STEWART McKELVEY
LAWYERS • AVOCATS

Purdy's Wharf Tower One, 900 – 1959 Upper Water Street, P.O. Box 997
Halifax NS B3J 2X2 Canada tel: 902.420.3200 fax: 902.420.1417 stewartmckelvey.com

April 29, 2011

Nancy G. Rubin
Direct Dial: 902.420-3337
nrubin@stewartmckelvey.com

*Delivered by E-mail*

Nancy McNeil
Regulatory Affairs Officer/Clerk
Nova Scotia Utility and Review Board
3rd Floor 1601 Lower Water Street
PO Box 1692 Unit "M"
Halifax NS B3J 3S3

File No: SM000349-15

Dear Ms. McNeil:

**Re: Renewable Energy Community Feed-In Tariffs - BRD-E-R-10/Matter No: M03632**

1. This is the submission of the Alliance of Nova Scotia Sawmillers ("ANSS"). It focuses on the Tariff to be established by the Nova Scotia Utility and Review Board ("NSUARB" or "Board") for a combined heat and power biomass facility ("CHP Facility").

2. The Tariff setting process cannot be about least-cost principles. Were it so, small renewable generation projects would never be built. Instead, the Board is to set cost-based rates for certain small renewable generation.

3. This brief will address the following issues in respect of the biomass CHP Facility:

    1. Capital costs.

    2. Operating costs.

    3. Debt-equity ratio.

    4. Internal rate of return.

    5. Fuel cost reset mechanism.

**OVERVIEW AND BACKGROUND**

4. In April 2010, the Province released its *Renewable Electricity Plan* with the intent of supporting and encouraging renewable electricity generation. In October 2010, amendments to the ***Electricity Act*** were proclaimed in force and the ***Renewable Electricity Regulations***, N.S. Reg.155/2010 enacted.

5. The ***Electricity Act*** now provides:

    *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) <u>whether a tariff is to be adjusted periodically and, where it is to be adjusted, the basis for the adjustment</u>;*

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

*(d) the duration of a tariff; and*

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

*(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.*

6. The ***Renewable Electricity Regulations*** enacted pursuant to the ***Electricity Act*** provide that the Tariffs are to be set by the Board (s.18) and in setting a Community Feed-In Tariff (COMFIT) the Board *must* determine the costs of the facility as well as other matters:

*19(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.*

7. The ***Act*** provides that in order to qualify as a generator, it must be a Band Council, a Municipality, a not-for-profit entity, a community economic-development corporation, a

cooperative or any other entity permitted by the Regulations (4A(8)). The Regulations additionally permit a university, a wholly owned subsidiary of a Municipality or any entity owning a CHP Facility if the heat is consumed or used by the generator or an affiliate (Regulation s.20(5)).

8. Following the proclamation of the ***Act*** and enactment of the Regulations, the Board set up a consultative process with the assistance of Synapse to develop proposed rates for the COMFIT.

9. In relation to Biomass CHP, Synapse had submitted a proposed Tariff based upon a rate of $156/MWh in year 2012 for Biomass CHP Facilities, composed of a fixed component of $94/MWh and an escalating component of $62/MWh representing the cost of fuel.[1]

10. For reasons discussed below, the ANSS submits that the Board should reject the rate proposed as it is not cost-based and does not reflect the risk of a Biomass CHP. The ANSS urges the Board to adopt the rate developed in response to Undertaking U-10 of $320/MWh along with the biennial fuel cost readjustment as described in response to Undertaking U-11.

**CAPITAL COSTS**

11. In deriving its proposed rate, Synapse assumed that the most likely developer of a Biomass CHP Facility would be a small to medium sized sawmill. Synapse chose a condensing turbine with extraction design which allows the power plant to operate irrespective of the operation of the sawmill. The alternative, a back-pressure turbine which is directly linked to the operation of the dry kiln (which is directly linked to demand from the lumber market) was agreed by all to be inappropriate. A condensing turbine with extraction allows the power plant to maintain a higher capacity factor resulting in a lower cost of electricity to ratepayers.

12. Synapse testified that the first steps in developing their proposed rates were to develop COMFIT capital costs and operating expenses.[2] Ms. Susan Shaw was presented as the independent consultant with expertise in combined heat and power. Ms. Shaw provided the assumptions about the type of equipment on which to base the Biomass CHP Tariff and the cost and operation of that equipment.[3]

13. ANSS states that where the evidence of Patrick (Mitch) Hayes conflicts with the evidence of Ms. Shaw, the evidence of Mr. Hayes is to be preferred. The qualifications of Mr. Hayes and of ESI, Inc. of Tennessee are beyond reproach. ESI, Inc. is a design engineering, procurement and construction firm (EPC) that specializes particularly in biomass and solid fuel projects.[4] Mr. Hayes, a qualified engineer and MBA has been a construction manager and/or commissioning leader for power facilities ranging from small 30,000 pph gas-fired boilers and 5 MW combustion turbine units up to 50 MW (thermal) solid fuel CHP plants.

---

[1] Synapse Evidence and Final Tariffs, Exhibit B-1, p.5, lines 14-15.

[2] Transcript, April 4, 2011, p.21, lines 7-8.

[3] Synapse Evidence, Exhibit B-1, p.3, lines 10-11 and 28-30.

