

Governor's Wood-to-Energy Task Force Report

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The Governor's Wood-to-Energy Task Force ("Task Force") was first convened on January 30, 2008 and was tasked to investigate and eventually recommend strategies that could provide the citizens of Maine relief from both the dependence upon and the cost of traditional energy by sustainably utilizing the forest resources that exist in the region. After several meetings the Task Force adopted the following mission statement.

MISSION

The Governor's Task Force on Wood to Energy was established to identify, evaluate and promote the economically advantageous use and development of sustainable wood-based alternative energy resources and technologies based for buildings by capitalizing on the abundance of Maine's forest resources. The Task Force will evaluate the economic, environmental and public health impacts of forest-based energy alternatives and will provide recommendations to reduce energy costs, reduce reliance on foreign oil, develop and preserve new and existing markets and ensure the responsible stewardship of Maine's forest resources. The Task Force shall also examine European technologies and resource management, drawing lessons from their existing markets.

Abstract

The recent trend in heating oil prices is having a devastating effect on Maine's economy. The conversion of homes and businesses to modern, efficient, and clean wood fueled heating systems has many advantages that can mitigate the economic challenges; but the increased reliance on Maine's forests also requires attention. There is a strategy that can achieve increased energy independence and maintain the well being of Maine's forests and the industries that rely upon them.

Maine can show the nation how to make green energy. This report shows the way.

The following pages detail the outcome of the Task Force's investigations and conclusions. The material on the following pages is based on the presentations, both written and spoken, of many experts representing a broad cross section of stakeholders. The material also draws upon less formal testimony from members of constituencies affected by the wood-to-energy initiative who have attended the meetings. Accompanying this document are supporting documents that provide background and collaboration for the factual statements and the logic behind the conclusions.

Introduction

The Task Force's title and its mandate provided a focus for the investigations and the direction of the strategic planning efforts. The boundaries of this report's content are set by the concerns for energy costs, uses, and environmental effects within the context of shifting some proportion of that energy use into wood based sources.

The current cost of fossil fuels has made the creation of a strategic energy plan critical as a long-term goal and as a very near-term solution to a crisis for Maine citizens. Maine needs to diversify its fuel base. Currently, Maine has the highest dependence on #2 heating oil of any state in the nation. Over eighty percent (80%) of Maine homes use oil-based heating systems. Maine households' annual consumption of #2 fuel oil runs at about 400,000,000 gallons per year. Maine's commercial buildings on average use an additional 100,000,000 gallons per year. Maine's households spent over \$1.37 billion last year for #2 heating oil¹. Every dollar increase in heating oil prices shifts another \$400,000,000 per year out of Maine's homeowners' incomes. Businesses suffer an additional cost of \$100,000,000 per year. This half a billion dollars or more per year is taken out of the Maine economy and a significant portion of that ends up in foreign oil producers accounts. The loss of this potential commerce has multiplier effects that are far greater than the half a billion dollars per year of foregone consumption in Maine and is causing harm to the Maine economy and hardship to its citizens.

Heating costs are presently also a difficult challenge for capital budgeting in state and public facilities. Schools in particular are under intense capital pressures due to their increased heating costs and the tight state budget.

The need to shed reliance on foreign oil and create alternative energy sources has never been more apparent.

In any discussion of wood-to-energy, the foremost concern should be the continued conservation and sustainable management of the forest resource that has served and will continue to serve Maine. Sustainable practices include: considerations of the ratio between harvests and growth of a forest; environmental considerations like the protection of water quality; ecological factors that include creation and protection of wildlife habitats.

Although not within the purview of this report, it is important to stress that there is a prioritized hierarchy of actions that contribute to reducing Maine's aggregate reliance on energy no matter what its source. At the top of this list are the combined benefits of energy efficiency and energy conservation. The first line of defense against the escalation in the volume and the cost of energy consumption should be the adoption of energy efficiency strategies that are readily available to Maine's homeowners, businesses, and industries. The most efficient strategy for dealing with rising costs and usage are weatherproofing and insulation improvements. This Task Force therefore

¹ Based on data from the Energy Information Administration, 2007, the US Census, 2006, the Energy Information Administration, Distillate Fuel Oil and Kerosene Sales by End Use, #2 residential use, Maine http://tonto.eia.doe.gov/dnav/pet/pet_cons_821use_dcu_SME_a.htm.

suggests that any energy strategy adopted by the state include a comprehensive plan for decreasing waste through heat loss in homes and businesses.

While reducing our dependency on fossil fuel we should not incur negative public health or environmental consequences. For example, we could diversify our residential fuel base in very unhealthy ways with high polluting outdoor wood boilers. The Task Force is concerned that high heating oil costs will shift more homes and small businesses into the use of already installed older highly polluting wood stoves. This is not only an air pollution concern but also a more general public safety concern over the potential for increased chimney fires that are caused by the incomplete combustion products that older stoves are more likely to create. The Task Force therefore suggests that the state investigate stove “buy back” and exchange programs such as those that exist elsewhere².

Furthermore, although it is beyond the scope of the Task Force’s mission to examine diversification of Maine’s energy sources as a whole, it is important to place this report in context by acknowledging that wood energy is only a part of any solution to Maine’s energy needs. Ultimately, this issue can only be addressed through a comprehensive energy policy that considers numerous alternative energy sources and the optimal application of those solutions that best meets the unique needs of each energy user.

