

# Forest Biomass Harvesting for Electricity

*12,800 + acres... Every Year... Up in Smoke*

## Key Issues

### **Burning Forest Biomass Must be Removed from the List of Renewable Sources of Electricity.**

Large areas of Nova Scotia's forests are being clearcut, and many 'full-tree clearcut', to produce electricity. The current science clearly demonstrates that burning forest biomass does not produce carbon neutral 'green energy'. Other governments, such as Massachusetts, have revised their green energy policies to reflect current science. Nova Scotia must follow suit.

### **Forest Biomass Harvesting is Destroying Our Forests and Our Future.**

The economics of the forest biomass business dictates the use of clearcutting, which is a destructive harvest method. It reduces biological diversity, critical wildlife habitat, soil fertility, forest productivity and accelerates the decline of aquatic life in our lakes and rivers already severely impacted by acid rain. By destroying all forest types and ages, this archaic forestry practice prevents us from securing the full range of ecological and economic benefits from our diverse forests. It has already contributed to the closing of forest product manufacturers and destroys opportunities to build a new rural economy from the benefits that a biologically diverse forest can provide.

### **We are Mismanaging Our Forests.**

We have allowed international corporations, including Emera, to dominate forest policy. Large industry profits are boosted while Nova Scotians grow poorer and our Acadian forest is destroyed. Meanwhile we are investing minimally in energy conservation and true renewables. The mismanagement of our forests must be addressed. Nova Scotians told the late Hon. Constance Glube "*The status quo is not an option.*" (*A Natural Balance-Report of the Steering Committee on Natural Resources 2010*). That advice was ignored. Today the public is even more convinced that our forests are mismanaged. Recently over 28,000 people have signed a petition asking Premier McNeil to stop the destruction of our forests for biomass power generation.

**Harvesting forests for electricity must end.  
We urge Cabinet to act in the public's interests and create a  
future for natural resources and rural economies.**

## Background

### **Burning forest biomass is not a green source of electricity**

In 2014, at least 18 percent of the total provincial harvest - about 12,800 acres - went to energy generation<sup>1</sup>. This is considerably more than the 6 percent published in the Nova Scotia Department of Natural Resource's 2015 Registry of Buyers report. Port Hawkesbury Biomass (PHB), Brooklyn Energy, Great Northern Timber, Northern Pulp and Scotia Biomass are all acquiring wood harvested within the province to generate electricity.

Burning forest biomass to produce electricity releases 50 percent more carbon dioxide (CO<sub>2</sub>) per unit of electricity than coal. The rapid injection of CO<sub>2</sub> into the atmosphere from biomass burning creates an immediate addition to green house gases. Offsetting CO<sub>2</sub> emissions through new tree growth requires many decades to a century or more. We need carbon reduction now, not in decades from now. Furthermore, many trees will not reach maturity due to short-rotation harvest practices and destructive forest removals on private lands through land use conversion and few laws. The combination of the flawed accounting of CO<sub>2</sub> emissions from forest biomass burning and the polluting emissions produced by biomass burning necessitate the *removal* of biomass from the list of renewable electricity sources.

Decades of published scientific research have shown that repeated clearcut harvesting in short rotations has detrimental impacts on carbon storage. Recent studies in the Maritimes show that organic matter can take 70-80 years to rebuild to pre-clearcutting levels, while nitrogen can take 120 years to recover<sup>2</sup>. A 1998 New Brunswick study concluded that a landscape managed as plantations on a 60-year rotation would store only 22% as much carbon as a landscape covered in older-growth natural forest<sup>3</sup>.

To justify allocating the province's forest resources for bioenergy, successive governments in partnership with the forest industry and Nova Scotia Power (NSP) have bought into the myth that if you burn a tree all you have to do is grow a tree and the fuel is carbon neutral. This 'burn a tree-grow a tree' myth ignores the time lag between when the tree is cut and the time it takes to grow back, and the impacts of forest harvest processes that often create a one-way flow of carbon from our forests into the atmosphere.

The maximum electrical efficiency of PHB is approximately 21.5 percent when the paper mill is not running. Running at peak capacity, it is capable of consuming about 60 truckloads of wood per day. The government operates the PHB to suit the paper mill's demand for steam despite the fact that it is creating a financial burden on ratepayers. Nova Scotians have been paying \$6 - \$8 million extra a year to keep the inefficient biomass plant operating on a 'must-run' basis (until spring 2016) to comply with provincial regulations.

