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### Energy from biomass and wastes: 1985 update and review

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#### Abstract

The gradual and then rapid reduction of crude oil prices, the impact of U.S. Gramm-Rudman-Hollings legislation (to reduce budget deficits) on R&D (research and development) budgets, the partial elimination of renewable-energy tax credits, and the possible elimination of all energy tax credits and forgiveness via tax reform, are all taking their toll on energy research and commercialization ventures. However, it appears that “biofuels” will survive and continue to exhibit modest increases in contributions to primary energy demand. A comprehensive assessment of renewable-technology options has shown that biofuels is the only option capable of making significant contributions to all energy sectors. The total contribution of renewable energy to primary energy demand in the U.S.A. is about 7.2EJ/y (6.8 quad/y); biofuels provide about 40% of the total. Research on short-rotation intensive-culture (SRIC) trees and herbaceous and aquatic biomass has identified specific species for development. Some of these species appear to be near economic feasibility as energy crops now. Commercialization of biomass and waste combustion systems has shown a spurt in growth because of the business

waste combustion systems has shown a spurt in growth because of the business opportunities offered by laws encouraging cogeneration. Thermochemical gasification research on advanced technology systems has reached the point where scale-up is being considered. Commercialization of state-of-the-art technologies has slowed, but applications for small-scale producer gasifiers, particularly in developing countries, continue to expand. Thermochemical liquefaction research has concentrated mainly on high-temperature pyrolytic conversion methods that can increase yields and selectivities. Significant research achievements have been made in anaerobic digestion, but whatever its future as a large-scale source of methane, it is clear that digestion capacity will have to increase many-fold before biological methane can attain its potential. The mandated reduction in lead content of gasolines presents substantial marketing opportunities to alcohol-fuel producers. If projections for ethanol-fuel markets materialize, conversion of low-cost lignocellulosic materials will be necessary. Research to develop this technology is now in progress.



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