[4] Evidence of Patrick M. Hayes, Exhibit B-11, p.5 and Exhibit B, Standard Qualifications Package for ESI.

14. He has extensive experience as a project engineer responsible for the complete design of multiple steam and power facilities and as project manager also responsibility for all ESI commercial aspects of steam and power projects including budgeting, scheduling, engineering and construction interface, client interface, engineering packages, construction subcontracts, contract compliance, commissioning and facility turnover.

15. In his current role as the Director of Sales, his responsibilities include all conceptual design engineering, budgeting, preliminary calculations for mass and energy balance, emissions projections, equipment specification, consulting engineering and support for permitting and financing. Of particular note, Mr. Hayes had performed engineering and budgeting studies for more than 50 solid fuel (mostly woody biomass) fired steam and power facilities.[5]

16. Mr. Hayes was qualified to give opinion evidence in the development, budgeting, design, construction and operation of biomass CHP Facilities.

17. Mr. Hayes submitted pre-filed expert evidence, submitted to cross-examination and prepared a detailed CHP Plant Facility Study setting out the design basis, the capital cost estimate, operating and maintenance cost estimates, drawings and arrangements. All of the assumptions are set out in the Study.

18. The Study was prepared after ESI's Study proposal was accepted by the ANSS in response to a detailed scope of work.[6]

19. Compare and contrast the qualifications of Ms. Shaw and the work product produced.

20. Ms. Shaw worked at the Charlottetown District Heating System when the company that she worked for acquired that system in 1995 and she participated in some capital planning for modifications and additions to the system. In contrast to Mr. Hayes, she has never designed a wood fired cogeneration facility; she has never developed purchase orders and bid packages for the installation of any such facility.[7] She never worked as a general contractor for a biomass CHP Plant.[8]

21. Ms. Shaw was retained to provide "some technical assistance with developing the biomass CHP rate".[9] While she referenced a retainer agreement, the retainer simply confirms that Ms. Shaw was retained as an independent contractor for "work regarding feed-in tariffs."[10] Unlike Mr. Hayes, Ms. Shaw provided no written report or Study.[11]

---

[5] Evidence, pp.4-5.
[6] Undertaking U-4.
[7] Transcript, p.107.
[8] Transcript, p.108.
[9] Transcript, p.102.
[10] Undertaking U-3.
[11] Transcript, p.113.

22. The Synapse Panel paid lip-service to the importance of having accurate costs but ultimately, very little, if any, weight should be afforded to the capital cost estimates. The following exchange took place with Mr. Keith:

**Ms. Rubin:** In evaluating the cost of the CHP Project, would you agree it's important to include all of the project costs, including the equipment, the systems, the services and the labour?

**Mr. Keith:** Yes, I think a key difference between our methodology and the methodology that ANSS used is that we netted out the cost of a boiler only scenario. …

**Ms. Shaw [sic Rubin]:** Yes, that is a key difference in the approaches taken. But in evaluating the costs of a stand-alone CHP Project, would you agree it's important to include all the project costs, including equipment, system, services and labour?

**Mr. Keith:** Of a stand-alone CHP Project, yes.

**Ms. Rubin:** And the omission of any of those costs would underestimate the real cost of developing such a project?

**Mr. Keith:** Yes.

23. Mr. Keith stated in order to develop the CHP Plant costs, they discussed the cost of large pieces of equipment with vendors and got estimates and then went back and benchmarked the costs against "other data".[12] In response to Undertaking U-5, Synapse produced the e-mail communications with vendors on which they based the cost of the boiler, steam turbine, condenser and transformer.

24. They sourced a single ballpark estimate by e-mail for each piece of equipment with the little appreciation for how the equipment would integrate. This may be contrasted with how the proposed tariff for small wind was developed. Synapse had actual installed cost data from more than 18 installations of 50 KW turbines in Canada as well as a database of 50 KW projects in the U.S.

25. The difference between the CHP Project costed out by Synapse and the CHP Project costed out by Mr. Hayes is almost double. In Table III of Mr. Hayes evidence, he charted the apparent differences between the two estimates, noting that the estimate given by Synapse was too general to draw many direct conclusions.

26. Despite having the opportunity to source installed cost data from ESI or a similar entity, Synapse did not do so. Mr. Hayes identified obvious omissions in Synapse's costs in relation to material handling systems, water treatment systems, construction expenses as well as contingency, engineering, project management, construction management and EPC profit but neither Ms. Shaw nor Mr. Keith were able to qualitatively or quantitatively respond to Mr. Hayes' table. Ms. Shaw, "didn't spend any time really

[12] Transcript, p.111, lines 14-19.

analyzing it,"[13] and Mr. Keith believed that it was a Greenfield project specifically designed for Marwood.[14] This was simply not correct. As explained by Mr. Hayes in his evidence and in response to questioning by Board Counsel, it was a "generic" facility suitable for anywhere in Nova Scotia.[15]

27. It is evident that Synapse relied in large part on "benchmarking" its plant costs as well as the overall rate:

> **Mr. Keith:** Well, I think the fundamental issue here is that we believe when we look at the market metrics against the benchmarking – again which we're benchmarking our plant or our rate, we're quite comfortable with where our rate sits relative to those market metrics.

