



OKLAHOMA'S BIOENERGY FUTURE

Presented to:

Biomass 2009: Fueling our Future

March 18, 2009

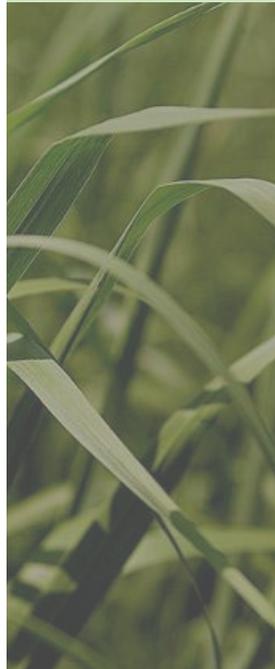
Presented by:

Robert Wegener

Secretary of Energy, State of Oklahoma

Oklahoma Bioenergy Center

- \$40 million program over 4 years
- Contributing Institutions:
 - Oklahoma State University
 - University of Oklahoma
 - The Noble Foundation
- Purpose: Conduct the research and establish the outreach programs to foster the **development of a biofuels industry** in Oklahoma while also contributing to the **national research effort**



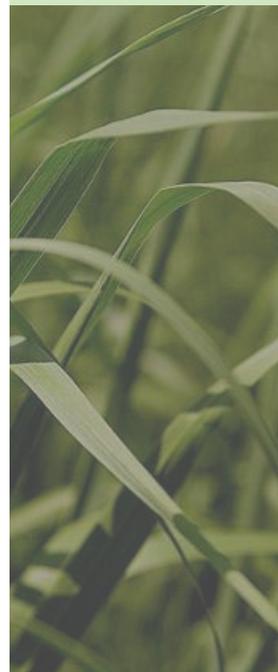
2009 State of the State Address

Two years ago, in recognition of the potential of biofuels, we created the Oklahoma Bioenergy Center to capitalize on the innovative research being conducted in our state.

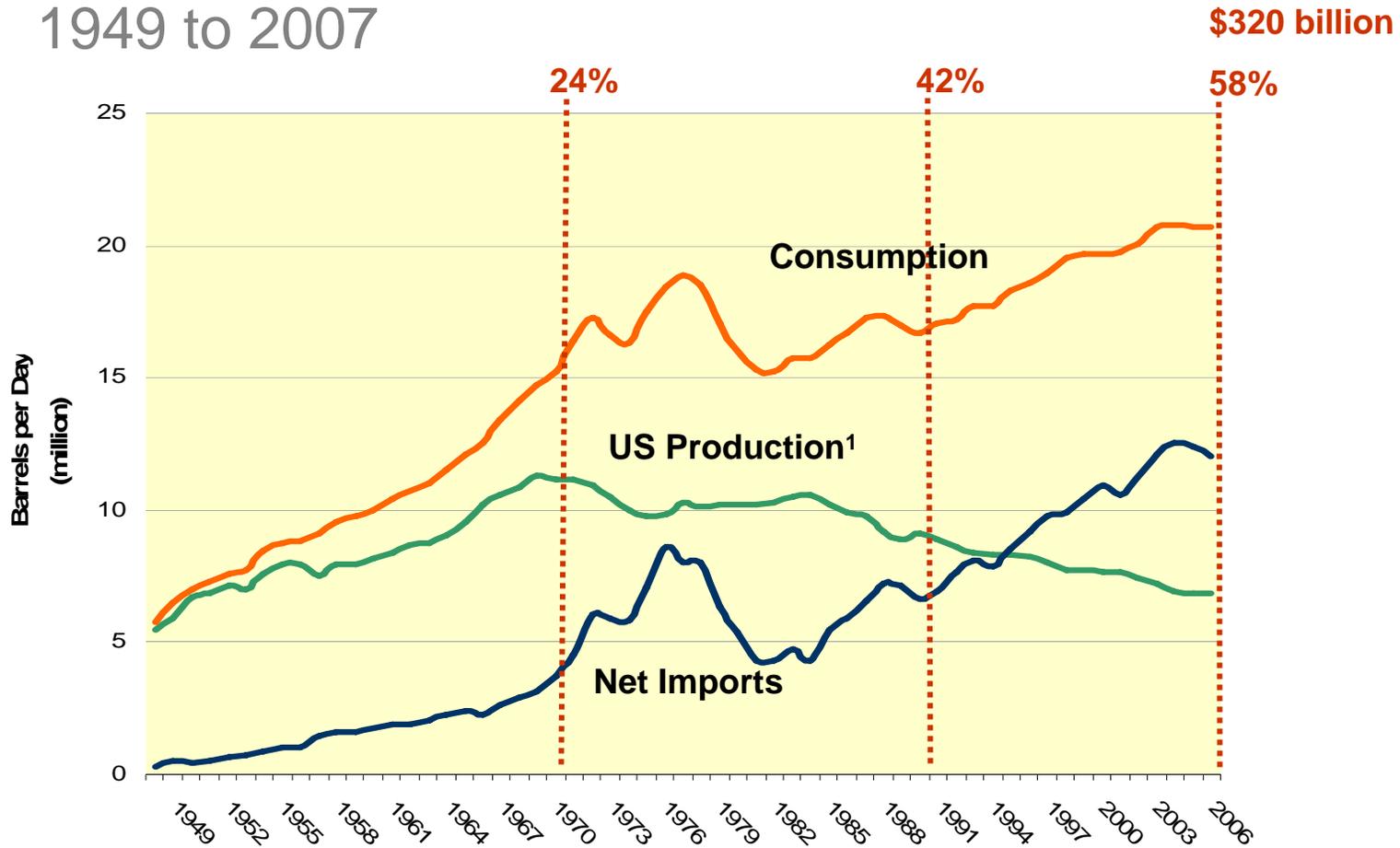
*Oklahomans are expanding the possibility and viability of cellulosic ethanol, and **it is critical that we continue our commitment to this visionary enterprise.***

