

**Climate Change Action Plan
Agriculture, Forestry and Waste (AFW) - Draft Action Report List and Summaries**

**New Hampshire Climate Change Policy Task Force
Draft Action Report List and Summaries**

**Agriculture Forestry and Waste
Working Group**

**Prepared by NHDES
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Agriculture, Forestry and Waste Action Report List

AFW Goal 1 - Carbon Sequestration

AFW Action 1.1 Build Up Soil Carbon

AFW Action 1.1.1 Increase Cover Crops

AFW Action 1.1.2 Increase Conservation Tillage/No-Till Farming Practices

AFW Action 1.1.3 Agriculture Land Protection

AFW Action 1.2 Avoid Forest Land Conversion

AFW Action 1.3 Durable Wood Product Promotion

AFW Goal 2 - Fuel and Electricity Generation

AFW Action 2.1 Encourage the Construction and Use of Bioreactors

AFW Action 2.2 Maximize Availability of Biomass for Electricity and Heating within Sustainable Limits

AFW Action 2.2.1 Maintain Infrastructure to Support Biomass Production and Support Regulatory and Business Efficiencies

AFW Action 2.2.2 Ensure Biomass Consumption is within Sustainable Limits

AFW Action 2.2.3 Ensure the Most Efficient Use of Energy/Biomass Stock

AFW Action 2.3 Secondary Biodiesel Feedstocks

AFW Action 2.4 Encourage the Use of Biogenic Waste Sources for Energy Generation

AFW - Goal 3: Recycling and Source Reduction

AFW Action 3.1 Pay-As-You-Throw Initiative (PAYT)

AFW – Goal 4: Reduced Food System Emissions

AFW Action 4.1 Strengthen Local Food Systems

AFW Action 1.1.1 - Increase Cover Crops

Summary: Soil carbon content and the capacity of soil to hold nitrogen can be increased by cultivating cover crops. Increasing the use of cover crops can also potentially increase the nitrogen content of soil and reduce the amount of fertilizer needed.

AFW Action 1.1.2 - Increase Conservation Tillage/No-Till Farming Practices

Summary: Practices that result in less disruption of the soil or increase organic content through carbon deposition can increase the carbon content (stock) of soil or reduce its rate of loss (flow) to the atmosphere.

AFW Action 1.1.3 - Agriculture Land Protection

Summary: The conversion of agricultural land to developed land affects its carbon absorption capacity. Acquiring and preserving open space, reducing sprawl through smart growth measures and encouraging the reuse of existing infrastructure can avoid releases of carbon stored in soils preserves the carbon absorption capacity of existing agricultural lands and enables continued carbon sequestration from the atmosphere.

AFW Action 1.2 Avoid Forest Land Conversion

Summary: Through photosynthesis, New Hampshire's forests take up 25 percent of the State's manmade CO₂ emissions annually (by EPA's estimate). It is critical that we sustain this natural carbon sink and its capacity to take man made CO₂ out of the atmosphere. Minimizing forest land conversion to non-forested uses is a key goal to any successful emission reduction strategy as it sustains the sink and avoids new CO₂ emissions (20% of global manmade emissions of CO₂ are the result of conversion of forest land to non forested uses). Encouraging forest land owners to manage their land sustainably for forest products and to also manage their forest land to store additional carbon should be the focus of public policy objectives. More conservation of large blocks of unfragmented forest land through perpetual easements --- an activity New Hampshire has had great success with --- continues to be a key tool in sustaining the carbon sink New Hampshire's forests presently provide.

AFW Action 1.3 - Durable Wood Product Promotion

Summary: When wood is used to produce products that are valued and held for long periods of time, carbon is stored and not released to the atmosphere. Consumers often have a choice between products made from petroleum or a mineral base versus those produced from wood. The purchase decision is often based on price and a short term, "throw away" mentality. An education campaign could change consumer thinking to use of durable wood products over other materials when buying furniture, building homes, and other structures. Using durable wood products can be more economical while providing a benefit to the environment. This program provides additional benefits to the economy of New Hampshire while improving product, and transportation efficiency.