28. In reality, the plant benchmarks are of no assistance given the economies of scale. Ms. Shaw stated she relied upon the United States Department of Energy Annual Report of Plant Costs. However, on questioning it became evident that there were only two Biomass Projects in that data set: one a 20 MW project and one a 50 MW project.[16]

29. Synapse equipment and installation cost of its assumed CHP plant ($7,888,608 divided by its generator capacity per MW of 2.05) results in a cost/MW of $3.85 million/MW.[17]

30. In comparison, the CBCL feasibility study for a project four times the size for St. FX resulted in an approximate cost of $4.6 million/MW. Likewise, when considering the comparators for the Nova Scotia Power – Port Hawkesbury Biomass Project which came before the Board last year, one sees an average cost of $3.97 million/MW.[18] Ms. Shaw and Mr. Keith acknowledged that these projects are on a scale that is exponentially larger than the 2 MW plant which has been assumed and that the Synapse cost per MW is lower than plants of a scale 10 times to 20 times greater than what is proposed to be developed in Nova Scotia.[19]

31. As noted by Mr. Hayes, if you look at Synapse's capital:

> *It's in the range of a 25-40 MW project for a 2 MW project, and that's just untenable. That's not in any realm of possibility.*
>
> *We built some of the most cost-effective biomass plants in North America and been recognized for it by people like Power Magazine and Bentley Systems Internationally.*

---

[13] Transcript, p.128.
[14] Transcript, p.127.
[15] Transcript, pp.154-156.
[16] Transcript, p.112.
[17] Transcript, pp.132-133 and Synapse Evidence, Exhibit B-1, Exhibit F, p.4 of 6.
[18] Exhibit B-17.
[19] Transcript, pp.136-137.

*I know what these things cost, and I'm just telling you that their capital and operating estimate is not going to cover the needs of somebody trying to apply for this tariff.*

32. Given the economics of scale, it is inconceivable that a 2 MW plant could be developed at a relative cost lower than a 50 MW plant.

33. ESI's estimate is a complete estimate that provides a fully operational, turnkey power plant. No-one strenuously challenged the ESI capital and operating costs.

34. A review of the questioning of Ms. Shaw and the e-mailed estimates demonstrate the absence of analysis which went into developing appropriate capital cost estimates. In part, it appears to be not only as a result of inexperience in the construction of such facilities, but due to erroneous assumptions made with respect to existing facilities. Again, referencing Mr. Hayes' Table III comparing the capital costs assumed by Synapse and contained in the ESI study the following exchange took place with Ms. Shaw and Mr. Keith:

**Ms. Rubin:** Sure. The other significant area where it shows a number of zeros has to do with the balance of the plant, the sewer, HVAC, pre-engineering, building, painting, fire protection, water treatment, storage tanks, air compressors, and pumps. Were these included in your cost estimate?

**Ms. Shaw:** I think for those costs our – the bulk of our assumption for the scenario that we decided upon was that 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.

**Mr. Keith:** Yeah, I think there may be a fundamental disconnect between the Synapse and ESI estimates here because as Susan was saying, there were a number of facilities that we assumed were already at the facility and would not need to be constructed, whereas the ESI numbers, it looks like are for a Greenfield facility.[20]

35. As noted, that assumption that it was a Greenfield facility costed by ESI was simply wrong as demonstrated through the cross-examination of the ANSS Panel by Mr. Outhouse:

**Mr. Outhouse:** Now, I'm just interested in the term "generic". Did you assume for the purpose of your study that this was going to be a Greenfield project?

**Mr. Hayes:** No, sir. We assumed this was going to be a Brownfield project.

**Mr. Outhouse:** Just elaborate.

[20] Transcript, pp.144-145.

**Mr. Hayes:** Sure. 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 MW thermal energy. The way in which we tried to make it generic was to analyze what assumptions we could make about that existing facility. That existing facility is receiving steam at a low pressure saturated temperature. We assumed that their internal infrastructure is existing for that pressure and temperature.

However, when we go to generate electricity, we're going to have to generate steam at a much high pressure and temperature which, according to Canadian Boiler Code and ABMA, are going to require you to change out all of the steam lines, all of the water lines, the water treatment system. It's going to require additional steam because it's now a CHP Plant.

It's going to require somewhere between 33 and 40% more steam than the existing facility would, which means that the existing air compressors, water treatment, ash handling, things like that are probably no longer sized correctly.

So what we did was we assumed that we were going to have to replace all of the systems that go with the high pressure and temperature steam, replace part of the system that had to do with the balance of facility, and that all of the systems internally for distribution of the thermal side would be existing. And in that way, we qualified it as a Brownfield facility.[21] [Emphasis added]

36. Mr. Keith asserted that ESI made no allowance for equipment on site that could be used in the project but acknowledged although offered the opportunity to speak with ESI to discuss the evidence, did not.[22] As explained by Mr. Hayes in the above exchange, that assumption is wrong. ESI had a much better understanding of the existing facilities and what could be used when adding on the electrical plant.

37. Synapse failed to include any cost for piping and valves on the assumption there was an existing steam host without inquiring as to the suitability of the existing system when applied to a high pressure system.[23]

38. Synapse neglected entirely to include costs associated with engineering and project management, construction management and project for the EPC contractor. These costs are legitimate costs in order to construct such a plant. The evidence before the Board in the approved NSPI – NewPage Port Hawkesbury Biomass Project is that it is being constructed under an EPC contract and it was a key element of risk mitigation. St. FX indicated any project it constructed would be done with an EPC contractor and likewise, the ANSS indicated any project would be constructed with an EPC contractor.