Governor Brad Henry

February 2, 2009



U.S. oil production, importation and usage 1949 to 2007



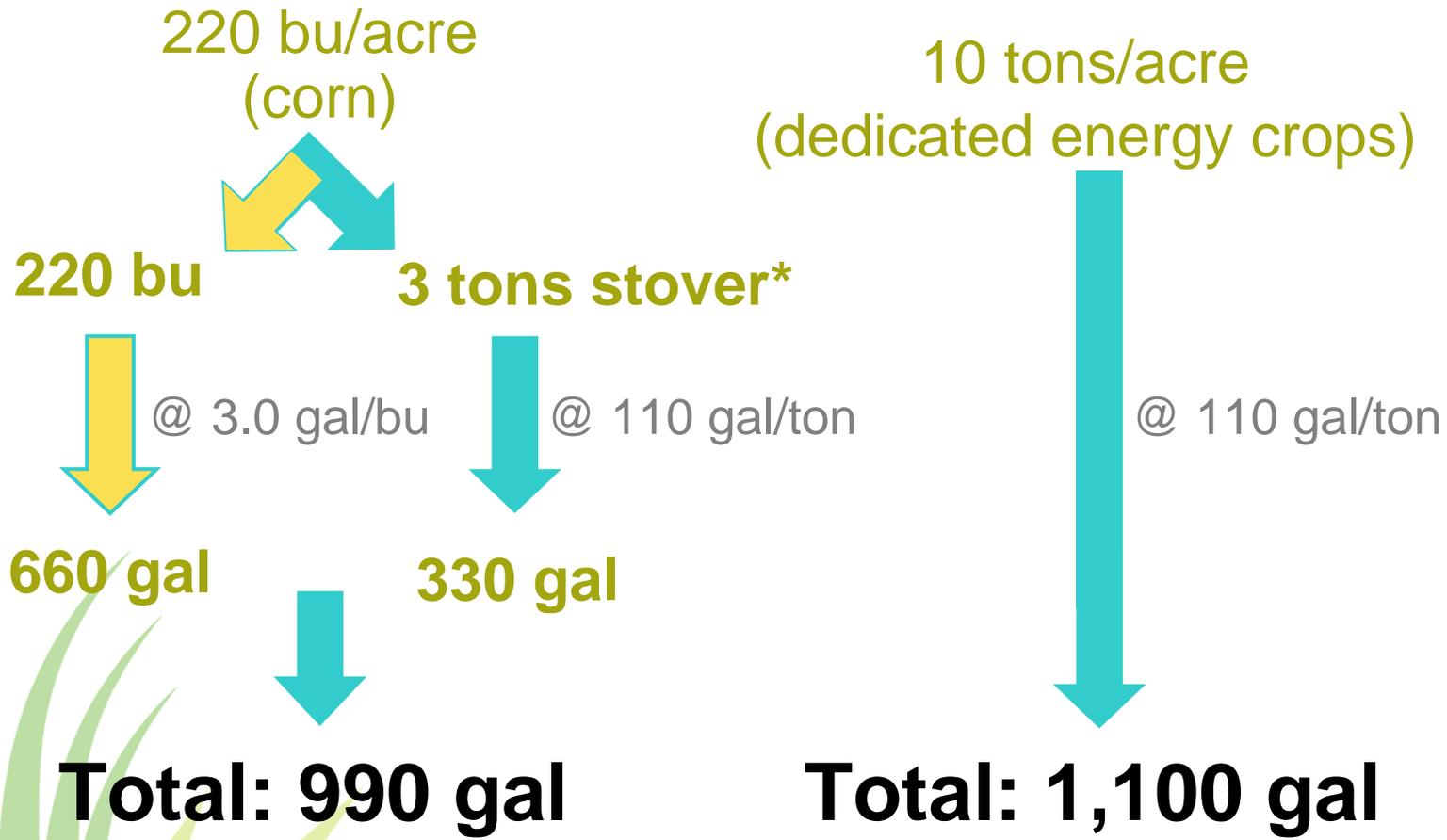
¹Crude oil and natural gas plant liquids production.

