

West Virginia Bioenergy Crops

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Using Plants for Fuels is not a New Idea

Wood Powered Steam Engine



Nebraska Gas-Station 1933



In the Last 30 Years:

- U.S. Dept. of Energy (DOE) has Developed a Strong Research Program on Crops for Energy Production

An Excellent Reference

- Oak Ridge National Laboratory
(ONRL)
- Bioenergy Feedstock Information Network
(BFIN)
 - <http://bioenergy.ornl.gov>
- <http://www.doe.gov/energysources/bioenergy>

Bioenergy Feedstock Information Network (BFIN)

- “BFIN is a gateway to a wealth of information resources from the U.S. DOE National Labs and other organizations”

Website contains:

Fact sheets, Reports, Journal Articles,
Presentations, Databases, Models

Bioenergy vs. Biomass Crops

Bioenergy “All plants used for energy”

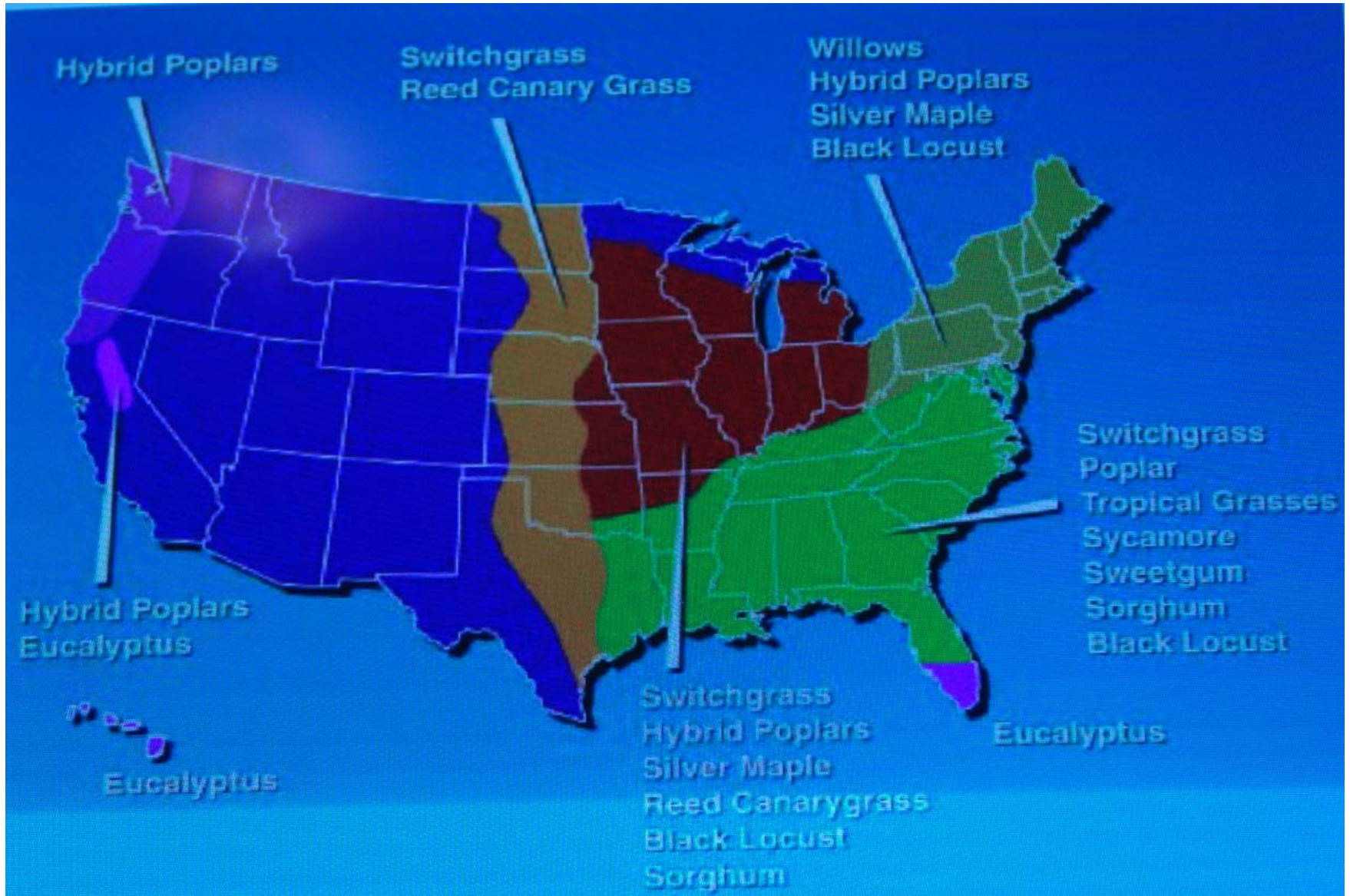
- **Commodity Crops**
Corn, Sugarcane, Sorghum, (sugars & starches); soybeans, rape (oils)
- **Biomass Crops**
(wood, fiber , hays)

Biomass

- **Hays & Crop residues**
(celluloses)
- **Trees** (wood & fiber)

Not all Energy Crops are Biomass Crops

Location Determines Biomass Crops



WV Bioenergy Crops

1. Traditional Commodity Crops

Corn, Soybean, Sorghum, Rape

2. Trees

Hybrid poplar, Willow, Silver maple, Black locust, Sycamore, Sweet gum, Yellow poplar