39. Instead, Ms. Shaw assumed that a sawmill would have competent technical staff and be able to perform some of these functions.[24] It is respectfully submitted that this assumption is naïve, at best, and ignores the business realities.

---

[21] Transcript, pp.632-634.
[22] Transcript, pp.146-147.
[23] Transcript, p.151.

**OPERATING COSTS**

40. As explained in the pre-filed evidence of Mr. Hayes, the Synapse model considers most of the non-fuel operating expenses between a steam only plant and a CHP to be zero. However, he explains that simply by operating the CHP Plant for 7,884 hours per year versus 5,256 hours per year for the steam only plant (using ESI's assumed availability of 90% versus 60%) there is a difference in O&M costs.[25]

41. As demonstrated in Table IV of Mr. Hayes' evidence, Synapse neglected to include parasitic power costs, water costs, chemical costs, incremental maintenance costs, sewer costs, and landfill costs associated with the facility (net of a steam-only facility).

42. As Mr. Hayes explained, the parasitic power losses for a generating plant are higher due to the larger plant size and the extra motors. The water costs for the generating plant are higher because of the makeup required for the cooling tower evaporation and blow down.

43. The water treatment chemical costs are higher because of the addition of anti-scalant in the condenser loop and the biocide for the cooling tower basin. The landfill costs are higher because of the additional fuel burned (ash in fuel plus unburned carbon). The maintenance costs will be higher due to the additional equipment including the amortized price of the turbine generator overhaul. The sewer costs are essentially the same.[26]

- **Parasitic Power**

44. Ms. Shaw acknowledged that parasitic power should have been included and it was not.[27]

- **Labour Costs**

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.

46. All boilers operated by members of the ANSS operate at a pressure of 15 psi or below. Synapse states it did not have the information from ANSS members in response to requests for information, although Mr. Travis indicates he had a number of telephone discussions with Synapse where the boiler sizes and operating pressures of the facilities

---

[24] Transcript, pp.154-156.
[25] Pre-Filed Evidence of Mr. Hayes, Exhibit B-11, p.15.
[26] Pre-Filed Evidence of Mr. Hayes, Exhibit B-11, p.15.
[27] Transcript, p.158.

were discussed. Regardless of any apparent misunderstanding, it seems clear that the labour costs should be adjusted for the reality in Nova Scotia.[28]

- **Net of Steam-Only Scenario**

47. The ANSS submits that the approach taken by Synapse to allocate all of the costs of generating the steam for extraction to the heat user is inequitable and unwarranted. As was evident during questioning, the Synapse panel chose this allocation of costs based on their interpretation of Regulation s.20(3)(b): "If it uses Biomass, it must be a combined heat and power generation facility."[29]

48. However, Mr. Keith acknowledged that to the extent some portion of the cost of steam is allocated to the production of electricity, it does not take away from the fact that this facility is a combined heat and power generation facility. The driver to allocate the costs of steam production solely to the steam host was to have a mechanism to ensure it is a "legitimate CHP Plant".

49. No one on the Synapse Panel could point to tariffs in other jurisdictions in which the steam generation costs are allocated 100% to the steam host as was done by Synapse which have successful CHP Plants.[30]

50. As explained by Mr. Hayes, the evidence presented by Synapse is that the host facility would have to build the boiler either way but, he observed the same could be said of the electrical generation facility. In other words, the power facility would have to built a boiler plant in order to supply steam to the turbine to generate electricity and therefore, the contribution of capital carried by the heat user should be the difference in capital costs between the power only plant and the CHP Plant. (The CHP Plant would have to be larger than the power-only plant in order to extract steam for sale and produce and equal amount of power).[31]

51. As he observes, either extreme alternative is unfair based on the intent of the program to promote renewable energy as in either this scenario or the Synapse scenario, one user benefits unfairly from the base cost of the plant built by the other user.

52. Mr. Travis explained in evidence that he sought an electrical engineering allocation but was unable to derive one. This is consistent with the evidence of Ms. Shaw who indicated that she viewed it as a policy allocation rather than a technical allocation. An allocation of the capital cost and the fuel portion on a 50/50 split between the cost of electricity and the cost of steam, it is submitted is appropriate and consistent with the second alternative whereby there is a revenue stream driven by the electricity generation and a separate revenue stream driven by the sale of heat or steam.

---

[28] Pre-Filed Evidence of Fenton Travis, Exhibit B-11, pp.6-7.

[29] Mr. Keith, Transcript, p.183.

[30] Transcript, pp.189-190.

[31] Pre-Filed Evidence of Mr. Hayes, Exhibit B-11, p.8.

53. The primary business of sawmillers requires the operation of the steam host. The ANSS is not looking for a rate to be set on the basis that it is set to generate electricity only. CHP Facilities will be incented to operate efficiently as it is assumed they are operating 60% of the year with full steam use.[32] Synapse has attempted via a rate mechanism to define a CHP. The rate proposed by ANSS embeds an efficiency incentive (but does not impose one by regulation) as if it does not operate at 60%, then the sawmill stands to lose money.

