

# Bioenergy in Oklahoma's Energy Portfolio

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Oklahoma Secretary of Energy

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# Oklahoma

## Jobs and Economic Impact

- Employs more than 76,000 workers
  - Average compensation: **\$116,000 per worker**
  - These workers earned \$9 billion in income in 2007 alone
- Each worker supported 3.2 additional jobs
  - Totaling 322,000 workers employed by the energy industry
- Energy industry contributed approximately \$50 billion to gross state product in 2008

# Thoughts from energy leaders...

*“We need more from **all sources of domestic energy** to get America’s **economy on track** and growing again and to increase our energy security...**Thus, we need a multi-pronged approach that along with current sources includes renewable energy and increased energy efficiency.**”*

-J. Larry Nichols

Chairman, American Petroleum Institute and  
Chairman and CEO Devon Energy Corporation

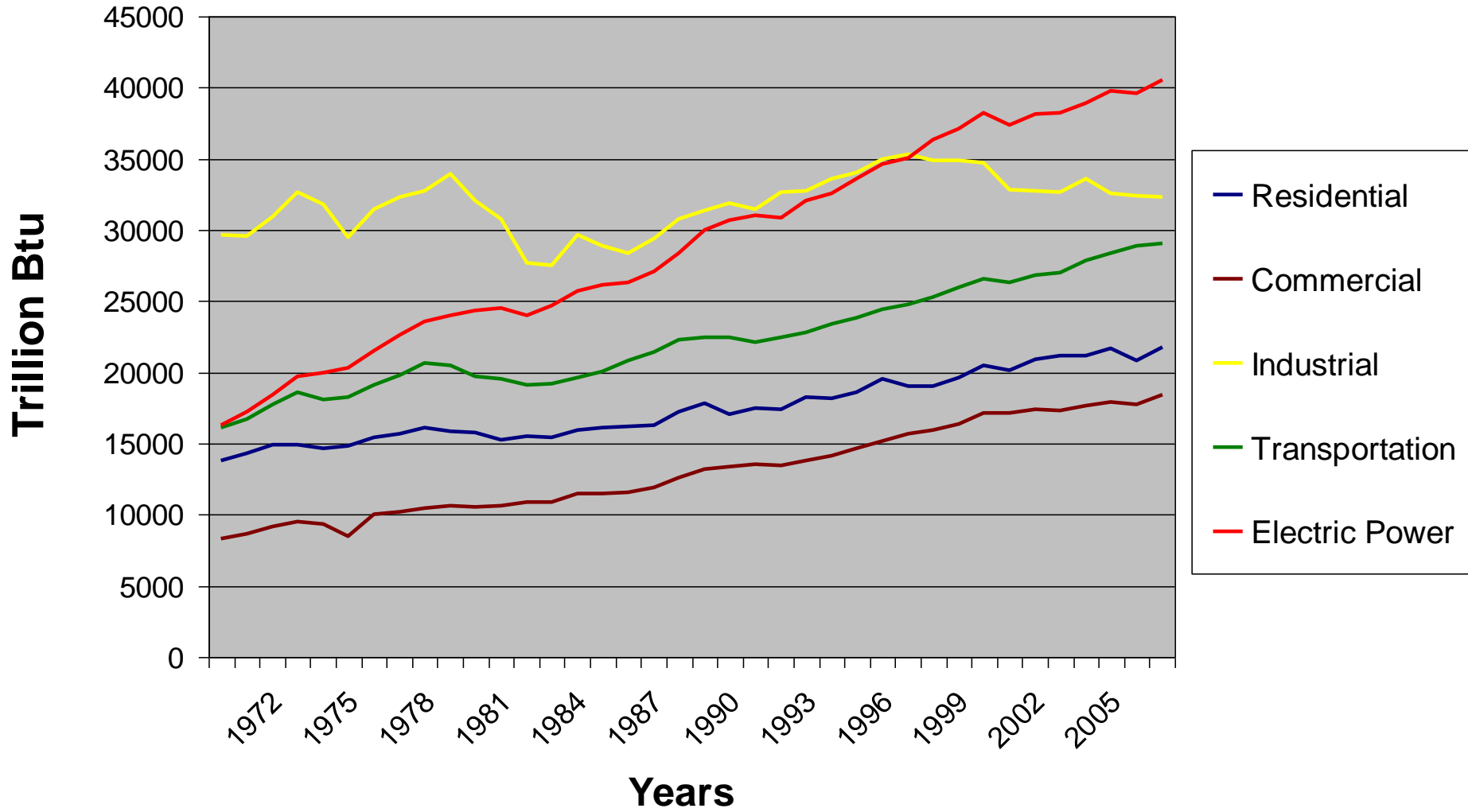
September 10, 2009 Testimony before Senate Finance Committee

