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May 26, 2010

Thomas S. Burack, Chairman
N.H. Site Evaluation Committee
N.H. Department of Environmental Services
29 Hazen Drive
Concord, NH, 03302

**Application of Laidlaw Berlin BioPower, LLC for a Certificate of Site and Facility for a Renewable Energy Facility in Berlin, New Hampshire**
**SEC Docket No. 2009-02**

Dear Chairman Burack:

On behalf of Clean Power Development, LLC, I am filing the pre-filed direct testimony of Melvin E. Liston and William W. Gabler.

Mr. Liston's testimony documents that there is not enough biomass fuel available to supply existing biomass users as well as the proposed 70 Mw Laidlaw Facility. The only way that the Laidlaw Facility will be able to obtain enough biomass fuel will be to outbid the existing biomass users and recover the increased cost from PSNH's ratepayers.

Mr. Gabler's testimony explains why there is not enough transmission capacity on the 115 Kv Coos Loop to allow existing and permitted generating facilities to interconnect and simultaneously operate at full output. Some of the existing users will have their output curtailed.

Sincerely,

**/s/James T. Rodier** James T. Rodier/cap

# THE STATE OF NEW HAMPSHIRE
# BEFORE THE
# NEW HAMPSHIRE
# SITE EVALUATION COMMITTEE

## DOCKET NO. 2009-02

## RE: APPLICATION OF LAIDLAW BERLIN BIOPOWER, LLC FOR CERTIFICATE OF SITE AND FACILITY IN THE CITY OF BERLIN AND COUNTY OF COOS

## TESTIMONY OF MELVIN E. LISTON ON BEHALF OF CLEAN POWER DEVELOPMENT, LLC
## MAY 2010

## Introduction

Clean Power Development, LLC has concerns regarding impact and orderly development of the region as it relates to issues surrounding the magnitude and implications of the increased biomass fuel requirement for the proposed Laidlaw facility.

Please state your name, title and business address?

My name is Mel Liston and I am the President of Clean Power Development, LLC that has its office at 130 Pembroke Road, Concord, NH 03301.

**Briefly summarize your background and qualifications**

I have an Associate Degree in Industrial Electricity and Electronics from NHVTC, a BS in Business from New Hampshire College, and an MBA from Golden Gate University. My employment has always been in the steam and power industry stretching back 38 years to 1972. The first ten years were related to facility maintenance having worked first for Stauffer Chemical Company and then Public Service of New Hampshire. The

balance of my career has all been related to construction management, project development, facility operations or alternative energy industry consulting, primarily biomass. I was the construction manager and start-up engineer for both the Timco project in Barnstead, NH and the Bio Energy project in West Hopkinton, NH. Both of these projects included biomass fueled cogeneration facilities. While serving as president of Pinetree Power Development Corporation, I developed two additional biomass generating facilities in New Hampshire that remain in operation today, Bethlehem at 15MW and Tamworth at 22MW. In conjunction with others of diverse biomass and energy backgrounds, we commenced business as Clean Power Development, LLC in 2006. Our business plan is focused upon biomass energy in New England with our initial emphasis on New Hampshire.

**What is the purpose of this testimony?**

The purpose of my testimony is to provide the SEC with additional analysis and perspective related to the biomass fuel requirements of the proposed 70MW Laidlaw project, the supply potential that can be sustained within the identified region, analysis of pricing, and a synopsis of probable impacts that can be anticipated and would negatively affect the orderly development of the region or the environmental integrity of our working forests.

## Background

**Please provide some background regarding your investigation of biomass fuel supply in the Berlin region?**

As an individual I began looking at the Coos Region with regards to the biomass potential of the area and possible sites for development in September 2006. Like many others I anticipated that a very substantial amount of underutilized low grade biomass resource would be available due to the shut-down of the Burgess Mill in Berlin. Information provided by the New Hampshire Department of Resources and Economic Development (DRED) to parties that might be interested in salvage of equipment or

other related redevelopments as well as initial research painted a consensus that the historical utilization of the mill had been as much as 1.1 million tons of pulp and chips. Therefore an initial interest by me and many others was that there must be at least that amount of biomass potential for energy development in the region. I joined with associates to form Clean Power Development, LLC. (CPD) and began in earnest the effort to explore the opportunity and bring a new north country biomass project to fruition. However, in March of 2008 CPD received preliminary information from Innovative Natural Resource Solutions (INRS) that made it clear that the biomass fuel potential within a reasonable distance and at an affordable price delivered was significantly less than what was originally anticipated.

LandVest noted that the lack of available low grade wood in the region may well have contributed, in fact, to the shutdown of the mills in Berlin and Groveton in the 2008 study they performed for the State of New Hampshire Division of Forest and Lands.

> *In addition, many factors caused the closure of Groveton and Berlin pulp mills, but one of them is likely due to the competition for low grade wood which causes less low grade wood available in this region. As we know, these two mills consumed approximately 1 million green tons per year. That implies the low grade wood supply is likely less than 1 million green tons.*

Additionally a review of the news articles at the time of the Fraser Berlin Pulp Mill shut-down clearly attest to problems related to wood supply and cost.

> *"**Rising cost of wood**, energy, and chemicals over the past three years have led to a significant deterioration in the financial results at our mill in Berlin despite the efforts of our employees and the State of New Hampshire to improve the sustainability of the operations," said Dominic Gammiero, President and CEO of Fraser.*
>
> March 8, 2006 Berlin Daily Sun and Union Leader

> ***"What has really handicapped the mill from day one is the cost of wood fiber** and oil," said Fraser Senior Vice President and CFO Peter Gordon. **"We didn't get the wood we thought at the price we thought."***
>
> March 9, 2006 Berlin Daily Sun

By May 2008 the INRS Berlin Biomass Fuel Availability report was fully vetted and we were appraised that the net available biomass fuel available at a reasonable cost and

within a reasonable distance was only sufficient to support nearly 30 MW of new biomass generation. Based on that analysis, CPD adjusted our North Country development perspective according to the obvious facts regarding the availability of biomass fuel. CPD dropped the Lancaster project on September 8, 2008 and nearly simultaneously reduced the size of the Berlin project to 29.5MW. It is our sincere contention that this is the full biomass potential that can be sustained with a Berlin sited facility based upon known conditions that would place new demand on a finite supply.

## Proper Project Sizing

**What do you see as the major biomass related issue with the Laidlaw project?**

It is sized inappropriately for the region. The size of the Laidlaw Berlin Biopower project was not determined by any engineering or forestry study, but rather by the dimensions of the existing black liquor boiler. This has led to a situation where the demand for fuel exceeds that which is locally available on a sustainable basis and can only be sustained by transporting fuel over vast distances.

For a long period of time the largest size forest derived biomass energy facility generally considered for development by the industry has been 50MW if the fuel required can be sustainably obtained within a maximum 50 mile radius of the site at a price that works for the project business model. The reason for this self imposed maximum size limitation is predicated upon a host of issues that all entail diminishing returns over distance when considering bulky, wet, and relatively low Btu biomass as fuel. These facts have long been recognized throughout the biomass industry:

*Pinochot Institute April 2009 "Reconciling Renewable Energy Goals with Forest Sustainability"*

> *The single most critical set of information is a realistic estimate of woody biomass availability within a feasible transportation distance. Overestimates of local supply will mislead energy companies into decision to site facilities that are of the wrong type or scale, and the resulting boom and bust will work in no one's best interest. There will be pressure to overharvest the available resources in the short term*

*and then disruptions in local employment as the facility is forced to downsize or close.*

*Terrain, transportation distance, truck weight limits and other factors will further constrain the proportion of the woody biomass supply that is economically recoverable.*

*After the limits are reached for woody biomass supply from residuals, energy producers will shift to round wood harvesting from existing forests, where they will compete directly with wood-based industries for feedstock. As prices for round wood increase, marginal existing wood-based industries will be displaced.*

*Harry Short – April 24, 2009 "Pipes, Trains, and Trucks: How to move biomass cost effectively"*

*Reliance on truck transport, which is expensive relative to those options used by fossil fuels, limits the size of bioenergy plants as escalating transportation costs reduce the profitability of large –scale*

*The power costs associated with larger distances (and larger plants) would increase with distance in an expensive diesel market rather than stay flat as previously found. Therefore, even though rail transport may become cost competitive with truck transport because the latter is more affected by fuel price, the resulting increase in shipping costs for both modes limits profitability to small plans with a limited draw radius.*

*Christoper Galik, Robert Abt and Yun Wu March 2009 issue of Journal of Forestry "Forest Biomass Supply in the Southeastern United States –Implications for Industrial Round wood and Bioenergy Production"*

*Biomass can only be considered a viable feedstock if it can be sourced near the point of process or end-use. This is because transportation costs play a strong role in the delivered price of the resource. Even at 50 miles or less, transportation costs alone can rise as high as $10-$30 per dry ton.*

*Should demand for woody biomass exceed the supply of forest residues, our findings suggest that all users of forest resources will be affected by the resulting spike in resource price. Biomass demand for pulpwood will not simply be added to current demand, except possibly in the very short run. As prices increase marginal wood consumers in existing markets will be displaced.*

*Public Renewables Partnership – Renewable Energy partnerships for Consumer Owned Utilities*

*The key financial variable for biomass-based electricity is fuel access. As most biomass fuels are bulky and of relatively low energy density, transport costs quickly become prohibitive outside a radius of 50 to 75 miles.*

*University of California Cooperative Extension "Woody Biomass Utilization"*

*The costs of gathering and processing multiple small trees to produce a unit of product are much higher than the costs associated with larger trees. As a result the transport of this low quality, low value raw material more than 50 miles is a major challenge*

*US Forest Service – Forest Products Laboratory "Wood Biomass for Energy"*

*Before building or remodeling a facility to utilize wood biomass for energy, potential users should evaluate the local market for the available supply of wood. Transportation costs may limit the benefits of burning wood fuel – Hauling wood biomass from outside a 50 mile radius is usually not economical*