The Task Force has listened to discussions regarding the technologies for wind power and tidal power as well as the costs to implement solutions such as solar and geothermal. The Task Force also considered the speed at which a positive impact for Maine’s citizens could be achieved and the ability of the solutions to stand on their own in the marketplace without the need for governmental support. The Task Force wanted to be sure that a wood-to-energy strategy:

- Contains a relatively low set of barriers for a rapid but safe and economically and environmentally responsible deployment;
- Contains incentives for rapid results in moving Maine toward energy independence.
- Contains concrete suggestions for helping find relief to Maine’s homeowners and business owners from the increasing burden of heating fuel costs.

After considering these criteria, the Task Force feels that the implementation of a comprehensive wood-to-energy strategy for the state of Maine will provide significant benefits to the citizens of Maine in the very near term and that the strategy can be implemented without compromising the stewardship of the forest resources of Maine.

The Wood-to-Energy Task Force Process

See for example:

http://www.spokaneleanair.org/wood_stove_changeout.asp.

http://www.env.gov.bc.ca/epd/woodstove/implement_info.htm

The Wood to Energy Task Force, established by Governor John Baldacci, and chaired by Leslie B. Otten, began its regular meeting schedule on January 30, 2008. The group has met for two hour sessions, generally from 10:00 a.m. to noon, every other Wednesday since its inception. The meetings have been well attended by Task Force appointees or their representatives and by other interested parties.

Sessions have generally included an initial presentation delivered either by a stakeholder from the Task Force or an expert in a field related to the question at hand followed by far-ranging discussion and debate about matters related to the use of some of Maine's biomass for energy.

The meetings have included input from a variety of stakeholders that span the wood-to-energy value chain from the growth of trees in Maine to the use of wood-based fuel in homes and businesses and even to the emissions produced by the use of combustible fuels that affect the air quality of everyone in the state. In order to have a comprehensive understanding of the impacts of a wood-to-energy strategy, the Task Force has investigated both the internal and external costs of converting wood to energy. To facilitate and understand these costs, the meetings have had presentations and statements from a variety of sources including the Maine Department of Conservation, large and small land owners, loggers, the pulp and paper industry, the environmental community, wood pellet manufacturers, experts in alternative woody crops, economists, and the American Lung Association of Maine.

The Task Force has circulated detailed minutes from every meeting and has also produced documents that contain the materials discussed. The Task Force has also periodically circulated draft documents that summarize the understanding of the group in order to check the facts and gain consensus on conclusions.

Summary of Important Facts and Conclusions

--Maine is the Most Oil Dependent State

Maine has the highest use per capita of residential #2 heating oil of any state in the nation. Approximately 440,000 households in Maine use on average 900 gallons per year of #2 oil. At the current average Maine heating oil costs of \$4.60/gallon³, the expected heating bill for this upcoming winter will be on average in excess of \$4,100 per household. This extreme reliance on heating oil makes Maine vulnerable to magnified negative economic effects from high oil costs. The aggregate cost for #2 oil in Maine, just for residences, is expected to exceed \$1.8 billion for the 2008-2009 heating season. Maine's businesses consume one hundred million gallons per year on average and are thus experiencing an increased cost of more than \$250 million based on the increase on heating oil cost over the past two years⁴. The expectation is that there will not be a return to cheap oil and therefore the burdens of high distillate fuel costs will continue to have a severe negative impact on Maine's economy.

³ June 10, 2008 from <http://www.maineenergyinfo.com/oil/index.html>

⁴ Based on June 10, 2008 from <http://www.maineenergyinfo.com/oil/index.html> and EIA data http://tonto.eia.doe.gov/dnav/pet/pet_pri_wfr_a_EPD2F_prs_cpgal_w.htm

Maine also has the highest per capita output of residentially produced CO₂, a primary greenhouse gas, of any other state in the nation. Each man, woman, and child in Maine produces in excess of 7,300 pounds of carbon dioxide every year⁵. This is directly correlated to the heavy reliance on #2 oil for heat.

Wood-to-energy can address both the cost burden on households and the cost to the environment. The cost for a BTU of energy from a wood fuel is about 45% the cost of the same BTU of energy from #2 oil. Furthermore, wood fuels are almost net carbon neutral. This statement is based on the expectation that Maine's forests will be harvested in a sustainable fashion so that trees can grow to maturity and perform their important role in the sequestration of carbon⁶.

--Wood-to-Energy is Already Here

- Cordwood

Wood-to-energy is already a staple in Maine. But most of the wood is consumed in cut and split form in fireplaces, wood stoves, or outdoor wood boilers. Although modern wood stoves are more efficient and relatively clean, they require constant attention to loading and cleaning. Many of these appliances have air quality drawbacks as well and will not solve Maine's reliance on heating oil. Many homeowners and businesses will not want to substitute the convenience of an automatic heating system for a manually fueled system that requires constant attention. Converting to cordwood fueled wood stoves will not replace primary heating systems. As heating oil costs remain high, there is expected to be a significant increase in the use of wood stoves as a secondary source of heating for some homes. They are a viable wood-to-energy solution if they are modern, efficient, and clean burning and there is already a mature market for wood stoves and cordwood delivery in Maine.

Considering how widespread cordwood burning is in Maine, it is surprising that relatively little data on wood burning exists. Information is not available on such basic facts as: the age of woodstoves being used, the percentage of stoves in use that are EPA certified, the number of homeowners who heat only with wood, how much supplemental heat woodstoves provide, how much wood is burned each year and where it is burned.