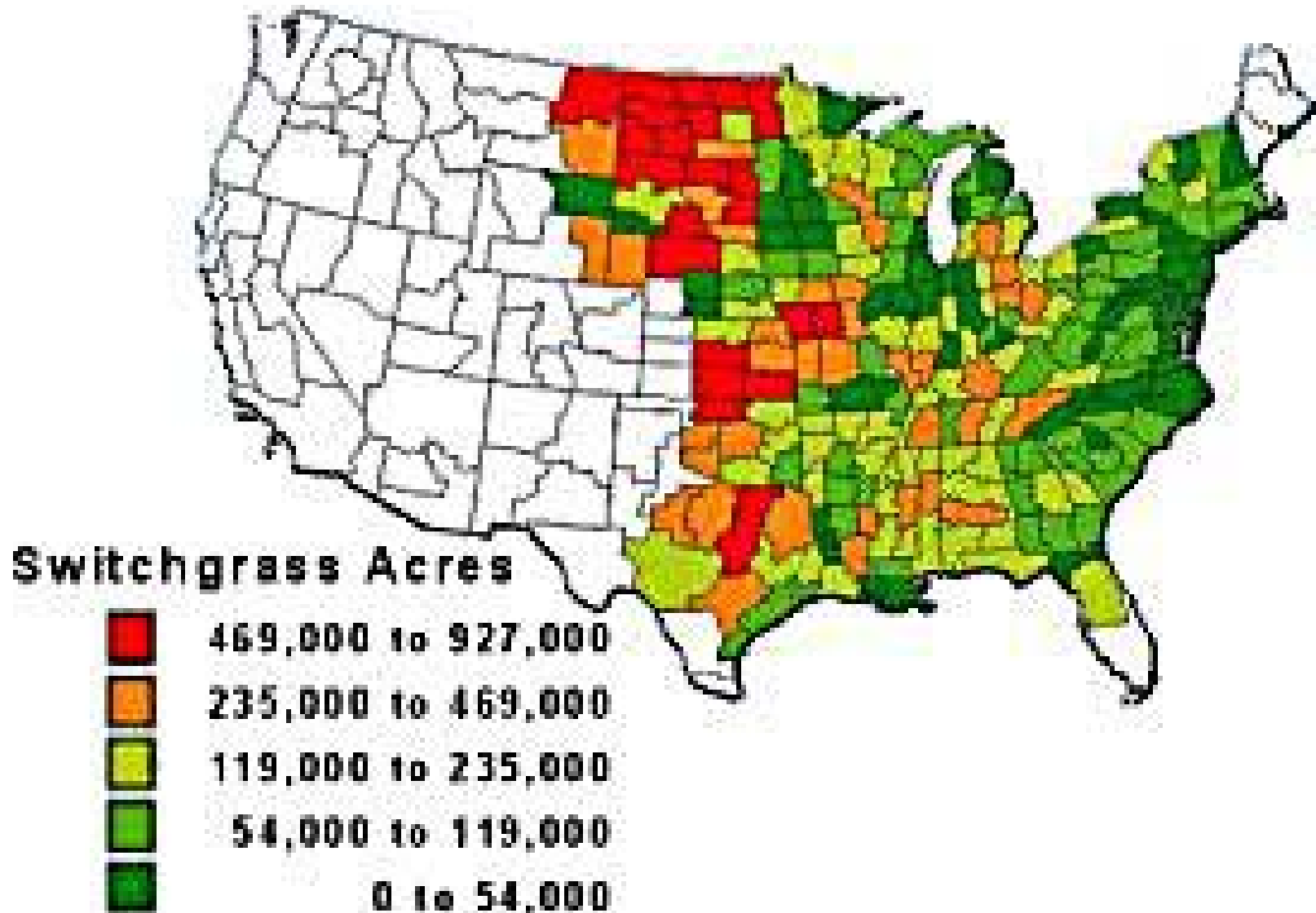
3. Grasslands

Switchgrass & other prairie grasses,
Miscanthus, Legumes

Switchgrass (*Panicum virgatum*)



Potential Distribution of Switchgrass



Switchgrass as Model Biomass Crop has been studied for two decades



A 1200 lb. bale = 48 gallons of ethanol (400-500 gal./ acre).
Improvements should double the yield.

Perennial Crops Do More Photosynthesis Early in the Season



Alfalfa bales in June



Cornfield in June

Miscanthus x giganteus



Attributes of Biomass Energy Crops

The "Ideal" Biomass Crop?	Corn	Short-Rotation Coppice*	Perennial Grass
C4 photosynthesis	★		★
Long canopy duration		★	★
Recycles nutrients to roots			★
Clean burning			★
Low input		★	★
Sterile (noninvasive)	N/A	(★)	<i>M.g.</i> **
Winter standing		★	★
Easily removed	★		★
High water-use efficiency			★
No known pests or diseases			<i>M.g.</i>
Uses existing farm equipment	★		★

* Coppice is a grove of densely growing small trees pruned to encourage growth

** *Miscanthus giganteus*

Fig. 2. Attributes of an "Ideal" Biomass Crop. [Table adapted from S. Long, University of Illinois]

Thank you!

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