*Univ. of New Hampshire Cooperative Extension - FAQ*

*Q. How far apart, in distance, can you have wood burning power plants?*

*A. Facilities must consider the sustainable supply within a reasonable haul time, as well as the existing demand for wood resources when placing a wood-fired power plant. If a one-hour haul time is reasonable, then power plants would be at least two hours apart.*

*Q. How long can local wood resources be expected to supply a wood-fired facility?*

*A. A properly sized and designed wood-fired facility that considered the sustainable supply of the available resource should not run out of fuel unless other market pressures or local policy and regulation changes affect the availability. A properly designed facility will match the size of the facility to the available resource within a reasonable haul radius of the facility. Generally speaking the maximum haul distance is 30-50 miles. To go farther out means the facility's business model must be able to absorb higher transportation costs. If the facility is oversized with respect to the available resource then the answer to the question will be 'not very long'. However, if the facility is properly sized to the available resource then both the resource and the facility will be sustainable over the long run. William H. Carlson*

*Biomass Power as a Firm Utility Resource: Bigger not Necessarily Better or Cheaper"*

*It is so true that "all biomass is local". The high moisture content and low energy density means that long distance transport is out.*

*Perhaps a more logical conclusion is that there is a unique optimum size for biomass in each location that uses data on fuel availability and costs potential steam host and available incentive to arrive at the lowest required busbar power cost. Most biomass size versus cost studies done to date have failed to recognize this.*

The 70MW Laidlaw facility if running today would be the largest such merchant owned wood fueled biomass electrical generation facility in the Northeast. Laidlaw did not come

to be a 70 MW project as a result of thorough analysis of biomass fuel potential within a reasonable distance of Berlin, New Hampshire. Quite to the contrary it is based upon trying to make everything else fit for an existing facility that does not lend itself well for size reduction to match the fuel availability constraints and other issues.

The choice of a 100-mile radius (180 minute drive time) for the procurement area for the Laidlaw facility is peculiar. LandVest's own study for the North Country Council used a 120 minute drive time radius, more a kin to a 75 mile radius. This smaller area was chosen by LandVest at that time for that study because it was deemed the reasonable supply radius given trucking distances/cost to bring the biomass to market. No justification was given by LandVest in this new study for Laidlaw as to why the radius was expanded so far. It appears the procurement area may have been chosen to fit the supply need for the Laidlaw facility, not the usual and customary supply analysis based upon reasonable distance.

Laidlaw themselves, in the past has acknowledged the negative economic impact of transporting biomass greater than 50 miles. During the public hearing on the Laidlaw project proposed for Ellicottville, NY held on October 3, 2005, John Kiouses asked Laidlaw where the wood chips for the Ellicottville facility would be purchased. To which Laidlaw responded:

*A. Wood chips will be purchased from the local region, including the greater buffalo area. It is generally not economically feasible to haul wood chips over significant distances.*

Note: Buffalo is approximately 50 miles from Ellicottville.

## Laidlaw Fuel Requirement Understated

**How much biomass fuel will the Laidlaw facility require?**

According to the testimony of Mr. Bravakis on page 8 lines 18-20 filed with Application;

*Q: Will there be an adequate and sustainable supply of fuel for the Facility?*

*A: Yes, there will be an adequate and sustainable fuel supply for the Project. The Project will utilize approximately 700,000 – 750,000 wet tons of biomass annually.*

At the May 5, 2010 Technical Session in Berlin, Mr. Bravakis of Laidlaw provided the following key information for analysis of fuel utilization:

(a) Wet wood is a description of biomass as delivered directly from the forest products industry that varies in moisture content (MC) from 35-55% but is assumed in the industry to be 45% on an annualized average basis as delivered.
(b) Laidlaw now considers that the fuel taken from inventory after some period of natural drying will average 42.5%MC as fired in the boiler.

At the May 5, 2010 Tech Session, Mr. Kusche of Laidlaw when questioned about the annual plant availability described it as follows:

There will be two scheduled outages for planned maintenance annually each of which shall be two weeks duration for an annual total of four weeks scheduled down time. During the remaining forty-eight weeks of anticipated operation Laidlaw assumes 94% availability.

Thus a calculation of the annual hours of operation at full load shows;

8,760 hrs/yr – 672 hrs scheduled downtime = 8,088 hrs potential operation

8,088 hrs potential operation X .94% availability = **7,602.72** hours at full output

Let me say that we concur that the average 45% moisture content of biomass as delivered and offer the following links to further substantiate that aspect;

The National Association of State Foresters notes in their comments to USDA (CCC) on the Biomass Crop Assistance Program that;

*NASF strongly encourages the CCC to modify its requirement for moisture testing to accommodate the industry-wide practice which generally assumes a moisture level of 45 to 50 percent." (see comments on 1450.103 Eligible Material.*
http://www.stateforesters.org/node/1801

Similar comments were offered by the Biomass Thermal Energy Council regarding moisture (page 3)

> *Most indicated that common industry practice is to measure in terms of green tons with the general assumption of a moisture level of 45 to 50 percent. Based on these comments, CCC proposes to modify its requirement for moisture testing and adopt the industry-wide standard for measuring moisture* www.biomassthermal.org/pdf/BTEC_BCAPComments_04.01.2010.pdf

The USDA Forest Service has a "desk guide" for their staff when dealing with biomass projects, and it states (Chapter 6)

> "*1 standard chip van carries 25 green tons, or approximately 12.5 bone dry tons (BDT) assuming 50-percent moisture content.*" http://www.forestsandrangelands.gov/Woody_Biomass/documents/biomass_deskguide.pdf

Given the above information and the firing rate provided in the Air Permit, the Steam and Power Engineers at Bloomfield Associates P.C. determined the annual fuel requirement for the Laidlaw facility to be **823,700 tons /year** as received.

**Bloomfield**

May 6, 2010

Laidlaw fuel consumption analysis

Assumptions:

1,013 MMBtu/hr firing rate – From air permit application
8,500 Btu/ lb in Bone Dry wood

45% average annual moisture content in purchased fuel
4,675 Btu/lb in purchased fuel

42.5% moisture content in as fired fuel
4,888 Btu/lb in as fired fuel

At a firing rate of 1,013 MMBtu/hr, the boiler will need to burn 103.6 tons of 42.5% moisture content (MC) wood per hour. If the plant operates 7,603 hrs/yr, the facility will burn 787,900 tons/yr of as fired fuel. This amount of green fuel consists of 453,050 tons/yr of bone dry fiber.

The average moisture content of wood fuel in NH is 45% as delivered. Laidlaw will buy in wood at 45% and store and manage the fuel to reduce the MC to 42.5% before combustion. Therefore Laidlaw will need to buy the equivalent of 453,050 tons of bone dry fiber that when purchased at actual as received moisture content of 45%, equates to 823,700 tons/yr of green wood purchased and received every year.

Peter Bloomfield, PE

Steam & Power Engineers

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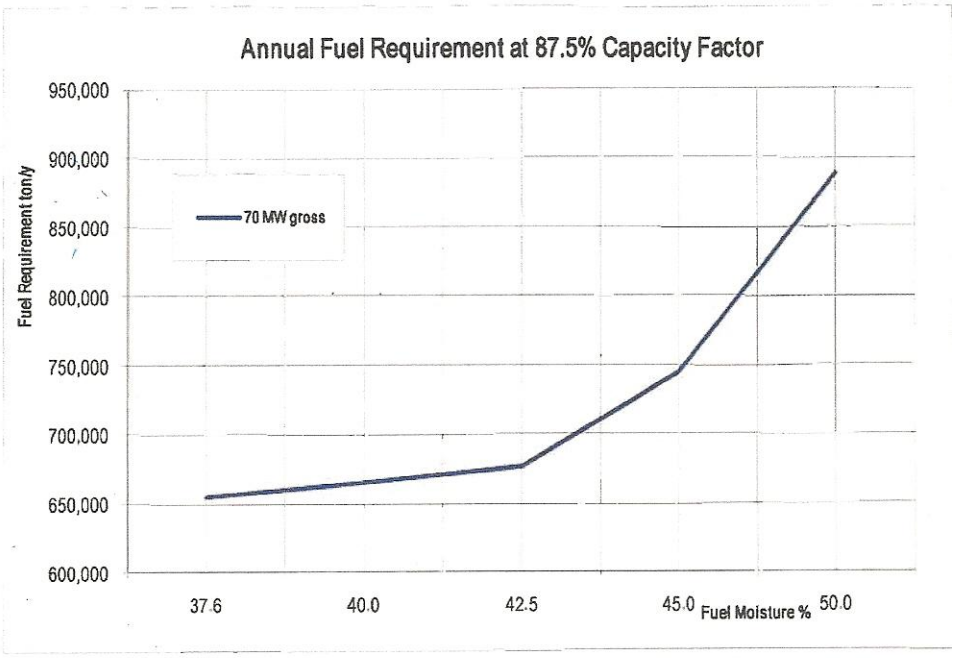
| Fuel Moisture % | Export heat rate Btu/kWh | Annual fuel rqt ton/y at 87.5%CF 70 MW gross |
|---|---|---|
| 37.6 | 14,724 | 654,480 |
| 40.0 | 14,771 | 664,597 |
| 42.5 | 14,818 | 676,333 |
| 45.0 | 15,229 | 744,793 |
| 50.0 | 16,003 | 887,841 |




During the May 5, 2010 Tech Session in Berlin, CPD asked for detailed calculation of Laidlaw's anticipated annual fuel usage, to which the following written response was provided;

> *"If the moisture content of the combusted fuel was 50% than the total weight needed would be approximately 887,841. However, as noted above, that figure is unrealistically high and does not represent expected actual operations. See attached graph showing the corresponding consumption with various moisture content fuels. See Attachment 9".*

From the above graph that is provided by Laidlaw as Attachment 9 we can draw some conclusions;

**#1** At 87.5% capacity given 50% moisture fuel the chart would imply approximately 875,000 tons /year of biomass. Therefore 100% capacity factor would be 1,000,000 tons/year of biomass at 50%MC.

