The Implications of High Energy Prices on U.S. Agriculture

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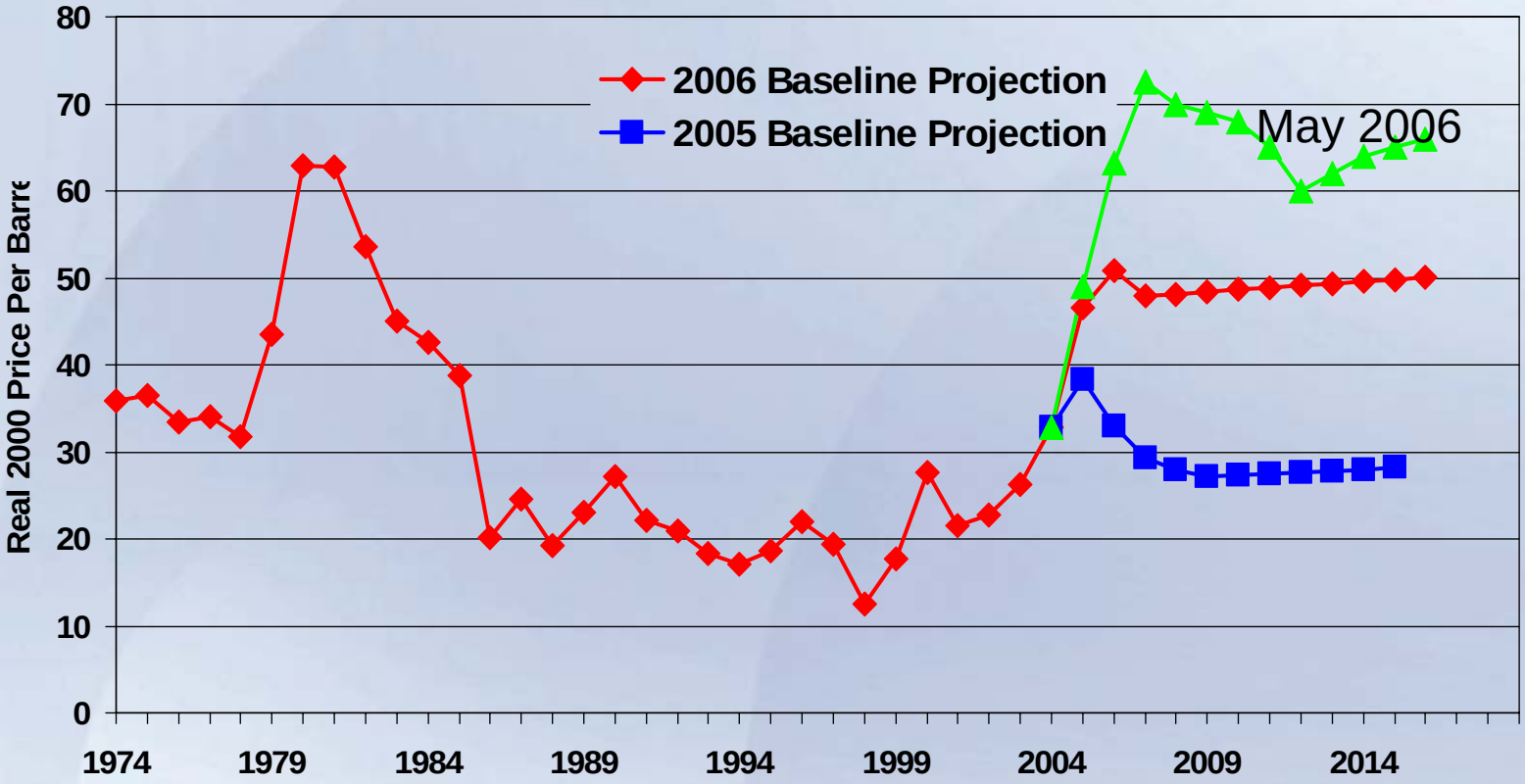
Introduction

- Oil prices rose in 2005 more than anyone expected
- Change in the current outlook for long-term increase in oil and energy prices
- What has caused this dramatic change?
- What does it mean for U.S. agriculture?

