW.
>
> [Synapse Report, Exhibit B-1, p. 22]

[120] Mr. Chernick, on behalf of the Consumer Advocate, recommended a tariff of $400 per megawatt hour. He assumed debt financing at 6%. His assumptions also included a capacity factor of 23%.

[121] Mr. Chernick, Seaforth and Scotian WindFields agreed with Synapse's assumed capacity factor of 23%, while CanWEA submitted that a capacity factor of 20% was appropriate.

[122] CanWEA submits that it may be more realistic to assume a capacity factor of 20% because of the proximity of small wind systems to buildings, as well as their lower tower heights. It states that Synapse's higher capacity factor could limit the feasibility of a greater number of locations for small wind systems.

[123] Seaforth stated in its pre-filed evidence:

> Currently the Synapse model uses a capacity factor of 20% [23%] which is the generally accepted appropriate rate for small wind systems. We support the information provided by CanWEA regarding the average of 20% being much more realistic. However, taking into account the objective to spur more efficient renewable energy development and to encourage projects in good wind regimes, we continue to believe that the capacity factor can be 23% in good wind sites. This will encourage better producing sites and better projects yet still make the COMFIT available across all of the counties in Nova Scotia. A positive by-product of this approach may be an increase of wind turbine R&D in Nova Scotia to improve small wind turbines and associated projects to attain an improved capacity factor.
>
> [Seaforth Evidence, Exhibit B-7, p. 2]

[124] Scotian WindFields agreed that 23% is a reasonable assumption for small wind systems.

[125] Small wind operators submitted that Synapse underestimated or omitted certain input assumptions relating to the operation of small wind systems.

[126] Seaforth suggested that Routine O&M should be increased from $1,642 per year to $3,778 per year.

[127] Scotian WindFields submitted the following inputs should be increased (from zero):

(a) General & Administrative - $500 per year;

(b) Site Maintenance - $1,000 per year; and

(c) Land Lease - $1,000 per year.

[128] Some intervenors also raised concerns about interconnection costs related to wind projects of 50 kW or less. Synapse assumed $13,300 for these costs based on an estimate received from NSPI, while Scotian WindFields suggested these costs should be $21,550. Scotian WindFields stated that Synapse did not make an allowance for the distance between the wind turbine and the existing electrical grid. Given typical municipal setbacks for wind turbines under land-use bylaws, Scotian WindFields calculated the increased cost for the interconnection distance by multiplying an average distance of 150 metres by NSPI's recommended rate of $55,000 per km, which results in an increase of $8,250 ($13,300 + 8,250 = $21,550).

[129] CanWEA and Seaforth both required further review to confirm that NSPI's interconnection estimate is reasonable.

8.2 Findings

[130] With respect to the capacity factor, Synapse proposed a rate of 23%. The Board considers Seaforth's comments to be reasonable in terms of supporting the 23% recommendation. Based on its review of the evidence, the Board concludes that 23% is an appropriate capacity factor for wind projects of 50 kW or less.

[131] In terms of interconnection costs, the Board accepts the evidence of Scotian WindFields to the effect that Synapse's projected costs omit the cost of the interconnection distance between the turbine and the grid. The Board directs that the input be adjusted from $13,300 to $21,550.

[132] On issues of O&M, maintenance, and other related matters, the Board accepts the evidence of the small wind operators that Synapse underestimated or omitted certain input assumptions relating to the general operation of small wind systems. Taking into account apparent overlap in the submissions of Seaforth and Scotian WindFields, the Board directs that Routine O&M be increased from $1,642 per year to $4,500 per year to appropriately account for O&M, general and administrative expenses and land lease costs.

[133] Accordingly, for small wind projects, the Board approves the tariff as submitted by Synapse, with the changes noted in the above findings which are to be addressed through the Compliance Filing.

8.3 Tariff Overlap Between Small and Large Wind Projects

[134] The Board considers it should specifically address one point raised by Mr. Couture on behalf of the Ecology Action Centre.

[135] Mr. Couture submitted that the significant disparity between the proposed tariffs for systems greater than 50 kW and those 50kW or less might cause developers to "exploit" the higher tariff by linking a series of small wind turbines to qualify individually for the small wind tariff, rather than developing a single larger project. The

total output of these small turbines combined would normally qualify for the much lower large wind tariff.

[136] In his pre-filed evidence, Mr. Couture warned that the threefold discrepancy in tariffs may lead to "regulatory arbitrage" as developers designed projects to benefit from the difference. He stated:

> ...As designed, the COMFIT wind market is at a risk of "clustering" around the 50kW turbine size, installing multiple 50kW units rather than larger single units, putting more upward pressure on rates, and decreasing the overall efficiency and cost-effectiveness of the policy framework.
> ...
> The policy mechanism would be made more efficient both for communities and for NS ratepayers if communities were able to scale their turbine purchases to their financial resources, choosing the best turbine size category for their area, as well as the turbine that bests suits their community's context. In order to achieve this, a tariff structure that is more reflective of real economies of scale should be introduced.
>
> [E3 Analytics, Exhibit B-14, pp. 6-7]

[137] To remedy this potential problem, Mr. Couture recommended an interpolated rate based on a linear scale between the small and large wind tariffs, which would apply according to the size of the project.

[138] The Province submitted that the Board should set only one tariff for each class of generation facility:

> 39. With respect, NSDOE submits that the mechanisms proposed by Mr. Couture to address this issue are outside of the scope of the regulations which require the board to set "a tariff" for each of the designated classes of electricity generation facilities (s.18). NSDOE submits that, properly interpreted, the current regulations require one rate for each class.
> ...
>
> 45. In the case at hand, s.18(2) of the Regulations states:
>
> > Subject to subsections (3) and (4) the Board must set a tariff for all of the following classes of electricity generation facility...
>
> 46. Although the term "tariff" is not defined in the regulations, s.18(2) refers to it in the singular rather than the plural (ie: "a tariff" v. "tariffs"). Furthermore, s.18(2) generally permits the setting of "a tariff" for a "class" of electricity generation facility not for a "size" of generation facility.
>
> 47. Indeed, the only distinction based on size set out in the regulations is in s.18(3), which directs the board to set "separate tariffs for wind power with a capacity greater than

> 50kW and wind power with a capacity of 50kW or less." The fact that the distinction in the wind power tariff based on size is set out specifically is significant, and suggests that the only size differentiation intended by the Regulations was with wind power tariff, and that this distinction was to be made at 50kW. If the language in s.18(2) requiring "a tariff" for a "class" of generation facility were broad enough to include a tariff of variable rates based upon the size of generation facilities, then the directive in s.18(3) would not be set up as an exception to the Board's general duty in s.18(2) (ie: the duty in s.18(2) is "subject to" the requirement imposed upon the board by s.18(3)).
>
> 48. The interpretation offered by NSDOE in these submissions is also consistent with the January 27, 2011 letter from Deputy Minister of Energy to Synapse clarifying the "policy intent of the government with regard to the draft community feed-in tariff rate for wind technology at the 50 kilowatt level." That letter indicated that it was the intent to have the "Board establish a feed-in-tariff at the 50kw level to distinguish the cost of a 50kw wind turbine generator from larger scale wind projects" and not to "incentivize power generation using less cost effective technologies that may exist below the 50kw level."
>
> 49. There is an additional concern as well with the development of a tariff under s.18(2) that contains more than one rate. If the interpretation offered by NSDOE in these submissions is not accepted, and the language of s.18(2) is broad enough to permit more than one rate (or if the interpolation method is determined to constitute a rate or "a tariff" because it is mathematically derived, it stands to reason that such an approach to setting "a tariff" would be open to be applied to all of the other classes of electricity generation facility noted in s.18(2) because the language in s.18(2) does not distinguish between the setting of "a tariff" for wind power from any of the other classes of electricity generation facilities that are identified.
>
> 50. Based upon the foregoing, NSDOE respectfully submits that the term "a tariff" in s.18(2), in the context of the Regulations, is synonymous with "a rate". A tariff that includes more than one rate would not be permitted by the Regulations. All three of the remedies proposed by E3 Analytics to address the difference between the small and large wind rates proposed by Synapse results in more than one rate for a class of generation facility.
>
> [Province Closing Submission, April 29, 2011]

[139] As the Province also notes, the concerns raised by Mr. Couture are mitigated by s. 28(2) of the *Regulations*, which impose a total 5 MW cap on small wind projects.

[140] The Board agrees with the interpretation of the Province as noted in paragraphs 47 and 50 of its counsel's submission quoted above. In the Board's view a proper reading of the *Regulations* is that the Board is to set a tariff or rate for small wind - 50 kW or less, and large wind - greater than 50 kW. The *Regulations* do not contemplate a multiplicity of tariffs in this or any other resource class.

9.0 BIOMASS COMBINED HEAT AND POWER PLANT

9.1 Definitions

[141] The tariff to be set for a Biomass CHP is defined in the *Regulations* as follows:

> **18(4)** The tariff for biomass must apply only to the electricity produced from a combined heat and power plant.

[142] Generally the COMFIT only applies to "community" groups defined in the *Regulations*. However, for Biomass CHP:

> **20(5)** The ownership requirements in subsection 4A(8) of the Act and in subsection (2) do not apply to a combined heat and power generation facility described in clause (3)(b) if the heat is consumed or used by the renewable electricity generator or an affiliate of the renewable electricity generator.