*“We need more energy in all forms. **ConocoPhillips strongly supports development of alternative and renewable sources, like solar, wind and geothermal power, biofuels, and others...**We also need more fossil fuels – oil, natural gas and coal – as well as more nuclear power.”*

-James J. Mulva

Chairman and CEO ConocoPhillips  
January 13, 2009, National Press Club

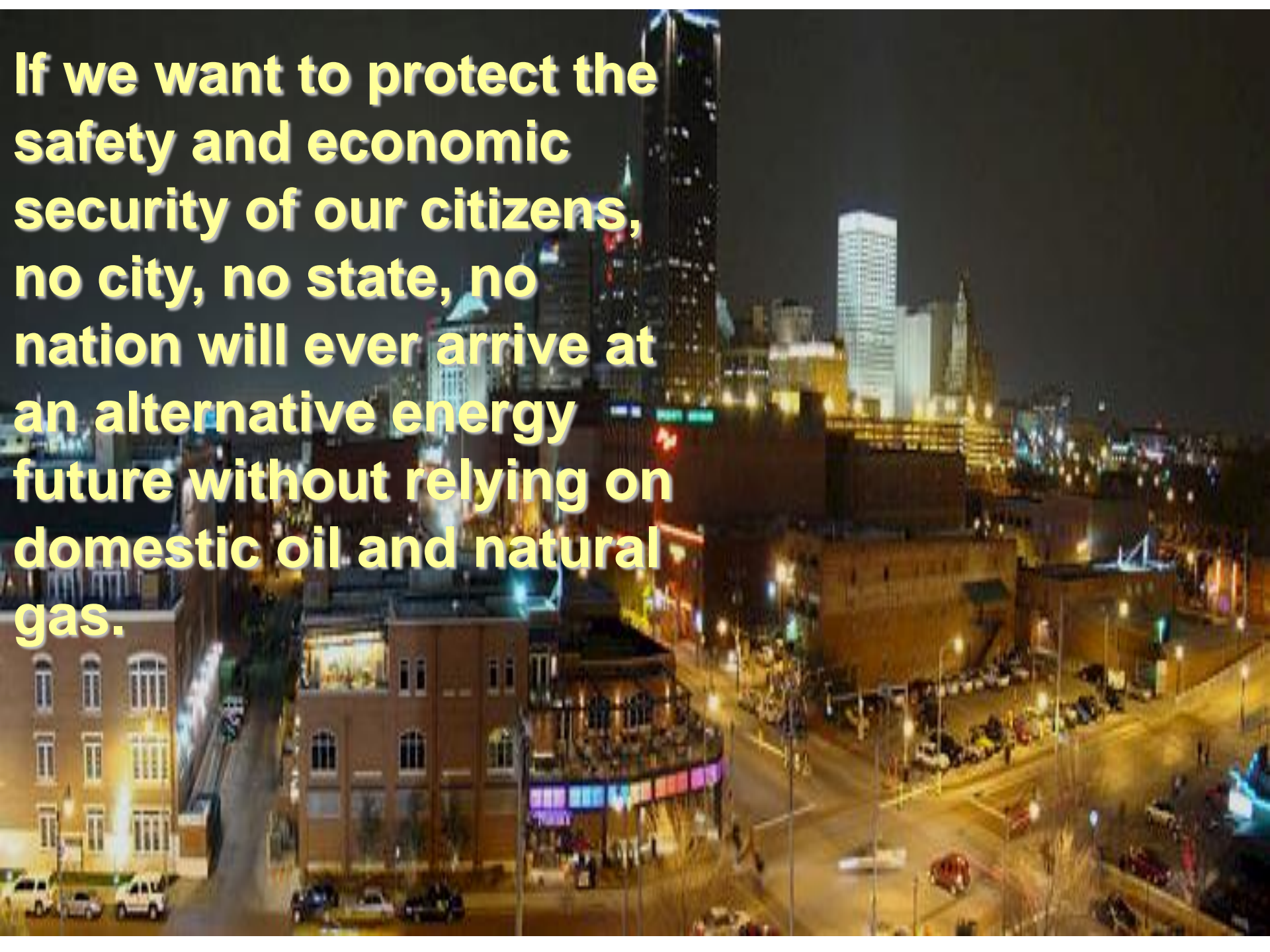
# Energy Consumption by End Use Sector



Source: Energy Information Administration:  
2008 Annual Energy Review

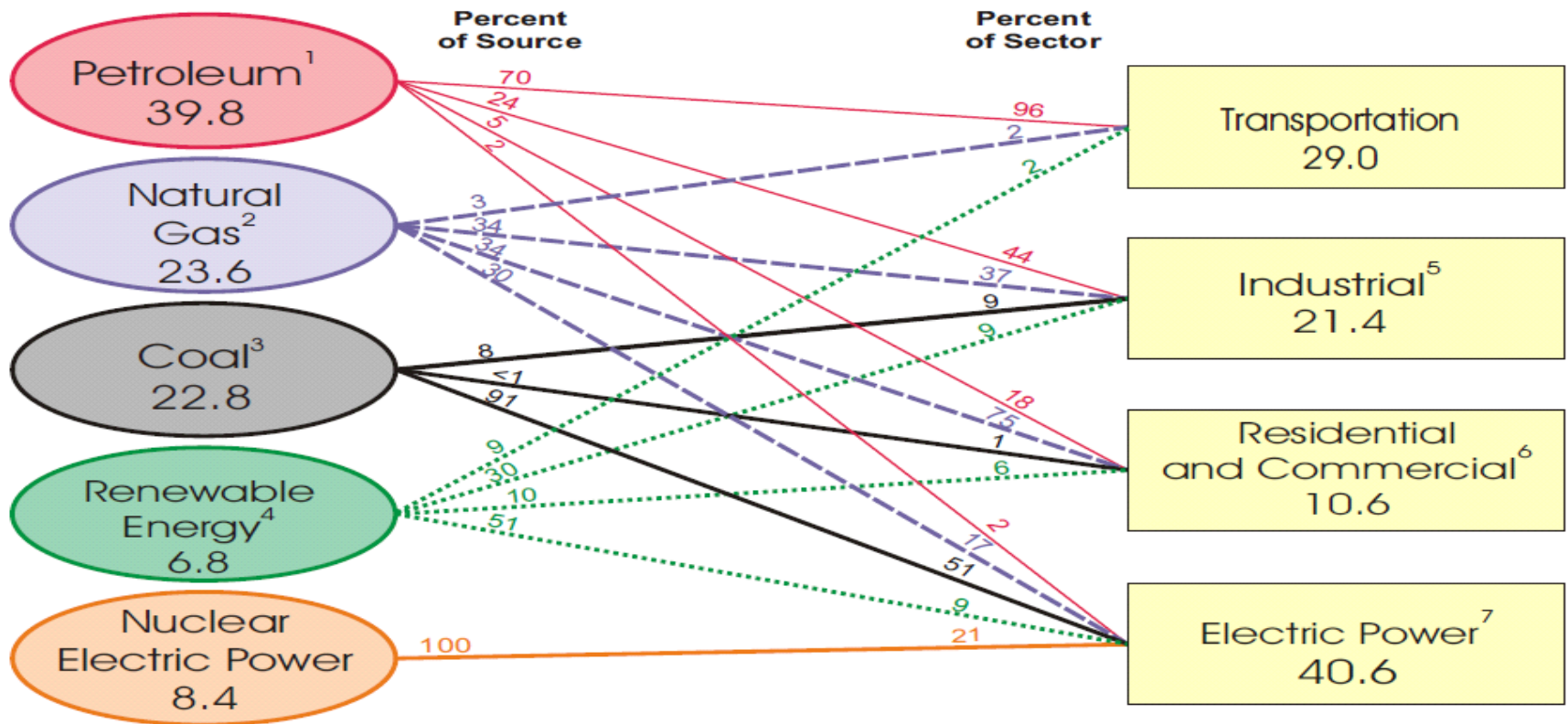