The USDA expectations of future oil price has jumped



Source: USDA Baseline

What has caused change in energy outlook?

Demand outstripped supply

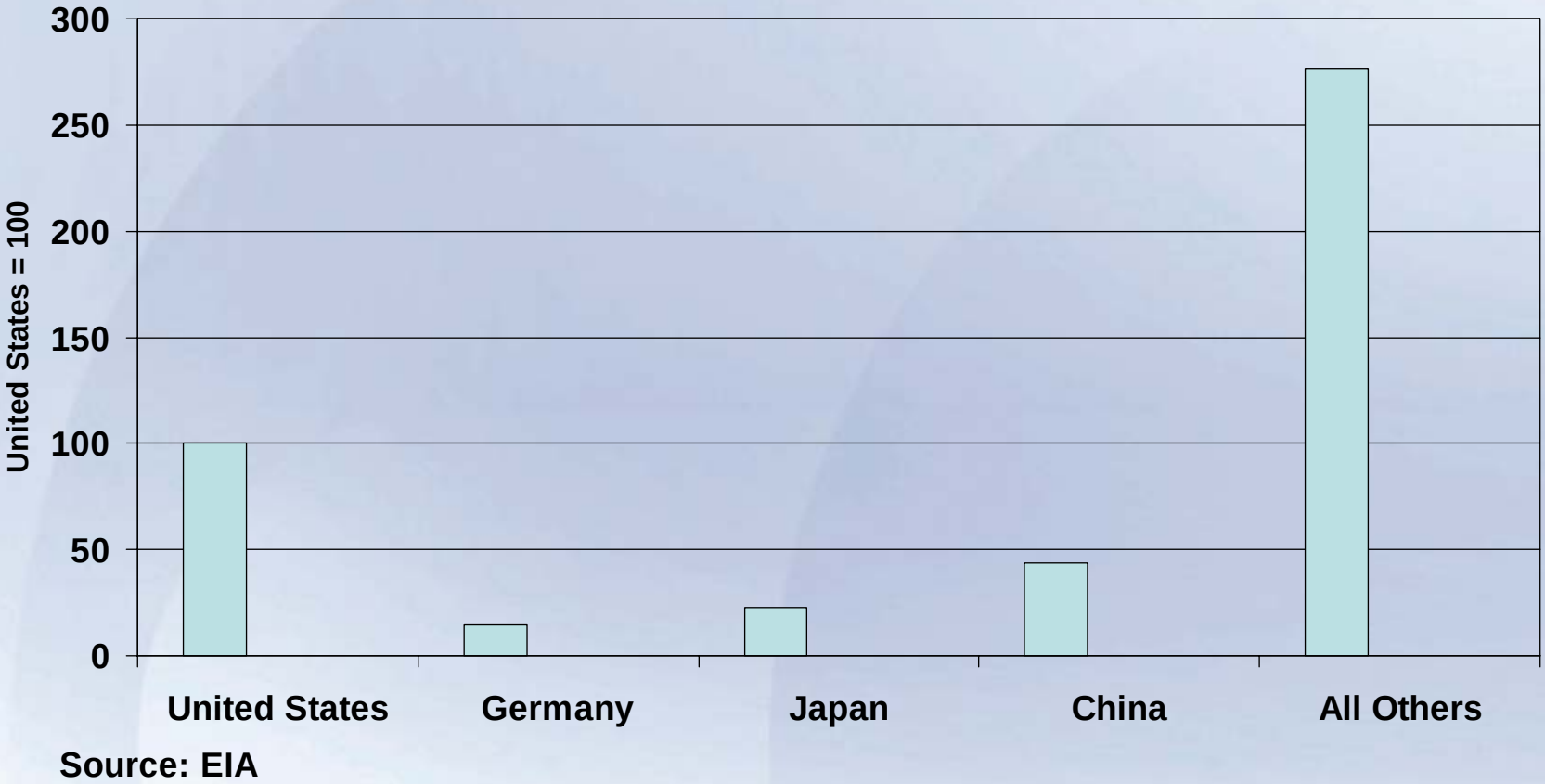
- High GDP growth in China, India and other Asian Newly Industrialized Economies competing with…..
- High GDP growth and energy demand in the United States
- Supply uncertainties from Iran and Iraq, Venezuela, and Nigeria
- Difficulties bringing new oil supplies online
- Constraints and costs of alternative energy

What factors will stabilize the energy market?