[143] Synapse attempted to refine what is meant by a CHP in the *Regulations*:

> ... They do not define how much time a plant must be operating in CHP mode to be considered a CHP plant, nor do they provide a definition of CHP stated as an annual average efficiency. We sought direction on this issue from the Nova Scotia Department of Energy, but they were not able to provide a precise definition of CHP.
>
> [Synapse Report, Exhibit B-1, p. 24]

[144] As stated by Patrick Hayes on behalf of ANSS:

> I mean, Synapse had a near impossible time trying to define CHP, and I don't blame them because everywhere you go in the world, we run into the same issues. There is risk inherent with having a steam host, but it's better for both the steam host and the ratepayer to have a combined heat and power plant.
>
> [Transcript, April 5, 2011, p. 584]

[145] The Province, in its closing submission stated:

> ...Combined heat and power means that there is a requirement to produce two separate energy outputs from the facility – heat and power.
>
> [Province Closing Submission, p. 13]

[146] Synapse determined a size for a "typical" steam host (steam only plant), as would be used by a sawmiller:

> Thus we have based our calculations on the steam load of a small to medium sized sawmill. We have assumed a steam load of 22 mmBtu/hr for 60% of the hours each year.
>
> [Synapse Report, Exhibit B-1, p. 27]

[147] In refining this for a CHP, the assumptions were:

> ...We sized the boiler in the steam-only cases at 20,000 lb/hr and assumed a design pressure of 75 to 100 lbs. In the CHP cases we assumed a 30,000 lb/hr boiler for a condensing turbine and a 20,000 lb/hr boiler for a back pressure turbine, both with design pressures of 600 lbs...
>
> [Synapse Report, Exhibit B-1, p. 27]

[148] Mr. Hayes, in determining a typical steam only plant, used the following parameters:

> ... So the intent was that this could be located anywhere in Nova Scotia adjacent to a steam host who needed the 18,000 pounds per hour, roughly 20 megawatt thermal energy.
>
> ...
>
> That existing facility is receiving steam at a low pressure saturated temperature. We assume that their internal infrastructure is existing for that pressure and temperature. ...
>
> [Transcript, April 6, 2011, p. 633]

[149] The sawmillers' steam host needs were further defined by Fenton Travis, of ANSS, under questioning from the Board as follows:

> Q: So the first one is the value for steam only. So this is if you were ---
>
> A: Yeah. This is you built an 18,000 pound boiler at 15 psi. This is what ---
>
> Q: You would use as a sawmill to ---
>
> A: Yeah, that's right.
>
> Q: --- run your kiln.
>
> A: Yeah.
>
> [Transcript, April 6, 2011, pp. 737-738]

[150] In costing the electricity component ("ESI" in the chart) for a Biomass CHP, Mr. Hayes assumed an output slightly higher than that used by Synapse:

		Normal Operation	Full Condensing
Synapse approximation	MW	1.55	2.05
ESI actual equipment	MW	1.602	2.414

[ANSS Evidence, Exhibit B-11, p. 10]

9.1.1 Findings on Definition

[151] The Board finds that for a CHP facility to be entitled to a COMFIT it must produce both heat and steam, and that the primary purpose of the plant is to supply a steam host.

[152] The Board also finds that for a "typical" CHP plant, any costing of a tariff should be based on producing approximately 2MW of electricity.

9.2 Cost Allocation

[153] In preparing the tariff for Biomass CHP, Synapse had to allocate the capital and operating costs between the steam host and electricity generation. They did so as follows:

> ... So we decided to ensure that biomass facilities under the COMFIT are real CHP plants by allocating a large portion of the boiler cost to the steam host and then effectively saying you need to find a steam host who's willing to cover a large portion of these plants. In other words a steam host who needs a lot of steam, they need it on a consistent basis. And so by doing -- by allocating the boiler costs that way that's how we're trying to make sure that electricity sold on the COMFIT Tariff is truly combined heat and power electricity.
>
> [Transcript, April 4, 2011, p. 182]

[154] Synapse further elaborated:

> The steam host bears the full cost that they would have had under a scenario where they have a plant that only produces steam.

> So the two scenarios that we netted out are one which is combined heat and power with a back - - with a condensing steam turbine, and another facility which generates steam only, no electricity at all, at a lower pressure.
>
> So it's not that we allocated the steam that went into the steam turbine, it's that we looked at the differential between the two plants.
>
> [Transcript, April 4, 2011, p. 188]

[155] As stated by Mr. Travis:

> ...our primary business is to produce forest products, so without question when our drying kilns need heat, that's our first and primary goal. You know, we're going to -- steam is the absolute number one -- getting steam to the drying kiln to dry our forest products and get them sold is the number one goal for us.
>
> [Transcript, April 5, 2011, pp. 577-578]

[156] ANSS disagrees with the Synapse allocation. They suggested that it would be more equitable to divide the costs 50%/50%. Its Closing Submission stated:

> ... The proposal of the ANSS is based on a combined heat and power plant which is entirely consistent with the Regulations and simply suggests that costs should be divided 50/50 for areas where the steam resource is shared to produce electricity and heat. ...
>
> [ANSS Reply Submission, p. 4]

[157] It further went on to state:

> ... There is, however, nothing in the Electricity Act or Regulations which mandates that the heat be used 24/7. CHP Facilities are not designed to operate in full extraction mode 24/7 nor can they be as kilns have to be loaded and unloaded and shut down for maintenance, at minimum.
>
> 21. As explained in the evidence of Mr. Travis, the member sawmills in ANSS are operating at 50% to 60% of full operational capacity.
>
> [ANSS Reply Submission, p. 4]

[158] The CA, in his reply submission, agrees with the allocation of costs as submitted by Synapse.

9.2.1 Findings on Cost Allocation

[159] The Board finds that there are two methodologies being suggested for cost allocation: one based on incremental cost (an economic model), and one based on the ratio of the value of the outputs (an accounting model) suggested to be 50%/50%.

[160] In determining what is a Biomass CHP, the Board has already found that to be eligible for the tariff, it must be needed primarily for a steam host. As such, only the incremental capital costs associated with fitting a plant to produce electricity are eligible for consideration.

[161] At the same time, the Board finds that any operating costs, above those required to supply the steam host, are also eligible for consideration. This would include those costs to operate the boiler to achieve steam in excess of 15 psi, and to operate the whole plant in excess of 60% of the time.

9.3 Capital Costs

[162] Synapse developed a capital cost of $7,888,608 for a Biomass CHP. ANSS developed a capital cost of $15,846,150 (increased to $16,150,398 in response to Undertaking U-10). ANSS analyzed the difference between the two capital costs and identified five areas of material disagreement. They were:

Material Handling Systems	$1,145,725
Balance of Plant	1,158,566
Commodity Construction	2,986,369
Engineering and Project Management	715,060
EPC Profit	1,267,692
	$7,273,412

[Extracted from ANSS Evidence, Exhibit B-11, pp. 12-13]

[163] When Synapse was questioned by Ms. Rubin about these differences, they responded:

> Q: ... the balance of the plant, the sewer, HVAC, pre-engineering, building, painting, fire protection, water treatment, storage tanks, air compressors, and pumps. Were those included in your cost estimate?
>
> A: I think for those costs our -- the bulk of our assumption for the scenario that we decided upon was that we were adding equipment to an existing facility which would already contain some of the basics of a serviced site.
>
> And therefore, it isn't that those costs were ignored; it's that they were assumed to be largely already present.
>
> [Transcript, April 4, 2011, p. 144]

[164] The differences in the capital and operating costs between Synapse and ANSS for CHP were not reconciled. ANSS did offer to review its calculations with Synapse, but this was made one week before the hearing. As stated by Synapse:

> It would but what we found in this process is that there's a tremendous amount of uncertainty around the actual cost of developing a CHP project and the type of projects that are likely to be developed. For example, when intervenors filed evidence we received a large amount of data that wasn't provided during the proceedings and the Alliance of Sawmillers has said that a project that they're contemplating would need a tariff rate of something like $340 per megawatt hour. ...
>
> [Transcript, April 4, 2011, p. 120]

[165] ANSS further commented upon the cost per MW to construct the electricity plants:

> The smaller these projects get, the more they cost per megawatt.
>
> [Transcript, April 6, 2011, p. 658]

[166] ANSS commented upon the overall cost of the Synapse plant as follows:

> But Synapse's number, if you look at their capital, it's in the range of a 25- to 40-megawatt project for a 2-megawatt project, and that's just untenable. That's not in any realm of possibility.
>
> [Transcript, April 6, 2011, p. 660]

[167] In the costing for the St. FX 8 MW Biomass Cogeneration Plant, the following comments were made:

> **Scale**. At 8 MW (7 MW net) electrical output, the specific capital cost is high. This plant will cost approximately $4,500,000 per 1 MW electrical output. Larger biomass plants can be built for $1.5 - $2.0 million per MW.
>
> [St. FX Evidence, Exhibit B-3(ii), p. 4]

[168] The ability to construct a small MW CHP was explored by the Board with Mr. Hayes:

> Q: What you're telling us is that this technology cannot be built for what regulators and governments in other jurisdictions have decided is a fair price, keeping ratepayers in mind?
>
> A: In those provinces, it's been our experience that the entities are now going back and paying them more.
>
> ...
>
> Q: But what you're telling me is these plants can't be built for what those jurisdictions ---
>
> A: For what -- no, sir. They cannot be built for what those jurisdictions say.
>
> Q: --- have determined -- to the ratepayers of Ontario, Vermont, British Columbia or wherever you want to pick.
>
> A: Yes, sir. I think it would be safe to say that those governments are now incentivizing outside of the ratepayer cost.
>
> Q: And that's the only way these plants can be built.
>
> ...
>
> Q: Yeah. I guess, are we in a position where the affordability of the ratepayer and the requirements of the developers simply can't be met?
>
> A: Sir, I don't know that. I think you'd have -- if it were me, I think you'd have to look at what the entire base of generation here is and what affect a handful of these projects would have on the entire rate base.
>
> ...
>
> [Transcript, April 6, 2011, pp. 661-665]

[169] Mr. Travis added:

> Mr. Chairman, I would just add to that that it's really not a whole lot different than the tidal or the small wind in that respect, that they're both higher cost and you know that they had the same challenges as both of those technologies do.
>
> [Transcript, April 6, 2011, p. 666]

9.3.1 Findings on Capital Costs

[170] The opinion of Mr. Hayes, together with the analysis of costs per MW to construct a full CHP, is indicative that the capital costs for equipment and installation used by Synapse might be too low. Synapse was responsive, and made changes, with respect to timely submissions made by intervenors during the consultative phase. It may well have been more helpful to ANSS's case to have made these representations to Synapse earlier. Consequently, the Board is not convinced that all the gross costs as calculated by Mr. Hayes are appropriate in setting a COMFIT tariff for Biomass CHP.