**If we want to protect the safety and economic security of our citizens, no city, no state, no nation will ever arrive at an alternative energy future without relying on domestic oil and natural gas.**



# Sources of Transportation Fuel

U.S. Primary Energy Consumption by Source and Sector, 2007  
(Quadrillion Btu)



<sup>1</sup>Does not include 0.6 quadrillion Btu of fuel ethanol, which is included in "Renewable Energy."

<sup>2</sup>Excludes supplemental gaseous fuels.

<sup>3</sup>Includes less than 0.1 quadrillion Btu of coal coke net imports.

<sup>4</sup>Conventional hydroelectric power, geothermal, solar/PV, wind, and biomass.

<sup>5</sup>Includes industrial combined-heat-and-power (CHP) and industrial electricity-only plants.

<sup>6</sup>Includes commercial combined-heat-and-power (CHP) and commercial electricity-only plants.

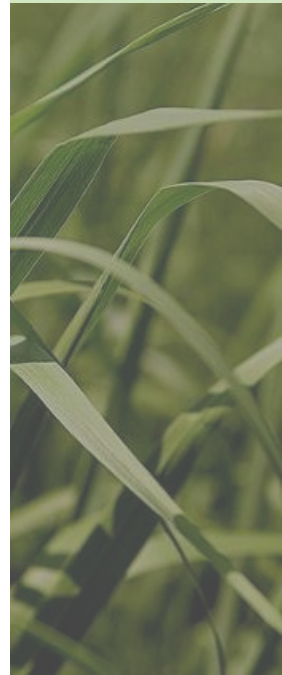
<sup>7</sup>Electricity-only and combined-heat-and-power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.

Note: Sum of components may not equal 100 percent due to independent rounding.

Sources: Energy Information Administration, *Annual Energy Review 2007*, Tables 1.3, 2.1b-2.1f and 10.3.