Over time higher prices will induce

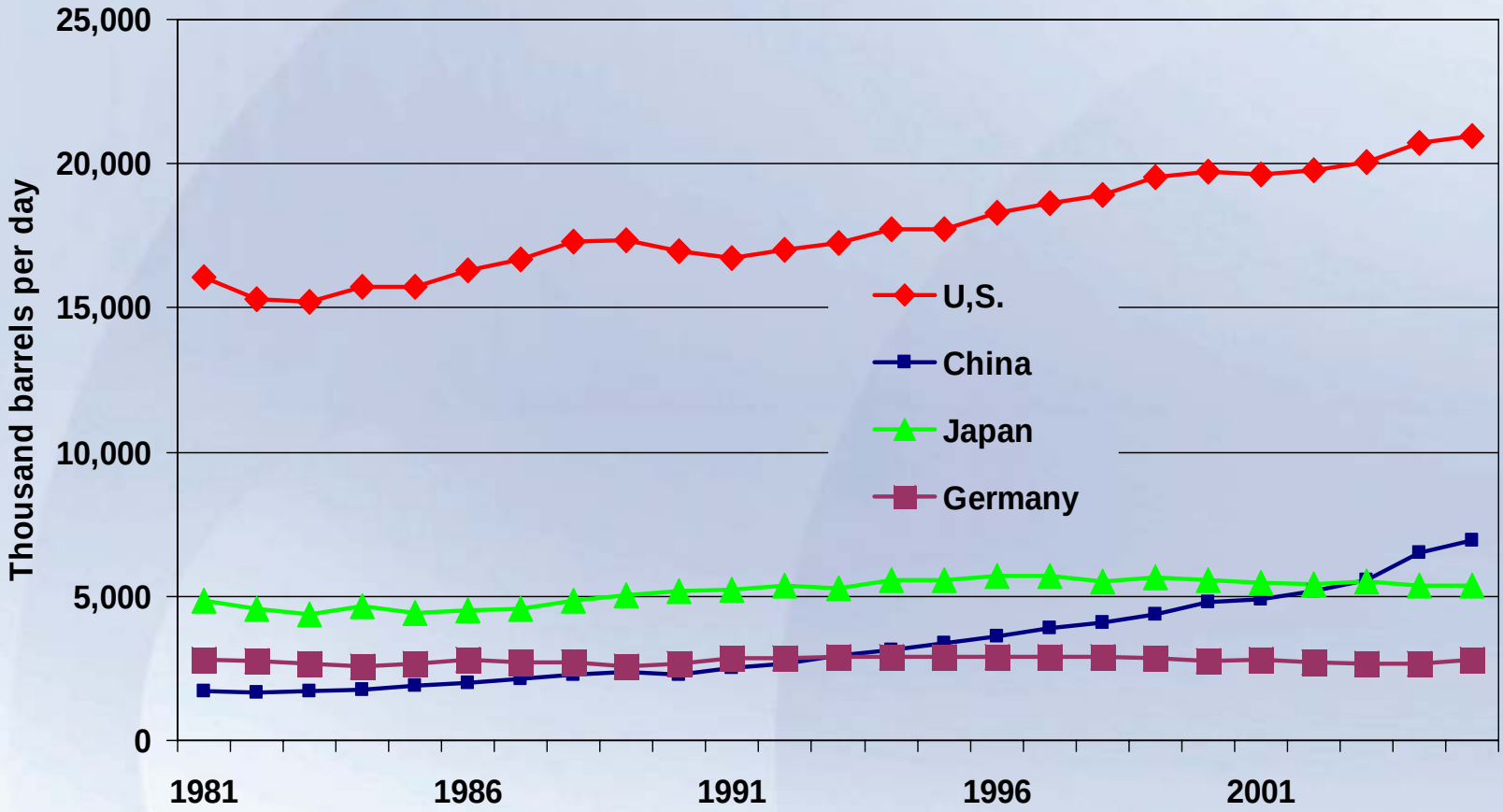
- efficiency gains
- conservation
- increase supplies from producers
- Increased supplies of alternative energy
  - Biofuels
  - Wind
  - Solar
  - Nuclear
  - Thermal
  - Other