[171] The Board notes that the comparison between the Synapse and ANSS total capital costs by category is not very refined as to detail and, hence, can only be used as a rough guide. The Board is unwilling, without greater precision for both estimates, to make any comparison and accepts Synapse's base cost (including profit on the various components). As noted later in this Decision, the Board would rather set a tariff on a conservative basis so as not to overburden the ratepayers.

[172] The Board also accepts that the total cost of the plant is to be reduced by the cost to solely supply a steam host.

9.4 Financing

[173] Synapse in its evidence stated:

> ...In addition, the lenders we talked to who were familiar with biomass felt that CHP projects could be financed with 60% debt if the question of fuel cost risk were addressed in a satisfactory way. ...
>
> [Synapse Report, Exhibit B-1, pp. 11-12]

[174] Synapse, when discussing the debt to equity ratios and the rates to be used for third party financing, decided they needed to be adjusted:

> ... And so that was primarily the conversation that caused us to increase the cost of debt from 8 percent to 9.5 percent and the return on equity from 11.5 percent to 13 percent for biomass projects.
>
> [Transcript, April 4, 2011, p. 205]

[175] Jeffrey Bodington, who has extensive experience in arranging financing for a variety of biomass and generating facilities, stated in his evidence:

> Increasing the interest rate on debt from 8.0% for most COMFIT projects to 9.5% for CHP biomass does not adequately compensate lenders for fuel risk and is irrelevant to the cost of equity. Material fuel cost increases have a large impact on EBITDA, debt service coverage and lenders' chance to be repaid in full. As explained above, lenders do not make loans under such circumstances. An extra 1.5% per annum does not adequately protect a lender from a 25% to more than 75% loss of principal. B&Co has advised lenders who lost such amounts on loans to biomass-fired projects.
>
> [Bodington Direct Evidence, Exhibit B-11, p. 9]

[176] He added at the hearing:

> ... That doesn't alter the fundamental risk profile of a biomass power project. The fundamental risk profile is driven by fuel; having to get it, having to burn it, and all the issues related thereto. ...
>
> [Transcript, April 5, 2011, p. 543]

[177] As for D/E ratios Mr. Bodington stated:

> I'm saying that Canadian investors without some of the benefits of the U.S. will have to raise more equity, and that will make the project more costly. But that doesn't make a project impossible, and it certainly doesn't mean that you have to raise debt instead. My view is that the only way to do these smaller projects is equity.
>
> [Transcript, April 4, 2011, p. 543]

[178] In Mr. Bodington's evidence he had concluded that the project would have to be completely funded from equity and:

> ...Accordingly, including development and construction risk, a reasonable middle-of-the-range cost of capital for operating biomass projects without material fuel cost risk is approximately 17.5% – 4.5% = 13.0%.
>
> [Bodington Direct Evidence, Exhibit B-11, p. 13]

[179] Board Counsel questioned Mr. Bodington about whether the plants could be financed by the sawmills:

A: That the only source of repayment for a lender would be the subject power project.

...

I think that is a reasonable assumption based on my experience in financing plants like this because we see some mills in situations like this decide that they don't want to use their own capital for what is a side business.

...

They want to preserve their capital to devote it to mill operations or forestry operations. They don't want to use up their ability to raise money for their core business by using up some of their recourse capacity to finance a power plant that is a side business and a small business considering the full scale of their operations.

Q: I can understand that but I also heard evidence yesterday that the members of the Alliance lobby hard to not be included in the community based program but to be able to do it on a strictly commercial basis because they did not want somebody else owning a part of what was their plant.

So they intended to build these things themselves presumably using either their own capital or borrowed capital, or are you suggesting that they would go out and seek equity investors in their business?

A: We have seen both happen in our experience.

[Transcript, April 6, 2011, pp. 639-640]

[180] Mr. Travis described his efforts to get financing for a CHP project:

A: ...but I can tell you that we went to ScotiaBank who was our bankers at Marwood.

They told us to go to Scotia Capital in Toronto and they said, "Your project's way too small. Go see Jeff Bodington because we don't -- we aren't interested and we can't finance a project like that."

Q: Were you looking for non-recourse financing?

A: What we asked them is that, you know, "Can we get debt and what's your opinion on debt and equity." And they said you know you're not -- "We don't do those projects. They're too small. You need to see a boutique guy like Jeff," and so I can only speak to one project's experience in terms of our ability to be able to acquire debt. ...

[Transcript, April 6, 2011, pp. 669-670]

[181] Under questioning from Mr. Outhouse, Mr. Bodington, in reviewing his experience stated:

> And I will also mention that the smallest biomass plant that's actually been built that we've been involved in is about 6.5 megawatts.
>
> [Transcript, April 6, 2011, p. 693]

[182] Mr. Bodington, when questioned about his involvement with 2 MW biomass projects stated:

> No, I have not. That's because under the rate schemes that I've been exposed to so far in my career, 2-megawatt projects just aren't economic, primarily for the economics of scale reasons that we've discussed earlier.
>
> [Transcript, April 6, 2011, pp. 692-693]

9.4.1 Findings on Financing

[183] The Board accepts the wide experience of Mr. Bodington in financing various electric generation projects, of which some are biomass. However, the Board finds it difficult to conclude a Nova Scotia sawmiller would actually finance a Biomass CHP by only using third party equity. The amount to be raised is small, in comparison to other projects that are funded by third party equity offerings. It is likely that a company would finance such a project from its own resources. As such, it is more than likely that it would be a mixture of debt and equity. Therefore, the Board accepts, for this tariff setting, the D/E ratio as used by Synapse.

[184] As discussed later in this Decision, the Board also accepts the need for a fuel escalator mechanism. The Board finds this should meet Mr. Bodington's primary concern about managing fuel risk and, accordingly, qualify for his calculation of an ROE of 13%. This is the same ROE as used by Synapse. The Board accepts Synapse's determination of rates for the cost of debt and ROE for a Biomass CHP project.

9.5 Operating Costs

[185] In developing the operating costs, Synapse decided to use a model having high "granularity", meaning that the data was aggregated at a high level. As stated by Synapse:

> And when we put the model up for review and asked for comment, the feedback we received was that generally the Vermont model or something like it that has about six relatively aggregated capital costs and also several -- I think four or five O&M cost cells was the appropriate balance of granularity and precision for the stakeholder process.
>
> [Transcript, April 4, 2011, p. 171]

[186] The lack of precision made it difficult for ANSS to compare operating costs. Synapse defended its choice of granularity as follows:

> I think there's a trade-off between granularity and precision. There's a difference between rate setting and developing a pro forma to take for a specific project to a bank which may require a great deal more granularity.
>
> [Transcript, April 4, 2011, p. 173]

[187] Synapse also stated:

> When we try to put those pieces together for biomass we get a tremendous range and so in the face of that, we feel like you really need to look at the market data, and you really need to make sure that whatever rate you start with makes sense. And so we have placed a lot of weight on the data we see in the market and so that's why we believe if we went back at this again and looked at it, we wouldn't come out with a rate that's dramatically different, because we feel like we really need to be respecting the market data.
>
> [Transcript, April 5, 2011, pp. 511-512]

9.5.1 Non-Fuel Operating Costs

[188] Synapse projected operating costs were based on the following:

	Steam	Combined	Net
Routine Maintenance ($/yr)	$130,557	$173,264	$42,707
Labour ($)	$305,760	$356,720	$50,960
General & Admin.	$0	$0	$0
Insurance	$9,691	$39,443	$29,752
Property taxes	$0	$3,567	
Year-10 Turbine overhaul ($)	$0	$152,880	$152,880
Year-10 Boiler overhaul ($)	$0	$203,840	$203,840

[Synapse Report, Exhibit B-1, Exhibit K]

[189] ANSS, in analyzing these operating costs, made the following comments:

> 3. Parasitic power losses appear to be absent from the COMFIT calculation and need to be included. ESI has provided these losses as 14% of the gross energy of the plant. ANSS also suggests that the plant purchase the parasitic power from the grid which will reduce the COMFIT cost to the ratepayer compared to self-consuming.
>
> ...
>
> 5. Boiler engineer regulations have been incorrectly interpreted by Synapse and have resulted in an incorrect analysis of the labour requirement. Based on the regulations and salary estimates provided by the Nova Scotia Institute of Power Engineers ANSS recommends the labour cost for the "boiler only scenario" be $40,000 and that the labour cost for the CHP plant be $214,000.
>
> ...
>
> 7. Based on the ESI study it appears that Synapse has omitted the cost of operating expenses such as: Ash Landfill, Make-up Water, Sewer, Water Treatment and has underestimated the cost of plant maintenance. ANSS recommends that the Board adopt the ESI study estimates for these costs, (adjusted for size difference).
>
> [Direct Testimony of Fenton Travis, Exhibit B-11, p. 3]

