Environmental and
Energy Study Institute
Carol Werner, Executive Director

March 4, 2008

Sustainable Forest Bioenergy - Knowledge Gaps and Research Needs

1) Reliable biomass assessments, national, regional, AND local and including economic, infrastructural, and ownership layers in addition to simple forest inventories.
2) Sustainability and environmental impacts, especially relating the removal of increased amounts of small-diameter woody biomass and its impacts on erosion, regeneration, nutrient cycling, and wildlife habitat elements.
3) New innovative, efficient harvesting equipment, including mobile chippers, 'bunk' forwarding systems, and equipment for the harvest and processing of small-diameter materials.
4) The appropriate role of GMO technologies.
5) Conversion technologies (cellulosic ethanol, pyrolysis, gasification).
6) Life Cycle Analysis (LCA) models for climate change impacts of forest-based bioenergy (similar to the GREET model for corn ethanol).
7) What are the optimally-effective (and ideally non trade-distorting) policy incentives?
8) A better understanding of potential competition for feedstock between energy, pulp, timber, and special products interests.
9) A more thorough methodology for estimating the appropriate scale for a wood energy project, given the size of the forest resource, local economy, local energy demand (including thermal), community priorities, etc.
10) Landowner (as well as neighbors, community members, etc.) attitudes towards bioenergy and forest management for energy.
11) Likely market trends given an increased value placed on biomass, especially as it might pertain to opportunities for small non-industrial private landowners.
12) A more detailed understanding of the forests types and circumstances under which fuel reduction is a successful and appropriate means of fire mitigation. This information would provide a background against which we can frame meaningful, agreed-upon policies that promote bioenergy as a means to reduce catastrophic wildfire.
13) The appropriate means of structuring an RFS to ensure sustainability, while still providing for flexibility and inclusion of woody biomass from a wide variety of ownerships.
14) A functional definition of ‘sustainable forest management’ is needed – one that meets wide consensus and includes multiple values.
15) The importance of including value-added co-products in the marketing and economics of bioenergy.
16) Ways to add value to forest materials in the woods. By increasing the value and density of forest products, relative fuel and transportation costs are reduced, and the distance that products can be economically shipped is increased.
17) What is the human capacity for forest bioenergy? Do we have enough trained foresters? Is the traditional forestry education, focused on production of sawlogs, adequate for dealing with management that includes or even emphasizes woody biomass?

18) Good regional information on woody biomass prices, as well as pricing information for wood alternatives (ag residues, wastes, fossil fuels), on a seasonal basis and in total.
19) How much will biomass value have to increase to really make a difference in the affordability of sustainable management and ecological restoration? Similarly, how much of an increase is necessary to make a difference in whether a landowner decides to sell out (to development) or not?
20) EIA lists all renewable energy biomass as other – this needs to be broken out into usable subsections – cordwood, pellets, chips, tons of ag residue, etc.
21) A good market analysis comparing the market-creating potential of various policies in law or under consideration (RFS, RES, etc.).
22) How sustainability standards can be successfully tracked and implemented.
23) A comparison between the relative merits of carbon sequestration and producing energy from woody biomass, as well as determining to what extent both approaches can be used simultaneously.
24) Tools and methods for determining the most efficient use of woody biomass at a given location, taking into account local markets, infrastructure, community needs, transportation, and the inherently greater efficiency of using wood for heat and power over liquid fuels.
25) The water demand for the various energy products from woody biomass.
26) How communities can be proactive is managing forest resources for energy products and what benefits they can hope to see at a number of scales and timeframes – case studies.
27) A good analysis on European markets, policies, and infrastructure for using forest biomass, with a focus on what is likely to be effective in the U.S.
28) The effect of climate change on biomass productivity and supply.
29) Thorough and credible analysis of wood combustion emissions, performance, and chemistry across tree species and wood characteristics.
30) Comparison of cost/unit carbon emissions between wood energy and other renewables.