It is also a concern that very little is known about the oil burners being used so commonly in the state and the interplay between oil and wood heat. The improvement in oil burner efficiency over the past decade is significant but the age of the oil burners in use in Maine today is unknown. This

⁵ CO₂ per capita is from the US EPA Energy CO₂ Emissions by State by Sector http://www.epa.gov/climatechange/emissions/downloads/CO2FFC_2005.pdf divided by population from the US Census.

⁶ With the assumption that Maine's forests will be harvested in a sustainable fashion so that trees can grow to maturity and perform their important role in the sequestration of carbon, wood chip fuels produce a net carbon output of about 20.5 lbs. of CO₂ per million BTU. Wood pellet fuels on average produce about 28.6 lbs. of CO₂ per million BTU. This is compared to home heating oil which produces 219.3 lbs. of CO₂ per million BTU. Based on data in <http://www.pelletheat.org/3/2007SummerConf/PFI%20Net%20Energy%20Presentation%20July%202007.ppt>

makes it impossible to estimate how much oil could be saved through burner replacement in addition to supplementation with wood.

The combination of increasing fuel oil costs, expensive gasoline and rapidly rising food costs have hit Maine people very hard. In the near term however, most Maine people will not abandon their oil systems and switch fuels. To supplement their oil burners, it is likely that more Maine people will turn or return to burning wood. If they are already burning wood, they will increase the use of their woodstoves for heat.

This situation presents potential serious public health concerns. The amount of air pollution emitted by woodstoves this winter could approach record levels. Maine's topography will contribute to this problem since many towns are located in or near river valleys.

Maine has already witnessed what can happen when wood burning is done in a manner that impacts the health and comfort of neighbors. Until this year, the rapid and unregulated expansion of outdoor wood boilers produced dozens of complaints throughout the state and challenged the Maine Department of Environmental Protection's enforcement processes. Given the emissions from OWBs, their relative inefficiency and the limited areas in which they can be operated, they are not a viable contributor to solving our dependence on oil in a healthy manner.

Although the modern EPA certified woodstoves are more efficient and relatively clean compared to earlier models, they still require constant attention to loading and cleaning. Thus while increased use of cordwood fueled woodstoves will reduce our dependence on oil for heat, they are only a part of the solution and in many cases a temporary one. Most homeowners and business will not want to substitute the convenience of an automatic heating system for a manually fueled system that requires constant attention. Cordwood fueled wood stoves will not replace primary heating systems for the vast majority of people. But they can continue to be a part of a viable wood-to-energy strategy. If the stoves in use are modern, efficient, and clean burning they can minimize air quality impacts. Also there is already a mature market for wood stoves and cordwood delivery in Maine.

--Biomass

The use of biomass made from bark and limbs that have no value for pulp, sawlogs, or clean chips has increased in recent years. The biomass harvest had fluctuated between 1.0 and 1.7 million green tons per year until the last two years of data. In the most recent year, 2006, the harvest was approximately 2.3 million green tons⁷. Biomass applications are commercial in scale. Biomass with bark and leaves is currently used in wood fueled electricity generation facilities, is used in pulp and paper mills for steam and electricity, and can be used in large scale central heating systems. Properly combusted, biomass is relatively efficient and clean-burning.

--Wood Chips

For larger commercial applications, modern wood chip fueled systems can provide heat at a cost of less than half of #2 oil fueled systems. Modern wood chip systems are efficient and clean burning. They do require regular maintenance for cleaning but in a larger commercial application that is generally not an impediment to implementation. In district heating applications in which there is a central boiler facility that distributes hot water or steam to a system of users, wood chip systems are a viable wood-to-energy solution. Clean wood chips (no bark or leaves) are also used for pulp production.

--Wood Pellets

The use of wood pellet fuel has already made inroads in Maine via wood pellet stoves and fireplace inserts. This segment of the market is growing rapidly. Pellet stoves are very efficient and clean burning. Wood pellet stoves need almost daily attention by the homeowner for fuel loading typically from 40 pound bags of pellets. The bags of wood pellets can be bought individually at local hardware stores or stove shops, or they can be delivered on pallets with 50 bags typically weighing one ton.

Fully automated wood pellet fueled home heating systems that use a boiler to heat hot water for baseboards and domestic hot water are common in Europe but not in the United States. For example, 80% of new homes in Sweden and 76% of new homes in Austria are now built with pellet fueled central heating systems⁸. These systems are transparent to the owner in that all they have to do is set the thermostat and the home or business is warmed to the setpoint. Pellet fuel is delivered in bulk from delivery trucks similar to oil delivery trucks into basement storage tanks that hold from several months to a full winter's supply of fuel. A cube six feet on a side holds about a half a winter's supply for the typical Maine home. For that sized tank, compared to the typical 275 gallon oil tank, delivery frequency would be halved. These systems are also very efficient and clean burning. They use premium pellets⁹ and thus produce about a cubic foot of ash for every two tons of pellet fuel.

⁷ Maine Forest Service data.

⁸ Data is from Pellets@las.info

⁹ Ash content is less than 1.0%.

Proven reliable and efficient pellet fueled boiler and domestic hot water systems with full regulatory approval for installation in homes and small businesses have recently become available in Maine. Commercially applicable systems for larger businesses, district heating plants and public buildings are also available.