## Forest biomass harvesting is destroying our forests and our future

Pressure to meet biomass volume commitments is leading to deforestation. At least 58 percent of the biomass that NSP bought for PHB in 2014 came from cutting down forests and of that nearly a third from land clearing, for purposes such as agriculture or blueberries. Logging contractors supplying NSP have been encouraging landowners to sign land-clearing declaration forms allowing the conversion of forestland to agriculture and the cutting of every tree, including those along watercourses. Deforestation to supply PHB alone amounted to 1,000 acres in 2014.

Forest cutting is depleting Nova Scotia's soils of so many nutrients that species needing rich soils (such as sugar maple, white ash and yellow birch) can no longer grow in some locations, or if they do, are stunted and deformed from deficiencies, according to Nova Scotia research<sup>4</sup>. Increasingly aggressive cutting practices are removing crucial nutrients from branches, bark and foliage. It is possible to sustainably harvest a forest stand into perpetuity without diminishing soil productivity but this can rarely (if ever) be done by clearcutting.

The decline of salmon and its extirpation in many Nova Scotian river systems during the 1980s-1990s should have raised alarm over declining nutrients in our forest soil, as it was the lack of buffering capacity of our forest soils that made these systems so sensitive to acid rain. By the mid-2000s, critically low levels of base cations (notably calcium) in forest soils, especially in southwest NS, were clearly documented by aquatic scientists<sup>5</sup>. A subsequent study commissioned but not released by DNR illustrated that clearcutting increases nutrient losses substantially<sup>6</sup>. Further, recent studies have shown that aquatic systems in southwest NS, unlike those in other eastern N.A. jurisdictions except Newfoundland, are not responding to reductions in sulfur emissions because of critically low calcium levels<sup>7</sup>. Regardless, clearcutting continues in the most susceptible watersheds (e.g. in the St. Margaret's Bay Ecodistrict), further damaging aquatic ecosystems and undermining future productivity and biodiversity of forests.

Nova Scotia has lost nearly all of its old-growth forests<sup>8</sup>. Since European colonization almost every stand of old growth forest has either been cut or burned. In the last 60 years, the decline in remaining older forests has accelerated. Between 1958 and 2003 NS Department of Natural Resources (NSDNR) data showed that the percentage of 0-20 year-old forests increased by more than 300 percent and the 21 to 40 year-old age class increased by 103 percent. During the same time period the 61 to 80 year-old age class dropped by 65 percent; the 81 to 100 year-old age class by 93 percent; and the 101+ year-old age class by 97 percent.

Animals dependent on old growth conditions (e.g., fisher, pine marten, goshawk, Atlantic salmon, woodland caribou) are now rare or extirpated. Ten forest-dependent species are listed as provincially endangered, and another five as "threatened" and "vulnerable." Many more forest-dependent species, while not officially listed under the *Endangered Species Act*, are assessed as 'rare' or 'potentially at risk'. Our landscapes are falling silent as forest songbird populations decline, their breeding habitat flattened.

## Hardwood saw log industry depleted of resources.

The large volumes of hardwoods required to operate the PHB facility have resulted in many fewer high quality sawlogs reaching value-added hardwood businesses. Since 2014, two hardwood flooring mills have gone out of business, and two hardwood sawmills are operating with skeletal crews. Finewood Flooring in Victoria County was in operation for 33 years, Rivers Bend Wood Products in Antigonish County for 20 years, and both were heralded as model value-added wood products operations. At their peak, their combined workforce was 36 full-time employees.

The biomass plant is supposed to use poor quality wood and milling wastes, and it is not supposed to accept better quality logs that can be sent to a hardwood sawmill. The problem is that it takes time, expertise and additional equipment to cut and handle sawlogs, all of which adds to the cost of production for logging contractors. Sawlogs are being chipped along with other hardwoods. The practice of harvesting forests on short, 45-50 year rotations is now widespread in the industry, resulting in young, promising hardwood stands of future sawlogs being clearcut and chipped.

## Government is mismanaging our forests

Fundamental change is required in how our government manages our forests. Clearcutting remains the norm, and wasteful use of forest resources and environmental degradation is widespread. The provincial government has ignored the advice it sought from experts and engaged citizens. The late Hon. Constance Glube, Chair of the Steering Committee on Natural Resources, wrote:

“Exercise great caution in the use of biomass for power generation. There is ample evidence that our forests are already under considerable stress. Despite the need to reduce greenhouse gases, Nova Scotia does not have the wood capacity for biomass use to make much of a difference even provincially. It is counter-intuitive for the province to protect the environment by cutting down too many trees or reducing the quality of already thin and acidic soils. The province should instead encourage the exploration and expansion of other sustainable methods to generate power and, at the same time, methods to conserve energy and reduce demand.”