**#2** The above graph is not identified as being supplied by the boiler manufacturer as guaranteed performance ( that would establish it as valid data) therefore the accuracy is based upon assumptions by others.

**#3** The data provided in the graph seems to conflict with data provided in the air permit.

It is interesting that Laidlaw answered a CPD question from the May 5th Tech Session about biomass fuel moisture content by referring to a INRS report that laid out industry averages and rules of thumb in their Attachment #7 – seen below;

**Biomass Fuels**

A number of potential sources of biomass exist in the region, from residue from existing logging jobs to chips from sawmill operations to wood derived from land clearing wood. Each type of biomass fuel has unique characteristics, including moisture content and Btu content (British thermal units, a measure of heat content). Table 3 details the *typical* moisture content and heating value of different fuel types.

**Table 3. Characteristics of Biomass Fuels**

| Fuel | Moisture | BTU/lb | MMBtu/ton |
|---|---|---|---|
| Logging Residues | 45% | 4,625 | 9.25 |
| Sawmill Chips | 45% | 4,625 | 9.25 |
| Pallet Grindings | 20% | 6,600 | 13.2 |
| Secondary Forest Product Residue | 10% | 7,425 | 14.85 |
| Land Clearing | 45% | 4,625 | 9.25 |

As a rule of thumb, it takes about 1.7 green tons of wood (45% moisture content) to make 1 megawatt hour (MWH) of electricity using most existing technologies[ii]. Put differently, each megawatt of installed biomass electricity generation will use roughly 13,000 green tons (45% moisture content) of biomass fuel annually (assumes 90% capacity factor).

The availability of each of these types of wood is described in detail later in the report.

Therefore, using the rule of thumb data provided by Laidlaw which shows that biomass electricity generation consumes roughly 13,000 tons for each megawatt, we must conclude that the 70 MW Laidlaw Berlin Biopower will consume **900,000 +/- tons** of biomass per year.

At 90% Capacity Factor 13,000 tons X 70MW = 910,000 tons/year

At 87.5% Capacity Factor = 884,722 tons/year

Finally, consider that the air permit application for Laidlaw Berlin Biopower shows that their calculations are based on a fuel flow rate of 124.9 tons per hour. Using the 7,603 annual hours that Laidlaw plans to operate the plant that totals an annual consumption of **949,615 tons** of biomass.

The purpose of all the differing ways of looking at Laidlaw project annual fuel consumption is to show that it will be a range of numbers based upon assumptions and math. Clearly Laidlaw has need of implying their consumption will be on the lower end of the range because the analysis of the available resource reveals serious limitations.

The Laidlaw assumption about fuel usage anticipates a considerable amount of down time whereas in reality they will be motivated to run much more than that to maximize annual revenue. A realistic range of the annual biomass supply required for a 70MW facility is 820,000-910,000 tons/year. I believe the SEC needs to be conservative in its assessment about the biomass demand of a 70MW facility and the impacts that it may bring.

## Existing Biomass Use is Understated

**Please Discuss the Laidlaw Analysis of competing use of biomass from within its defined wood basket?**

I would first like to draw attention to the LandVest report that is Appendix P of the Application and start with the Addendum filed on March 10, 2010 more specifically *Table 1. Initial low-grade wood assignment.*

Table 1. Initial low-grade wood assignment

| Plant Name | Type | Consumption (Green Ton) | Radius | Acres in the Study Area | Acres of Each Facility | Geographical Analysis | Wood Assigned |
|---|---|---|---|---|---|---|---|
| Androscoggin Mill | Pulp | 2,000,000 | 125 | 8,810,983 | 16,679,231 | 52.83% | 1,056,521 |
| Madison Paper Industries | Pulp | 400,000 | 50 | 1,364,917 | 4,111,343 | 33.20% | 132,795 |
| Masonite Corp. | Pulp | 100,000 | 50 | 1,692,342 | 2,698,907 | 62.70% | 62,705[1] |
| Newpage Corp. | Pulp | 2,200,000 | 125 | 9,800,165 | 16,864,509 | 58.11% | 1,278,446 |
| Sappi Fine Paper | Pulp | 2,300,000 | 125 | 6,359,931 | 17,042,103 | 37.32% | 858,335 |
| Bridgewater Power | Power plant | 229,000 | 75 | 7,053,629 | 8,377,035 | 84.20% | 192,823 |
| Whitefield Power and Light | Power plant | 187,000 | 50 | 4,077,687 | 4,077,687 | 100.00% | 187,000 |
| Pine Tree Power | Power plant | 230,000 | 75 | 8,109,391 | 8,418,486 | 96.33% | 221,555 |
| Hemphill Power | Power plant | 208,000 | 75 | 6,048,745 | 8,464,339 | 71.46% | 148,640 |
| PSNH Schiller Station | Power plant | 450,000 | 75 | 3,536,302 | 4,336,563 | 81.55% | 183,479 |
| Finch, Pruyn, & Co., Inc. | Pulp | 638,000 | 100 | 3,006,480 | 12,165,734 | 24.71% | 157,667 |
| International Paper Co. | Pulp | 750,000 | 100 | 4,532,595 | 11,899,043 | 38.09% | 71,423 |
| Joseph C. McNeil Station | Power plant | 380,000 | 75 | 2,915,249 | 5,798,031 | 50.28% | 250,000 |
| Ryegate Power Station | Power plant | 260,000 | 75 | 6,934,641 | 7,804,296 | 88.86% | 231,027 |
| Pine Tree -Tamworth | Power plant | 300,000 | 75 | 7,802,191 | 8,014,101 | 97.36% | 292,067 |
| Alexandria - Power | Power plant | 200,000 | 75 | 6,843,218 | 8,365,359 | 81.80% | 163,608 |
| Boralex - Livermore Falls | Power plant | 320,000[2] | 75 | 4,571,587 | 7,885,834 | 57.97% | 185,511 |
| New England Wood Pellet Pellets | Pellet plant | 150,000 | 50 | 1,829,104 | 3,605,944 | 50.72% | 50,000 |
| Boralex – Stratton Power Plant | Power plant | 500,000 | 75 | 3,505,722 | 7,384,441 | 47.47% | 200,000 |
| SAPPI – Westbrook Power Plant | Power plant | 360,000[3] | 75 | 4,174,855 | 5,221,232 | 79.96% | 287,853 |
| Total | | 12,162,000 | | | | | 6,211,456 |

According to the addendum:

**Base Methodology:**

*The primary reason the basic methodology used in our 12114/09 report is being supplemented is that the estimate was a baseline analysis without specific sensitivity to supply economics. Furthermore, this baseline approach simply used nominal circles to describe wood-sheds that we know are shaped by economic considerations. This analysis did not fully account for the Canadian influence on the study area* ***and we have come to recognize that***

> ***several facilities were omitted that draw material from the primary source of supply, i.e. the wood shed.*** *The first step in refining our analysis was to add the three facilities not previously accounted for to our list of the existing facilities that draw wood from the study area. We also have incorporated data from additional timber supply experts that refines our overall estimates on how much wood each competing facility procures from the study area. Good examples of the importance of this refinement are that Schiller Station's wood-shed draws a disproportionate share of its fiber needs from areas to the south of its Portsmouth location, and conversely McNeil Station draws considerably more of its fiber from our study area than our nominal circle methodology would estimate.* ***The result of these changes is reflected on Table 1 (below), which lists the competing facilities and the consumption data necessary to run the competitive consumption model.***

At the 5/5/2010 Tech Session the LandVest representative confirmed that the column entitled Consumption (Green Ton) was the total amount consumed by the identified competing facility and the column entitled Geographical Analysis is the percentage of the total that is overlapping use, such that the Consumption multiplied by the Geographical percentage of utilization determines the amount of wood fuel assigned the competing facility that is derived from the identified wood basket.

Now I would like to identify five very significant math errors in Table 1 that substantially change the total amount of wood assigned to the existing facilities.

PSNH Schiller Station at 450,000 tons X 81.55% = 366,975 tons assigned for an **increase of 183, 496 tons.**

International Paper Company at 750,000 tons X 38.09% = 285,675 tons assigned for an **increase of 214,252 tons**.

Joseph C. McNeil Station at 380,000 tons X 50.28% = 191,064 tons assigned for a **decrease of 58,936 tons**.

New England Wood Pellet at 150,000 tons X 50.72% = 76,080 tons assigned for an **increase of 26,080 tons**.

Boralex – Stratton Power Plant at 500,000 tons X 47.47% = 237,350 tons assigned for an **increase of 37,350 tons**.

The net effect of these five math errors is that the 6,211,456 tons of wood assigned to the 20 existing competing users listed in Table 1 was in error by 402,242 tons such that

**the total amount assigned to users in that table should increase to 6,613,698 tons**.

Beyond these simple math errors there appears to be errors in some of the Consumption (Green Ton) data that would also impact the credibility of this table. Both the Schiller and Mc Neil plant are 50MW units and some degree of logic would then argue that both of them would be in the range of 550,000 ton /year range for fuel consumption. In fact, PSNH Schiller plant has a formal annual filing of wood usage that they do with New Hampshire Timberland Owners Association (NHTOA), and in their most recent filing of 1/4/10 stated that their total number of tons received within the 12 month period of 2009 was 533,721.34 tons, an increase of 83,721 tons over the amount reflected in the table.

The Mc Neal station is a utility owned and dispatched unit, and as such may have significant time off line in any given year related to the need for its capacity. It is very possible that the number in Table 1 was correct for a specific year of operation, however it must be understood that in some years the production at Mc Neal could be significantly more.

Clearly accurate potential consumption numbers for Schiller and McNeil would have the effect of raising the wood basket amount assigned by approximately another 200,000 tons such that existing users would more accurately account for **6,800,000 tons** of what is available.