Energy use index of major users

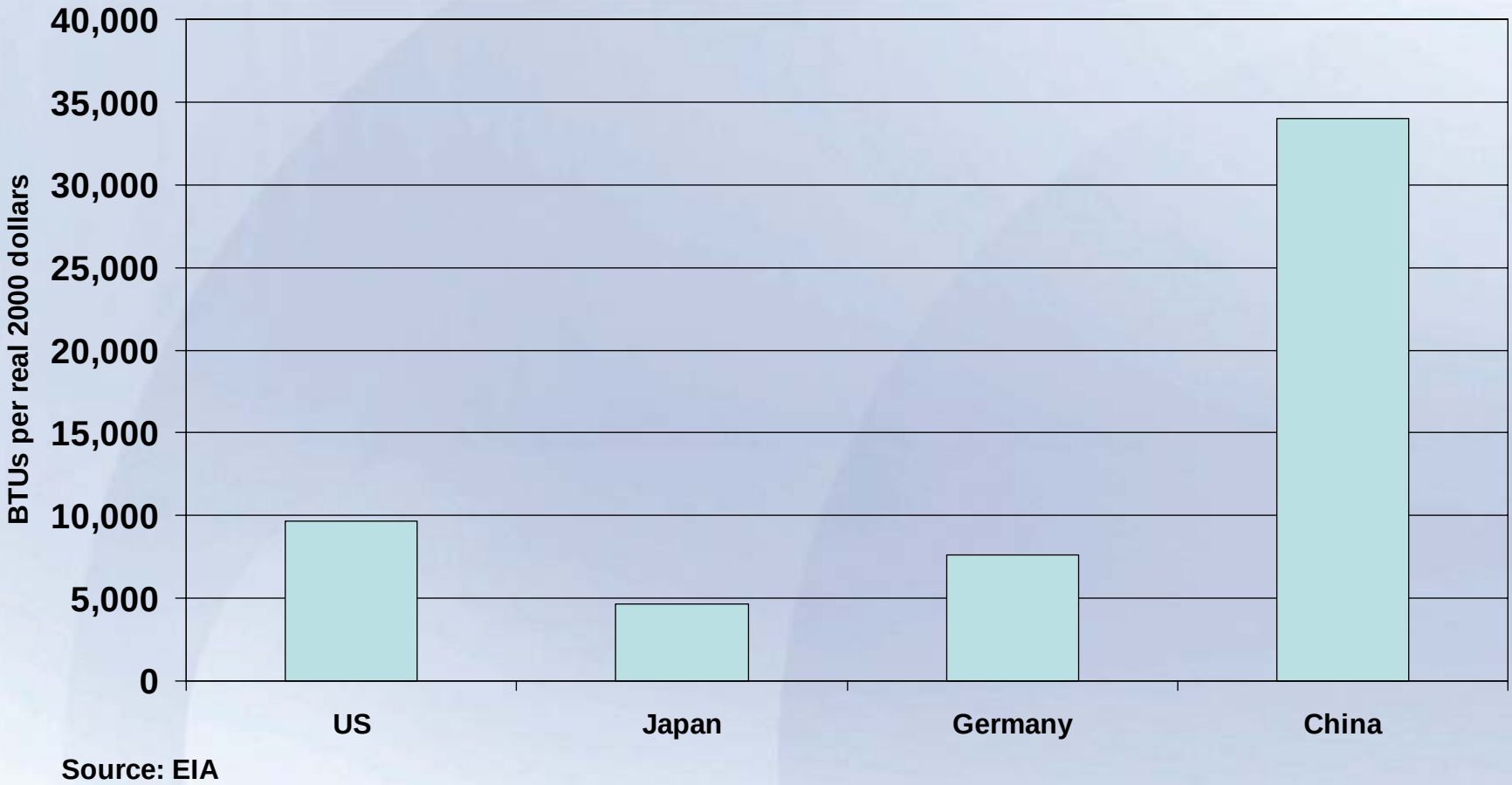


Source: EIA

China becomes number two oil consumer in 2003