54. If this Board is looking to implement the government's plan by getting shovels in the ground, it is imperative that real costs and accurate costs be used.

> **Ms. Rubin:** Would you agree that the closer the rates are set to being cost-based, the more likely it is that we are going to see projects being developed and successful?
>
> **Mr. Couture:** Absolutely. I think the guiding principles of successful feed-in tariffs is that the rates are sufficient to allow efficiently operated projects to make a return on their investment.
>
> **Ms. Rubin:** And for a biomass CHP project, or I suppose for any project, the more accurate the capital cost as an input cost, the more likely you are to arrive at a cost-based rate derived from that?
>
> **Mr. Couture:** Absolutely. The inputs – quality of the inputs is essential.
>
> **Ms. Rubin:** In establishing cost-based inputs, is it appropriate to consider the cost of putting a plant on the ground in practice or in theory?
>
> **Mr. Couture:** It's necessary to consider the cost that a real project would incur in order to be developed.[33]

55. The most telling admission came from Ms. Shaw in cross-examination when she asserted in defence of their costs: "I'm not building a real plant, ok?"[34]

56. If this Board wants "real plants" built under these tariffs, it must use "real costs".

### DEBT EQUITY RATIO

57. Synapse suggests that financing of 60% debt and 40% equity at a cost of debt of 9.5% and internal rate of return at 13% is appropriate.

58. The ANSS submits that the evidence of Jeff Bodington ought to be preferred over the hearsay evidence of an unnamed lender and that the Board should set a rate assuming biomass CHP Plants be financed with 100% equity.

---

[32] See discussion at Transcript, pp.584-585.

[33] Transcript, pp.114-115.

[34] Transcript, p.150.

59. No one on the Synapse Panel had independent expertise in utility finance or risk assessment nor was any effort made to qualify the Panel members as such. No one on the Panel had ever arranged debt or equity financing for a Biomass fired-power project.[35] Instead, Synapse based its recommendation on discussions with what it asserted was "a broad range of lending experts and project developers". On questioning, it was apparent that of this "broad range" only two had actual experience in arranging debt or financing for a Biomass power project; however, Mr. Keith could not say whether either had any experience with a small Biomass project.[36] Likewise, Mr. Keith was unable to say if these two lenders actually did fund a 2 MW Biomass fired project at 60% debt.[37] Nor was he able to identify any 2 MW Biomass fired power project financed with 60% debt where it was secured by the power plant alone.[38]

60. In fact, the hearsay evidence of the lenders (as reported in the Synapse evidence) is that "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**".

61. Unfortunately for the Board and other parties, none of the individuals with whom Synapse spoke filed reports or were present to be questioned with respect to the assumptions regarding the ability to finance such a small project based on 60% debt.

62. The ANSS, in contrast, submitted the evidence of Jeff Bodington and presented him for cross-examination. Mr. Bodington and his company have been involved in financing, selling and restructuring over 400 power projects; more than 20 of those were biomass and two thirds of these were biomass CHP.[39] Mr. Bodington was qualified as an expert to give opinion evidence in financing, valuation and transactions concerning electrical power projects.[40] Mr. Bodington explained, through personal experience that financing a biomass fired power project presents challenges. The potential volatility in fuel costs make non-recourse debt financing for biomass projects difficult and sometimes impossible to arrange. Furthermore, the current market data which he introduced supported the lack of debt financing for small biomass projects.[41] For all those reasons, Mr. Bodington recommended that the rate be structured assuming 100% equity.

- **Internal Rate of Return**

63. Synapse lacked an evidentiary basis or a specific methodology for recommending a 13% cost of equity for Biomass CHP. Reliance appears largely to be placed on the unnamed U.S. investment banker:

---

[35] Transcript, p.199.

[36] Transcript, p.200.

[37] Transcript, p.201.

[38] Transcript, p.202.

[39] Transcript, pp.524-525, Pre-Filed Evidence of Jeff Bodington, Exhibit B-11 and attached curriculum vitae.

[40] Transcript, pp.525-526.

[41] Pre-Filed Evidence of Jeff Bodington, Exhibit B-11, pp.4-7.

**Mr. Keith:** Well, as an example, when I was speaking with the investment banker, the U.S. investment banker, we – the conversation went quite quickly to the issue of fuel cost risk. And we discussed that in various options, and I pressed him to give me – you know could you give me some numbers about what you think different projects would be financed at.

And he said he thought 8% debt would be a reasonable expectation if the fuel cost risk had been handled to the – you know for a project with a 20 year Power Purchase Agreement with a credible business plan if the fuel cost risk had been handled to the lenders satisfaction, that 8% debt would be a reasonable expectation.

And I asked him, “Do you feel like it would be a reasonable expectation for a project that had the kind of fuel indexing mechanism that I’ve just described to you?”

And he said, “No, it would not be. You’d have to go higher on that.”

And he also asked me what the return on equity we were assuming for these projects, and at the time we were assuming 11.5%. And he said, “No, you should probably go higher on that as well.”

And I said, “how high should we go?” and he said, “I’d have to see a lot more information about the project before I could start telling you about specific numbers. I’d have to see the fuel contracts, I have to see the COMFIT Power Purchase Agreement.”

You know, he said “This is a very unusual kind of project. It’s not the kind of thing lenders see everyday”.