--Cellulosic Ethanol

The University of Maine at Orono has developed a process for removing hemicellulose from wood before the wood is pulped. This material can then be converted to ethanol. The manufacturing of an essentially carbon neutral liquid fuel produced from wood that could be used in transportation, generation, and heating would have very positive impacts both in terms of carbon emissions and energy independence. The project is still in the laboratory. There are no commercial operations for the production of ethanol from hemicellulose. Several pilot projects are starting up in 2008 based on sugar cane waste with the companies expecting to scale into other feedstocks at commercial levels sometime after 2010¹⁰. This solution, although potentially very exciting, is many years from implementation on a scale necessary to bring relief to Maine's heating oil cost burden.

--Public Sector Initiatives

There are a number of initiatives underway currently in the public sector that will serve as pilots for wood to energy conversions in larger buildings. This work also aims to help increase Maine's understanding of when wood energy is the best option for buildings, and which kinds of wood solutions work best in which circumstances and buildings. The Department of Conservation in concert with other state agencies is developing a strategy for encouraging public buildings in the state of Maine to consider wood-based heat energy and is moving forward with the "Fuels to Schools" initiative. The lessons learned from these installations should be brought to the larger private sector efforts.

--Maine's Forest Resources, the Pulp and Paper Sector, and Wood-to-Energy

Any consideration of wood-to-energy needs to fully account for the impacts that the wood demand will have on the forest resource. The most recent data (2006¹¹) shows that approximately 14.8 million tons per year of wood is harvested in Maine and about 13.8 million tons was processed. In aggregate, Maine is a net exporter of wood. Maine was a net exporter of sawlogs in 2006 (3.37 million tons exported, 0.9 million tons imported, and 7.40 million tons harvested). In 2006, Maine was a net importer of pulpwood (1.00 million tons exported, 1.54 million tons imported, and 6.26 million tons harvested)¹². Maine is also an importer of biomass (2.33 million tons harvested, 0.36 million tons exported, 0.82 million tons imported). Currently, a very small portion of the wood harvested in Maine (less than 0.25 million tons per year) is converted into wood pellets. [See Appendix B for a brief discussion of the landowner's perspective.]

¹⁰ Annual Report of Verunium Corporation, March, 2008.

¹¹ Maine Forest Service Data

¹² Maine also exported pulp (not pulpwood) in 2007 valued at about \$266 million. From the Maine Economic Growth Council by the Maine Development Foundation, February 2008.

There is concern that an increasing demand for wood for energy will increase the price of the raw materials for pulp and lumber production. In particular, the pulpers and paper makers are concerned since the feedstock for pellet manufacturing and pulp production come from the same grades of wood. In the current environment in which wood prices have spiked and mills are paying high prices to maintain supply, there is a heightened sensitivity to the potential of further price increases. Any potential threat to an industry that is so important to Maine's economy needs to be carefully evaluated.

According to the Maine Forest Service (MFS)¹³, Maine can, over time, increase sustainable and environmentally responsible yield per acre substantially above current levels. That would increase the annual sustainable harvest by about 5.8 million tons per year. (MFS also notes that another 3.8 million tons are available for import from MA and NH. However, if wood based fuel use increases in other states in the region then the availability of exports may diminish.) This suggests that there can be enough wood in Maine in 20 to 30 years to eventually make a significant proportion of Maine's homes and businesses independent of imported oil without a demand induced scarcity of forest-based raw materials and thus without a demand induced price rise even if the pulpwood demand remains constant.

For example, if 10% of residences in Maine were to convert to wood pellet fuel, it would require approximately 640,000 tons of green wood per year to make approximately 380,000 tons of pellet fuel per year. The Maine Forest Service (see data in footnote 13) has shown that the Maine woods do have the capacity to sustainably produce wood pellet fuel at those levels both in the short term, by harvesting stock that is available but is not being harvested, and in the long term by implementing forestry management practices that increase the sustainable per acre yield of Maine's forests.

MFS also notes that a significant amount of wood not necessary for soil nutrient replenishment is being left under the processors. The economics of getting that wood to market are difficult due to the required investment in equipment. The move from skidders/chain saws to mechanical configurations have allowed efficiencies in hiring, safety, and the ability to harvest more wood with fewer people; but higher oil costs and the more diversified demand for wood products as a fuel source require that those difficult economics be solved so that less of the wood is left behind.

The short run availability of wood for energy in Maine for homes and businesses equivalent to 45,000 Maine households (about 10% of Maine's residences) is supported by data on the pulpwood harvests. The Maine pulpwood harvest in 2006 was almost 900,000 tons per year below its most recent peak in 1995 and has been declining by, on average, about 26,000 tons per year since 1990¹⁴. The approximately 640,000 tons per year of green wood that would be required to warm 10% of Maine's residences with pellet fuel is less than the 1,000,000 tons of pulpwood that was exported from Maine in 2006. To achieve this modest goal over 5 years, assuming no change in demand for pulpwood from the pulp sector and continued exports of pulpwood at current levels, Maine would need to increase its annual harvest by about 0.85% per year. That level, according to the Maine Forest Service, is sustainable and achievable.

¹³ See "MFS Assessment of Sustainable Biomass Availability: Absolute Supply is not the Issue." June 23, 2008.

¹⁴ Maine Forest Service data.

To facilitate the maximization of Maine's sustainable harvest, cooperative efforts should be pursued to aggregate parcels and jointly contract for cutting and/or marketing of wood. Many plots are small, but multiple small plots in proximity may make for more attractive and cost-effective harvests. Furthermore, public education should be enhanced for new owners and those who inherited land showing that forest management for harvesting can be compatible with their other goals such as recreation and conservation.