Source: Energy Information Administration, *Annual Energy Review 2007*-Table 5.1, June 2008.

Cellulosic ethanol



Cellulosic ethanol: future production



* Assumes a total of 6 tons with 50% removal

Impact to rural economies

If the U.S. were to reduce gasoline usage by 20% and replace that with homegrown biofuels:

*In the course of one year – assuming an average oil price of \$50 per barrel – farm communities and other biofuel players would reap **\$50 billion** that would have gone to foreign oil producers.*

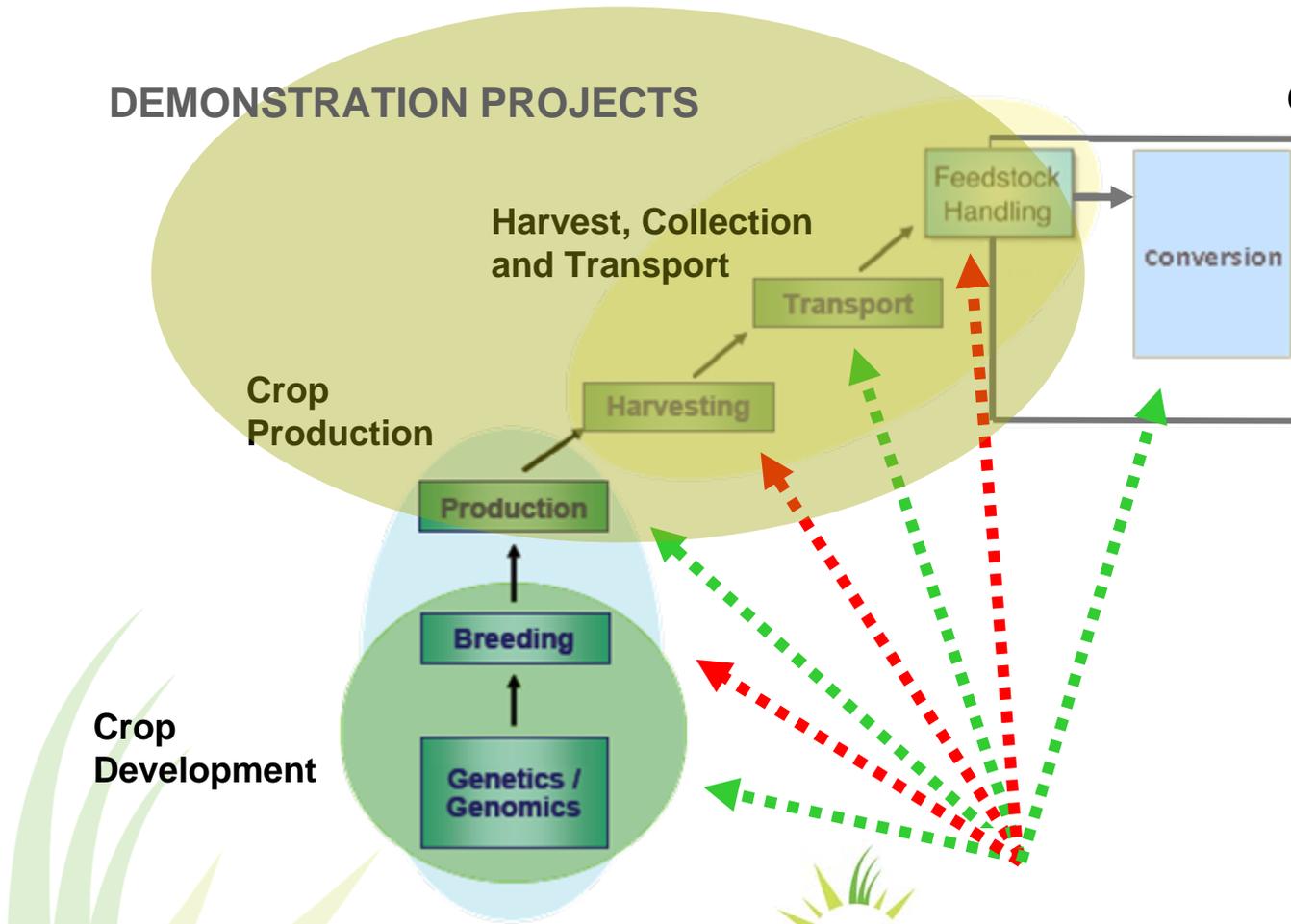
– **Business Week**, Nov. 13, 2006



Oklahoma Bioenergy Center

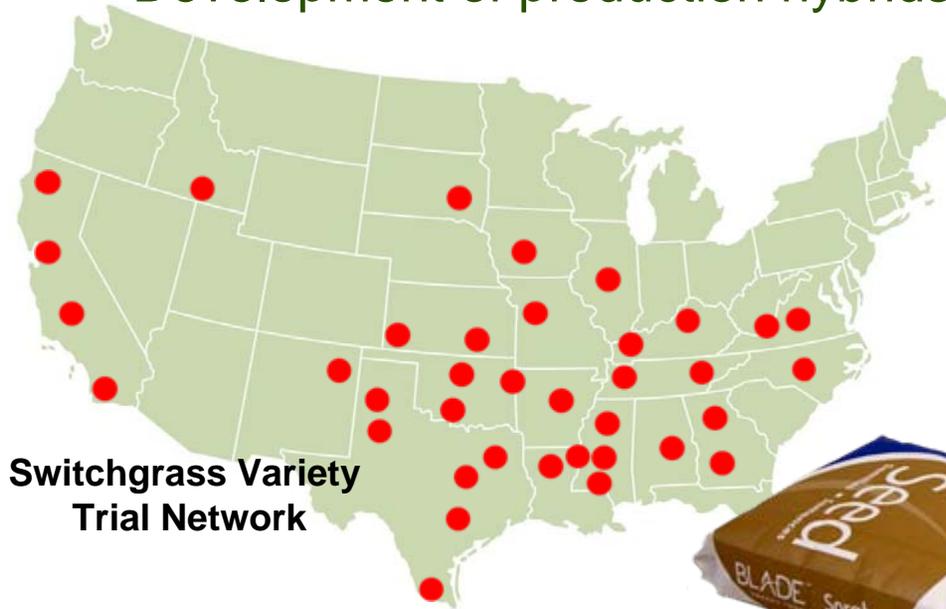
DEMONSTRATION PROJECTS

Conversion



Crop development

- New switchgrass varieties
 - 2009: EG1101 and EG1102 (Ceres, Inc.)
 - Traditional and molecular breeding
 - Development of production hybrids