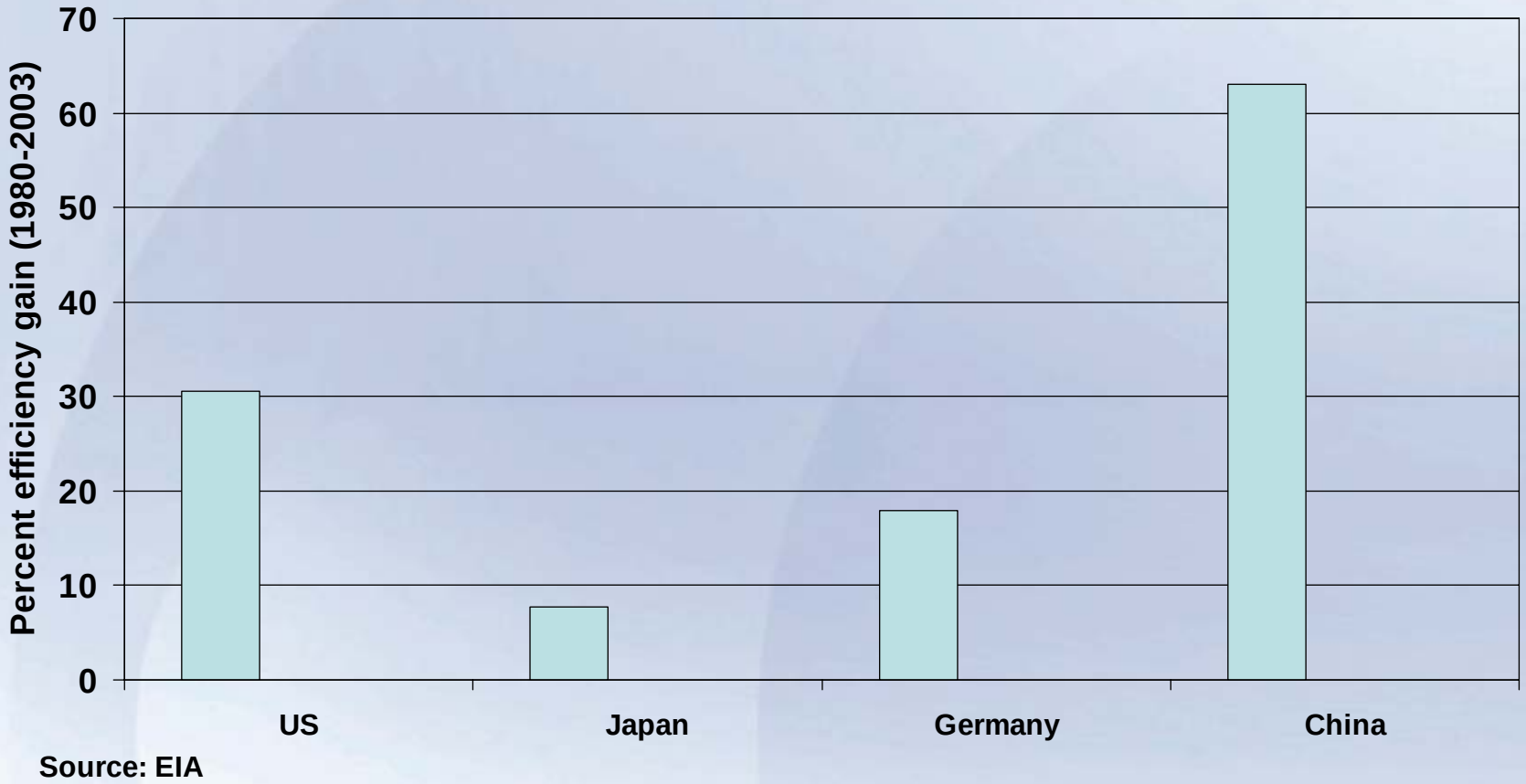


China has high energy use per dollar output, average 2001-2003



Source: EIA

