

Renewable Fuel Standard-2 (RFS-2) and Opportunities for Kansas Agriculture/Sorghums

U.S. RENEWABLE FUELS STANDARD



Richard Nelson K-State Center for Sustainable Energy

Fuel Type	Approved Standards from June 2011 ¹	Suggested Standards in original RFS 2 proposal ²
Biomass based diesel	1 billion gallons	1 billion gallons
Advanced Biofuels	2 billion gallons	2 billion gallons
Cellulosic Biofuels	a) 2010 6.5 from 100 million gallons b) 3.45 - 12.9 million gallons	500 million gallons
Total Biofuels	15.2 billion gallons	15.2 billion gallons

RFS – 2 Volumetric Requirements and Sustainability Criterion

Fuel Type	Sustainability Criterion
Conventional Biofuel Ethanol from Corn Starch	20% lifecycle greenhouse gas emission reduction
Advanced Biofuels Anything but corn ethanol, including the following subcategories	50% lifecycle greenhouse gas emission reduction
Bio-based Diesel A Biomass based diesel fuel substitute	50% lifecycle greenhouse gas emission reduction
Cellulosic Biofuels Renewable fuel produced from cellulose, hemicellulose, or lignin	60% lifecycle greenhouse gas emission reduction

Baseline is 2005 petroleum

Indirect Land Use must be considered !

KS Sorghum in this Category

Water use not part of the “sustainability” equation

Sorghum and RFS-2

- Corn-based ethanol is capped while sorghums will not be
- LCA in process by US EPA, but not approved and the first cut was not favorable due to comparison to corn. Being changed now with input from USCB-funded program at K-State.
- Sorghum as an Advanced Biofuel
 - Comparison to corn:
 - Less water and less CO₂ from irrigation (if considered); currently CARB does not consider irrigated sorghum
 - Less fertilizer hence less CO₂ emissions

Opportunities for KS with the RFS-2

- **Sorghum for Grain** – certainly has potential, but economics will play the most important role
- **Ag Crop Residues** – major national focus and select areas of KS have sustainable feedstocks
- **Herbaceous energy crops** hold most promise
 - Photoperiod sorghums
 - Sweet sorghums
 - Mixed grasses

**More marginal
lands/acres can be
used and less water**

Next Steps for Kansas

- Kansas Biomass Resource Assessment recently completed.
- Dedicated (but unconventional) bioenergy crops are probably the 2nd step. What is the impact of iLUC on sorghum and other potential bioenergy crops in KS?
- *How does water fit into the equation and how can reduced water be “externalized”?*
- Others?