Table 2 of the LandVest report takes credit for a very substantial reduction in the calculation of biomass committed to existing facilities. Through a technique that involves considerable arbitrary assumption and use of an undefined modeling process, the consultant comes up with a conclusion that has not been subjected to any peer review as to the assumptions utilized, the appropriateness of the model for the purpose intended or the interpretation of the results. Yet we are asked to accept the conclusion that this analysis is sufficiently correct that we should assume that the existing facilities will use 338,086 less tons of biomass fuel from the defined wood basket than what the

initial calculation implied. If we accept the LandVest modeling then the usage based upon the above information will now be at; 6,800,000 - 338,086 = **6,461,914 tons** used by others.

Yet when LandVest addressed the issue of overlapping demands for biomass in their "Timber Supply Study for the North Country of New Hampshire", performed for the state, they noted that:

> *Overlapping areas translate to intense competition, so our assumption was that a wood using facility located in Coos County would be at a distinct competitive disadvantage.*

The truth of the matter is that the analysis completed to date is still significantly incomplete in that the following additional existing users of biomass from within the identified wood basket have not yet been figured into the analysis;

Appendix P, page 17, table 6 contains a listing of other users of low-grade wood in the 100-mile radius, *or that are outside this radius but draw substantially from it (i.e. International Paper Company – Ticonderoga, NY and Finch, Pruyn & Co – Glens Falls, NY)*.

This list, even as refined with LandVest's addendum of March 10, is not complete.

a. Maine Wood Pellets, Athens, ME estimated at 140,000 green tons round wood is not included.

b.

c. Verso pulp mill, Bucksport, ME estimated at 900,000 green tons round wood is not included

d.

e. Corinth Wood Pellets, Corinth, ME estimated at 200,000 green tons round wood is not included

f.

g. Domtar's pulp mill in Windsor, Quebec estimated at 2.2 million green tons round wood is not included

h.

i. Greenville Steam, Greenville, ME estimated at 250,000 green tons is not included

j.

k. Old Town Fiber & Fuel, Old Town, ME estimated at 900,000 green tons is not included

l.

Tafisa's particleboard plant in Lac Megantic, Quebec estimated at 900,000 tons, (including some C&D derived wood) is not included.

These consumers, totaling 5,490,000 tons of biomass annually also draw from the specified wood basket. If the committee were to assume that these businesses acquire only 10% of their fiber from within the wood basket, that means that an additional 549,000 tons must be added to our total. Leading us to a grand total for existing consumption of **7,010,914 tons** annually.

Beyond our concern for larger existing employers and users of biomass that lie within the defined wood basket or draw from the defined wood basket, the SEC must give thoughtful consideration to the many smaller industrial and municipal users of biomass as well as the numerous alternative proposals of various types that would also depend upon this same resource. Even those homeowners who depend upon firewood for winter heating may be substantially harmed in a biomass market so overburdened by demand that exceeds local supply.

The Wilderness Society brings much of this to our attention on pages 4-9 of their March 2, 2010 comments to the SEC on the Laidlaw project.

**What is the overlapping utilization of these seven facilities that must be considered?**

The serious issue that the applicant has not adequately studied or addressed is an accurate representation of the present utilization of low grade biomass fiber from within the defined wood basket that will be available for its use? Or conversely the amount that is presently utilized by established industry. To insure the orderly development of the region, it would be appropriate for the SEC to request that the applicant address these concerns or more appropriately require that the applicant fund an independent study to do an unbiased third party analysis.

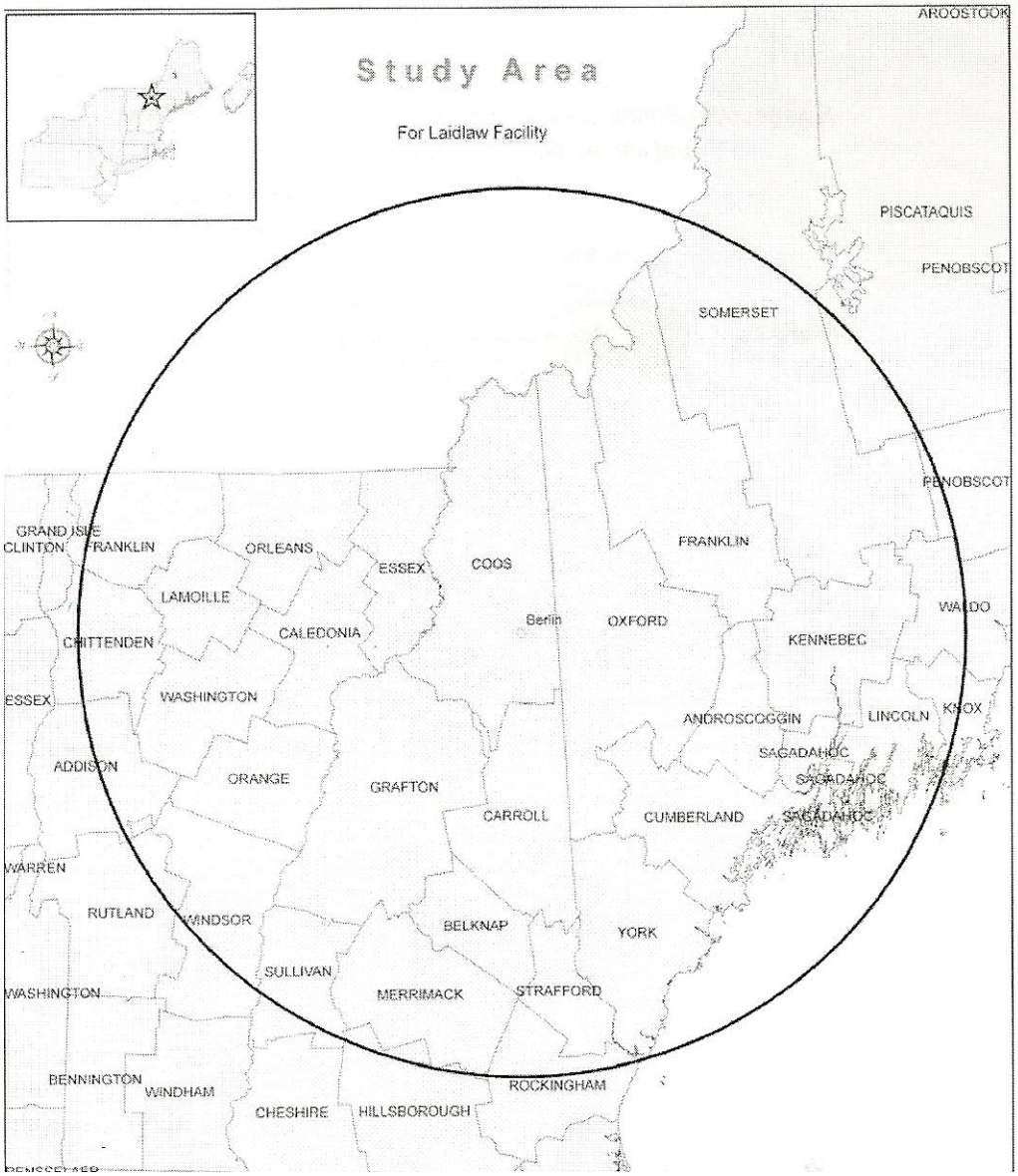
## Misleading Description of Wood Basket

**Please discuss the resource area within the Laidlaw defined wood basket?**

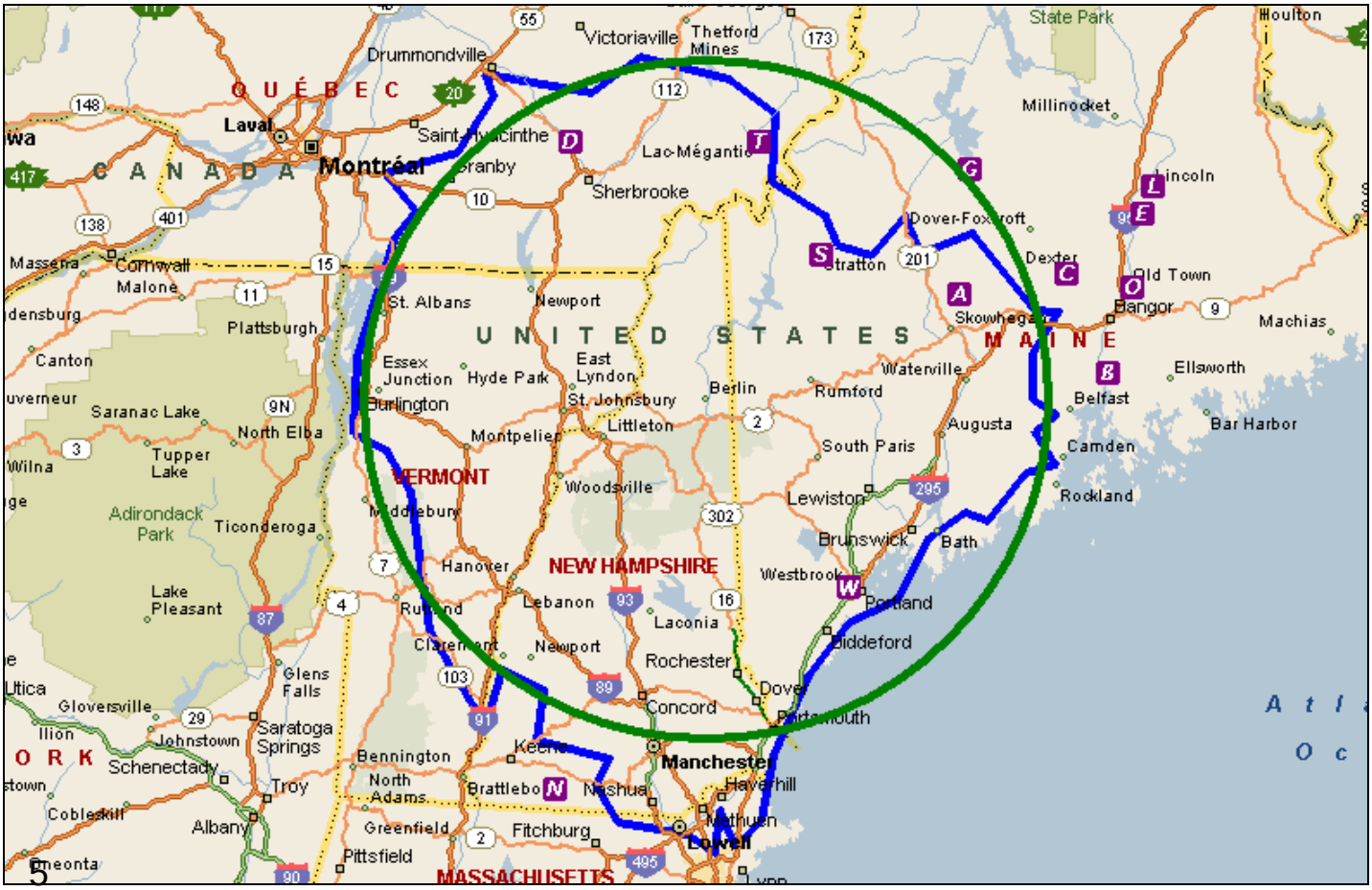
The LandVest Biomass Supply Study area is described on page 5 of Appendix P within the Laidlaw application;