AFW Action 2.1 - Encourage the Construction and Use of Bioreactors

Summary: The anaerobic biological process that takes place in landfills generates methane (CH₄, a GHG), which has a global warming potential 25 times greater than CO₂. Often the methane is released into the air, or it is burned off (flared) to reduce emissions. But methane can also be captured and utilized as an alternative fuel to produce energy. The process can be enhanced by bioreactors, which speed up the decomposition of solid waste so that methane is generated even more quickly. This technology is already being used at the state's largest landfill owned by Waste Management, Inc. to supply electricity to the University of New Hampshire in Durham. NH can seek to increase the number of landfills in NH that reduce methane and generate electricity by: encouraging the generation of additional electricity from landfill gas-to-energy (LFGE) projects in the state through the NH renewable portfolio standard; working with the PUC and NHDES to streamline project permitting; and supporting the interconnection of these projects by working with the PUC to determine whether projects are viable.

AFW Action 2.2.1 - Maintain Infrastructure to Support Biomass Production Support Regulatory and Business Efficiencies

Summary: The State of New Hampshire's forest industry has long been one of the cornerstones of New Hampshire's economic health. Historically, pulp mills, sawmills, and the production of firewood for home heating have provided the logging industry in this state with diverse markets within which to market their wood. However, New Hampshire has recently seen the loss of pulp and paper production in Berlin and Groveton, as well as a reduction in saw mill capacity for both hardwood and softwood mills. This reduction in available markets, coupled with increases in operating expenses due to the rising cost of petroleum products, equipment, parts, insurance, etc., has put a severe strain on the existing logging infrastructure.

Relatively new markets, such as the production of electricity from wood chips (biomass) and the production of wood pellets for heating residential and public buildings, have provided needed markets for low grade wood and have helped to strengthen existing logging infrastructure. These markets also reduce the use of fossil fuels, thus reducing the state's dependence on foreign sources of energy, as well as reducing its carbon foot print.

The State of New Hampshire must continue to maintain this infrastructure through policies which aid or do not impede the ability to conduct forestry based business in NH. These policies may include, but are not restricted to, the following.

1. Maintain and upgrade E-2 bridges so forest products may take the most direct route possible from stump to market.
2. Restrict municipalities from enacting rules or regulations regarding forest harvesting over and above state regulations.
3. Continue to support the certification of 100,000 pound loads for the transportation of forest products.
4. Continue to support fair and equitable Workman's Compensation Insurance rates for the forest industry job classifications.
5. Educate the general public as to the benefits of forest management.

6. Promote forest management and harvesting on public lands.
7. Continue to support the Baccalaureate and Associates Degree Forestry Schools at the University of New Hampshire.
8. Support work force training programs such as the Logger Certification Program.
9. Allow State Regulated Utilities to add renewable generation.

AFW Action 3.2.2 - Ensure biomass consumption is within sustainable limits

Summary: Forest biomass represents significant new opportunity to meet demands for both thermal and electric energy. However, biomass stocks to support this demand are not unlimited and biomass is only one of a suite of benefits we realize from our forests. Biomass consumption needs to be within the biological capacity of the land to grow fiber, should not compromise biological diversity, water quality, recreational values and aesthetics and should compliment the existing forest products economy.

AFW Action 2.2.3 Ensure the Most Efficient Use of Energy/Biomass Stock and Promote co-Location Projects

Summary: The economics and supply of wood biomass for energy or thermal heat production is complex and has many important variables. Planners, producers, potential suppliers, marketers, investors, governments, regulators and consumers need some understanding of these factors and the underlying resource data to make good decisions about the efficient use of the available resource. Low grade wood material appropriate for power generation or thermal heat production is limited in availability and its value is quickly diminished by the cost or distance it must be transported. It will be very important to carefully plan the location of the large consumers of this material to preserve the efficiency of the industry.

In the current energy market, wood biomass is only affordable as a byproduct of harvesting higher value material. In other words, higher returns are needed from the sale of saw timber and pulpwood to finance some of the costs of harvesting low value, energy wood. This is primarily top wood, branches, saw mill waste and other material not fit to make lumber or paper. The standards can vary depending on market conditions and hauling distances to the end points. The supply or availability of biomass can vary with demand for the other products. Growing conditions, soil productivity, tree species composition and forest age varies throughout the state. This results in different potentials for supply of biomass from different areas.

There is a higher efficiency of energy conversion from wood biomass to thermal heat than to electricity generation. Wood is grown and harvested in all communities in the state. There are opportunities to heat public complexes, buildings, private developments, individual homes or even entire communities with wood biomass throughout the state.

Portions of the state with some of the most abundant wood supply, lack the power line transmission capacity to locate a wood power generation facility there.