In order to further develop Maine's wood-to-energy potential, there is also a real potential for cultivating fast growing woody crops in Maine similar to those currently grown in northern Europe. This would also provide support on the supply side of the wood products sector.

The Task Force, with very serious consideration for the well being of the pulp and paper industry in Maine, realizes that too rapid a transition from oil based heat to wood based heat could have negative impacts to that industry. The Task Force also knows that the increase in forest yield, with sustainability and environmental stewardship as guiding principles, is indeed a long run process. [See Appendix A for a discussion of the market forces that will prevent overharvesting.] These considerations are balanced with the clear and present threat to Maine's economy from its dependence on costly imported oil.

--The Wood Harvesting Infrastructure

The availability of wood does not necessarily mean that the wood can come to market. The Task Force understands how cultivating the growing, harvesting, and transportation of wood in Maine is important in terms of the health of the logging and transportation components. And this understanding can have a direct impact on the harvesting and use of wood that is currently available for harvest but is not being harvested. The reasons for that are complex and are in part due to the high fuel costs that loggers and truckers are currently facing¹⁵. However, the distress in the logging sector is also due in part to the short-term nature of the wood market. Pulp mills' demand has been unpredictable from the point of view of the loggers. Mills are also carrying less excess inventory. Long-run supply agreements with known prices are rare. This uncertainty, coupled with a relatively undiversified market for pulpwood grades of wood, makes financing decisions for investments that often approach one million dollars or more challenging and very often impossible to act upon. As a result, the number of loggers in Maine has dwindled and continues to decline. The recent history of pulp and paper mill closings¹⁶, primarily due to global competition and the decline in demand for newsprint, only adds to the uncertainty and to the importance of cultivating an adequate, reliable, and consistent wood supply with the goal of reducing price volatility and maintaining pulpwood price growth at or below inflation. Maine's forest-based raw materials must remain priced at a level that is mutually beneficial to all stakeholders including the citizens of Maine who will come to rely on wood-based fuels.

¹⁵ It takes a mechanical operation, on average, about 6 gallons of diesel for every cord cut. About 2/3 are in the woods and 1/3 on the highway. Source: Sandra Brawders, Executive Director, Professional Logging Contractors of Maine.

¹⁶ According to information from the Maine Forest Products Council, Maine has been less impacted than the surrounding states and provinces.

There is a real perceived risk by components of the wood supply-chain when considering very large investments that have ROI calculations based on cash flow assumptions that run far into the future. The development of a reliable wood-to-energy market will create another off-take channel for non-sawlog grade clean wood. That channel will have a known expected annual demand as homes and business convert their primary heating from oil to wood fuels. Wood pellet fuel manufacturers and wood chip suppliers should be able to engage with land owners, loggers, and truckers in long term agreements with prices that allow everyone in that value chain to plan, invest, and gather a reasonable return on investment while providing low cost heating fuel to the citizens of Maine.

The dwindling number of loggers in Maine needs focused attention. These loggers represent the core infrastructure for bringing forest products to market. Recent changes show a dramatic shift in production from skidders and single operators to crews operating multi-equipment configurations. The production per logger has dramatically increased, but so has the capital expense of the equipment. While there are less loggers the level of harvest has remained the same during this transition.

A disturbing trend (also witnessed within wood manufacturing facilities) is that the average age of loggers is increasing indicating a growing concern about the lack of new replacement workers. The anecdotal evidence presented to the Task Force suggests that fewer young people are choosing to work in the woods. More stability and less uncertainty from the demand side will help create a more enticing and consistent pay expectation. But the forest products industry in partnership with the State needs to educate youth on the benefits of a career wood harvesting.

Immigration is also a serious factor in logging infrastructure in Maine. In the northwest regions of the north Maine woods approximately 600 bonded Canadian laborers have been long-term operators of logging equipment in Maine. It is estimated that they produce 20-25% of the volume of annually harvested wood. These H2B bonded laborers are part of a program caught up in the national debate on immigration reform, and similar to the shortages from these workers in Maine's hotel industry, fewer loggers are available currently until the program is extended for additional years. 600 loggers out of an estimated 2500 – 3000 total loggers is a significant shortage in logging capacity.

It should also be noted, however, that the reliance of Maine on bonded labor has been a key factor that has kept per hour rates of pay low in this profession. To bring young people into logging the industry will have to break the \$9-12 per hour rate for loggers. The Professional Logging Contractors of Maine have been working to raise wages to \$17.50 to \$19.00 per hour with full benefits. They feel that at “those rates that young people would consider the horrible hours and the lack of community respect for the necessity of the profession”¹⁷.

The transportation infrastructure in Maine needs to be optimized for the needs of the forest products industry. Rail integration issues that lower the efficiency of the movement of wood products need to be addressed. Trucking regulations should be reviewed and sections in which changes in the regulations will not negatively impact the highways or safety but will facilitate the cost effective movement of wood products should be rewritten.