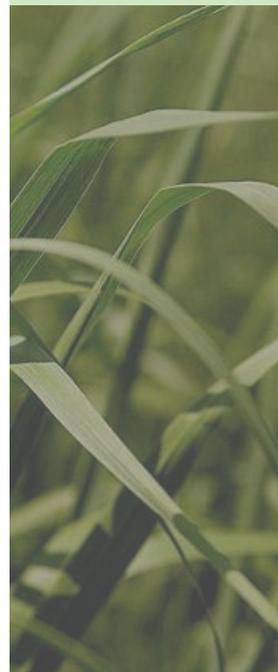
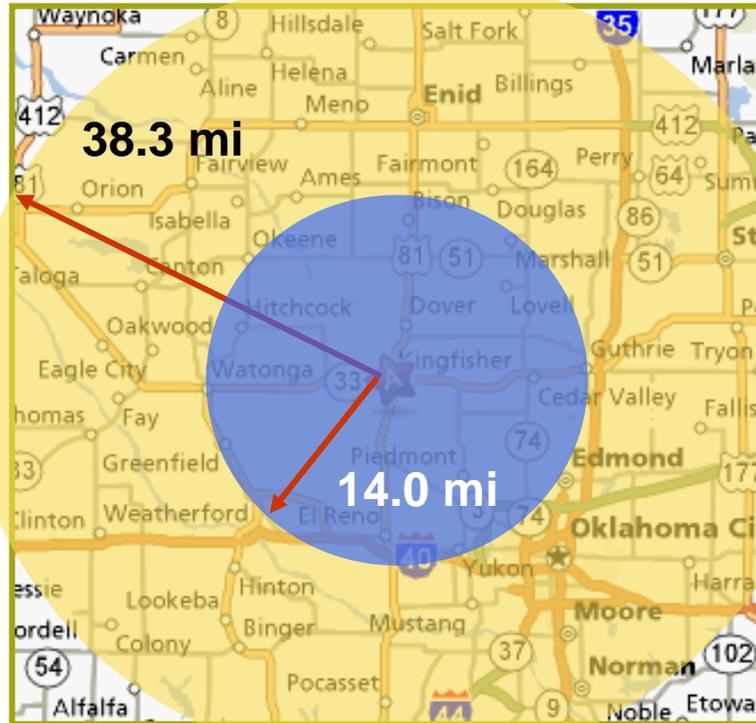
www.BladeEnergy.com

Crop development

- Key traits: establishment and yield

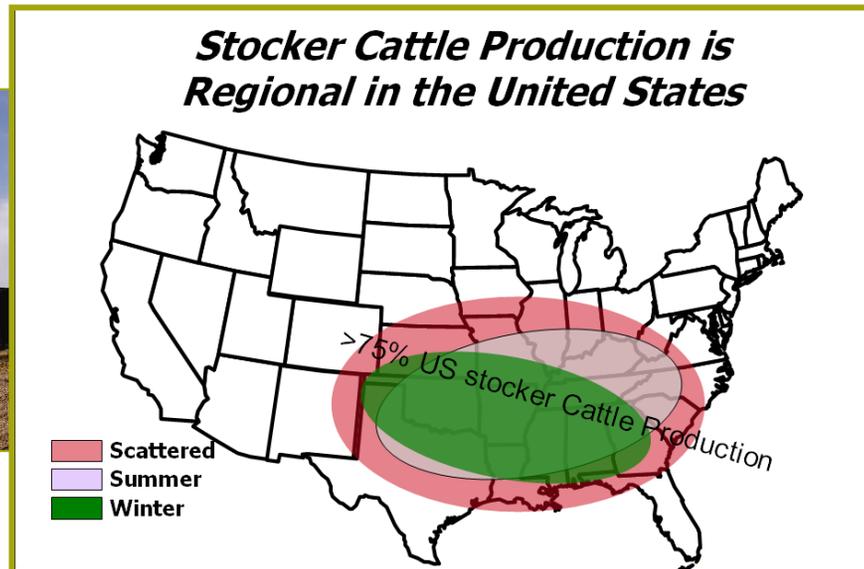
Assumptions:

- 100 Mgal/year
- 20% acreage usage
- 2 ton per acre to 15 ton per acre



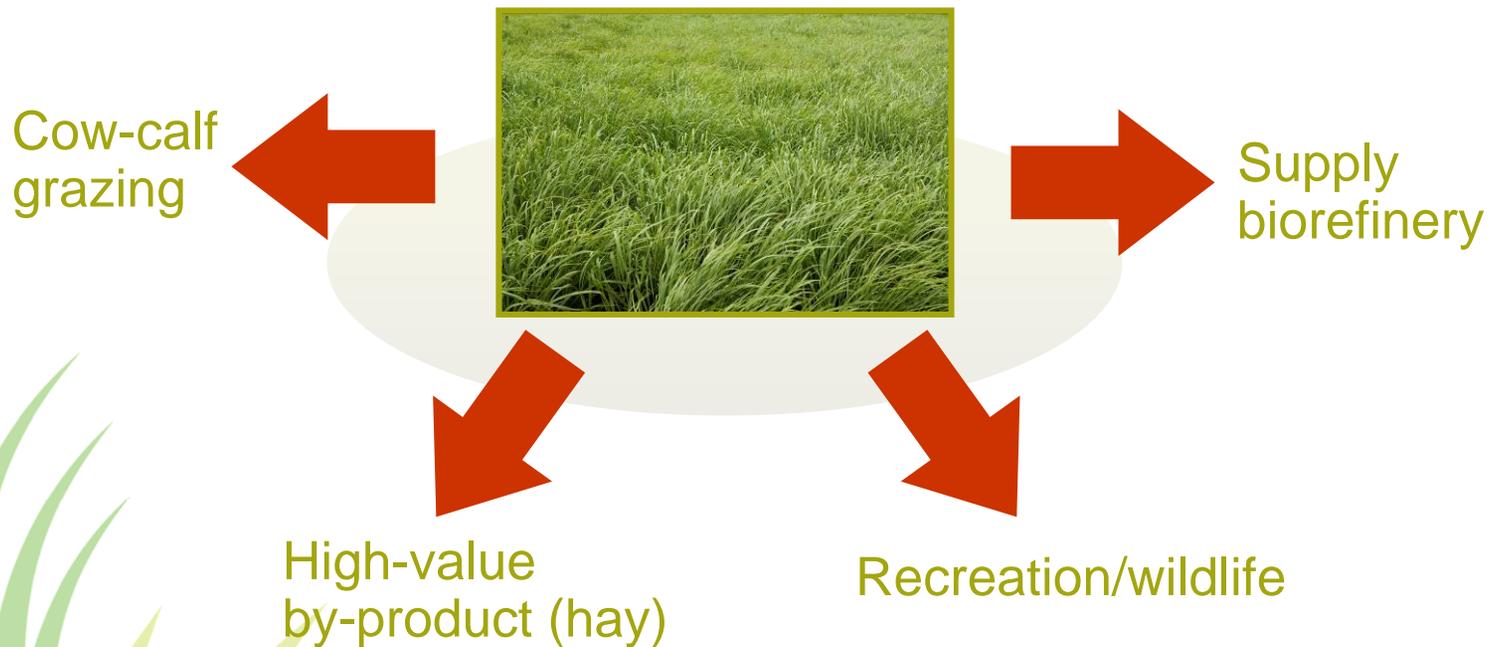
Crop production

- Creating **best management practices** for biomass cropping systems
- Developing plans to enable the **integration of livestock operations and dedicated energy crops**