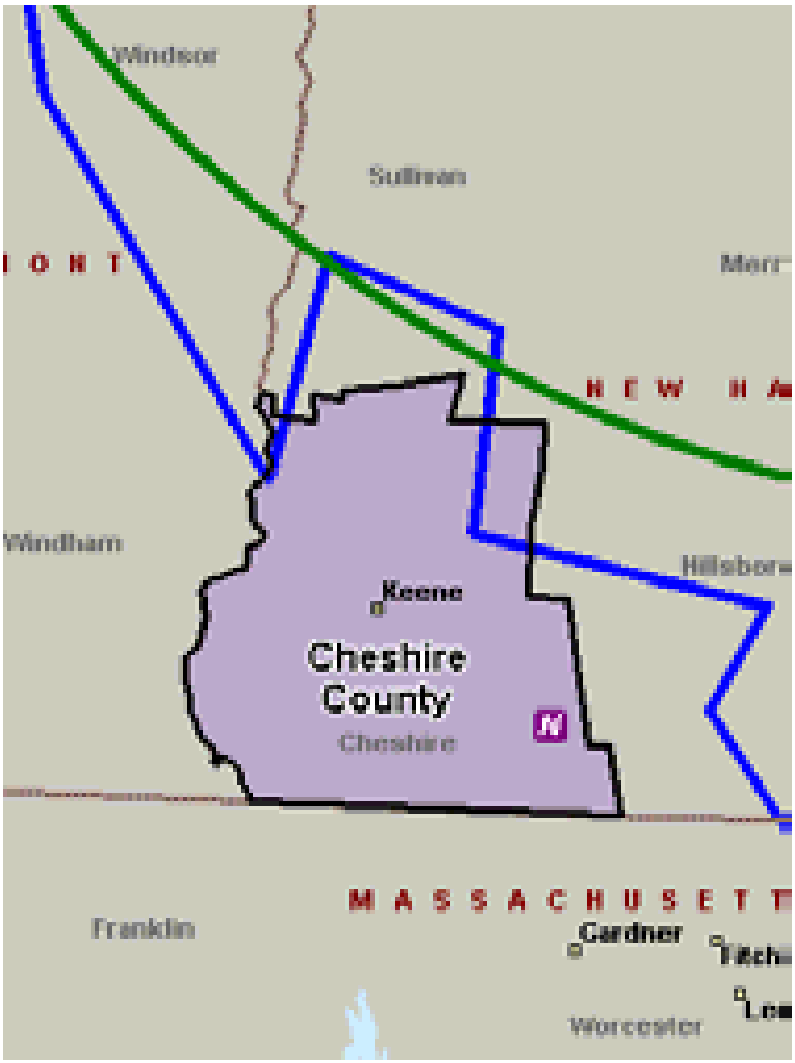
> *In order to ascertain the feasible reach of the Laidlaw facility, a Primary Source of Supply ("Wood Basket") was defined, based upon the size of the facility and projected annual consumption of up to 750,000 tons per year, to be a three-hour drive polygon approximately 100-mile radius centered at Berlin (Figure 1). Further refinement defined the area to only include whole counties due to availability of harvest data. The LandVest 2008 wood supply study noted that there are several wood using facilities situated in the five counties (i.e., Oxford, Franklin, Androscoggin, Cumberland and York) of southwestern Maine, therefore this analysis did not project any wood travelling through them from beyond. Portions of counties were not included, so there are some counties where a small proportion of land could have been included and others where a small proportion should have been excluded. Thus, the study area has been determined to be the following counties covering a three state area: (Figure 1). The wood basket includes (a). All of New Hampshire; (b). Essex, Caledonia, Washington, Orange, Orleans, Washington, Chittenden, Franklin and Windsor Counties, Vermont; and (c). Androscoggin, Cumberland, Franklin, Oxford, and York Counties, Maine (Figure 1). Overall, the study area covers approximately 10,757,208 timberland acres.*

The problem here is that the study area is described as a 100 mile radius or a 3 hour drive time from Berlin whereas it also clarifies that it uses whole county data for analysis that includes all of New Hampshire. Does this mean the study includes all the available fiber in Rockingham, Hillsborough and Cheshire Counties? If we are to assume that the 100 mile radius and 3 hour drive time are correct, then it needs to be determined that resources outside that definition are not counted.


Study Area
For Laidlaw Facility
AROOSTOOK
PISCATAQUIS
PENOBSCOT
SOMERSET
PENOBSCOT
GRAND ISLE
CLINTON
FRANKLIN
ORLEANS
ESSEX
COOS
FRANKLIN
LAMOILLE
CALEDONIA
Berlin
OXFORD
WALDO
CHITTENDEN
KENNEBEC
ESSEX
WASHINGTON
ANDROSCOGGIN
LINCOLN
KNOX
SAGADAHOC
ADDISON
ORANGE
GRAFTON
SAGADAHOC
CARROLL
CUMBERLAND
SAGADAHOC
WARREN
RUTLAND
WINDSOR
BELKNAP
YORK
SULLIVAN
WASHINGTON
MERRIMACK
STRAFFORD
BENNINGTON
WINDHAM
ROCKINGHAM
CHESHIRE
HILLSBOROUGH

Below is a map identifying the 100 mile radius in green and the 3 hour drive time colored in blue.






Cheshire County, in southwestern New Hampshire, is inappropriately included as part of the study area. This is an area rich in forest resources with a very strong growth to harvest ratio. However, its inclusion as part of this supply analysis is not clearly justified – the authors note that they use a 180 minute drive time, and a proxy 100 mile radius from Berlin. As shown in the figure above, none of Cheshire County is within a 100-mile radius of Berlin (green line), and very little is within the 180-minute drive time (blue line).

Given the criteria that LandVest indicated for inclusion of counties, it is clear that any volume of biomass assumed to be available from Cheshire County should be removed from their assessment of the wood basket. Likewise the amounts of biomass that LandVest assumes from Hillsborough and Rockingham are also suspect.

## Improper Assumptions about Utilization

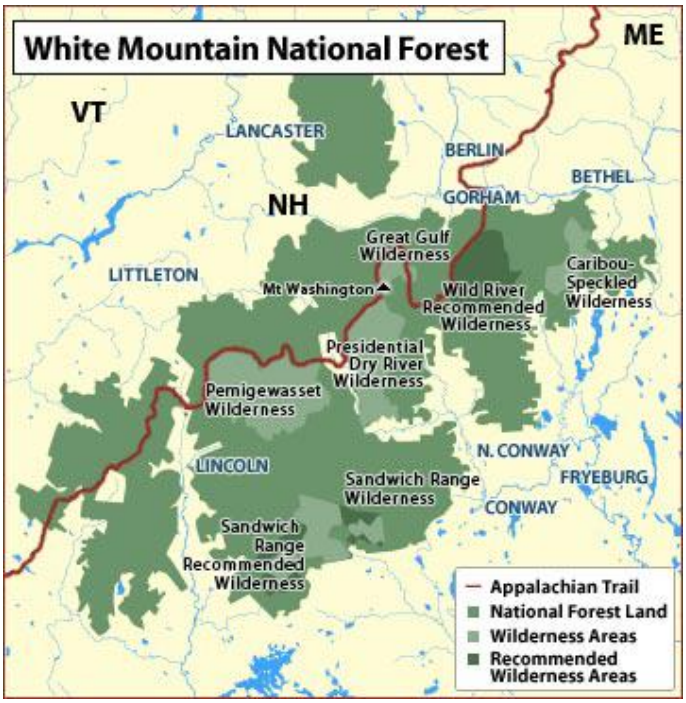
There are concerns that the LandVest study identifies or implies that Federal land is available as a significant source for its supply. It is identified in Table 2, Figure 2, and on page 9 of Appendix P. All the harvesters of biomass have long term knowledge that Federal land is at best a very intermittent and unreliable supply of biomass. LandVest acknowledged this in their 2008 study when they stated:

> *The federal timberland does not supply a lot of timber due to its multiple uses, such as recreation, eater and wildlife protection – the harvest has declined significantly from the White Mountain National Forest since 1995 (Figure 5). In recent years, the WMNF harvest has averaged about 75,000 green tons per year and there is no particular reason to expect that to change.*

A review of Figure 5 on page 11 of that document shows that the 75,000 green tons is an anticipated total harvest from the WMNF, with slightly less than half of that being saw timber. Thus, using the LandVest data, one must conclude that no more than perhaps 40,000 tons of low grade biomass might be obtained from the WMNF in the future.