And so that was primarily the conversation that caused us to increase the cost of debt from 8% to 9.5% and the return on equity from 11.5% to 13% for Biomass projects.[42]

64. Secondly, Mr. Keith reviewed the Board’s franchise decision in Heritage Gas and the NSPI rate of return and again “benchmarked.”

65. The rationale for comparing the risk profile of Heritage Gas to a small biomass CHP Facility is not discernable. Mr. Keith acknowledged he did not review the expert evidence that had been submitted by Kathleen McShane, the expert who developed the proposed risk adjusted return on equity for Heritage Gas.[43] Unlike Mr. Bodington, he relied on no market data to estimate the required return on equity for a comparable 2 MW biomass CHP.[44]

---

[42] Transcript, pp.203-205.

[43] Transcript, p.216.

[44] Transcript, p.217.

66. Synapse appears to assert in its evidence that COMFIT projects are likelier to be riskier than NSPI whose allowed rate of return is at 9.35% (within a range of +/- 25 points) thereby justifying its recommended 13%. These four reasons are: project-size risk, portfolio risk, the ability to apply for rate increases and inexperience and lack of internal expertise.

67. However, Mr. Keith conceded that all of these four risk factors could be applied relative to the Heritage Gas utility whose rate of return is 13%.[45] When further questioned, Mr. Keith indicated that he also looked at ROE's in Ontario (11%), Vermont (12.13% and deceasing) and Europe but "for us the final analysis is when we plug those numbers into our model and we get a number out, does the number look reasonable compared to the market data we seek. So that was sort of our line of thinking on the ROE."[46]

68. This is the same "smell test" that Synapse applies to the reasonableness of its capital costs. When questioned by the Chair whether any of the evidence would cause Synapse to revisit its recommendation, Mr. Keith indicated: "… 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."[47]

69. In effect, Synapse has cast its eyes around to other jurisdictions to see what has been done with respect to the rate and what type of take-up.

70. ANSS submits that Vermont, on which Synapse apparently relied heavily, offers a weak comparator. In the U.S., a number of incentives are available at the federal, state and municipal level. Exhibit B-27, a print-out from the U.S. Environmental Protection Agency (EPA) lists the funding resources available. As explained by Ecology Action Centre witness Toby Couture, in addition to guaranteed adders on top of the electricity price, there is a conservation loan program, a clean energy development fund, tax exemption on sales tax for certain components of the systems, property tax exemptions and a 30% investment tax "credit" (as further described by Mr. Hayes and Mr. Bodington). There are no such incentives, tax breaks or property tax exemptions available to biomass CHP producers in Nova Scotia.[48] As stated:

> **Ms. Rubin:** Okay. And I believe the words that you used, the availability of the incentives in the U.S. makes comparing the availability of equity in the U.S. to Nova Scotia for the purpose of developing rates tenuous at best?
>
> **Mr. Couture:** Yes, that's correct.
>
> **Ms. Rubin:** In addition to making comparisons about financing assumptions tenuous would you agree that these types of incentives would make the rate comparison a poor benchmark?

---

[45] Transcript, p.220.
[46] Transcript, p.492.
[47] Transcript, p.512.
[48] Transcript, pp.1105-1108.

**Mr. Couture:** I don't believe that the Vermont tariffs were designed with the assumption of the inclusion of these tax incentives. Now I stand to be corrected on that, but the tariff design did not assume the full capture of all of the available incentives because then it would essentially limit the pool of eligible participants in the policy. …

**Ms. Rubin:** Right. So does that mean a developer would sign up for the tariff or apply for the tariff that rate and, in addition, would be able to take advantage of all those other incentives or tax breaks or loans with a beneficial effect on what was actually received?

**Mr. Couture:** On profitability, absolutely.

71. In contrast, Mr. Bodington provided an evidence-based recommendation for the cost of capital: (1) market data and (2) the capital asset pricing model ("CAPM").

72. The market data was based on B & Co's experience being active in the market for biomass fired power project representing both buyers and sellers. The market data, in his opinion supported a 17.5% average cost of capital. The CAPM approach yielded results consistent with the market data.[49]

73. Mr. Bodington did not agree with Synapse that a 13% return was reasonable with the proposed CPI/diesel escalator as it did not offer an effective fuel cost hedge.

74. He stated however that *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. If such an effective fuel cost hedge could be developed, including development and construction risk, a reasonable cost of capital for a biomass CHP project would be approximately 13%.[50]

75. Where the ANSS and Synapse differs is whether or not the proposed CPI diesel escalator offers an effective fuel hedge.

- **Fuel Cost Reset Mechanism**

76. Synapse has recognized the risk associated with fuel costs in a biomass CHP project. Certainly, it is the single largest risk to such projects. Generators are unable to hedge against abrupt market changes in supply and demand because it is sourced from a small geographic area, is supplied on short-term contracts and cannot be swapped for other fuels to create a portfolio. Further, as noted by Mr. Bodington, many fuel suppliers have few assets in addition to a truck and a chipper and bankruptcies among fuel suppliers and the resultant failure of any contract in place are common.[51]

77. Synapse has proposed a CPI/diesel index as adopted in the agreement between NSPI and NPPH. Significantly however in the NSPI-NPPH agreement, the fuel costs are

---

[49] Pre-Filed Evidence of Jeff Bodington, Exhibit B-11, pp.10-12.