[190] Synapse, in developing the costs, did not specifically consider parasitic power. ANSS asked Synapse's view of Mr. Hayes' (ESI) calculations on parasitic power:

> Q: ... And ESI determined that it was about 14 percent of the power generated?
>
> A: Yes, I remember reading that.
>
> Q: Is that within a reasonable range that you're familiar with?
>
> A: The numbers in this particular situation that they've provided looked roughly accurate. I didn't go into it in any more detail than that.
>
> [Transcript, April 4, 2011, p. 168]

[191] In Board questioning of Synapse about the parasitic load, it was noted that some would be required for the steam only scenario:

> Q: Now, you have mentioned -- I want to talk about parasitic load too, I mean, I think it's -- we heard it's 14 percent overall.
>
> And if I heard you correctly yesterday and again today, there is some parasitic load that maybe not -- had not considered in the turbine or whatever. But the

> majority of that 14 percent or some percent is -- a good chunk of that 14 percent is already included in the steam plant ---
>
> A: Yes.
>
> Q: --- is sort of where you're standing?
>
> A: Exactly.
>
> Q: So when we asked you to do scenarios yesterday to say all these different additions. So if you were going to do a differential do you have a figure you could use for the difference? It's not 14 percent obviously, and I think I noticed 5 percent, 3 percent, or if you have an idea what that number may be?
>
> A: So something like 110 or 115 kilowatts out of 2500 kilowatts is really where I think that difference was.
>
> [Transcript, April 5, 2011, pp. 460-461]

[192] In Exhibit B-20 (which is also the response to Undertaking U-10), ANSS used Synapse's model to support its requested revised tariff of $320/MW. For the input parameters ANSS stated a parasitic power need (overall) of 14% equivalent to 0.33796 MW. The parasitic power for the boiler alone was stated as 0.217 MW. The calculation of parasitic power for electricity generation would, therefore, be 14% - [14% x (0.217/0.33796)] = 5%.

[193] In developing the steam only scenario, Synapse had assumed an operating pressure of 100 psi. This does affect the consideration of operating costs, as stated by Synapse:

> ... on Mr. Keith's response; for example, the difference in a 15-pound use and 100-pound use is going to be not just [a] capital cost, it's also going to be an operating cost, and there will be a difference to some extent in, for example, labour as well.
>
> [Transcript, April 5, 2011, p. 465]

[194] The rating of the boiler (essentially based on operating pressure) impacts the labour qualifications needed and the time an operator must be available. In response to Board questions, Synapse stated:

... The Sawmillers Association, in their testimony, basically were saying that we had considered a Class 3 facility but, in fact, most sawmillers, as I understand, have -- and as I infer out of what they submitted, have a Class 4 facility. So for a Class 4 facility under the Power Engineers Act in this province, a Class 4 facility is, indeed, required at a base level to be attended, to have an operator there whenever it's operating. However, for the heating boiler of the size that they have said that they have, you are allowed to get dispensation from that, from the Chief Power Engineer of the province, to reduce that to what's called periodic supervision, ...

[Transcript, April 5, 2011, p. 496]

[195] Synapse further verified the model it had used under Board questioning:

Q: Yeah. Sorry, I just want to get clarification. So that your base model, which is 100 PSI ---

A: Yes.

Q: --- is that a Class 3?

A: It's a Class 3 plant.

Q: So, and if I -- then if I understand the answer you just gave, to go to a class -- 600 PSI or whatever it is in the amount of steam you need, it would be Class 2?

A: It's 600 PSI and the amount of steam ---

Q: Which you need for a CHP plant.

A: -- it's Class 2.

...

[Transcript, April 5, 2011, p. 499]

[196] St. FX, in costing its plant, commented upon the labour costs as follows:

2. Operating Labour Cost. This plant will need to be manned with operators 24/7 because of the steam boilers involved and also because of the inherent nature of solid fuel handling equipment. The labour cost as a percentage of operating cost is very high as a result.

[St. FX Evidence, Exhibit B-3(ii), p. 4]

[197] The potential labour cost misallocation was highlighted by ANSS in its closing submission:

45. Synapse has estimated that the labour to operate in the steam only scenario is $300,000 and that labour to operate in the CHP scenario is $350,000 resulting in a net labour cost of $50,000. As explained by Mr. Travis, all boilers operated by ANSS members are operated by one fourth class boiler engineer. The labour cost

> is approximately $40,000 per year in the experience of Marwood. Therefore, the cost estimate by Synapse for the "boiler only scenario" is approximately $260,000 too high when netting out.
>
> [ANSS Closing Submission, p. 10]

[198] This was also noted by the Municipality of Clare in their letter to the Board.

[199] Synapse, in using a high granularity, stated that some of the costs such as ash handling, etc., are included. Synapse defended this high granularity:

> ...You know, we have mentioned a few areas here over the last day or so where their parasitic load, for example, that we may make a different judgement on that particular item, but I think that we still believe that overall we've got a recommendation which is reasonable and is our best recommendation for stimulating a reasonable amount of projects under this tariff.
>
> [Transcript, April 5, 2011, p. 460]

9.5.2 Findings on Non-Fuel Operating Costs

[200] Because of the high aggregate approach taken by Synapse, the Board must take care in ascribing any precision to the components of any operating cost figure. Even with this limitation, the Board finds that two areas, parasitic power and labour, should be considered further.

[201] The Board finds that there could be an addition for parasitic power. The amount to be added, if it is found to be required, would be the difference between full parasitic power for the plant as a whole, and that which would be used for a steam only scenario. As calculated at paragraph [192] this would be 5%. Whether parasitic power should be considered or not is dependent on what is included in the overall efficiency calculations. Efficiency is canvassed later in this Decision.

[202] For labour, the Board finds that the differential (in essence the amount to be allocated to electricity generation) should be increased. The amount of increase is

the difference in labour cost to operate a 15 psi plant, to that required for the 600 psi CHP.

9.5.3 Fuel Operating Costs

[203] The total fuel consumption is driven by the size and availability of the plant, and the boiler efficiency. The Synapse FIT model is the one being used for turbine size, so any differences would be in availability and boiler efficiency.

[204] The Synapse FIT model assumes an availability of 85%, whereas ANSS suggests it should be 90%:

> Synapse considered an availability of 85% (60% at full extraction and 25% at full condensing). Based on dozens of facilities we have constructed over the last 30 years, we would expect to construct a biomass CHP with an availability of 90% of which 60% of the time would be full extraction and 30% would be considered full condensing.
>
> [Testimony of Patrick M. Hayes, Exhibit B-11, p. 14]

[205] The Synapse FIT model had a boiler efficiency of 80%, which, with the 60/25 availability, yielded an overall efficiency of 51%.

[206] St. FX, in its submission, calculated a boiler efficiency of 68.79%. ANSS calculated the boiler efficiency at 69.9% using the "Loss Method Boiler Efficiency Calculation". As ANSS stated:

> The number utilized by Synapse is 80% which is more indicative of natural gas or coal fired facilities than woody biomass fired facilities. Because there is so much more water in the fuel (of typical green wood) that must be evaporated in combustion, the efficiency of wood boilers can only approach that of other fuels if this moisture is removed prior to use in the boiler (requiring energy from somewhere else). Using a more accurate efficiency for woody biomass boilers will dramatically impact the calculation for fuel usage.
>
> [Testimony of Patrick M. Hayes, Exhibit B-11, p. 16]

[207] The energy to generate the steam in the boiler is largely used to bring the water to a boil. As stated by Mr. Hayes:

> ... because the actual energy put into the system is significantly larger on the heat of vaporization side than it is on taking it up from 15 psi to 600 psi ...
>
> So you know, 80 percent of your energy goes into boiling the water and then 20 percent goes into generating the electricity on top of that. ...
>
> [Transcript, April 5, 2011, pp. 554-555]

[208] The use of that energy, when calculating overall efficiencies (i.e., heat versus electricity) needs to be carefully considered. Mr. Hayes stated:

> ... 18,000 pound per hour steam host at 15 psi, the difference between the electrical generation of 2.41 megawatts and 1.6, I believe, megawatts, you're looking at an 800 kilowatt difference in electrical generation. But on the steam side, the assumed efficiency of the system is significantly higher because on an electrical generation system you lose all of the energy when you condense the steam to condensate in the condenser side of the cycle.
>
> That's why when you hear people talk about steam -- or electrical-only plants having very low efficiency, 16, 18 percent, they're losing a significant amount of that heat of vaporization when they condense, whereas in a steam host you're assuming that all of that energy is being transferred to the steam host.
>
> That's why CHP facilities typically have 40-plus percent efficiencies. And we were just discussing this earlier with St. F.X. I think that Synapse miscalculated their thermal efficiency significantly because they ignored the returning condensate coming back from St. F.X. If their condensate is just somewhere in the range of 170 degrees and they get about 70 percent of it back, their efficiency jumps from 28 percent to around 42 percent, which I think under any definition would qualify as CHP.
>
> [Transcript, April 5, 2011, pp. 551-552]

9.5.4 Findings on Fuel Operating Costs

[209] The Board finds that in developing fuel requirements for the CHP, it should be on the basis which yields the lowest tariff. It may not make sense to increase availability for a less efficient (based on fuel alone) electricity output; it just increases the cost recovery required per MW of electricity produced. Nevertheless, this could be offset by a greater recovery of the fixed costs for labour and financing. In the Compliance Filing, the rates are to be calculated using both an 85% and a 90% availability. The Board will then select the one that results in the lowest rate.

[210] The Board agrees with the evidence of Mr. Hayes and finds that the boiler efficiency should be set at 70%.

