

CAN SUGARBEETS BE USED FOR ENERGY IN CALIFORNIA?

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The last factory for sugar production from beets in Mendota in northern California closed in 2009. Recently, the grower-based Mendota Beet Energy Cooperative has formed to develop an integrated biorefinery based on sugar beets for ethanol and other bioenergy products. When developed, the biorefinery will link residual orchard biomass gasification for heat and power, ethanol production from sugarbeets (both advanced and cellulosic), and biogas from both stillage and crop and urban residues. Water and nutrients will be recycled. California's Low Carbon Fuel Standard incentivizes low carbon intensity (CI) biofuels, calculated using Life Cycle Assessment (LCA). Initial LCA estimates for the direct CI of beet ethanol are less than 20 g CO_{2eq} MJ⁻¹ of ethanol, compared to more than 96 g CO_{2eq} MJ⁻¹ for gasoline. Thirty thousand acres will be needed to produce an estimated 30 million gal of ethanol per year, plus biogas and other by-products. Additional novel features of the proposed biorefinery call for harvesting beets daily for 12 months, and greater reliance on drip irrigation than previously. To achieve this goal, the previous system of varied planting and harvesting date districts that supported the older sugar factory must be recreated. Challenges to this plan include important pathogens like beet curly top virus and Cercospora leaf spot, harvesting roots in wet periods in winter, and availability of sufficient annual crop land. To help identify costs of production for growers and the refinery, the California Biomass Crop Adoption model (a partial mathematical programming model) was used to estimate costs in each district, and overall costs to the biorefinery. Economic and LCA analyses are integrated in this project and are described.