[50] Pre-Filed Evidence of Jeff Bodington, Exhibit B-11, p.13.

[51] Pre-Filed Evidence of Jeff Bodington, Exhibit B-11, p.5.

tracked and if, after eight years they escalate excessively, NewPage can walk away or the parties can renegotiate.[52]

78. The ANSS has proposed using the CPI/diesel index in conjunction with a biennial readjustment of the price of fuel to track actual fuel prices, whether up or down. The indices alone, it is submitted bear no relationship to actual prices paid for biomass and a periodic readjustment is required.

79. Mr. Hayes discussed that the inability to adjust the rate based on fuel variations will "kill a project as investors look at that as a risk that they are unwilling to take at whatever return, in our experience."[53] He referenced the Vermont biomass tariff and explained that ESI is involved in a number of the projects that have been cancelled. Of the original nine proponents who responded to say they were going to build the biomass plants, there is only one left in Montpelier.

80. Montpelier, in addition to the rate at which they are getting from the PPA, it is also getting a 30% investment tax credit on the back-end of the project and in addition, is getting an $8 million grant from the City of Montpelier to continue to develop the project. Absent the $8 million grant, they would have abandoned the project.[54]

81. When looking at the Ontario rate which Synapse appears to use as a benchmark, in Mr. Hayes' direct experience and understanding, those projects have fallen apart ,with the exception of St. Mary's Renewable Energy Corporation. That company went back and broke the original PPA with OPA and negotiated a significantly higher rate. He explained that while projects may have been announced, they have not spent capital on moving the projects forward outside of the development side.[55]

82. As this Board would be well-aware, the fact that an entity has signed a PPA does not inexorably lead to the conclusion that the plant will be developed. One hopes that history is not doomed to repeat itself in relation to the COMFIT projects.

83. Exhibit B-19 introduced by Mr. Simpson through the cross-examination of the ANSS Panel demonstrates the volatility of fuel costs. As noted, if the rate were set in July of 1993 based on pulpwood chip prices then three years out the price would have escalated incredibly such that a CPI/diesel escalator would be unlikely to have covered off that risk. The likely result is that plants would sustain severe losses. Likewise, if the tariff rate had been set at 1996 at the peak, then a few years later there would be excessive profitability. The rate would continue to increase due to the CPI/diesel escalator proposed but the market would have dropped for the price of wood.[56]

---

[52] Transcript, p.211.

[53] Transcript, p.644.

[54] Transcript, pp.644-645 and see explanation by Mr. Hayes regarding the investment tax credit, specifically called a 1603 grant which is a cheque from the government, at Transcript, pp.647-648.

[55] Transcript, pp.652-653.

[56] Transcript, see discussion by Mr. Travis, Mr. Hayes and Mr. Bodington at pp.565-569.

84. Refernece is made to the paper co-authored by Mr. Couture, "The Policy Makers Guide to Feed-In Tariff Policy Design" for the National Renewable Energy Laboratory, the leading lab conducting research in renewable energy for the United States government.[57] In response to questioning, Mr. Couture elaborated upon flexible formulae in rates for renewable energy resources dependent on a fuel such as biomass. As he explained:

> *"Flexible means it would respond to changes in the – in this instance, would mean that it's responsive to changes in the price of the fuel so that there's a formula to allow it to adjust in some responsive way to market prices."*[58]

85. Mr. Couture discussed both formulaic adjustments as well as more generally, feed-in tariff reviews of the entire policy.

86. Specifically on an adjustment he concurred:

> **Ms. Rubin:** Okay. My last question, then, was of these feed-in tariff adjustments in the program itself, is this something that you would recommend for Nova Scotia?
>
> **Mr. Couture:** I think that the inclusion for renewable energy resources that are dependent on a fuel where there is a price component that can be considered stochastic or that fluctuates in an unpredictable way, some form of adjustment is necessary to ensure that the tariff price is sufficient to keep the project profitable over time.
>
> Now the precise details of that structure and that adjustment formula can become quite complex and require, I think, a finer lens than we are to bring to bear today.
>
> But I think the general principle, if that's what you're hoping that I'll confirm, that **for renewable energy resources dependent on fuel there should be some mechanism to incorporate the adjustment of the price of that fuel, that input, then yes, I think that generally is advisable.** In most jurisdictions that include – if not all; I can't – most jurisdictions that have biomass as part of their feed-in tariffs do include provisions to adjust for the fuel price.[59] [Emphasis added]

87. In response to further questioning by Mr. Outhouse, Mr. Couture indicated that while he could not think of one biomass feed-in tariff that did not include some flexibility mechanism to account for fuel price escalation, what is occasionally done as a substitute is a shorter contract duration. For example, instead of a feed-in tariff for 20 years, it is done on a five-year basis at which point a new tariff is introduced.[60]

---

[57] Exhibit B-28.

[58] Transcript, see discussion at pp.1120-1125.

[59] Transcript, pp.1128-1130.

[60] Transcript, pp.1182-1183.