[211] Synapse has calculated the overall efficiency of the model to be 51%. In Undertaking U-6 Synapse, using a 69% boiler efficiency, has calculated the overall efficiency to be 42%. As these calculations were determined at a high aggregate level it is possible it may have captured the parasitic power. No evidence was led by any party to indicate whether it did or did not. The Board is aware that Synapse had stated they did not consider parasitic power specifically, but had countered that, overall, they had given "weight on the data we see in the market". The Board is mindful that it should not attribute too much precision to any one such adjustment and, accordingly, accepts that Synapse's revised calculation for overall efficiency takes into consideration parasitic power.

9.6 Overall Findings – Biomass CHP

[212] ANSS, in its reply submission stated:

> 30. Likewise, the risk of undue costs being borne by ratepayers is tempered by the reality that only a limited number of CHP Facilities will be likely to participate due to inherent limitations in the system and the cap on biomass in the Act and Regulations.
>
> [ANSS Reply Submission, p. 6]

[213] Synapse also reviewed all of ANSS's costs and said:

> … And when we plugged all of these assumptions into our model we came out with a rate of $330 per megawatt hour compared to the rate that we had proposed of 156. And *when we looked around us at the market data that we were seeing, the bids, for example that NSPI got, the uptake they've had on $138 in Ontario and $121 in Vermont we determined that we would have a lot of difficulty coming in and recommending that the Board set the feed-in tariff rate at $330 a megawatt hour based on the market data we were looking at.* [Emphasis added]
>
> [Transcript, April 4, 2011, p. 161]

[214] Overall, Synapse took a conservative approach with a view that if nothing gets built the tariffs could be revisited:

> ... We could set the rates at sort of what we felt was a reasonable level that we thought would probably produce projects, or we could bump the rates up much higher in an effort to be certain that we produce a robust activity in the first year or two of the program. You know, if we took the former approach and we set the rate too [low], the downside is we don't get any projects and 18 months from now the government takes another look at it. If we took the latter approach and *we set the rate too high, we'd be locking in overpayments for 20 years.* [Emphasis added]
>
> [Transcript, April 4, 2011, pp. 238-239]

[215] The CA commented upon ANSS's rate calculation as follows:

> Since ANSS's proposed biomass COMFIT rate is based on a facility inconsistent with the regulations, the Board should not rely on ANSS's proposal.
>
> [CA Reply Submission, p. 3]

[216] The CA also agrees with the stance taken by Synapse:

> ... But there is no requirement that the tariffs be established at a level that ensures each proponent is successful or free of risk, nor are the tariffs to be set to ensure proponents are able to recover all anticipated costs and to remove from the proponents any pressure to be efficient.
>
> [CA Reply Submission, p. 3]

[217] When discussing the St. FX project, Synapse had problems with it being considered a CHP:

> ... And frankly, that's one of the concerns I would have about this project because it has an overall efficiency of 28 percent, and I would have difficulty recommending that that project be allowed to sell electricity on a tariff that was for combined heat and power.
>
> And another factor is that the 28 percent efficiency of the project drives the cost up. When you're converting biomass to electricity at 28 percent efficiency, your fuel cost per kilowatt hour is going to go up significantly relative to a biomass -- a CHP facility that's operating at a 60 percent efficiency.
>
> So you're asking us to pay more for electricity so you can generate more electricity and less steam.
>
> [Transcript, April 5, 2011, pp. 433-434]

[218] St. FX, in response to Undertaking U-12, recalculated the rate they would require using the Synapse model as being $148.58/MW. In the calculation, they felt the allocations were incorrect:

> We feel that a better allocation of the cost of the plants would be as a ratio of the fuel consumption. In our case we have a CHP plant where 87% of the annual fuel consumption is used for electrical power production and only 13% is used for steam production. If we then allocate 87% of the cost of the CHP to electrical production we find that we require a COMFIT rate of 187.35 $/MWh.
>
> The spreadsheets are attached for your review. Again we would like to emphasize that the Synapse model was developed for a typical sawmill operation we feel that using this same model to compare to a University Heating Plant is not entirely correct. To meet peak heat needs in the winter months at the University a large boiler is required. For the balance of the months in the year the boiler has low utilization and in the summer months is hardly used at all. To compare St.F.X. with the sawmillers is to compare apples to oranges. ...
>
> [Undertaking U-12, p. 1]

[219] Synapse, as part of Undertaking U-2, corrected two offsetting errors it had made in determining the Biomass CHP rate. The two errors did not completely offset, and resulted in a net increase in the total rate of $2 per MW to $158/MW. The corrected rate has as its two components (rounded) fixed $95/MW and variable $64/MW.

[220] The Board accepts Synapse's conservative approach to set COMFIT rates, noting that if a tariff is set too high ratepayers will be burdened with the excessive rates for 20 years. On the other hand, the Board intends to review the COMFIT rates in three years.

[221] ANSS has stated that the FIT rates in other jurisdictions are inadequate. The Board agrees that the COMFIT rates need to be increased, taking into consideration some major differences as noted earlier in the Decision. The Board has estimated, using the calculations in Undertaking U-6, and subject to the Compliance

Filing, that the allowed adjustments referred to above will likely increase the overall rate by about $20/MW for a total rate of about $180/MW.

[222] The Board is aware that this tariff is in excess of the comparative Biomass rates in Vermont ($121/MW in 2010) and Ontario ($142/MW). However, the evidence from witnesses on behalf of ANSS and Synapse indicates that these rates are for projects that do not have to meet the same criteria as used in Nova Scotia, and have access to different financial incentives. The Board also notes the evidence on the minimal number of Biomass CHP plants that have actually been built and are running using the above published rates.

[223] The Board also notes that this tariff is close to that originally requested by St. FX ($213/MW), which was revised to $148.58/MW using the Synapse model. Whether St. FX would be able to receive this tariff is dependent upon it being classified as a CHP.

9.7 Fuel Escalator

[224] Synapse proposed an index for fuel in recognition that biomass fuel costs will fluctuate over time. They based their adjustment mechanism on one already approved by the Board:

> We are proposing to treat biomass fuel cost in the same general manner that the Board approved in the New Page/Port Hawkesbury proceeding. That is, to index 75% of the cost of fuel to a percentage of the Consumer Price Index for Nova Scotia (all items) excluding energy and 25% of the cost of fuel to a diesel fuel index. Costs are indexed to a percentage of the CPI (90% of it) to provide a productivity incentive.
>
> [Synapse Report, Exhibit B-1, p. 6]

[225] The evidence of ANSS was that in order to finance a CHP project using a 13% cost of equity (100% equity financed) the rate would need "an effective fuel cost

hedge". Mr. Bodington, who testified for ANSS, expressed the opinion that the proposed 75/25 CPI/Diesel Index is not an effective fuel cost hedge to support a 13% ROE:

> A. In addition to the analysis above, ANSS asked B&Co to evaluate the cost of capital for a biomass CHP project whose rate structure that effectively hedges fuel cost risk. As noted above, we do not consider a 75% CPI/25% Diesel index to be an effective hedge. Such a hedge would address and insulate investors and lenders from changes in a power project's actual fuel costs.
>
> If biomass fuel costs were hedged, then the risk profile of a biomass project would approach that of a natural-gas fired project with a long-term fuel contract or that operates in a market whose prices are determined primarily by natural costs. There is an active market for such projects, and the lower risk justifies a lower cost of capital.
>
> [Bodington Direct Evidence, Exhibit B-11, p. 13]

[226] Mr. Travis, on behalf of ANSS, likened the Synapse index to asking NSPI to guarantee electricity rates at today's prices for 20 years based on an escalator that tracks the cost of mining coal. He pointed out that the market price of coal, oil or gas is driven by demand. In his view, supply and demand drives the price of biomass.

[227] The issue of an appropriate index was the focus of several exchanges between the Board and ANSS:

> Q. As you can see, we're struggling a bit with this reopener and how it might work. And the suggestion of a fuel adjustment mechanism suffers from kind of the same problems that you've described in that the one we have for Nova Scotia Power, the cost of administering it is spread over 2,300 megawatts, whereas it's difficult to replicate it for a bunch of 2-megawatt plants.
>
> Is there a better index that you could think of as a starting point then CPI diesel, or did you give any thought to that?
>
> A. I tried very hard to find -- I tried to do that. I called suppliers and I tried because I wanted to present something that was better. But at the end of the day, I couldn't find anything that was sufficient to be able to adequately cover off the risk.
>
> And I reviewed it with Mr. Bodington, and the data is really tough to get, which is why I think it's important that we report this information to you as the Board. You know, if we're going to ask for, you know, a formula to be -- to readjust the rate then I think, you know, you guys need to have our costs in the market.

That will establish -- start to establish a knowledge base of biomass -- that will become a biomass index before too long. People will recognize that in the forestry business and others will recognize it, and that will start to become an index on itself, I think, after we start, you know, tracking that.

I think it will be valuable information going forward because it's difficult right now to determine. That's one of the difficult things to do, so ---

Q. Now, under the Public Utilities Act if we want to know something from Nova Scotia Power, we just ask them. And they're a regulated utility and they've got to give it to us.

We don't regulate J.D. Irving or the Creelman companies or any of those companies. What's the mechanism to ensure we're going to get this information from ---

A. I guess you could make it a requirement of the tariff so that in order to be qualified to -- if we accept the tariff and the contract, we would sign an agreement that we would provide you with our -- you know, the fuelling.

[Transcript, April 6, 2011, pp. 746-748]

[228] Mr. Couture also commented on the need for revisions to the escalator.

