Undertaking U-11: Provide a suggested formula for a reopener of the biomass tariff.

Response U-11:

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).

The "Adjusted Biomass Market Price" is then entered into the approved biomass CHP feed-in tariff model as the new fuel input to recalculate the biomass CHP feed-in tariff rate. Approved CHP Plants will receive the new CHP feed-in tariff rate as established by the NSUARB based on the Adjusted Biomass Market Price with no retroactive adjustment. In the following year, the rate will be adjusted 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.

Definitions

Adjusted Biomass Market Price – price of biomass established by calculating the average price of Market Biomass energy during the Evaluation Period for all Approved CHP plants participating in the feed-in tariff.

Approved CHP Plants – as determined by the Minister of Energy or designate pursuant to the *Renewable Energy Regulations, NS Reg. 155/210*

Bone Dry Ton (BDT) – A unit of measure for the weight of wood excluding its water.

BDT Delivered = (1-Wood Moisture Content %) x (Delivery Weight in Green Tons)

Evaluation Period – The 6 month period of time preceding the determination of the Adjusted Biomass Market Price by the NSUARB.

Green Ton – the weight of wood including its moisture content.

Gross Energy –The amount of heat released during combustion. Also known as higher heating value (HHV), which takes into account the latent heat of vaporization. The Gross Energy of a bone dry ton of wood is approximately 17.2 MMbtu.

Market Biomass – biomass that is procured from a third party that is not owned, partially owned or affiliated with the owner(s) of an Approved CHP Plant.

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Wood Moisture Content % – the amount of water contained in wood as a percentage of its total weight.

Reporting Requirements

Each Approved CHP Plant must agree to supply to the NSUARB specific information regarding each load of Market Biomass purchased. This information would include the following items:

1. Weight of biomass expressed in Green Tons.
2. Moisture content of the load of biomass expressed as a percentage by weight.
3. Dry weight of the biomass expressed in Bone Dry Tons.
4. Cost of the load.
5. Energy content of the load expressed in MMbtu.

Biomass data reports for the month will be due by the 15th day of the following month submitted electronically in the appropriate format as determined by the NSUARB.

Illustration of Reporting by an Approved CHP Plant

A biomass CHP plant receives a delivery of 25 green tons of biomass from the market at a price of $925 ($37/green ton) and its moisture content is measured to be 50%. A calculation is required to determine the "bone dry tons" delivered and the subsequent energy of the delivery.

Gross energy of 1 ton of wood @ 0% moisture content (bone dry ton) on a Higher Heating Value Basis is = 17.2 MMbtu (reference USDA)

Bone Dry Tons Delivered = (1-Moisture Content %)(Delivery Weight)
Bone Dry Tons Delivered = (1-0.5)(25 tons) = 12.5 BDT
Energy Content of Delivery = (12.5 BDT)(17.2 MMbtu/BDT) = 215 MMbtu

A report is generated and sent to the NSUARB that includes the information as outlined in Table 1.

Table 1 – Biomass Fuel Load Reporting Example

Biomass Fuel Load Reporting						
Plant	Load Number	Net Weight (Green Tons)	Moisture Content (%)	Dry Weight (Bone Dry Tons)	Cost ($/load)	Energy Content (MMbtu/load)
CHP Plant A	123456	25	50%	12.5	$925.00	215

Illustration of "Adjusted Biomass Market Price" Calculation

CHP Plant A

Total Market Biomass deliveries during the Evaluation Period = 10,000 BDT
Total cost of all Market Biomass Deliveries during the evaluation period = $800,000
Total Energy delivered during the Evaluation Period = 172,000 MMbtu

CHP Plant B

Total Market Biomass deliveries during the Evaluation Period = 15,000 BDT
Total cost of all Market Biomass Deliveries during the Evaluation Period = $1,140,000
Total Energy delivered during the Evaluation Period = 258,000 MMbtu

CHP Plant C

Total Market Biomass deliveries during the Evaluation Period = 6,250 BDT
Total cost of all Market Biomass Deliveries during the Evaluation Period = $525,000
Total Energy delivered during the Evaluation Period = 107,500 MMbtu

Cumulative Total cost of all Market Biomass Deliveries during the Evaluation Period [Plants A,B,C]= $2,465,000

Cumulative Total Energy delivered during Evaluation Period = 537,500 MMbtu
Adjusted Biomass Market Price = $2,465,000/537,500 MMbtu = $4.586 per MMbtu

Illustration of Biomass Price Adjustment Over PPA Term

Year 1 – Base price of biomass

Year 2 – Biomass price escalated based on CPI/Diesel index

Year 3 – Biomass price changed based on the "Adjusted Biomass Market Price"

Year 4 – Biomass price escalated based on CPI/Diesel index

Year 5 – Biomass price change based on the "Adjusted Biomass Market Price"

And so on……..