Over the past decade governments have passed out hundreds of millions of taxpayer dollars in subsidies to pulp companies that can't compete financially in declining world markets. NSDNR won't disclose all details of those agreements, the current state of our forests or certain documents that likely condemn clearcutting, such as a soils study they commissioned with taxpayer dollars. There is growing public perception that management within NSDNR now works for the interests of a few dominant industries rather than its mandate to protect public interests.

In 2008-09, a voluntary planning committee, at the direction of the provincial government, held public consultations about forests. The overall conclusion was: *“Across Nova Scotia, a resounding call for change has been voiced. Current natural resource practices for all uses and all users are not sustainable.... The economy is a wholly-owned subsidiary of the environment”*. But the status quo promoted by the forest industry prevailed within NSDNR in an entrenched, out-of-date culture of promoting intensive forest management practices. Science-backed recommendations that mirrored the public desire for changes in forest management were ignored in Phase II of the voluntary planning process. An industry-led attack of those recommendations ensued. Since that time some staunchly- industrial members of both forestry and the energy sector have been elevated to high level positions within provincial government.

Forest biomass harvesting for energy in Nova Scotia is a glaring example of poor forestry and energy policy development. Good governance would insure environmental objectives are included and not greenwashed, precious resources are stewarded for present and future generations, and wealth benefits distributed broadly in society. Good governance would insure rate and tax payers are not subsidizing poorly informed energy policy. Nova Scotians support a “real change” agenda.

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1. This estimate is greater than NSDNR’s 6%, which is erroneous. The amount of primary wood originating within NS purchased for the PHP biomass plant alone was 6.6% of the provincial harvest in 2014. In addition, primary wood is used by Brooklyn Energy, Great Northern Timber for biomass chips, Scotia Biomass for industrial pellets purchased by power plants in Europe, and Northern Pulp for generating electricity. As well, secondary biomass accounts for a large percentage of energy generation. Secondary biomass includes chips, sawdust, bark and shavings. Secondary biomass is a by-product of manufacturing, but also represents a demand from harvested forests.
  2. Dale Prest Sackville dale@forestsinternational.org Clear Cutting Causing Long-term Declines in Forest Productivity? Implications of the Forestry Strategy <http://voxinteractif.ca/~forestnb/wp-content/uploads/2014/04/Dale-Prest.pdf>
  3. Fleming, TL, and B. Freedman. 1998. "Conversion of natural, mixed-species forests to conifer plantations: Implications for dead organic matter and carbon storage." *Ecoscience* 5(2): 213-221.
  4. Noseworthy, J. 2011. Mass balance, biogeochemical framework for assessing forest biomass harvest sustainability. MSc thesis, University of New Brunswick.
  5. Ouimet, R. et al. 2006. Determination and mapping of critical loads of acidity and exceedances for upland forest soils in Eastern Canada. *Water, Air and Soil Pollution* 172: 57-66.
  6. DNR 2009: Nova Scotia Forest Biomass Harvest and Retention Guidelines. This slide presentation highlights a “Soil nutrient budget computer model—a decision support model to assess site suitability for biomass harvest in NS.DNR contracting with UNB”, which would be released mid-2010. The only publicly available document available to date from that study appears to be a thesis released independently by UNB: Noseworthy, J. 2011. Mass balance, biogeochemical framework for assessing forest biomass harvest sustainability. MSc (Forestry) thesis, Faculty of Forestry and Environmental Management, University of New Brunswick. Data are presented only for Kejimikujik National Park “due to confidentiality concerns with Nova Scotia forest inventory data”.
  7. Dennis, I.F., Clair T.A. 2012. The distribution of dissolved aluminum in Atlantic salmon (*Salmo salar*) rivers of Atlantic Canada and its potential effect on aquatic populations. *Canadian Journal of Fisheries and Aquatic Sciences* 69:1174-1183.
  8. True old-growth forest (at least 150 years old) once dominated the Nova Scotia landscape. Old growth is endangered today and exists only in very small, scattered, isolated pockets in the province. (Mosseler, A. *et al.* (2003) Old-growth forests of the Acadian Forest Region. *Environ. Rev.* 11: S47-S77.