In terms of the escalator, I actually -- I think the formula, as designed, is a fairly reasonable compromise between the tensions that exist in this market. But that does not obviate the need for more -- does not remove the need for revisions in the future because CPI can change and as we've pointed out, diesel can change, and whether that formula remains adequate remains to be seen.

So I think, just as on coal contracts, the same principle applies; you need to adjust to the prevailing market price of coal. And I think those factors apply equally to renewable energy resources dependent on fuel.

[Transcript, April 7, 2011, p. 1194]

[229] At the conclusion of the hearing ANSS was asked to provide a suggested formula for the re-opener of the Biomass tariff. The response is in Undertaking U-11 and is, in part, as follows:

Calculation and Methodology of Biomass Fuel Cost Adjustment

For biomass combined heat and power (CHP) plants, the initial base biomass fuel price for purpose of establishing the feed-in tariff rate during the first year shall be set by the NSUARB and escalated in year 2 on the basis of 75% of the cost of fuel to the Consumer Price Index for Nova Scotia (all items) excluding energy and 25% of the cost of fuel to a diesel fuel index. The initial base biomass fuel price will be adjusted and reset, up or down, effective year 3 and every two years thereafter in accordance with the following mechanism for adjustment of fuel prices:

Adjusted Biomass Market Price = CD/ED

Where:

> "**CD**" is the total cost of all Market Biomass delivered to Approved CHP Plants during the Evaluation Period ($).
> "**ED**" is the total Gross Energy of all Bone Dry Tons of Market Biomass delivered to Approved CHP Plants during the Evaluation Period (MMbtu).
>
> [Undertaking U-11, lines 3-15]

[230] In its final submission, the Province supported the notion that biomass fuel cost should be subject to a future price adjustment. Notwithstanding, it objected to adopting Undertaking U-11, based on concerns about the Board's ability to enforce compliance and the fact that the suggested fuel adjustment mechanism is based on a market price for biomass that, in the Province's view, is not open and transparent.

[231] The Consumer Advocate submitted that the Synapse index adequately compensated for fuel risk in its escalator. ANSS suggested that the standard form power purchase agreement could compel the needed disclosure in order to have proper information for the price re-opener.

9.7.1 Findings on Fuel Escalator

[232] The Board accepts the evidence of ANSS and Mr. Couture that there needs to be a periodic review of the biomass fuel cost. It appears it would be difficult, if not impossible, to finance these projects with the escalator as proposed by Synapse alone. Between re-openers, however, the index as proposed by Synapse appears generally satisfactory.

[233] The challenge for the Board is how the re-opener should work. There was surprisingly little precision (except for Undertaking U-11) in the course of the hearing from various witnesses.

[234] Having considered the matter the Board has decided as follows:

(1) The index as proposed by Synapse will be the escalator.

(2) The Board will review biomass fuel costs every second year.

(3) The formula outlined in Undertaking U-11 will form the basis of the review. However, it will not be an automatic adjustment – the Board will look at other factors to ensure that the formula is providing an accurate adjustment.

(4) Parties must agree, in order to qualify for the rate, that they will provide the same level of disclosure of biomass fuel costs as a utility regulated by the Board must disclose with respect to its fuel costs. This condition will be a condition of the tariff and any power purchase agreement approved by the Board.

(5) There will be no retroactive adjustments. In the years following the adjustment, until the next adjustment, the Synapse index would apply.

10.0 SMALL-SCALE IN-STREAM TIDAL

10.1 Submissions

[235] Synapse proposed a tariff of $652 per megawatt hour for in-stream tidal projects. They based this tariff on a 500 kilowatt installation employing one or more in-stream tidal generators. Synapse assumed total project costs of $5 Million or $10,076 per kilowatt noting that the range of estimated costs is much larger for tidal than other technologies. In Synapse's view this was to be expected given the immaturity of the technology. Synapse went on to say:

> ...A 2010 study by Ernst & Young of the tidal potential in the U.K. estimated the cost of in-stream tidal projects at $18,100 per kW in the pre-demonstration phase and $7,000 in the demonstration phase (adjusted from £2010). The Canoe Pass project in British Columbia, which will use the Encurrent turbine, has estimated costs at $13,000 per kW (adjusted from 2011$). Fundy Tidal estimates costs at $10,600 per kW, and Champlain Tidal Energy estimates costs at $10,200 per kW for pilot projects and $5,100 per kW for early production projects (all adjusted from 2011$).
>
> [Synapse Report, Exhibit B-1, p. 33]

[236] Synapse assumed $75,000 per year in routine operating and maintenance costs calculated as $150 per kilowatt and $62,500 of major maintenance every six years.

[237] The capacity factor Synapse assumed for tidal projects was 37%.

[238] The Synapse FIT model assumed 100% equity financing and 15% return on equity.

[239] Mr. Chernick, on behalf of the Consumer Advocate, adopted a 6% after tax equity return based on his view that manufacturers would finance these projects at little or no return. He recommended a rate of $398 per megawatt hour.

[240] Mr. Couture indicated that the rate of $652 per megawatt hour should be more than sufficient to create an incentive for tidal developers. He went on to express some concern with respect to uncertainties concerning tidal power:

> This makes the treatment of emerging technologies like tidal power under a FIT a particularly difficult issue: shorter contract lengths would push up the required tariff, all else being equal; and yet, without a performance-based incentive (i.e. which pays for output in $/MWh), cash grants and other incentives may not be the best policy tools to encourage performance improvements. This suggests that a FIT-like mechanism is justified, if only to encourage new technologies to enter the market, and compete with one another. In the final analysis, it is unlikely that they will last the full 20-years, thereby minimizing the overall impact to ratepayers of the (admittedly high) initial tariff.

> However, as with all technologies experiencing rapid cost reductions, it may be advisable to introduce tariff degression to both track, and encourage, technological change in the tidal sector. This can occur either via a pre-determined formula, or by periodic adjustments applied on projects installed in subsequent years. The primary role that pre-determined degression plays is that it communicates a clear signal to the market, encouraging manufacturers to improve their technology, and reduce costs. It also has the advantage of reducing costs to ratepayers over time.
>
> [E3 Analytics, Exhibit B-14, p. 11]

[241] There was very little other comment on the tidal tariff.

[242] In argument, the Province responded to the suggestion of tariff degression. The Province's final submission stated as follows:

> 37. "Small-scale in-stream tidal" is defined in s.3(1) of the Regulations as a generation device for the capacity of .5 MW or less, and NSDOE believes that electricity generation from this class of facility will be a small component of the overall COMFIT program, despite not having a cap on generation like the 5MW cap on small wind contained in s.28(2) of the Regulations. As such, NSDOE submits that this issue could be considered and in government's 2012 review or subsequent reviews, and addressed as needed.
>
> [Province Final Submission, April 29, 2011, p. 17]

10.2 Findings

[243] While the Board is concerned about the high tidal tariff, it recognizes that this is both an experimental technology and is likely to be a small component of the overall COMFIT program. The Board notes that the Province will be undertaking a review of the *Regulations* in 2012. As noted elsewhere in this Decision, the Board intends to review all of the tariffs in three years time. Accordingly, while not dismissing the idea of introducing tariff degression, the Board has chosen not to do so at this time. Given the experimental nature of the technology the Board accepts Synapse's capital structure and return recommendation.

[244] The Board therefore approves the tariff as submitted by Synapse recognizing the experimental nature of this technology.

11.0 RUN-OF-THE-RIVER HYDROELECTRICITY

11.1 Submissions

[245] For run-of-the-river hydroelectricity Synapse proposed a tariff of $140 per megawatt hour. They based this tariff on a one megawatt project of either penstock or in-river type. At a penstock plant, water is diverted from the river through a conduit to a turbine located on land and then back into the river. At an in-stream project, the turbine is located in the river. Based on Synapse's analysis they believe their recommended tariff could support either type of project at an attractive site.

[246] Synapse assumed an installation cost of $3.9 Million and a total project cost of $4,447 per kilowatt. They compared their proposal to a Vermont FIT proceeding in 2009 and estimates prepared by Hatch Acres and CanMed Energy.

[247] Unlike other renewable projects, Synapse included a significant residual value for hydro because its assets have a relatively long life. Synapse calculated the residual value by estimating the percentage of the installed cost with useful lives over various lengths of time.

[248] With respect to O&M costs, Synapse assumed $50,000 per year for equipment and $150,250 per year for all-in O&M, including insurance and property taxes. Synapse assumed an annual average net capacity factor of 55% based on information obtained from other jurisdictions. They benchmarked their rate against other jurisdictions:

> The FIT for small hydropower in Vermont started in 2010 at $119 per MWh and escalates to $131 per MWh in 2029 (in nominal dollars). On the date of this evidence, 7 projects were in the Vermont hydro queue, ranging in size from 50 kW to 1.1 MW. These projects are very similar in size to probable COMFIT projects. However they are not required to be majority owned by a community-based group, and they will benefit from the 30% grant/ITC available in the U.S. Thus, we would expect that a rate significantly higher than the Vermont rate would be needed to produce similar COMFIT development activity.

> Ontario's FIT for hydro =10 MW started in 2010 at $131 and $135 for community owned projects, and 20% of the rate escalates with inflation. Adjusting these figures to 2012 dollars, the community based rate is almost exactly the same as the rate we have proposed, $140 per MWh. On the date of this evidence, 44 contracts had been signed with hydro projects totaling 183 MW. In addition, 37 projects had applied to the program, totaling 152 MW. We do not know the sizes of these projects or if any of them are community owned.
>
> [Synapse Report, Exhibit B-1, p. 32]

[249] Mr. Chernick recommended a rate of $114 per megawatt hour. In arriving at his figure Mr. Chernick adjusted the assumed debt and equity, and made provision for land donation and property tax relief. He also noted that rates in other jurisdictions range from a low of $95 per megawatt hour in British Columbia to a high of $131 per megawatt hour in Ontario.