--Summary of Important Facts and Conclusions

¹⁷ Sandra Brawders, Executive Director, Professional Logging Contractors of Maine

As with any good or commodity, the price of wood fuels will depend on supply and demand. If the demand for wood increases more rapidly than supply, wood prices will rise. If the demand for wood fuels rises more rapidly than supply then wood fuel prices will rise. The balance between the growth of the wood-to-energy sector and the ability of the harvesting infrastructure to bring the wood to market must be considered as a keystone in securing price stability. However, the wood-to-energy sector will grow based on the demand from the consumers not on some mandate from government. Thus the government must act to facilitate the sustainable supply of wood and wood fuels to meet demands for all stakeholders that depend on Maine's most valuable renewable resource. The stakeholders include the pulp and paper sector, the lumber production sector, the wood fuels manufacturing sector, the wood fuels delivery infrastructure, and the homes and businesses that will make Maine more energy independent and environmentally responsible.

Wood-to-Energy Task Force Consensus

The Task Force has assimilated the information that is summarized above and is substantiated in more detail in the supplemental documents. Based on the facts, concerns, and stories heard at the meetings, the following points of consensus have been derived. Note that the numbering does not imply a ranking in terms of importance.

OVERARCHING CONCERNS

- 1. Improving the energy efficiency of all buildings that are drafty and leak heat as well as the implementation of conservation measures should be promoted simultaneously with any conversion to wood fuels.**
- 2. Any solutions should provide a net benefit to Maine's air and water quality and should not have a negative impact on the healthy forest ecosystem.**
- 3. A long run goal is to increase the reliable, consistent, and sustainable supply of wood while maintaining the environmental standards that are important to Maine's forests from the perspectives of industry, tourism, and the ecosystems of which they are a part.**

GENERAL SUGGESTIONS

4. The State should embark on a statewide educational campaign highlighting the return on investment for weatherization, fuel efficiency, and fuel switching. The State, in partnership with lending sources, should help homeowners and businesses understand, in straightforward terms, what programs are available to facilitate the implementation of efficiency, conservation, and fuel switching measures.
5. The sustained high prices for heating oil will cause more homes and businesses to supplement their heating needs by burning cordwood in old, inefficient, and polluting wood stoves and boilers. The expected pollution that this will cause should motivate the State to act quickly to mitigate this problem.
 - a. The State should inventory the state's current reliance on wood stoves and outdoor wood fired boilers. That inventory should also record the age and types of the

systems in use, including oil burning systems. The State should also research and quantify the use of cordwood for fuel in the state.

- b. The State of Maine should investigate and promote a program for buying back or converting old polluting wood stoves and boilers in exchange for modern clean and efficient wood-to-energy appliances.
 - c. The Maine DEP and Maine CDC must take timely and effective action to respond to public complaints of wood smoke as a public health hazard/nuisance.
6. There are many forms of alternative energy that can help make Maine energy independent and they should continue to be evaluated. Other forms of wood-to-energy such as cellulosic ethanol and bio-oil should also be evaluated.
7. Cost effective and environmentally compliant wood fueled solutions for buildings in Maine can include cordwood, chips, and pellets.
- a. The wood-to-energy solution that can have a significant impact on Maine's economy in terms of penetration into the typical home and business is the replacement or supplementation of #2 oil fired home and small business heating systems with pellet fueled heating systems.
 - i. Regulatory issues for the safe installation, maintenance, and certification of these systems must be addressed to make this a reality.
 - b. There are currently UL and ASME¹⁸ approved fully automated pellet fueled systems available in Maine that can be installed in homes and small businesses under current codes and rules by properly licensed technicians. Pellet fueled systems have significant advantages over other solid fuels because of wood pellets' consistent size, density, low moisture, and renewable fiber base. Pellets are a refined wood fuel that lend to automated handling and combustion, and are the cleanest burning of all solid fuels¹⁹. Some of the European designed systems are fully transparent to the owner and the transition is seamless. Just like oil fired systems, the owner only has to worry about where to set the temperature. The systems interface with existing circulating hot water systems to provide warmth to radiators or baseboards as well as to provide for domestic hot water.
8. The State should not inhibit the ability of the private sector to provide pellet fueled heating systems for use in homes and small businesses and wood chip fueled heating systems for larger applications. The State should also not inhibit the development of the delivery infrastructure to supply wood pellet fuel and wood chips to Maine's end users.

¹⁸ Underwriters Laboratories Inc - (UL) is an independent, not-for-profit product safety testing and certification organization based in the USA. UL marking indicates that the product conforms with the safety standards laid down by Underwriters Laboratories. ASME is the American Society of Mechanical Engineers. They certify boiler standards to assure that pressure vessels are safe.

¹⁹ See www.pelletfuels.org.

9. As a model for the private sector, the State should continue to pursue the conversion of public buildings, schools, prisons, and hospitals to using modern and clean wood fueled systems. The Department of Conservation has already engaged in some conversions and the Bureau of General Services is also engaged in developing alternative fuel conversions.
10. There is currently sufficient wood supply²⁰ to provide Maine-made wood pellet fuel to 45,000 homes and small businesses in Maine so that over the 5 to 7 years that it takes for the conversion, wood prices will not be significantly impacted by the production of about 375,000 tons per year of wood pellets in Maine. 45,000 homes and small business are the equivalent to about 10% of the households in Maine.
11. There is sufficient wood supply in the region to provide for an increase in wood chip fueled boilers for larger businesses and central heating systems without wood prices being impacted so long as the growth in demand for chips is gradual enough for the harvesting and transportation infrastructure to develop to serve the wood-to-energy sector.
12. Long run price stability, from green wood to end products, be they pulp, lumber, chips, or pellet fuels, should be an overarching consideration on any program or legislation. Although the most significant economic impact to the state comes by keeping the money spent on wood fuel inside the state, the importation of wood, chips, or pellets from other states and Canada may be necessary in the short run to maintain the supply and demand balance for Maine wood costs.
 - a. The sustenance and development of the harvesting and transportation components that move wood from the forest to the users are important to price stability.
 - b. Because of the dwindling numbers of people who choose to work in the Maine woods, the forest products industry in partnership with the State should engage in an educational campaign focused on meeting the current and future needs of the industry by highlighting the lifetime benefits of working in the wood harvesting business.
 - c. The government should audit the effectiveness of current transportation infrastructure in the state. This should include a close look at the integration of rail lines to the needs of the forest products industry as well as trucking regulations that impact the ability to cost effectively transport wood. The protection of the transportation infrastructure and safety should not be compromised; but if changes can be made that do not impact those concerns they should be implemented quickly.
 - d. The government should create or provide a foundation for programs that enhance the supply of Maine's primary natural resource; from the growing of the wood to the delivery of the wood for industrial users. This means that landowners, loggers, truckers, and rail owners need to be considered when formulating recommendations.