The White Mountain National Forest, as well as other public land, is within the wood basket that Laidlaw plans to access (and the WMNF borders Berlin significantly to the south and east). The more recent LandVest study appears to treat the “timberland” portion of this ownership as commercial timberland, with the potential to harvest at close-to growth levels on timberland, and to secure tops and branches (residue) as part of these harvests. National Forest harvest levels are set according to a forest management plan, and are well below the levels of growth on these lands. Further, recent practice on WMNF timber sales has been to not allow the removal of tops and branches, significantly diminishing the volume of available biomass from a harvest. It appears that the availability of wood fuel from the WMNF – an important piece of land for any project in Berlin – is significantly over-estimated. Our consultant Eric Kingsley of INRS recently had a telephone conversation with Wayne Millen of the White Mountain National Forest and who is the Forestry Program Manager and Timber Sale Contracting

Officer. Mr. Millen confirmed that there have been no sales of biomass chips (tops, branches, etc) from WMNF within the last two years. Additionally, it appears that the US legislature is now moving to define renewable biomass. In the Senate Bill sponsored by Senators Baucus,Tester, and Crapo, it is noted that they specifically do not allow harvesting from federal wilderness and roadless areas, national monuments, old-growth timber stands or other areas recognized for conservation. That would seem to exclude much of the White Mt. National Forest . . . which Laidlaw is including in their calculations. The Senate Bill also seems to exclude biomass from final harvesting operations in conjunction with development, as that material would not be available on a recurring basis.




Similarly, on many of the lands formerly held by paper companies (and now in the hands of private investment groups), fiber supply agreements dictate / influence / restrict where wood from these lands can be sent. This is particularly true for timberland in Franklin and Oxford Counties, Maine. Much of this wood is destined for facilities in Rumford, Skowhegan and Jay, Maine; it may be contractually unavailable for a biomass facility in Berlin. It does not appear that this was factored into the supply analysis. Lands now held by Wagner [former Mead Westvaco], GMO [former International Paper] and

Plum Creek [former SAPPI] have some level of restriction on them, the details of which are not public.

Clearly the definition of the wood basket needs further clarification and the volume of biomass that would be available on a sustainable basis within the identified wood basket needs to be vetted by a qualified and independent third party if the SEC is to exercise its environmental stewardship role and also assure an orderly development of the region. We must not forget that the Canadian-based Fraser Papers bought the Berlin and Gorham mills in 2002 but subsequently ran into supply and price problems related to biomass. The consequences of being too aggressive related to available biomass and pricing can be very damaging to the regional economy.

LandVest and Laidlaw seem to imply in their conclusions and testimony that whatever the actual volume required or whatever the volume available in the wood basket "that it appears to be entirely feasible that significant additional volume is sustainably available in a more competitive market" This can only mean that Laidlaw assumed they will have significant competitive advantage to take biomass supply away from other users. On May 7, 2010 Laidlaw removed the following statement related to a contemplated PSNH Power Purchase Agreement wherever it appeared in the filing:

> *As a hedge against rising fuel prices, the energy price will be adjusted based on the Project's cost of biomass fuel pursuant to the terms of the PPA*

Which was replaced with

> *The Project will have incentive to acquire fuel at competitive prices.*

If we are now to assume that the eventual PPA will not give Laidlaw a competitive advantage or hedge against fuel price increases due to lack of supply, increased cost of delivery or competition, it is now much more critical that approval of a Laidlaw project be based upon accurate analysis and assessment of fuel supply and pricing.

**Please discuss other issues related to resource area or anticipated utilization by Laidlaw?**

The Wilderness Society comments on pages 1- 4 of their April 2, 2010 comments on the Laidlaw Biopower Application bring to light numerous other issues and concerns:

> *"Our assessment indicates that the available supply is overestimated and the competing demands underestimated."*

**Please discuss the issue of utilization as it applies to the LandVest summary and conclusions, as noted below.**

> *The findings of this study conclude that assuming current demand for low-grade biomass remains constant at 6 million tons per year, the defined Primary Source of Supply (Wood Basket) has the capability to generate an additional 710,000 tons per year on a sustained basis. A key element in this study is the estimate that biomass utilization has been at about 50% of what is available. We believe that if there is a solid, consistent demand for biomass and pricing that is attractive, more could be utilized.* ***To estimate how much more we looked at recommendations developed by the Forest Guild, and implemented in, a number of states that suggest removal of up to 70% would not have a detrimental effect on the forest health.*** *If this 70% figure were used the available biomass in this study area would be up to 1.2 million tons.*

LandVest assumes a substantial increase in the amount of biomass available from within its defined wood basket based upon the contention that a more competitive market (their assumed ability to pay more) will increase the percentage of utilization from the historical norm of 50% to a more aggressive 70% and further that this will not be detrimental to long term health of the forests. Supposedly this is recommended or suggested by the Forest Guild and drawn from the Guild's January 2009 Assessment of Biomass Harvesting Guidelines authored by Evans and Perschel. This is what Mr. Bob Perschel wrote in his e-mail to Eric Kinsley on 12/21/2009 when questioned about the LandVest assertion;

**From:** Bob Perschel [bob.perschel@verizon.net]
**Sent:** Monday, December 21, 2009 7:47 PM
**To:** Eric Kingsley
**Subject:** Re: Forest Guild Biomass Harvesting Recommendations

Hi Eric:

Our Assessment reported on what others may have done to set biomass standards - the Forest Guild has no current recommendations published. The quote stretches our report by using the word "suggested". We are not standing behind any of those figures - just reporting- maybe someone would interpret that as "suggesting".

The same two authors, Evans and Perschel, that wrote the Forest Guild Assessment of Biomass Harvesting Guidelines improperly interpreted in the Laidlaw application Appendix P, also wrote an article in the Northern Woodlands magazine winter of 2008 issue entitled An Appreciation of Debris – The Science and Changing Perceptions of Dead Trees. This article is about the numerous and varied benefits of leaving significant biomass behind in a forest harvest. The article ponders the appropriate balance as expressed in this quote from page 47 of the magazine article;

> *"So the forest policy discussion of woody debris has become increasingly complex. On the one hand, optimizing the utilization of wood – a naturally renewable resource – can help replace our reliance on foreign oil and can be a substitute for oil and other fossil fuels, thus helping to combat global climate change. On the other hand, as the allure of using woody biomass for energy increases, the removal of additional biomass raises questions about how much wood can be taken from a forest before the forest suffers negative consequences."*

**What does Laidlaws Own Data Show?**

Finally, a review of the base data provided by Laidlaw in Appendix P of the application reveals issues of concern regarding growth and removal data. Table 3 (page 9) in that appendix which is labeled as showing that growth exceeds removal. It then provides a 2002-2006 analysis of the FIA data, which ostensibly substantiates that net annual growth exceeds removals.

A careful review of the FIA data provided, in fact, reveals that annual growth in the wood basket exceeded removals, but by a mere 92,907 tons per year. Roundwood growth, which includes both sawtimber and pulpwood, when combined with the tops and branches, totaled 11,643,304 tons. While removals totaled 11,550,397 tons. Thereby showing that careful analysis of the data provided by the applicant continues to reveal issues, inconsistencies and facts that raise serious issues with their proposed project.

**Please express your concern related to the diminishing resource base?**

There are many environmental and sustainability concerns as well as practical issues

related to an ability to garner higher utilization of biomass from forest harvesting. If we are to consider even momentarily the concept that perhaps there might someday be harvest equipment and policies or approved practices to allow increased yield from the working forests, then certainly we should be giving full consideration to the declining resource base that is happening now and of more concern than a hypothetical improved utilization. The wood basket defined by LandVest for the Laidlaw project is not static. Not only is the forest land base declining but access is also on the decline as more parcels are resold or reclassified and no longer subject to the same degree of harvest. Consider the following article that appeared in many New England newspapers including the May 20, 2010 issue of the Berlin Daily Sun:

> *BOSTON (AP) — After more than 150 years of natural regrowth, forest cover is declining across all six New England states, threatening the region's landscape and chipping away at a natural buffer against global warming, according to a study released Tuesday by Harvard University's laboratory for ecological research.*
>
> *The study by Harvard Forest found that New England forests, having grown back after a spate of land clearings by European settlers, have come under increasing pressure from a new wave of commercial development, industrial use and invasive species.*
>
> *Less than 20 percent of New England's 33 million acres of trees, waters and wetlands are permanently protected from development.*
>
> *David Foster, director of the Harvard Forest program, said that the turning point for New England forests came about 20 years ago when the area once again began to lose forest cover.*
>
> *That shift has happened more rapidly in densely populated southern New England states, but even more sparsely populated Vermont and Maine — particularly southern Maine— have seen troubling signs, he said.*
>
> *"The trend is now downward in all of the states," he said. "There is great pressure on both forest and farm land."*
>
> *In Massachusetts, he said, forest cover is down to just 60 percent of the land, with conservation efforts in a race against new development. He said an ambitious goal would be retain 50 percent of the state's forest land.*
>
> *According to the report, there are three New England regions most threatened with loss of forest cover.*

*They include a band reaching from Rhode Island and Connecticut to coastal Maine that is vulnerable to dense development and sprawl; an area in central New England subject to increasing suburbanization; and a northern tier where rapid turnover in ownership could lead to more fragmented management.*

*The report makes a series of recommendations, including long-term conservation efforts to protect at least 70 percent of the region, or 30 million acres, as forest land permanently free of development.*

*The authors of the report say that the bulk of that — about 23 million acres — should be deemed "managed woodlands" that can be used for nature tourism and recreation, while providing critical habitats for plants and animals.*

*The remaining 7 million acres should be designated "wildland reserves" largely free of human intrusion.*

*The forest cover wouldn't be evenly distributed across the region.*

*In the south, only half the land may remain forested while large regions in northern Maine, New Hampshire and Vermont could remain up to 90 or 100 percent forested.*

## Concern for Electric Rate Payers

**Do you have any other specific biomass supply concerns that should be mentioned?**

Yes, as can be seen from the map of the defined wood basket the 100 mile radius and the 3 hour drive time both extend south and west of the PSNH Schiller biomass project. It appears from the LandVest study that Laidlaw intends to gain considerable supply outside that zone from Rockingham, Hillsborough and Cheshire counties. Clearly the Laidlaw project will be in direct competition with the PSNH Schiller biomass facility for biomass fuel supply. This competition will drive the price up for both facilities. Clearly any fuel price increase realized will be felt by the PSNH ratepayer as PSNH goes before the NH PUC for rate or fuel cost recovery. This issue would be greatly amplified if PSNH is the buyer of Laidlaw output and has fuel adjustment obligations for that facility also.