11.2 Findings

[250] Other than comments from the Consumer Advocate there was very little comment in the hearing on run-of-the-river hydroelectricity.

[251] The Board also understands that there may be significant other challenges in securing various approvals, including environmental and fisheries, to construct these facilities in Nova Scotia rivers, so it is not likely this technology will form a large part of the COMFIT. The Board accepts as reasonable the costs, including capital structure, as determined by Synapse. The benchmarking done by Synapse shows their proposed rate to be within a reasonable range of rates in other jurisdictions. The Board is not persuaded to make the adjustments to debt and equity suggested by Mr. Chernick, or to make the adjustment for land donation and property tax relief which the Board views as speculative.

[252] Accordingly, the Board is prepared to approve the tariff as submitted by Synapse recognizing that this, like all tariffs, will be reviewed in three years time and may be reviewed as part of the Province' regulatory review in 2012.

12.0 OTHER

12.1 Distribution system capacity

[253] During the proceedings, the parties made several references to limited capacity being available on certain distribution feeders, which could restrict the number or size of generators that could be connected to the network. At the hearing, the EAC addressed this matter with the Synapse panel:

> Q. In your estimation, how important is transparency and accessibility to information with regards to distribution zone capacity and availability for the development of COMFIT projects?
>
> A. I would say it's very important.
>
> Q. And would making grid capacity information publicly available create a more efficient development of COMFIT projects?
>
> A. It would -- if that's what -- if one of the barriers or generators are unable -- don't have visibility as to what -- where the grid congestion is and one of the goals is to increase generation and development, then removing that barrier would seem to make sense -- would seem to follow.
>
> [Transcript, April 4, 2011, p. 292]

[254] Brian Giroux also addressed this matter with the Synapse panel:

> ... did you guys do any analysis of the space within our distribution system to see if, in fact, there was room for some of these classes or some of these projects at all?
> ...I found that on the distribution side there wasn't a lot of room anywhere, at least in the project areas I was looking at.
> ...I can't seem to find out if that information was even looked at, and I'm -- I guess my main question was that, really, if there is no room at the inn, so to speak, then, really, setting a rate might be a bit of a wasted exercise unless you take that into account, that there's only small rooms at the inn available.
>
> [Transcript, April 5, 2011, pp. 301-302]

[255] In its Final Submission, the EAC advocated the creation of publicly accessible information about the distribution grid availability and capacity in order to support the success of the COMFIT program and investor confidence. The EAC suggested:

> ...implementation of, for example, a transparent and accessible grid information resource, perhaps in the form of perhaps an Online Mapping Tool showing the available distribution zone capacity levels throughout the Province of Nova Scotia (as has been done in other successful FIT programs in other jurisdictions)
>
> [EAC Final Submission, p. 10 of 15]

[256] NSPI, in its Reply Submission, disagreed with the need to provide a resource of publicly accessible information regarding capacity available on the distribution system:

> The Nova Scotia Power System Operator has been working directly with potential COMFIT developers to provide them with timely, transparent and current information about the distribution system in relation to their specific intended projects, and with consideration to the size and type of generator and intended location. It will continue to do so. There is no evidence before the Board indicating any issues with this process which could support EAC's recommendation in this regard and the Board should decline to accept this recommendation.
>
> [NSPI Reply Submission, p. 4]

[257] The Board understands the concerns raised by participants regarding information related to the available capacity at various locations on the distribution system. The Board is persuaded that information of this nature would assist developers in determining where they should pursue project development and what size generator might be acceptable on the distribution system in various areas.

[258] NSPI and the municipal electric utilities are directed to develop and maintain a resource of publicly available information which identifies available capacity for generation interconnection at each substation throughout the province. This resource is to include substations which supply municipal electric utilities and is to be

submitted for Board review by September 30, 2011. The Board recognizes that varying conditions among distribution feeders will determine the actual capabilities at specific locations and, therefore, developers will need to consult with the utility to obtain more detailed information regarding any proposed projects.

12.2 Future review of COMFIT tariffs

[259] The setting of COMFIT tariffs is a new process for the Board. A number of assumptions have, of necessity, been made based on the best judgment of Synapse, the Intervenors and the Board.

[260] The Board believes that it would be prudent to review all of the tariffs in three years time, once there is some experience. Three years, in the Board's judgment, is a reasonable amount of time to see how the tariffs are working. Any adjustments at that time would be applied prospectively.

12.3 Terms and Conditions of COMFIT tariffs

[261] In determining the terms and conditions for the various COMFIT tariffs, the Board considers s. 4A(3) and (4) of the *Act* to be instructive:

> **4A(3)** In setting a tariff pursuant to this Section, the Board shall make allowance for the matters set out in the regulations.
>
> **(4)** In setting a tariff pursuant to this Section, the Board shall determine
>
> (a) the class or classes of generation facility that qualify for a particular tariff;
>
> (b) whether a tariff is to be adjusted periodically and, where it is to be adjusted, the basis for the adjustment;
>
> (c) the effective date for commencement of a tariff;
>
> (d) the duration of a tariff; and
>
> (e) the terms and conditions under which payment is to be made by a public utility to generators.

[262] In its Closing Submission, the CA stated:

> The Consumer Advocate further recommends that the tariffs include the following express provisions that are to be met by the project.
>
> - Approval from the Energy Minister.
> - The requirements of s. 20 of the Renewable Electricity Regulations are satisfied.
> - That small wind projects are within the 5MW statutory limit.
> - That the project will not generate more than the minimum load on the substations serving the feeder to which the generator would connect, minus the capacity of generators already connected to the feeder.
> - The Board set a limit on the amount of tidal power allowed on the COMFIT rate to limit the rate impacts from the potential access to tidal tariffs to the same impact as would be achieved by the small wind limitation.
>
> [CA Closing Submission, pp. 13-14]

[263] In its Reply Submission, the Province submitted:

> In respect of the express tariff provisions recommended by the Consumer Advocate on the bottom of page 13 of his closing submissions, it is respectfully submitted that these matters are already addressed in the regulations and do not need to be included as express tariff provisions. Although NSDOE is not suggesting that the provisions requested on the bottom of page 13 are inconsistent with the current regulations (except for the request on page 14 relating to the capacity cap for tidal power), there is the potential that the regulations may be modified as a result of the review in 2012 or otherwise. This could result in inconsistencies between possible future provisions in regulations, and any provisions that might be expressly embedded in the tariff language at this point in time.
>
> [Province Reply Submission, p. 2]

[264] The recommendations of the CA appear reasonable to the Board, except for the final bullet. In the view of the Board, such limits on a particular class of generation facility should be a matter of policy by the Province, not this Board, as noted in the Province's Reply Submission. With respect to the remaining recommendations by the CA, the Board concludes they should apply throughout the duration of the tariffs and not be impacted by any regulatory change, except for any changes made to s. 20 from time to time.

[265] The Board notes that the *Renewable Electricity Regulations* limit the size of a small-scale in-stream tidal generation device to a capacity of 0.5 MW or less, that is capable of being interconnected with the electrical grid through a distribution system.

[266] With respect to the effective date of the tariffs, the Board is mindful that the Compliance Filing must be prepared and comments received, if any, from the parties. The tariffs will become effective on the date of the Board's final Order in this proceeding, which the Board expects to be in early September.

[267] During the hearing, the duration of the tariffs was addressed:

> BOARD: ...The duration, let's go there, which is (d), the duration of the tariff. I understand that all the tariffs you've -- with the exception of biomass is a 20-year duration. What you're suggesting is the tariff be in place for 20years. Is that correct?
>
> MR. RICKERSON: That's correct.
>
> BOARD: ...I wasn't quite sure as to the duration -- what the duration of the biomass rate was.
>
> MR. KEITH: I believe we are proposing that the $92 fixed rate would be fixed for 20 years.
>
> BOARD: okay. And then the fuel escalator would be, obviously, annually.
>
> MR. KEITH: Well, we haven't recommended a period. It could be -- we've said "periodically."
>
> ...
>
> MR. BIEWALD: I think annual would probably strike a good balance between sort of the fine -- you know, getting it right moment to moment and then administrative burden.
>
> [Transcript, April 5, 2011, pp. 484-485]

[268] The Board notes that all of the tariffs proposed by Synapse have been based on a duration of 20 years, which is assumed to be the term that will be identified in the Power Purchase Agreement ("PPA") between the utility and the project owner.

[269] The Board also notes that the PPA will use the tariff in effect at the time of its signing. To prevent arbitrage in the event a tariff is lowered, it may be appropriate to include a production date in the PPA.

[270] For Biomass, in accordance with s. 18(4) of the *Regulations*, "the tariff for biomass must apply only to the electricity produced from a combined heat and power plant". The Board understands that various CHP facilities can have very different efficiencies; however, the rate proposed by Synapse is based on a majority of the plant being used to supply the steam host, and an overall efficiency of 42%, which the Board accepts for purposes of calculating the tariff.

[271] As noted in the *Renewable Electricity Regulations*, one of the components of the feed-in tariff program is a PPA, as discussed immediately below. Accordingly, the requirement to enter into a PPA will need to be included as a term within the tariffs.

[272] The Board directs Synapse, as part of its Compliance Filing, to prepare draft Terms and Conditions for each of the COMFIT tariffs based on the above guidance and the findings in this Decision (including the respective tariffs in each resource class).