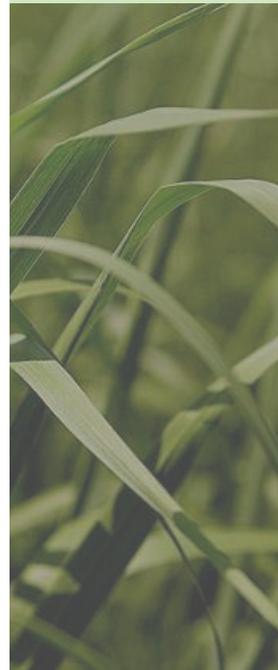
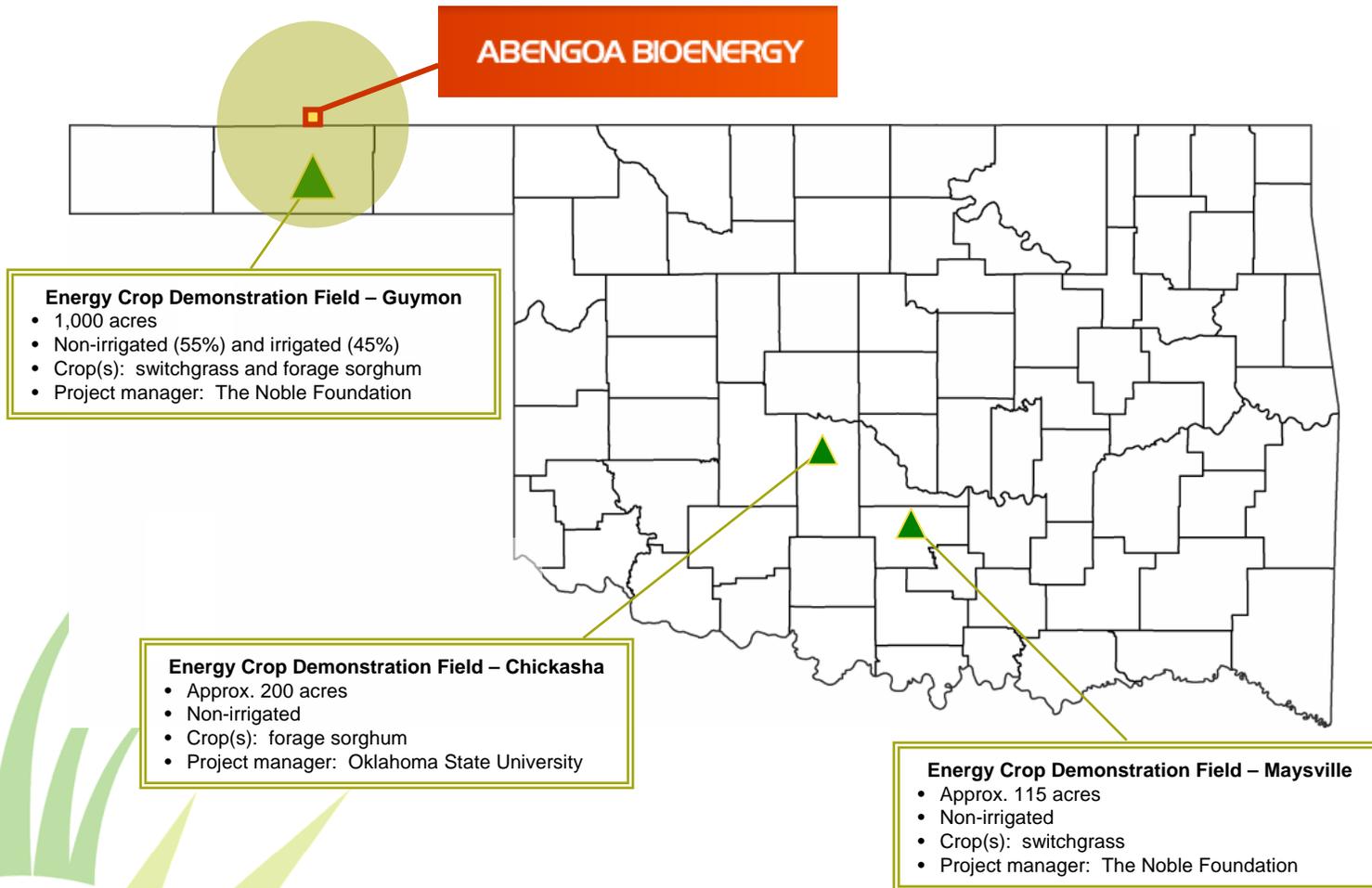