The SEC needs to gain a thorough understanding as to just what is at stake here. I suggest that a qualified and independent third party needs to study this situation to ascertain that an unnecessary and unjustified burden is not placed upon New

Hampshire electric rate payers. Perhaps this aspect should be undertaken by the PUC Office of Consumer Advocate.

## Carbon Neutrality

**Please explain your concern about carbon neutrality as it applies to the Laidlaw project**

Energy produced from fossil fuels removes carbon from permanent geological storage and adds to the carbon load on the ambient atmosphere. The basic tenant of renewable fuels being carbon neutral is predicated upon the assertion that the carbon released from renewable sources (trees and plants) is circulating between the atmosphere and the biosphere. This further assumes that this circulation is in balance. Certainly it would not be acceptable to burn all the earth's plant life and claim carbon neutrality with an atmosphere overloaded with CO2 and particulate matter while the earth was stripped of vegetation. The balance required necessitates that consumption rate of vegetation as biomass for fuel, not exceed the rate of re-growth and carbon sequestration from the working supply source. This balance between consumption involving the release of stored carbon and equal sequestration of atmospheric carbon in new growth is critical to the overall process being considered carbon neutral. Additionally the fossil fuel utilization in the procurement process is most important as different biomass energy facilities will vary in their quantity of fossil fuels consumed and therefore be carbon neutral to a greater or lesser degree. The higher the percentage of fossil fuels utilized in the harvest and delivery of biomass fuel the less carbon neutral the overall process is in reality. The utilization of fossil fuels in the process is often blended into the larger discussion of carbon footprint but that is a much more thorough analysis that includes many other significant issues such as overall plant efficiency and recapture of otherwise wasted energy. The reality is that biomass energy is carbon neutral to a greater or lesser extent inversely proportional to the distance over which the fuel must be transported and correlated with the amount of fossil/diesel fuel consumed. Because of the 100 mile fuel supply radius associated with the Laidlaw project, it will be carbon neutral to a much lesser extent than multiple smaller facilities more decentralized and

more intimate to their immediate regional fuel supply. I am particularly concerned as to overly large biomass energy project proposals as it is this approach that is causing considerable concern in the environmental community with a back lash that may negatively affect the entire industry and more specifically the status of biomass energy within the various Renewable Portfolio Standards of the various states. I wish to refer to a memo sent to CPD on December 8, 2009 by our consultant INRS;

> ***Suspension of New Biomass Participation in Massachusetts RPS.*** *On December 3 MA Department of Energy Resources (DOER) issued a letter suspending all consideration of new biomass for participation in the MA RPS. Fueled in large part by opposition to new biomass facilities proposed for Western Massachusetts,* ***MA DOER has initiated a third-party study to evaluate the sustainability and carbon neutrality of biomass power generation. This project is looking specifically at forest management as it relates to biomass collection, as well as a life-cycle analysis of the carbon inputs to biomass growth, harvesting, transport and combustion.*** *This study, led by the Manomet Center for Conservation Sciences (with support from the Forest Guild, Biomass Energy Resource Center, the Pinchot Institute and others) is expected to be completed in six months, and rules coming out of it completed in about a year. It is entirely possible that this effort will result in new restrictions on or accounting processes for biomass fuel at plants participating in the MA RPS – both proposed facilities and exiting participants****. Further, this may cause other states to consider similar actions for their RPS programs.***
>
> emphasis added

There is considerable concern expressed by The Wilderness Society on pages 9-12 of their April 2, 2010 comments submitted to the SEC (http://www.nhsec.nh.gov/2009-02/documents/100402wilderness_ltr.pdf ) related to the this projects carbon profile and impacts. Among other issues they bring up electricity line losses on the way to the final customer. This brings into focus the need and rational for smaller, more efficient, and decentralized projects. Not only is Laidlaw proposing to bring low Btu fuel in from great distances that would lock in a terribly unattractive carbon foot print but the power generated far exceeds what can be utilized in the region thus requiring considerable line loss to transport that power to end users. This is a very poor, wasteful and inefficient way for our country or state to use up a finite renewable resource if our goal is to become more energy independent and make progress on climate issues.

# Price Sensitivity Related to Long Distance Delivery

**Please explain your economic concern related to biomass fuel price sensitivity related to long distance delivery**

Clearly the cost of biomass fuel delivered has a component of diesel fuel cost that is expended in the forest harvesting activity as well as the transportation of the biomass from forest to the energy facility. The greater the distance the more diesel fuel consumed per ton of fuel delivered. The greater the distance the poorer the utilization of all cost associated with the truck and driver and therefore the higher the cost of delivered fuel per ton. This concern relates to both the volatile history of diesel fuel pricing as well as the increased risk associated with longer distance delivery. Today the diesel price is about $3.00/gallon whereas it was above $4.00/ gallon most of 2008 and peaked at around $4.76/gallon during July of 2008. Historical pricing of diesel in the New England region is available from the US Energy Information Administration website; http://tonto.eia.doe.gov/oog/info/wohdp/diesel.asp

**What method do you utilize to analyze all the variables related to biomass fuel supply?**

I utilize a proprietary model developed by INRS that makes all the appropriate calculations when the variables are provided. Below is a series of printouts the first being for a biomass project that draws from a 30 mile radius wood basket and with an assumed 20 mile average one way delivery trip. The second printout is for a project with a 100 mile radius wood basket and an assumed 70 mile average one way delivery trip. Both models assume diesel fuel at $3.00/gallon, a 27 ton load of wet chips, average road speed of 40mph, a cost for truck and driver at $55/hour, and a turn-around time at the energy facility to get weighed and dumped of 20 minutes. The bottom line of the printouts is the sum cost calculation for use of tractor and trailer plus driver and all cost

of diesel fuel for harvest in the woods plus transportation. For the purpose of this analysis, I will assume that all other cost including stumpage and profit or base cost is $20/ton.

**Diesel per green ton, delivered - estimator**

| | | | |
|---|---|---|---|
| Miles (one way) | | 20 | variable |
| Diesel ($ / gallon) | $ | 3.00 | variable |
| Tons per Load (tons) | | 27 | varibale |
| Road Gallons | | 8.9 | calculation |
| Road Diesel Cost | $ | 26.67 | calculation |
| Road Diesel $ / ton | $ | 0.99 | calculation |
| Chipping ($/ton) | $ | 1.26 | calculation |
| Landing costs ($/ton) | $ | 0.75 | calculation |
| In-woods ($/ton) | $ | 1.80 | calculation |
| Total Woods Cost ($/ton) | $ | 3.81 | calculation |
| Total Cost ($/ton) | $ | 4.80 | estimate |
| Total Diesel (gallon/ton) | | 1.60 | estimate |
| Average Truck Speed (mph) | | 40 | variable |
| Turn-around Time (minutes) | | 20 | variable |
| Round Trip Miles | | 40 | calculation |
| Round Trip Minutes | | 80 | calculation |
| Round Trip Hours | | 1.33 | calculation |
| Trucking Cost (truck and driver, $/ton) | $ | 3.95 | calculation |
| Total trucking and diesel ($/ton) | $ | 8.75 | estimate |

**Diesel per green ton, delivered - estimator**

| | | | |
|---|---|---|---|
| Miles (one way) | | 70 | variable |
| Diesel ($ / gallon) | $ | 3.00 | variable |
| Tons per Load (tons) | | 27 | varibale |
| Road Gallons | | 31.1 | calculation |
| Road Diesel Cost | $ | 93.33 | calculation |
| Road Diesel $ / ton | $ | 3.46 | calculation |
| Chipping ($/ton) | $ | 1.26 | calculation |
| Landing costs ($/ton) | $ | 0.75 | calculation |
| In-woods ($/ton) | $ | 1.80 | calculation |
| Total Woods Cost ($/ton) | $ | 3.81 | calculation |
| Total Cost ($/ton) | $ | 7.27 | estimate |
| Total Diesel (gallon/ton) | | 2.42 | estimate |
| Average Truck Speed (mph) | | 40 | variable |
| Turn-around Time (minutes) | | 20 | variable |
| Round Trip Miles | | 140 | calculation |
| Round Trip Minutes | | 230 | calculation |
| Round Trip Hours | | 3.83 | calculation |
| Trucking Cost (truck and driver, $/ton) | $ | 11.36 | calculation |
| Total trucking and diesel ($/ton) | $ | 18.62 | estimate |

The smaller project with the 30 mile radius will average fuel delivered at;
$20.00 + $8.75 = 28.75/ton

It should be noted that this equates to $.04025/Kwh gross production or $.04675 net output for fuel alone plus $.02/Kwh for other variable cost of production such as labor and materials, therefore $.06675/Kwh total cost of production before markup for debt service and profit.

The larger project with the 100 mile radius will average fuel delivered at; $20.00 + $18.62 = $38.62 or 1.34 times more expensive.

In this case, the longer distance equates to $.05503/Kwh gross production or $.06053 net production for fuel alone plus$.02/Kwh for other variable cost of production therefore $.08053/Kwh total cost of production before markup for debt service and profit.

Now let's take a look at the same two projects when the price of diesel returns to the historical high of $4.76/gallon.