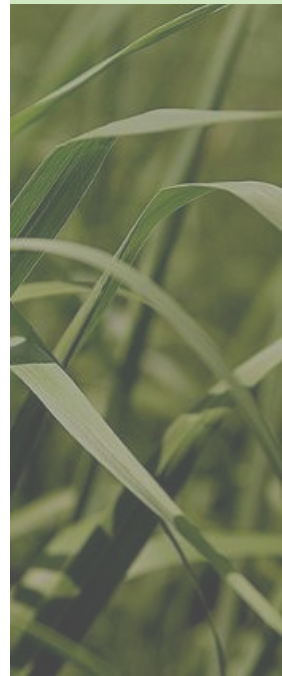
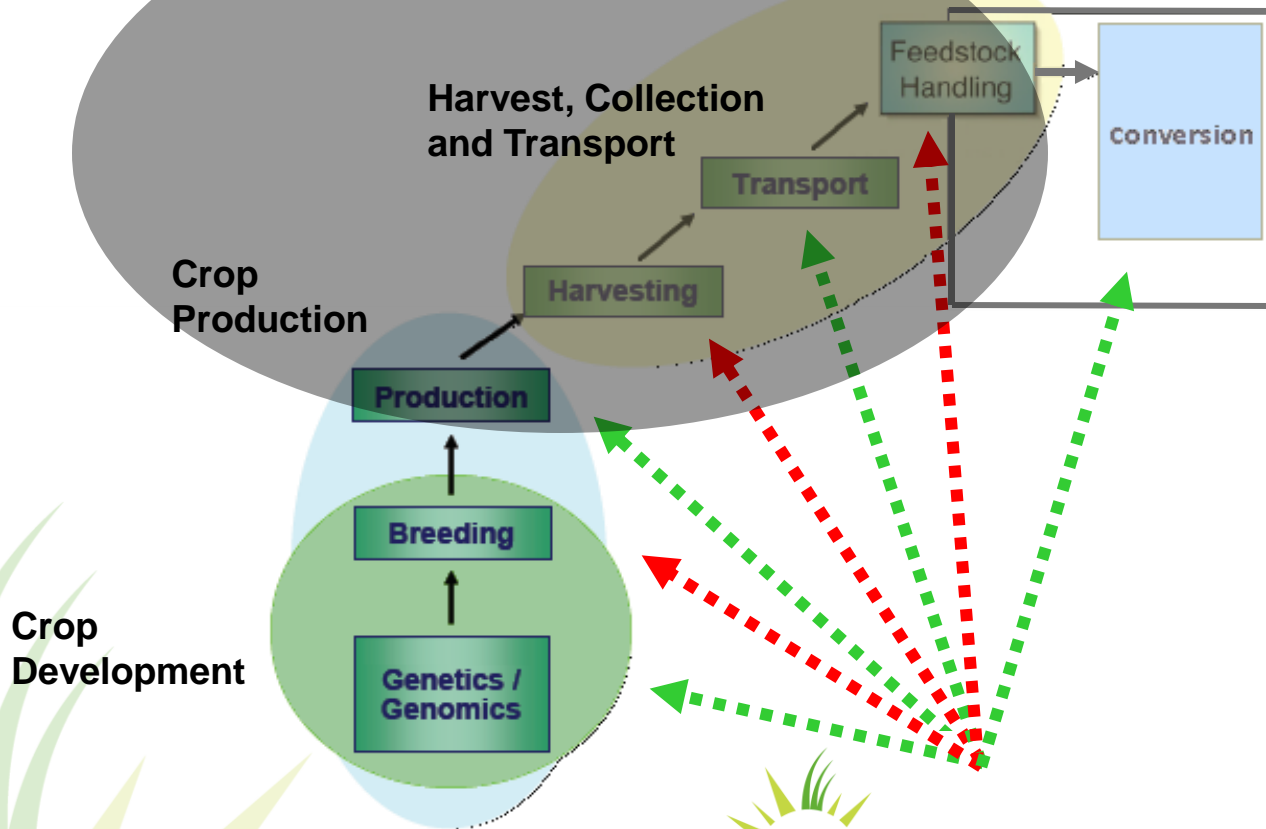
# Cellulosic ethanol