12.4 Standard power purchase agreement

[273] Section 32 of the *Regulations* provides:

> **Standard power purchase agreement for feed-in tariff program**
> **32 (1)** The Minister, in consultation with NSPI, must prepare a standard form of power purchase agreement to be used for the feed-in tariff program and must have the form of power purchase agreement approved by the Board.
>
> **(2)** When a feed-in tariff approval is issued, the applicant and NSPI are deemed to have entered into a power purchase agreement in the form provided for in subsection (1) effective from the date NSPI places the applicant in the interconnection queue as required by Section 31.
>
> **(3)** The intended parties to a power purchase agreement may agree to changes to the standard power purchase agreement provided for in subsection (1) and, if so, the form of power purchase agreement as agreed to by the parties must be provided to the Minister.

[274] The Board will review the standard form of PPA when it is filed by the Minister.

12.5 Annual Status Report

[275] In order to monitor the level of activity by participants in the COMFIT program, NSPI and the municipal electric utilities are directed to file an annual report with the Board by January 31st each year which provides a listing of, and details regarding, each COMFIT generator that is at any stage of the application or interconnection process. The details should identify the distribution feeder and substation, the generation resource type, generator size, annual energy production, annual capacity factor, and the total cost incurred by the utility to purchase power.

13.0 COMPLIANCE FILING

[276] The Board's findings in this Decision result in a number of adjustments to the numerical inputs in the FIT model with respect to each class of generation facility. Accordingly, the Board directs Synapse to provide, through a Compliance Filing, revised FIT model calculations for each class of generation facility canvassed in this Decision, as well as draft Terms and Conditions for each of the tariffs. The Compliance Filing shall be filed by August 2, 2011.

14.0 SUMMARY

[277] The Board held a hearing to determine Renewable Energy Community Based Feed-in Tariffs ("COMFIT"), pursuant to recent changes to the *Electricity Act* and the *Renewable Electricity Regulations*.

[278] While there is no overall limit expressed in the *Regulations*, the Province indicated in its Renewable Electricity Plan that it expects about 100 MW of distribution grid capacity will be used by COMFIT projects.

[279] The Board sets the COMFIT tariffs, but the *Regulations* provide that it is the Minister who approves the applications by electricity generation facilities to participate in the feed-in tariff program

[280] A total of 35 formal intervenors responded to the Notice of Hearing. The hearing was held over five days from April 4-8, 2011 in Halifax, Nova Scotia.

[281] The Board decided to follow a consultative process with Intervenors and Board Counsel consultant, Synapse, to set the COMFIT tariffs. Synapse adopted a "FIT model" which included entering assumptions about the input costs of typical COMFIT projects into a discounted cash flow model to calculate the COMFIT rate that would provide the target, after-tax, return on equity to project owners.

[282] Synapse developed one tariff for each class of generation facility. It adopted a methodology under the COMFIT modeling that identifies the "typical cost" for the input assumptions of each generation class in order to determine reasonable COMFIT tariffs.

[283] While some of the intervenors challenged a number of the specific input assumptions made by Synapse, the FIT modeling adopted by Synapse was generally viewed favourably by all intervenors.

[284] Taking into account the legislative scheme established under both the *Public Utilities Act* (i.e., just and reasonable rates for ratepayers) and under the *Electricity Act* and *Regulations* (i.e., to ensure a reasonable level of development

activity of COMFIT projects), the Board finds that it is appropriate to adopt an approach which determines a tariff for each class of generation facility that will achieve the lowest possible tariff, while at the same time encouraging a reasonable level of development activity in that generation class. In the view of the Board, the "typical cost" approach provides an appropriate balance of these legislative objectives.

[285] The setting of FIT tariffs, generally, and COMFIT tariffs, specifically, is a relatively recent exercise in North America. There is little in the way of context in which to assess the reasonableness of COMFIT tariffs. Given this backdrop, the Board considers it appropriate to assess the reasonableness of COMFIT tariffs by comparing them with benchmarks in other jurisdictions, distinguishing any differences in other FIT rates.

[286] The Board adopted the following tariffs recommended by Synapse for the five classes of renewable low-impact electricity noted below, with the changes as directed by the Board in this Decision:

- Wind power projects greater than 50 kW – Synapse's proposed tariff of $139 per MWh, except that the capacity factor is changed from 31% to 33%;
- Wind power projects 50 kW or less – Synapse's proposed tariff of $452 per MWh, except that Routine Operations and Maintenance expenses are increased from $1,642 to $4,500 per year;
- Biomass (combined heat and power) - Synapse's initially proposed tariff of $156 per MWh (later revised to $158), except that the tariff is increased to recognize additional labour costs for boiler operators and a reduction in the boiler efficiency used in the calculation of the tariff. The Board approves a fuel escalator for the

Biomass CHP, with conditions for a regular review. Subject to reviewing the Compliance Filing, the Board expects the new tariff to be approximately $180 per MWh;

- Small-scale in-stream tidal - Synapse's proposed tariff of $652 per MWh; and
- Run-of-the-river hydroelectricity - Synapse's proposed tariff of $140 per MWh.

[287] The tariffs shall all have a term of 20 years. The Board will conduct a review of all the COMFIT tariffs in three years.

[288] NSPI and the municipal electric utilities are directed to develop and maintain a resource of publicly available information which identifies available capacity for generation interconnection at each substation throughout the province. It is to be submitted for Board review by September 30, 2011.

[289] In order to monitor the level of activity by participants in the COMFIT program, NSPI and the municipal electric utilities are directed to file an annual report with the Board by January 31st each year which provides a listing of, and details regarding, each COMFIT generator that is at any stage of the application or interconnection process.

[290] The Board directs Synapse to provide, through a Compliance Filing, revised FIT model calculations for each class of generation facility canvassed in this Decision, as well as draft Terms and Conditions for each of the tariffs.

DATED at Halifax, Nova Scotia, this 4th day of July, 2011.

Peter W. Gurnham

Roland A. Deveau

Murray E. Doehler

APPENDIX - A

List of Witnesses

On behalf of	Witness
ALLIANCE OF NOVA SCOTIA SAWMILLERS	Patrick M. Hayes Fenton Travis Jeffrey C. Bodington
BLACK RIVER WIND LIMITED	Neal Livingston
BOARD COUNSEL	Bruce Biewald Susan Shaw Geoff Keith Wilson Rickerson
BRIAN GIROUX	Brian Giroux
CANADIAN WIND ENERGY ASSOCIATION	Tom Levy
CAPE BRETON EXPLORATIONS LTD.	Luciano Lisi
CONSUMER ADVOCATE	Paul Chernick
ECOLOGY ACTION CENTRE & NOVA SCOTIA SUSTAINABLE ELECTRICITY ALLIANCE	Toby Couture
EON WINDELECTRIC INC.	Paul Pynn
KWILMU'KW MAW-KLUSUAQN	Eric Christmas
SCOTIAN WINDFIELDS INC.	Daniel Roscoe
SEAFORTH ENERGY INC.	Jonathan Barry
ST. FRANCIS XAVIER UNIVERSITY	Moses Cody Darren Hartlen

APPENDIX - B

List of Formal Intervenors

Alliance of Nova Scotia Sawmillers	Robert G. Grant, Q.C. Nancy G. Rubin Fenton Travis
Black River Wind Limited	Neal Livingston Peggy Cameron
Canadian Wind Energy Association	Emilie Moorhouse Jean-Francois Nolet Tom Levy
Cape Breton Explorations Ltd.	Luciano Lisi
Champlain Tidal Energy Corp (CTEC)	Dr. Ian M. Flint John Wightman
Consumer Advocate	John Merrick, Q.C.
Ecology Action Centre	Brennan Vogel
First Nation Engineering and Technical Services	Louis Joe Bernard Jeff Feigin
Fundy Tidal Inc.	Dana Morin Brian Watling
Brian Giroux	Brian Giroux
Halifax Regional Municipality	Mary Ellen Donovan, Q.C. Stephen Jedynak Julian Boyle Angus Doyle Kaija Belfry Munroe
Johnson Controls L.P.	Paul D. Leitch Peter A.Cherry
Kwilmu'kw Maw-klusuaqn (KMKNO)	Eric Christmas Twila Gaudet
Lahave Renewables and Community Wind Fields Inc.	Keith Towse
Liberal Caucus Office	Andrew Younger Shawn Lawlor
Laurentian Energy	Denis Lanoe
McInnes Cooper	David MacDougall James MacDuff

Membertou First Nation and Membertou Development Corporation	Jeffrey Slivocka Rodrigo Moura Julen Torrontegui
Minas Basin Pulp & Power Company Limited	John Woods Aaron Long Krysta Hatt
Intercompany Accountant	Chris Peters Robert Patzelt, Q.C.
Municipality of the County of Colchester	Wayne R. Wamboldt Tom Taggart
Northern Innovations Holdings Limited	Robert B. Stoddard
Northumberland Wind Field Inc.	Sharon Henderson
Nova Scotia Department of Energy	Stephen T. McGrath Richard Penny Scott McCoombs Nancy Rondeaux Ross McLaren
Nova Scotia Environment	Christina Campbell
Nova Scotia Power Inc.	Nicole Godbout J. Rene Gallant Eric Ferguson
Nova Scotia Sustainable Electricity Alliance	Janice Ashworth
Ocean Renewable Power Co.	John Ferland
Pictou Landing First Nation	Brian Hebert Marc Dunning
Quetta Inc.	John H. Reynolds
Scotian WindFields Inc.	Daniel Roscoe
Seafroth Energy, Inc.	Jonathan Barry David Lombardi Paul Pynn
Sierra Club Canada - Atlantic Chapter	Gretchen Fitzgerald
St. Francis Xavier University	Moses Coady
Wind Prospect Inc.	Andy MacCallum Austen Hughes Kelly Browne