**Diesel per green ton, delivered - estimator**

| | | | |
|---|---|---|---|
| Miles (one way) | | 20 | variable |
| Diesel ($ / gallon) | $ | 4.76 | variable |
| Tons per Load (tons) | | 27 | varibale |
| Road Gallons | | 8.9 | calculation |
| Road Diesel Cost | $ | 42.31 | calculation |
| Road Diesel $ / ton | $ | 1.57 | calculation |
| Chipping ($/ton) | $ | 2.00 | calculation |
| Landing costs ($/ton) | $ | 1.19 | calculation |
| In-woods ($/ton) | $ | 2.86 | calculation |
| Total Woods Cost ($/ton) | $ | 6.05 | calculation |
| Total Cost ($/ton) | $ | 7.61 | estimate |
| Total Diesel (gallon/ton) | | 1.60 | estimate |
| Average Truck Speed (mph) | | 40 | variable |
| Turn-around Time (minutes) | | 20 | variable |
| Round Trip Miles | | 40 | calculation |
| Round Trip Minutes | | 80 | calculation |
| Round Trip Hours | | 1.33 | calculation |
| Trucking Cost (truck and driver, $/ton) | $ | 3.95 | calculation |
| Total trucking and diesel ($/ton) | $ | 11.56 | estimate |

**Diesel per green ton, delivered - estimator**

| | | | |
|---|---|---|---|
| Miles (one way) | | 70 | variable |
| Diesel ($ / gallon) | $ | 4.76 | variable |
| Tons per Load (tons) | | 27 | varibale |
| Road Gallons | | 31.1 | calculation |
| Road Diesel Cost | $ | 148.09 | calculation |
| Road Diesel $ / ton | $ | 5.48 | calculation |
| Chipping ($/ton) | $ | 2.00 | calculation |
| Landing costs ($/ton) | $ | 1.19 | calculation |
| In-woods ($/ton) | $ | 2.86 | calculation |
| Total Woods Cost ($/ton) | $ | 6.05 | calculation |
| Total Cost ($/ton) | $ | 11.53 | estimate |
| Total Diesel (gallon/ton) | | 2.42 | estimate |
| Average Truck Speed (mph) | | 40 | variable |
| Turn-around Time (minutes) | | 20 | variable |
| Round Trip Miles | | 140 | calculation |
| Round Trip Minutes | | 230 | calculation |
| Round Trip Hours | | 3.83 | calculation |
| Trucking Cost (truck and driver, $/ton) | $ | 11.36 | calculation |
| Total trucking and diesel ($/ton) | $ | 22.89 | estimate |

The smaller project with the 30 mile radius wood basket will experience: $20.00 + $11.56 = $31.56/ton delivered average annual price.

In this example the cost of delivery equates to $.04497/Kwh gross or $.04947/Kwh net plus balance of production cost so that total cost is $.06947/Kwh before markup for debt service and profit.

The larger project with the 100 mile wood basket will experience: $20.00 + $22.89 = $44.89/ton delivered average annual price.

With the longer distance the cost impact of delivery equates to $.06397/Kwh gross or $.07037/Kwh net output plus balance of variable cost to $.09037/Kwh before markup for debt service and profit.

Included within the 100 mile radius wood basket for the Laidlaw project in Berlin, would be biomass to be harvested and delivered from the town of Royalton, Vermont. Deliveries from Royalton will entail 120 road miles for the one way trip. At $3.00/gallon for fuel that will be biomass delivered at $48.20/ton and at the higher diesel price of $4.76/gallon the delivered price would be $54.21/ton.

This equates to $.07725/Kwh gross output or $.08498/Kwh net output just for the fuel cost plus balance of variable cost to $.10498/Kwh before markup for debt service and profit.

**Diesel per green ton, delivered - estimator**

| | | |
|---|---|---|
| Miles (one way) | 120 | variable |
| Diesel ($ / gallon) | $ 3.00 | variable |
| Tons per Load (tons) | 27 | varibale |
| Road Gallons | 53.3 | calculation |
| Road Diesel Cost | $ 160.00 | calculation |
| Road Diesel $ / ton | $ 5.93 | calculation |
| Chipping ($/ton) | $ 1.26 | calculation |
| Landing costs ($/ton) | $ 0.75 | calculation |
| In-woods ($/ton) | $ 1.80 | calculation |
| Total Woods Cost ($/ton) | $ 3.81 | calculation |
| Total Cost ($/ton) | $ 9.74 | estimate |
| Total Diesel (gallon/ton) | 3.25 | estimate |
| Average Truck Speed (mph) | 40 | variable |
| Turn-around Time (minutes) | 20 | variable |
| Round Trip Miles | 240 | calculation |
| Round Trip Minutes | 380 | calculation |
| Round Trip Hours | 6.33 | calculation |
| Trucking Cost (truck and driver, $/ton) | $ 18.77 | calculation |
| Total trucking and diesel ($/ton) | $ 28.50 | estimate |

**Diesel per green ton, delivered - estimator**

| | | |
|---|---|---|
| Miles (one way) | 120 | variable |
| Diesel ($ / gallon) | $ 4.76 | variable |
| Tons per Load (tons) | 27 | varibale |
| Road Gallons | 53.3 | calculation |
| Road Diesel Cost | $ 253.87 | calculation |
| Road Diesel $ / ton | $ 9.40 | calculation |
| Chipping ($/ton) | $ 2.00 | calculation |
| Landing costs ($/ton) | $ 1.19 | calculation |
| In-woods ($/ton) | $ 2.86 | calculation |
| Total Woods Cost ($/ton) | $ 6.05 | calculation |
| Total Cost ($/ton) | $ 15.45 | estimate |
| Total Diesel (gallon/ton) | 3.25 | estimate |
| Average Truck Speed (mph) | 40 | variable |
| Turn-around Time (minutes) | 20 | variable |
| Round Trip Miles | 240 | calculation |
| Round Trip Minutes | 380 | calculation |
| Round Trip Hours | 6.33 | calculation |
| Trucking Cost (truck and driver, $/ton) | $ 18.77 | calculation |
| Total trucking and diesel ($/ton) | $ 34.21 | estimate |

Ignoring the most basic economic criteria related to supply by arbitrarily expanding fuel resource draw distance to match the size of an existing boiler, entails very significant additional risk related to diesel fuel cost and transportation efficiency that are compounded over increasing distance. Such risks easily could cause a facility to fail on a purely economic basis. Such a business model (with exceptionally high fuel cost exposure) can only be viable if there is a pure fuel cost pass through clause in the power sales agreement that passes risk to the end user. Even a plant that has paid

down all of its debt cannot operate profitably if its variable cost of production exceeds the revenue from sales. With a biomass fueled electrical generation facility the most significant cost of operation that contributes to the cost of generation is the cost of fuel.

**Besides the obvious concern related to increased cost of biomass related to distance and exposure to diesel fuel price fluctuations, is there other possible related impact?**

The most serious impact that will assuredly play out relates to the increased pressure that will be placed upon the local forest resource to supply biomass. It is an illusion to think that the local area will not be overharvested in the 70MW Laidlaw scenario. Rather than pay $54.21/ton to attract biomass from Royalton, Vermont the project will pay a lower price delivered that will be a premium price for local suppliers such that local harvest will be increased beyond what is sustainable long term or that redirects biomass away from present users producing unintended economic or environmental consequences.

The 2008 “Timber Supply Study for the North Country of New Hampshire” conducted by LandVest, when addressing this topic, concluded that;

*“On the other hand a facility that could be aggressively competitive with pricing could likely command a higher proportion of wood in our study area”*

Thus making it clear that approval to operate a facility the size of Laidlaw Berlin Biopower would likely set off a major bidding war for fuel that will likely end in the demise of other facilities and higher rates for electric user

# Conclusion

**Do you wish to make a concluding statement?**

Yes. The following is clear to me from the Laidlaw testimony at the May 5, 2010 Tech Session in Berlin; Laidlaw’s business plan is conceptual at best and focused entirely upon the salvage and utilization of a black liquor boiler in Berlin. There is no depth to their business analysis beyond their perceived savings in capital cost and an assumed Purchase Power Agreement with PSNH that appears to be eroding. It would also appear that Laidlaw has assumed that the eventual PPA with PSNH would make its

cost of capital and operational cost a moot point of concern. It is such a reliance that has allowed Laidlaw to come to this point whereby they clearly do not know how much biomass fuel they will need, whether that supply can be met from the identified wood basket, or most importantly how much it will cost. I believe that Laidlaw was or remains under the impression that an eventual deal with PSNH will cover whatever fuel might cost and therefore it is a non issue to them. I believe that Laidlaw feels that their eventual PSNH deal will give them the ability to pay a higher cost for fuel thus trumping all other competitors for supply. I believe this is the reason that Laidlaw has not felt the need to do price sensitivity analysis related to their anticipated fuel supply. It is perhaps the reason that distance for biomass delivery is irrelevant to them. Laidlaw as a merchant developer seems to be banking heavily upon an eventual PPA with fuel adjustment or incentives from a regulated New Hampshire utility that may not be approved when vetted before the NH Public Utilities Commission. It appears that Laidlaw may need assurances from PSNH that have until now been reserved for rate based utility owned projects only. Assurances that place merchant developer risk upon ratepayers. Something that is not available to all other merchant energy developers within New Hampshire. I am not alone in my concern related to the PSNH connection to Laidlaw and what it may mean for competing merchant projects or the rate burden placed upon citizens and New Hampshire industry. The Wilderness Society on page 15 of their 4/2/2010 comments expressed concern on just how PSNH might favor this specific project when purchasing Renewable Energy Credits.

It is the responsibility of the SEC to analyze all aspects of a proposal to prevent an unfavorable situation from coming about. Part of what we need to achieve in the present economic environment is expansion of employment. We look to the renewable energy industry to provide a significant component of this via new green jobs. In the case of this Laidlaw proposal we need to be careful that their anticipated new green jobs are not at the expense of significantly more jobs lost at other industrial or generation facilities that fail due to inability to compete for biomass as a result of a regulated utility advantage extended to a single merchant developer. We must be careful as a State that we do not use up all the potential for multiple distributed biomass renewable developments and of

diverse types for the sake of a single grossly inefficient project. The SEC should not approve a project that will be a catalyst for diminishing returns elsewhere throughout the State and region. I believe that approval of the Laidlaw project would present a very serious disruption to the orderly development of the region.