New economic opportunities

Creating **new production alternatives** for agricultural producers –



Demonstration fields



Demonstration fields – Chickasha

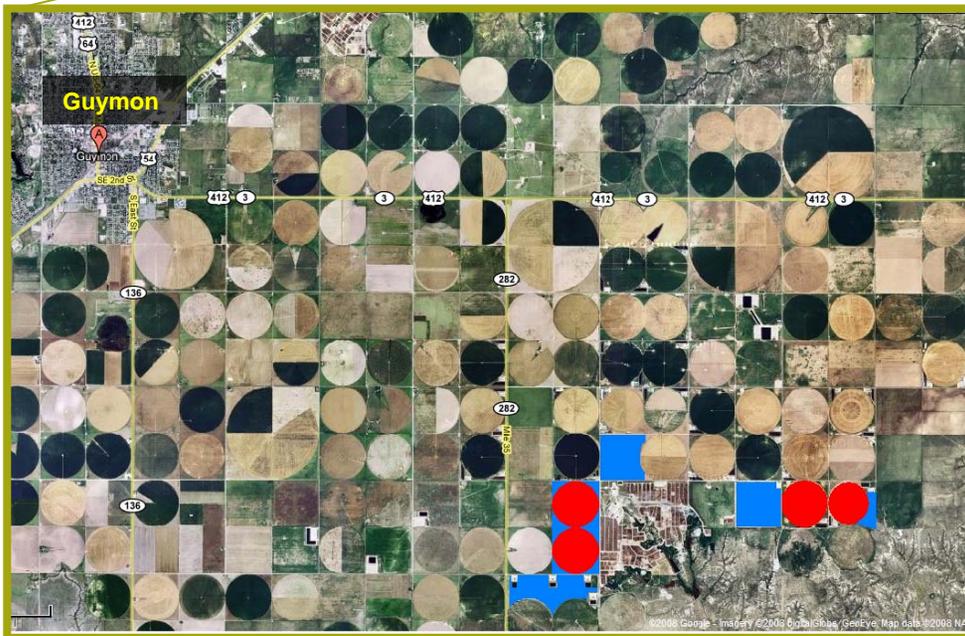


Quick Facts:

- 200 acres
- Oklahoma State University Experiment Station
- Planted early May
- Forage sorghum (three varieties)
- Row spacing and planting evaluations
- Agronomic studies (fertilizer and land treatments)
- Harvest studies
- Storage studies
- **Biofuels Field Day, Oct. 13, 2008**



Demonstration fields – Guymon



Quick Facts:

- World's largest stand of switchgrass dedicated to cellulosic ethanol production
- 1,000 acres
 - Non-irrigated: 550 acres
 - Irrigated: 450 acres

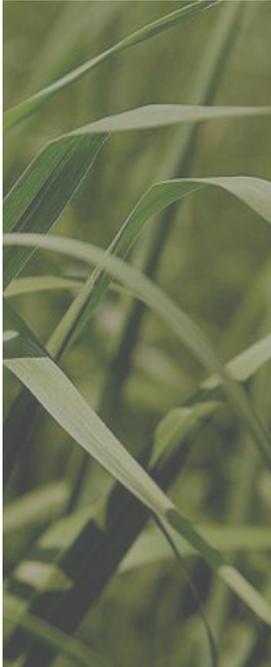
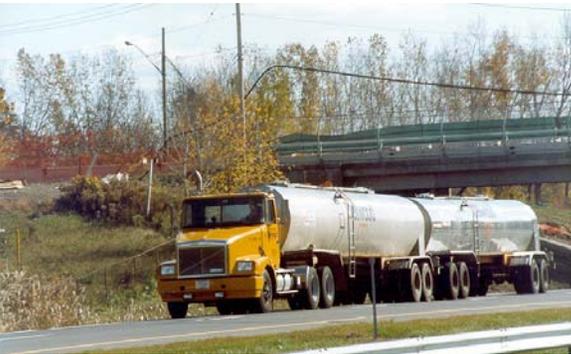


■ - Non-irrigated acres

■ - Irrigated acres

Scale: |-----|
1 mile

From field to biorefinery: an engineer's challenge





“As I look around
at the strides that have been
made in our research
laboratories, as I look at the
things undreamed of a few
years ago...**the only degree to
which we have reached the end
of the road of opportunity is the
degree to which we have
exhausted the imaginative
capacity of the human mind.”**

Lloyd Noble, Founder of The Noble Foundation
1896-1950