²⁰ See discussion under “*Maine’s Forest Resources, the Pulp and Paper Sector, and Wood-to-Energy*”.

13. Maine should encourage the research and development of liquid fuels from wood and woody crops. The potential of creating a renewable liquid fuel for transportation, generation, and heating should be pursued.
14. The State should engage in research and development for the growing of woody crops that can produce high per acre yields in areas that have traditionally been used for growing potatoes that have gone fallow. Certain fast growing grasses that are able to grow in Maine's climate can be used to make pellet or as a feedstock for liquid fuels production. These varieties can yield up to 10 tons per acre per year.
15. The currently available wood pellet home heating systems require premium pellets²¹. Maine should encourage research into developing automated systems that can use standard or commercial grade pellets that would be suitable for use in some businesses and homes. The lower grade pellets can be made from more of the tree including bark, limbs, and leaves (the typical biomass components used in power plants). They produce up to 10 times more ash than premium pellets but in some applications, the increased maintenance required would be offset by the lower cost of the fuel. Any development needs to be sure that the emissions are compliant with air quality regulations.

Wood-to-Energy Task Force Suggested Policy Actions (numbering does not imply ranking of importance)

1. Before fuel switching, homeowners and businesses should have incentives for energy efficiencies and conservation from comprehensive energy audits and subsequent weatherproofing, insulation and the conversion to modern efficient heat sources. (specifics)
2. Support for the supply side of the wood products industry that does not favor any particular stakeholder at the cost of another.
 - Financing for harvesting infrastructure (specifics).
 - Transportation bottlenecks (specifics on rail and trucking).
 - Canadian labor problems (specifics).
 - Research and development for fast growing woody crops.
 - Educational campaign promoting careers in logging (specifics).
 - Revisit regulations and examine the accumulative effects of rules and regulations that limit/regulate forest management activities and look for ways to simplify, eliminate duplication, and modify as appropriate. This should be a formalized interagency review with DEP, MFS, and perhaps others.

²¹ Ash is less than 1.0%.

- Develop pilot projects around cooperative efforts to aggregate parcels and jointly contract for cutting and/or marketing of wood. Many plots are small, but multiple small plots in proximity may make for more attractive and cost-effective harvests.
 - Public education should be enhanced for new owners and those who inherited land showing that forest management for harvesting can be compatible with their other goals such as recreation and conservation. The State should also investigate developing incentives to landowners to resist development pressure.
3. Codes and rules changes that can facilitate the development of a wood pellet fuel delivery infrastructure and the ability of homeowners and small businesses to get systems safely installed.
 - Regulated metering of the pellet fuel delivery trucks to “legal for trade” standards (to be on par with oil delivery trucks).
 - Load limit exemptions for wood fuel delivery trucks (like heating oil trucks).
 - Plumbing and heating codes for solid fuels are antiquated and do not apply to approved wood pellet fueled heating systems (specifics).
 4. Use of wood fueled systems in quasi-government supported housing both for current conversion and as standard in future development when it is cost effective.
 5. The State should craft a program to facilitate the conversion of old polluting wood fueled systems. (specifics on buy-back programs)
 - The State should educate its citizens as to the potential fire dangers from using old equipment and/or burning green wood that creates creosote. The State should also educate its citizens on the effects of pollution from older equipment on air quality and the health of its citizens.
 - The State should make its citizens more fully aware of any state or private loan programs (need specifics) and should eliminate as many bureaucratic “red tape” hurdles as possible.
 6. The State should continue and expand the demonstration projects that it has already begun (specifics perhaps....).
 7. With an increasing reliance on wood supplies as a source of heating fuel, the State should ensure that the long-run needs of the state from the perspectives of all stakeholders are strategically protected. (need specifics here)
 8. The State should promote the use of green energy (specifics).

What else....?