# Recommendations

## Energy

1. Amend the renewable energy regulations to include a new efficiency threshold for biomass energy of 50-60 percent. (*Do not grandparent existing facilities.*)
2. Eliminate primary forest biomass from the list of renewable electricity sources.
3. Accept that science has demonstrated that forest biomass electricity is an inefficient, non-green energy source that emits more CO<sub>2</sub> and toxins than even coal. \*Avoid having Nova Scotians level the disgrace of clearcutting forests for electricity on the current government.
4. Decommission existing biomass electricity plants, as Nova Scotia Power (NSP) produces cheaper forms of legitimately green energy, thereby achieving NSP's legislated commitments to green energy.
5. Prohibit further expansion of forest biomass electricity facilities. They will promote deforestation and contribute to carbon emissions/ global warming and air pollutants.
6. Ensure that policies are in place to maintain government authority over the management of natural resources used for alternate green energy, rather than entrusting large multinational companies, such as Emera. Ensure provincial government staff do not have financial ties with industry.
7. Support use of forest biomass only as localized energy sources for 'space heating' rather than for electricity. (*Biomass provides 3-4 times more energy as heat than it does as electricity.*)
8. Require any proposed biomass for electricity (e.g., from switchgrass) to prove by certified LCAs (Life Cycle Assessments) that they reduce carbon emissions over the short and long term.
9. Support Community Co-operative energy groups that obtain/store surplus electricity from solar, wind, tidal, or hydro sources in large batteries that NSP could draw from. This adds to the manufacture of 'green renewable' electricity.

# Recommendations

## Forestry

10. Enact better legislation to ensure that 'full-tree' harvesting does not take place under any circumstances for procurement of fiber. Only removal of stem wood is acceptable. Adopt regulations to prevent buyers from purchasing biomass containing branches, foliage and tops. Such legal tools ultimately help to support healthy forests.
11. A reduction in forest harvesting throughout NS is essential in the near-term for restoring healthy and diverse forests.
12. Immediately ban all clearcuts in watersheds that are being severely impacted by acid rain and press the federal government to require further reductions in sulfur emissions.
13. To ensure that carbon storage in NS forests is increasing or maintained over time, **commit to eliminating clearcutting. \*Soil nutrient depletion issues alone render clearcutting an unacceptable harvest practice.**
14. Revise the definition for 'clearcutting' to be scientifically valid and restore public confidence.
15. Implement economic disincentives for clearcutting private lands (e.g., higher tax rates).
16. Follow up on Land-clearing Declarations to ensure appropriate taxes are collected from private lands where forests were removed for land-use conversions to agriculture and other purposes.
17. Establish a task force to recommend policies for creating a new, vibrant forest economy compatible with Acadian forest ecology. Some areas to address:
  - Shift focus to smaller forestry operations and small scale diversified value-added wood product manufacturing.
  - Facilitate local sorting yards and better consultation among wood producers, primary industry, and value-added manufacturers to ensure that logs are put towards their highest-value end use. Sorting yards assist in assuring that buyers for value-added industries have first opportunity to purchase the higher-quality wood.
  - Lumber stamping at small sawmills should be facilitated by hiring a mobile certified wood grader. This enables small mills to sell lumber (often of higher quality) to local markets and home-builders.
  - Provide incentives/assistance to small mill operations with a niche for high-quality lumber, larger-dimension wood, rarer types of wood and value-added products.
  - Examine the value of forests as tourist and recreational destinations.

# Recommendations

## Forestry (*continued*)

18. Provide financial incentives to encourage manufacturing of wood products (e.g., wood flooring) and non-timber forest products (e.g., chaga tea, wild mushrooms).
19. Encourage partial harvest techniques through economic incentives that provide protection (e.g., shading) to forest soils to retain nutrients. Partial harvests must become the norm in the Acadian forest to ensure more high quality, late successional (shade tolerant) trees are grown that will support a diversified forest economy including a stronger saw log economy.
20. Ensure that NSDNR and the Department of Energy serve public interests rather than industry-led interests. Nova Scotians are not well-served and have lost trust. There must be clear divisions between industry interests and staff dedicated to working for the Crown and Nova Scotia's best interests.
21. To address the industry-led DNR mismanagement that is permanently damaging and devaluing NS forests, the Premier should establish an independent 3<sup>rd</sup> party review, perhaps by American scientists who have researched ecologically-based forestry in mixedwood forest ecosystems similar to the Acadian forest with similar disturbance regimes and climate.

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Date: April 8, 2016