# Oklahoma Bioenergy Center

## DEMONSTRATION PROJECTS

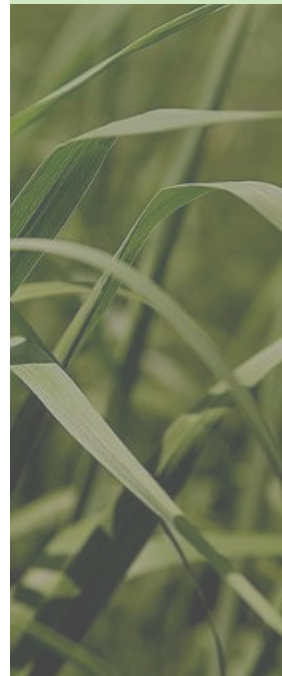
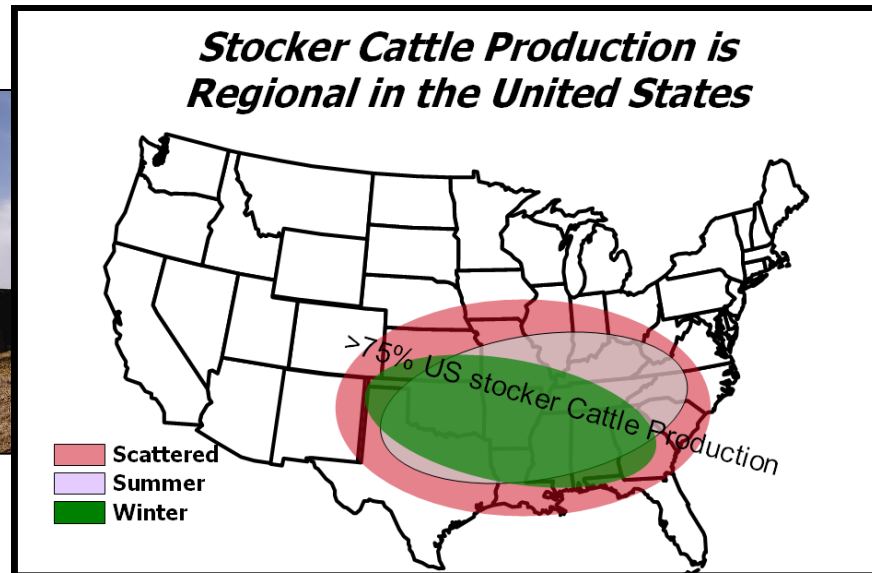
## Conversion