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Peter Triandafillou Huber Resources Corp.
Keith Van Scotter Lincoln Pulp and Tissue

List of Resource Material - Available on the Department of Conservation website

Mission Statement of the Governor's Wood to Energy Task Force

Minutes of Governor's Wood to Energy Task Force meetings

January 13, 2008; February 20, 2008; March 19, 2008; April 2, 2008; April 16, 2008; April 30, 2008; May 7, 2008; May 14, 2008

The Economic Impact of Converting to Wood Pellet Fuel in the State of Maine (PowerPoint)

FutureMetrics Summary Page of Economic Impact Report (FutureMetrics' President, William Strauss, is also a partner in Maine Energy Systems)

Wood Pelletization – Forest Bioproducts Research Project – (PowerPoint)

Maine Forest Service Summary Page of Wood Pelletization report

State of the North American Pulp and Paper Industry: There is Light on the Horizon (PowerPoint)

Maine Forest Products Council draft of Concepts for Wood Energy Task Force

“Where will the Wood Come From” - DOC (PowerPoint)

Woodstone Report – Growing Fiber (PowerPoint)

Wood Supply Analysis – Maine Forest Service

CEI Cut to Length Conversion Loan Program

Implications for Dust Emissions – Environmental Impact Study

Report of “Wishlist Items” - Forest Products Landowners

Maine Future Forest Economy Project – DOC, Maine Forest Service

MFS Assessment of Sustainable Biomass Availability: Absolute Supply is not the Issue

Maine's Forest – A Snapshot – DOC, Maine Forest Service

IEA Bioenergy Study on Global Wood Pellet Market

Northern Forest Biomass Plan

Pulp and Paper Industry – Report from Keith Van Scotter

Maine's Wood Basket – Chart presented by Rosaire Pelletier, Governor's Office

Maine Community College System Wood Pellet Heating Systems Technician Program Training Cost

Appendix A – Discussion of Sustainability and Wood Supply

(Thanks to Peter Triandafillou and Keith van Scotter for this information)

The issue of sustainability versus market opportunities is important, but the two do not have a simple relationship. Almost all land these days is disconnected from the mills and owned by investors. Regardless of their ownership time horizon, investors seek returns from both operating income and timberland appreciation. In order to sell timberland at the end of their tenure, they need to have something worth selling. This feedback mechanism is an effective tool to promote sustainability, creating an efficient market force to calculate a sustainable harvest level. This does not mean that everyone's interpretation of sustainability is the same, but over the long haul it is expected that this dynamic will work in Maine's forest's favor. For example, certain pulpwood products are in high demand, but we are not seeing a rush of landowners to increase harvest levels. Most large landowners calculate their harvest level over a long planning horizon, and they don't deviate from it significantly.

More importantly, when one goes up the value chain of products from low grade wood for energy feedstock, to pulpwood, then to logs, and finally high value logs one finds that the bottom of the ladder contains most of the volume but little of the value. The top of the ladder is in short supply but high in value. In most areas outside Maine, selling low value wood is a problem, forcing some landowners to sell only logs. It is not possible to practice good silviculture without access to markets for low grade wood. Rich, diverse markets for low grade material give landowners the tools to improve stand quality.

This is not to say that imbalances can arise, especially if a new class of non-residual wood consumer enters the market in a big way (in theory at least, pellets should have a high component of residual material from other mills). However, as long as the state does not engage in market distorting subsidies or attempt to allocate resources through policy, the market will correct any imbalances. Although the Maine forest has the capacity for increased production over time, in the short term, landowner forest models and logging capacity will act as a brake. In this situation mills with the best ability to compete will secure the resource. However, it is worth emphasizing that all consumers should be on a level playing field. The state should not give a market advantage to one consumer over another by subsidizing their operations or wood purchases.

Note also that in parts of northern Maine, there is currently little opportunity to market the tops and waste wood that is consumed by biomass boilers in other parts of the state. In addition, we have vast areas of young spruce fir stands that can benefit from an early thinning. These thinnings will produce a lot of low grade wood that will need a market.

Landowners of any significant size have 5 year plans that outline annual allowable cuts, and there are numerous regulations concerning harvest practices mandated by the state that in general provide that lands are managed sustainably. The penalties for landowners that do not follow practices are significant and given that many of them are also certified by third parties (SFI, FSC, ATFS) there is additional motivation to manage sustainably. Business people, including landowners, managers, harvest contractors, etc., do not view regulations as optional; they are part of the license to do business. Of course there are cases where people or companies violate regulations, but this is as uncommon as it is newsworthy.

Appendix B – The Landowner Perspective

(Thanks to Pat Strauch for this information)

In Maine 17.5 million acres of land is forested and primarily privately owned. There are many types of landowners but they can be generally separated into large blocks of commercially owned land (Northern and Eastern Maine) and by small woodlot owners (rural Maine)

From the commercial woodland owners perspective returns on wood products are greatest from quality sawlogs (both hardwood and softwood) with the least amount of return on biomass energy wood. Stumpage reports from the Maine Forest Service provide some perspective on the amount of money paid to a landowner contracting with a general contractor for wood cutting services

Maine Analysis of selected Stumpage prices paid to landowners

PRODUCT	STUMPAGE \$	CONVERSION TP	\$/TON
BIOMASS	\$1.92 TON		\$1.92
FIREWOOD	\$16 CORD		\$32
PALLET WOOD	\$60 MFB		\$12.0
PULPWOOD			
SPRUCE FIR	\$9 TON		\$9
HARDWOOD	\$5 TON		\$5
SPRUCE STUDWOOD	\$17 TON		\$17
SAWLOGS			
SPRUCE	\$135 MBF		\$27.0
SUGAR MAPLE	\$263 MBF		\$52.6
VENEER S. MAPLE	\$529 MBF		\$105.8

In Maine 2006 sawlogs represented 42% of the harvest volume; pulpwood 44%; and biomass 13%. While biomass and pulpwood are important markets for Maine landowners, the best returns are with the higher value sawlogs .

The addition of pellet markets in Maine will serve to diversify market opportunities for wood products as a low value markets.