88. Mr. Couture was unimpressed with the Vermont escalator of $1/year/MWh describing it as a "fairly bold assumption".[61]

89. Specifically discussing the proposed CPI/diesel index, the Chair questioned Mr. Couture:

**The Chair:** So, dealing with biomass, what would you take into account in trying to design an adjustment mechanism?

**Mr. Couture:** No, I think that based on the current – on the work that NSPI has done on generating the biomass tariff, you naturally – you do need to factor CPI, no question. You do need to factor diesel costs.

So those two inputs, *de minimus*, you need to factor, and I think then the question becomes, well what else needs to be included, are these new plants that are being built or are we using an existing facility and adding a boiler to it?

And the costs are going to differ more in biomass, project by project, I would suspect, than for wind projects, …

**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.**

**The Chair:** Sure. Do you have a view on how often the review should take place?

**Mr. Couture:** My understanding is that as it's currently structured the policy will be reviewed every 18 months.

**The Chair:** No, but how often the adjustment mechanism should be reviewed because we can include that as part of the tariff.

**Mr. Couture:** umhm. As I mentioned, Spain adjusts on a quarterly basis but it had a self-adjusting quality, so you don't need to have a hearing every time you want to – every quarter. **I think with the adjustment, 75/25, that we've discussed, adjusting on a quarterly basis or adjusting on an annual basis, as the case may be, layered on top of a review should be sufficient to keep things in check and to keep things developing as they should.**

---

[61] Transcript, p.1184.

> There may also be concerns that come up down the road with – related to environmental concerns over-excessive extraction of forced biomass for the purposes of electricity generation. …[62] [Emphasis added]

90. The ANSS submitted in response to Undertaking its proposed tariff language for the fuel cost reset mechanism. It offers a complete mechanism, defined, and simple to administer.

91. In Undertaking U-11, the ANSS provided a suggested formula for the reopener of the biomass tariff. If the price of wood fibre is lower, the rate would be dropped; if the biomass price is higher, it would be bumped up. The adjustment would be forward-looking rather than a rebate or claw-back.

92. In practice, the Board would establish a base price of biomass in the first year. In the second year, it would be escalated based on the CPI and diesel index. In the third year, the biomass price would be reset based on the "adjusted biomass market price" as that term is defined in the tariff. The following year, the newly reset fuel price would be escalated based on CPI and diesel. In year five, the biomass price would be readjusted again.

93. As acknowledged by Mr. Travis, it is not a perfect correlation between fuel costs. This is so, for a number of reasons. Firstly, the adjustment is forward-looking and does not adjust for over or under recovery. Secondly, each plant would have its own unique fuel costs depending on the amount it self-supplies and the fuel contracts it is able to secure. However, one should not let the perfect be the enemy of the good.

94. The readjustment, it is submitted, offers the benefit of a better tracking of fuel costs to actual prices as opposed to simply escalating in proportion to indices which bear little relationship to the actual price of biomass. It offers greater certainty to generators and, if felt to be an appropriate means to mitigate fuel risk, it may assist in securing debt and it could reduce the return on equity down to a level consistent with that recommended by Synapse of 13%.

95. The Board is expressly granted the jurisdiction to establish a tariff with a periodic adjustment and set the basis for the adjustment.[63]

96. The Chair questioned how the Board could compel biomass generators to supply information respecting the cost of fuels as it does not directly regulate such generators, unlike NSPI.

97. The response lies in the Regulations. The Minister, in consultation with NSPI, is to prepare a standard form of power purchase agreement (PPA) to be used for the feed-in tariff program and must have the form of PPA approved by the NSUARB.[64]

---

[62] Transcript, pp.1193-1195 and see also follow-up questioning by Ms. Rubin at pp.1208-1210.

[63] ***Electricity Act***, s.4A(4)(b).

[64] ***Renewable Electricity Regulations***, s.32(1).

98. The Board would be empowered therefore to include a requirement in the standard PPA for biomass CHP with the reporting requirements described in the tariff.

99. It is acknowledged that there will be some administrative burden upon Board staff to collate the submitted data but the readjustment in odd years will be no different than the readjustment done in even years when the biomass portion of the input to the rate is escalated based on CPI/diesel. Furthermore, the accumulation of market biomass pricing information will have a salutary effect. Month over month and year over year data will potentially lead to the development of a Nova Scotia biomass index. At minimum, it would offer greater comfort whether or not the proposed CPI/diesel index does indeed track the actual price of biomass fuel.

## A LAST THOUGHT: THE NEED FOR A COST-BASED RATE

## CONCLUSION

100. The reality is the government has made a policy decision to encourage small renewable generation. Electricity ratepayers will be paying for those costs. Other jurisdictions have offered tax breaks, grants, or incentives but at this stage, none are available in Nova Scotia. This may be a matter for government but the Board has to take the Regulations as they stand. For this province to set a rate based on Vermont and Ontario because they sound reasonable, particularly in circumstances where those jurisdictions do not have any successful projects on the ground at the tariff rate, is a risky proposition.

101. Mr. Hayes was unequivocal in his opinion that the capital costs and operating costs that he has provided are accurate and if this Board is to develop a cost-based rate that will work successfully for the community and these businesses, the ANSS urges adoption of the rate and its assumptions as developed in response to Undertaking U-10 along with the fuel cost reset mechanism as described in Undertaking U-11.

Yours Respectfully,

Nancy G. Rubin

NGR/lmc

cc Bruce Outhouse, Q.C.
Intervenors