Existing wood fired power plants produce “waste” heat that could support other heat using industries.

AFW Action 2.3 - Increase Development and Use of Secondary Feedstocks for Biodiesel

Summary

The soy industry has been the driving force behind biodiesel commercialization because of product surpluses in the Midwest states and declining prices. However, production of biodiesel with all available soy oil equates to only 5% of on-road diesel demand in the U.S. The state should invest time and money into research and development (R&D) and commercialization of using yellow grease, brown grease, and algae as alternative, sustainable feedstocks for biodiesel production.

According to a highly cited study by Wiltsee in 1998, and confirmed by NREL estimates, available yellow grease in the U.S. is approximately 8.86 lb/yr/cap and for brown grease is 17.9 lb/yr/cap⁹. Using 2006 population in NH and assuming 60% water content in trap grease, 11.6 million lbs of yellow and 9.4 million lbs of brown greases are available in NH. If these are converted to biodiesel, the state could displace almost 3 million gallons of diesel fuel. In 2005, NH consumed 106 million gallons of distillate fuel in the transportation sector alone⁸. Yellow and brown greases could therefore displace 3% of the state's transportation diesel fuel.

AFW Action 2.4 - Encourage the Use of Biogenic Waste Sources for Energy Generation

Summary:

The State should create and implement innovative programs to encourage the development of facilities and processes that utilize biogenic waste streams as energy sources and reduce New Hampshire's reliance on fossil fuels. These wastes can be generated in municipal, residential, agricultural, institutional and industrial settings and can provide heat, power and fuel through a number of applications. The potential wastes include sludge, septage, municipal and industrial wastewater, brown grease, residential and institutional food waste, and manure.

Due to the impact that a variety of factors can have on determining the most economical and efficient use of waste streams for energy, the state should create a flexible program that will enable the most appropriate application to be selected and developed. These projects could be incentivized through the creation of a loan program to assist livestock and industrial operations and the modification of existing funding mechanisms for municipal facilities to address the issue of higher first/capital costs and realize the long-term reduction in operating costs and fossil fuel consumption. Additional resources could be developed to facilitate the optimization of the selected processes and achieve peak efficiencies.

AFW Action 3.1 - Pay-As-You-Throw Initiative (PAYT)

Summary: A significant portion of the solid waste stream is composed of materials with a significant embodied energy and many materials have the potential to be recycled or reused and displace the emissions associated with producing new materials from virgin raw materials. The recycling rate in New Hampshire is less than 21%, well below the national rate of 32%. There are a number of potential strategies to see this rate increase, but one that has already proven successful in a number of NH communities is Pay-As-You-Throw (PAYT), a system that requires households to pay for waste disposal based on the amount they generate. The fee that is assessed for each bag or can of waste or based on the weight of the trash provides an incentive for households to generate less waste, and to reuse, compost and recycle what remains.

AFW Action 4.1 - Strengthen Local Food Systems

Summary: Food processing, packaging, storage, refrigeration, transportation, and marketing consume the vast majority of the energy used in the food industry. Food transported from the larger food producing centers can travel more than 20 times the distance of locally grown produce. Development of a stronger local food network can reduce the carbon emissions associated with distant food production, and may also insulate the state from disruptions in the food supply in the event that energy supply or transportation is threatened.

Only a small fraction of food consumed in the state is currently produced here. Currently the state's farmers produce nearly enough milk to supply the state's fluid milk consumption, but not enough for other dairy products (cheese, yogurt, butter, ice cream, etc.). Production of apples and maple syrup is nearly in balance with quantities consumed. Vegetables, small fruits and herbs are produced in quantities that supply a significant but undetermined portion of the state's needs during the growing season. All these products may be sold across state borders, however. Regionally (within New England or the Northeast) food production fills more diverse needs.

New Hampshire agriculture has suffered from competition from more cheaply produced foods from other regions and other countries. Local farm businesses can thrive and supply significantly larger portions of the state's food requirements if consumers accept prices that reflect the true values of locally produced foods and the costs of production in New Hampshire on our smaller and medium-sized farms, which are often higher than elsewhere. Increasing farmers' and growers' share of the consumer food dollar is key to achieving this goal.

Support for this goal will also result in better utilization of available land resources. Strengthening local food systems and building a more prosperous agricultural economy will help prevent conversion of land for development by keeping more land in profitable agricultural production.