279d Initial Comparative Process Economics of Leading Biomass Pretreatment Technologies

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In support of the Biomass Refining Consortium for Applied Fundamentals and Innovation (CAFI) research activities, initial comparative process economic models for five different pretreatment processes (dilute acid, hot water, ammonia fiber explosion (AFEX), ammonia recycle percolation (ARP), and lime pretreatment) were previously developed using a consistent design basis. These models were used to evaluate the techno-economic potential of each of these pretreatment approaches, using data generated in the earlier USDA-funded CAFI project. That work revealed little differentiation between the projected economic performances of the pretreatment options at the present level of process information. Additional process performance data, especially involving the identification of optimal enzyme activity blends for each pretreatment approach and conditioning requirements of hydrolyzates at process-relevant sugar concentrations resulting from each pretreatment, may lead to greater differentiation in projected process economics. These factors, among others, are being investigated in the current DOE Biomass Program-funded "CAFI 2" project. The existing process economic models and also being updated to reflect the ability to process two different feedstocks (corn stover and hardwood poplar), to allow for use of different enzyme activity preparations, and to account for different hydrolyzate conditioning requirements for effective fermentative conversion to ethanol. The status and initial findings associated with these model updates will be presented.