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Federal Forests and the Renewable Fuel Standard

On December 19, 2007, the President signed into law the Energy Independence and Security Act of 2007 (EISA). This law (PL 110-140) includes an increase in the national Renewable Fuel Standard (RFS) mandating the production of 36 billion gallons of renewable fuels by 2022. Within the total mandate, 21 billion gallons must qualify as advanced biofuels – fuels made from renewable biomass other than corn starch. There are additional carve-outs for biomass-based diesel and fuels made from cellulosic feedstocks, such as wood, grasses, and agricultural residues. An important component of the RFS is a series of greenhouse gas emissions screens, essential safeguards that ensure renewable fuels will meet minimum verifiable reductions in greenhouse emissions. For renewable fuels (from new facilities) to qualify under the RFS, they must achieve at least a 20 percent reduction in direct and indirect lifecycle emissions compared to equivalent petroleum fuels. Advanced fuels and cellulosic fuels are subject to a 50 percent and 60 percent emissions screen, respectively. Because of these stringent safeguards and the large quantity of fuel mandated, it is paramount that we not rule out potentially important feedstocks without valid reasons. The definition of 'renewable biomass' included in the law, however, **does** rule out a number of feedstocks, including thinning materials and woody residues from federal forests.

There are a number of reasons why the inclusion of federal forests in the definition of renewable biomass would be beneficial for the RFS, global climate, and our public forests:

Significant Potential

- U.S. forests cover 755 million acres (Alvarez 2007), of which approximately one third is managed by federal agencies. Public forests are concentrated in the western states, especially throughout the Rocky Mountains and Alaska. Slash, unmerchantable trees and other logging residues are ***regularly*** generated within these forests as byproducts of stand improvement thinnings and forestry activities intended to promote wildlife habitat, ecosystem functioning, timber production, biodiversity, and recreational opportunities. In addition, biomass is regularly harvested during restorative and preventative treatments to protect against wildfire and insect infestations. According to one assessment, 5.2-7.5 million dry tons of forest biomass could be sustainably generated from hazardous fuel reduction treatments in the western states (Western Governors' Association 2005).

No Indirect Greenhouse Gas Emissions

- Current estimates of **direct** lifecycle emissions for cellulosic fuels show reductions in the order of 88-94 percent compared to petroleum fuels (Schmer et al. 2008, Union of Concerned Scientists 2007). However, the emissions requirements in the RFS explicitly include both **direct *and* indirect emissions**. Recent publications (Searchinger et al. 2008, Fargione et al. 2008) highlight the potential magnitude of indirect emissions caused through agricultural displacement globally. These emissions occur when production on arable land shifts from food products to biofuel feedstocks. Since global demand for foodstuffs is fairly inelastic, this decrease in supply is met by clearing new lands for agriculture, resulting in greenhouse gas emissions from deforestation, fires, and erosion. To make matters worse, clearing often occurs in rainforests, wetlands, native grasslands, and other imperiled ecosystems. Although indirect emissions could become a major obstacle to producing biofuel feedstock on agricultural land, more research is needed to understand how to fully determine these effects. In the meantime, prudency would suggest that we place greater emphasis on those feedstocks which do not impact the supply of agricultural commodities and therefore will not result in such a chain reaction. This includes waste materials, such as agricultural residues, food processing byproducts, yellow grease, and urban wood waste, and feedstocks produced on non-agricultural land, such as algae and woody biomass **from *existing* forestlands –** including the extensive managed areas of our federal forests.

Cost-effective Tool for Sustainable Forest Management

- Not only can woody biomass contribute substantially to the production of sustainable biofuels, but biomass utilization can be a valuable tool to help improve stand conditions and facilitate management on those public forests that could benefit from increased thinning of small-diameter and low-quality trees. Small-diameter thinning is a major component of hazardous fuels reduction on lands identified as being at risk from catastrophic wildfire. Since 2000, the National Fire Plan has included hazardous fuels reduction as a key element of national fire policy (USDA and DOI 2000). Large, catastrophic fires destroy life and property, threaten communities, reduce air quality, and release huge pulses of greenhouse gases. One study estimates that large, stand-replacing fires can emit over 2 tons of carbon per hectare (Finkral and Evans 2007). **Where and when appropriate,** hazardous fuels reduction can decrease fire intensity, fire frequency, and fire velocity, as well as the likelihood that a fire will evolve into a highly destructive crown fire (Duvenek and Patterson 2007, Agee and Skinner 2005, Brose and Wade 2002, Pollet and Omi 2002, Finney 2001, Fule et al. 2001, Stephens 1998, Kalabokidis and Omi 1998, Weatherspoon and Skinner 1996). **In order to be successful in these objectives and avoid negative environmental impacts, however, hazardous fuel reduction treatments must be carefully tailored to the forest type, historical fire regime, geography, and ecological characteristics of the stand being treated.** After thinning, slash and harvest residues should be treated on site or transported out of the forest to avoid increased fire risks among accumulated low fuels (Bolding and Lanford 2001, Kalabokidis and Omi 1998, Stephens 1998). Currently, the majority of thinning materials are chipped, ground or burned on site (U.S. Government Accountability Office 2007). The intentional burning of residues in the field produces many of the same negative impacts as wildfires, including emissions of greenhouse gases and particulate matter (Radke et al. 1981).

- Thinning of small-diameter trees can be a valuable tool in managing federal forests for other values and objectives in addition to hazardous fuels reduction. Thinning can result in improved tree vigor, increased drought tolerance, and increased growth by decreasing the stand density and reducing competition between trees for sunlight, water, and nutrients (Smith et al. 1996). Because vigorous fast-growing trees are generally more proof against pests, thinning can be a successful means to reduce the extent and lethality of insect infestations in many forest systems (Fettig et al. 2007, Romme et al. 2006). In addition, harvesting of small-diameter trees can be an important component of habitat management for wildlife species that require early successional habitat or low stand density (McComb 2007, Gram et al. 2003, Desseker and McAuley 2001, Hume et al. 1999). Finally, forest thinning and other silvicultural activities can have positive effects on watershed functioning**,** and specifically water yield (Stednick 1996, Troendle 1983), of the most essential ecosystem services from federal forests in much of the western U.S.

- Stand improvement thinnings focusing on small-diameter trees are expensive operations; federal budgets are inadequate to treat the vast public acreages that could benefit from this treatment (U.S. Government Accountability Office 2008). Adding costs for residual treatments (chipping, grinding, and burning) only compounds the problem. The feasibility of thinning is limited in many places by the lack of markets for small-diameter trees and woody biomass. In the absence of markets, federal agencies almost certainly cannot afford to thin vast acreages on the public dollar – nor would this necessarily be the wisest and best use of funds. The RFS has the potential to provide necessary markets and bring a higher quality and greater range of management tools within the national budget – helping provide solutions to multiple problems.

Conclusion

Federal forests have the potential to contribute substantially to the production of sustainable biofuels. Furthermore, biomass extraction has the potential to become a powerful tool for improving the quality of management on our federal lands. The range of options for management of wildlife habitat, forest hydrology, hazardous fuels reduction, and pest infestations could be vastly increased if markets for small-diameter trees were expanded. These markets are not likely to appear, however, if federal forests are excluded from the RFS. A transparent and inclusive dialogue among stakeholders, interest groups, and policymakers will be a necessary step in amending this law.

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