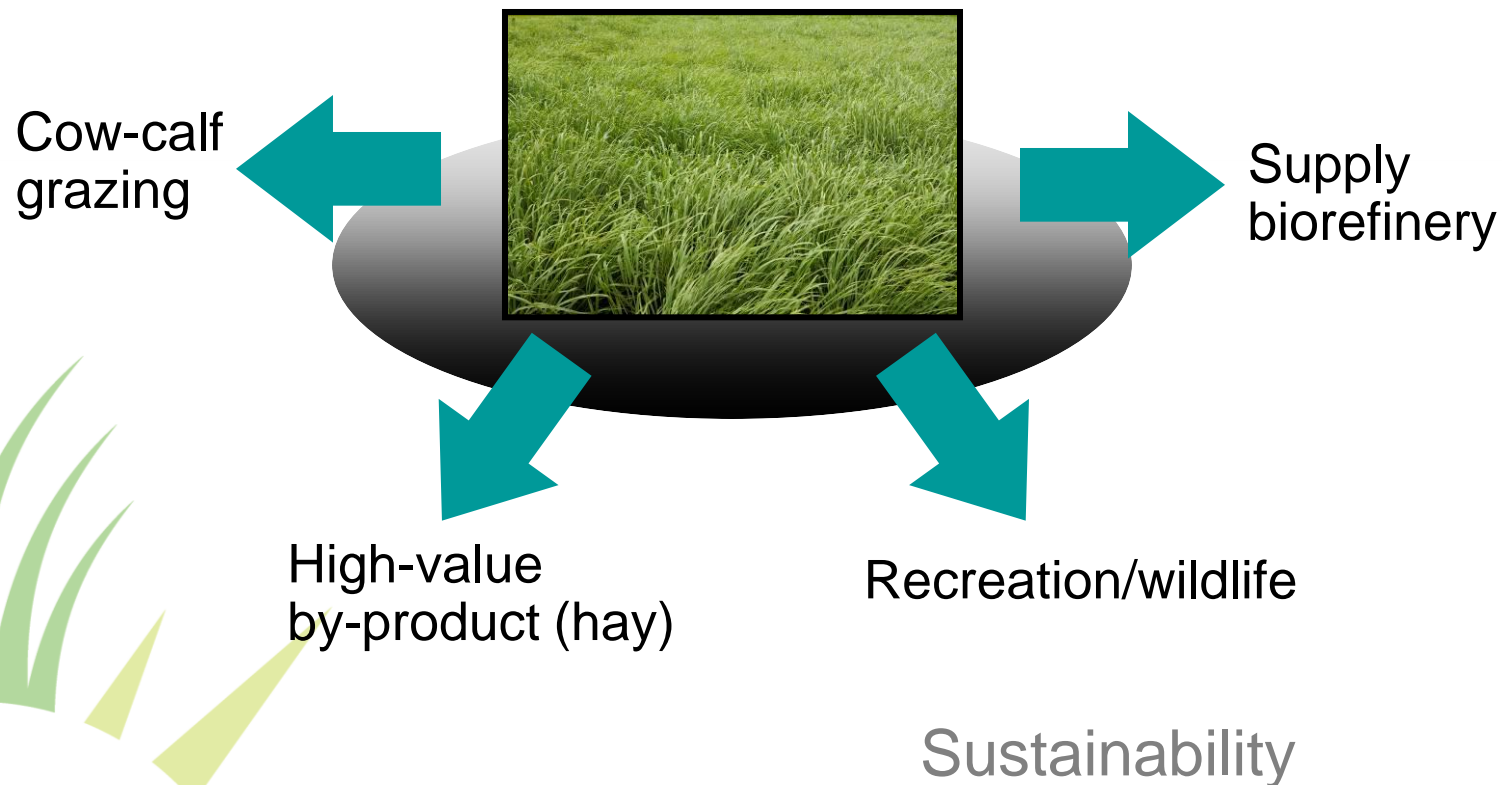
# Crop production

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

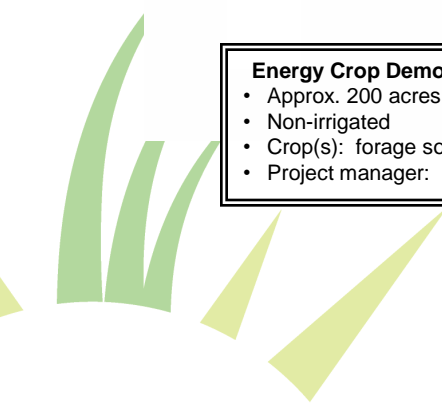
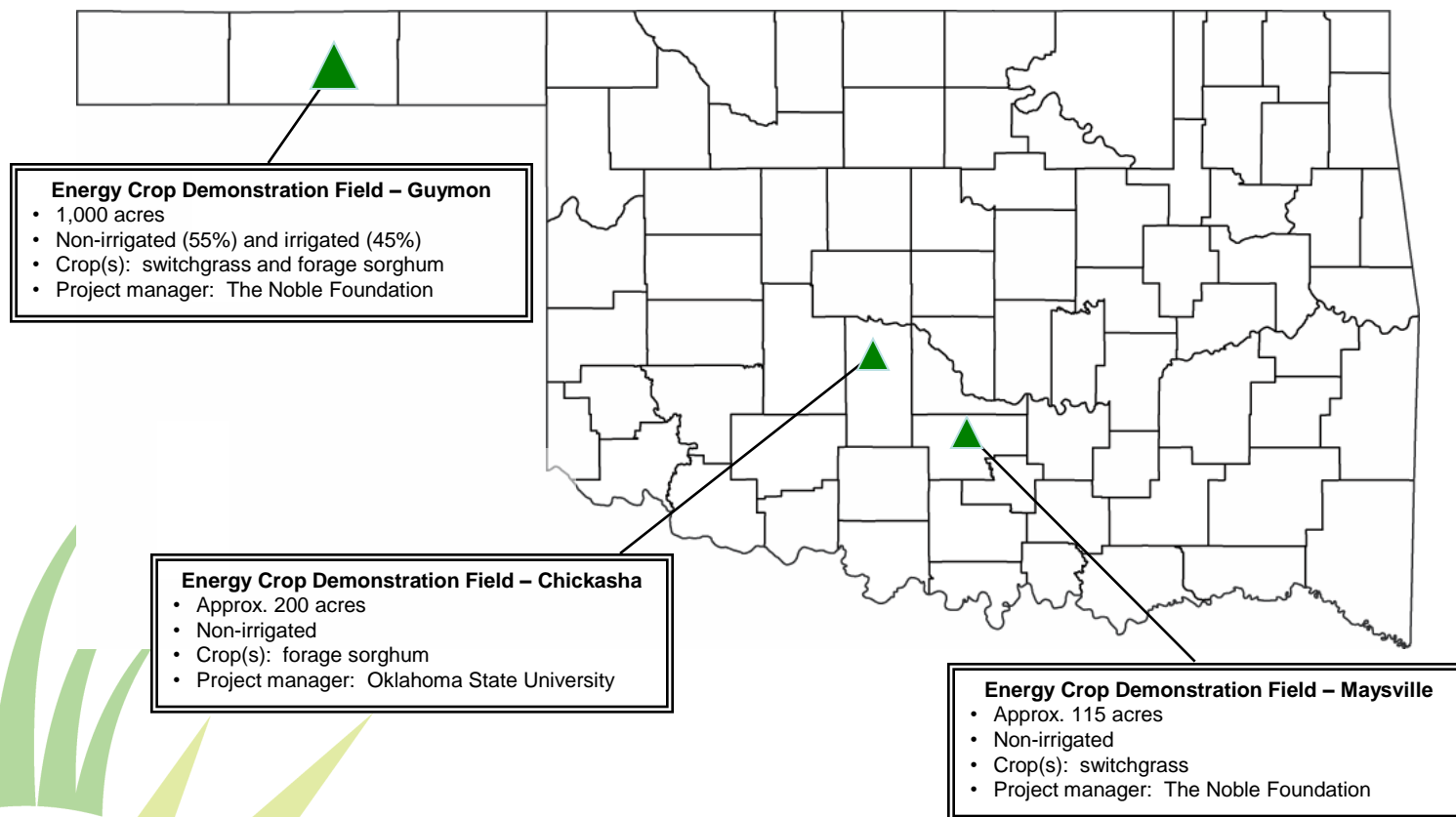


# New economic opportunities

Creating **new production alternatives** for Oklahoma's agricultural producers –



# Demonstration fields

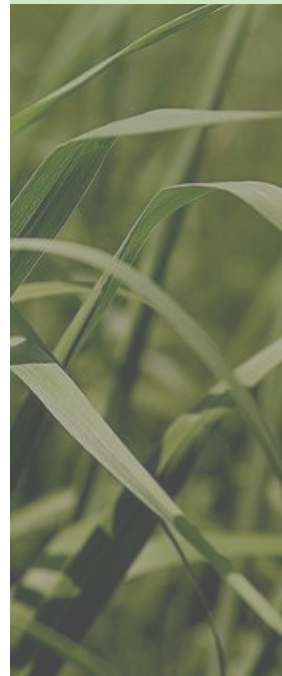


## Impact to rural economies

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





# How is the Refinery Sector Approaching the Changing Landscape



**Northeast Biofuels,  
LP**



**Central Florida  
Pipeline Company**

# Future of Cellulosic Bioenergy?

Based on published proposed changes to the renewable fuel standard program, USEPA predicts **85%** of the production of dedicated energy crops in the U.S. in 2022 is expected to occur in Oklahoma.

“The majority of switchgrass is projected to likely be grown in Oklahoma.....”

(U.S. Environmental Protection Agency, 2009)