But China shows highest efficiency gains since 1980

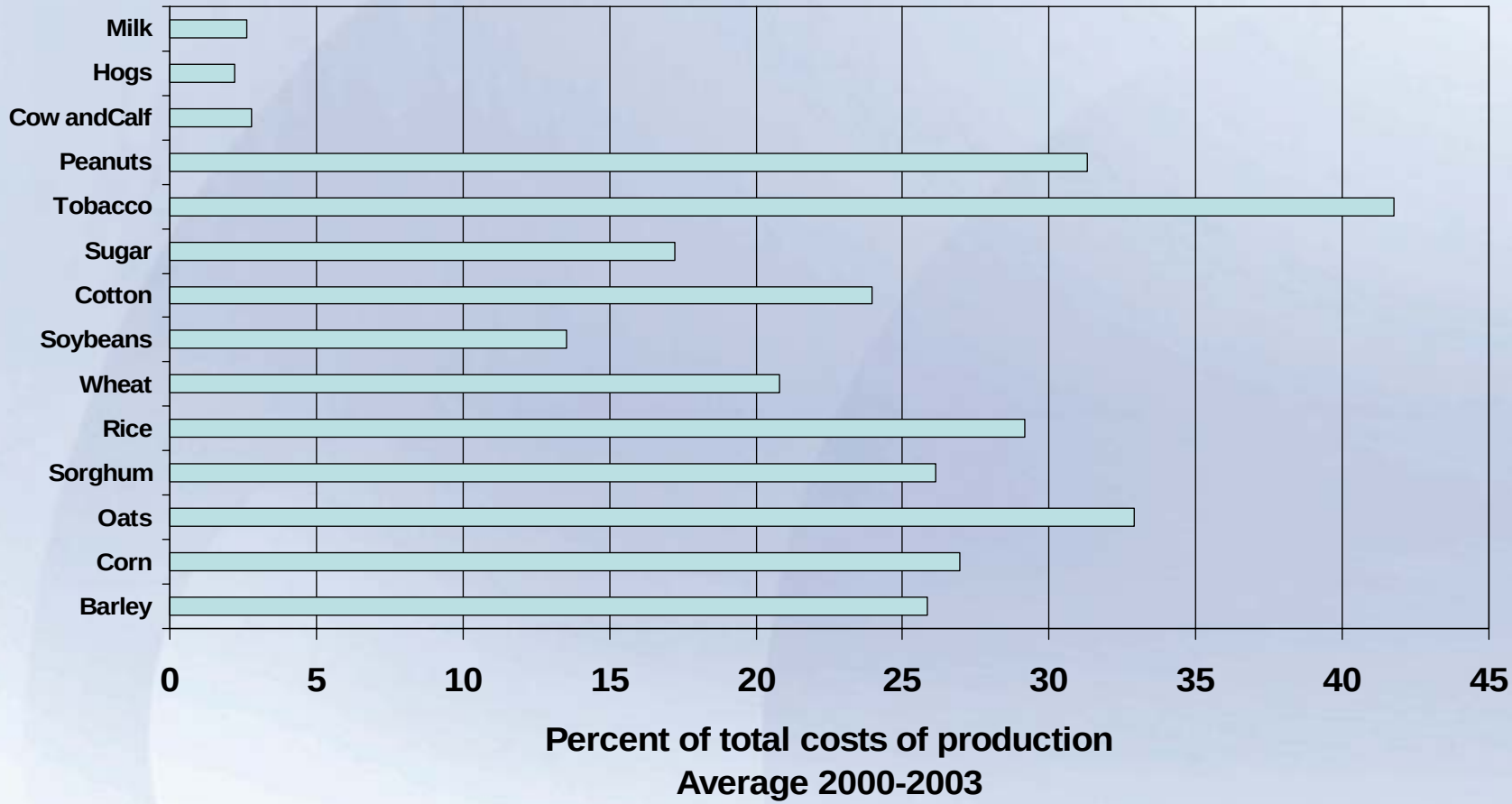


Source: EIA

Where does U.S. agriculture fit in?

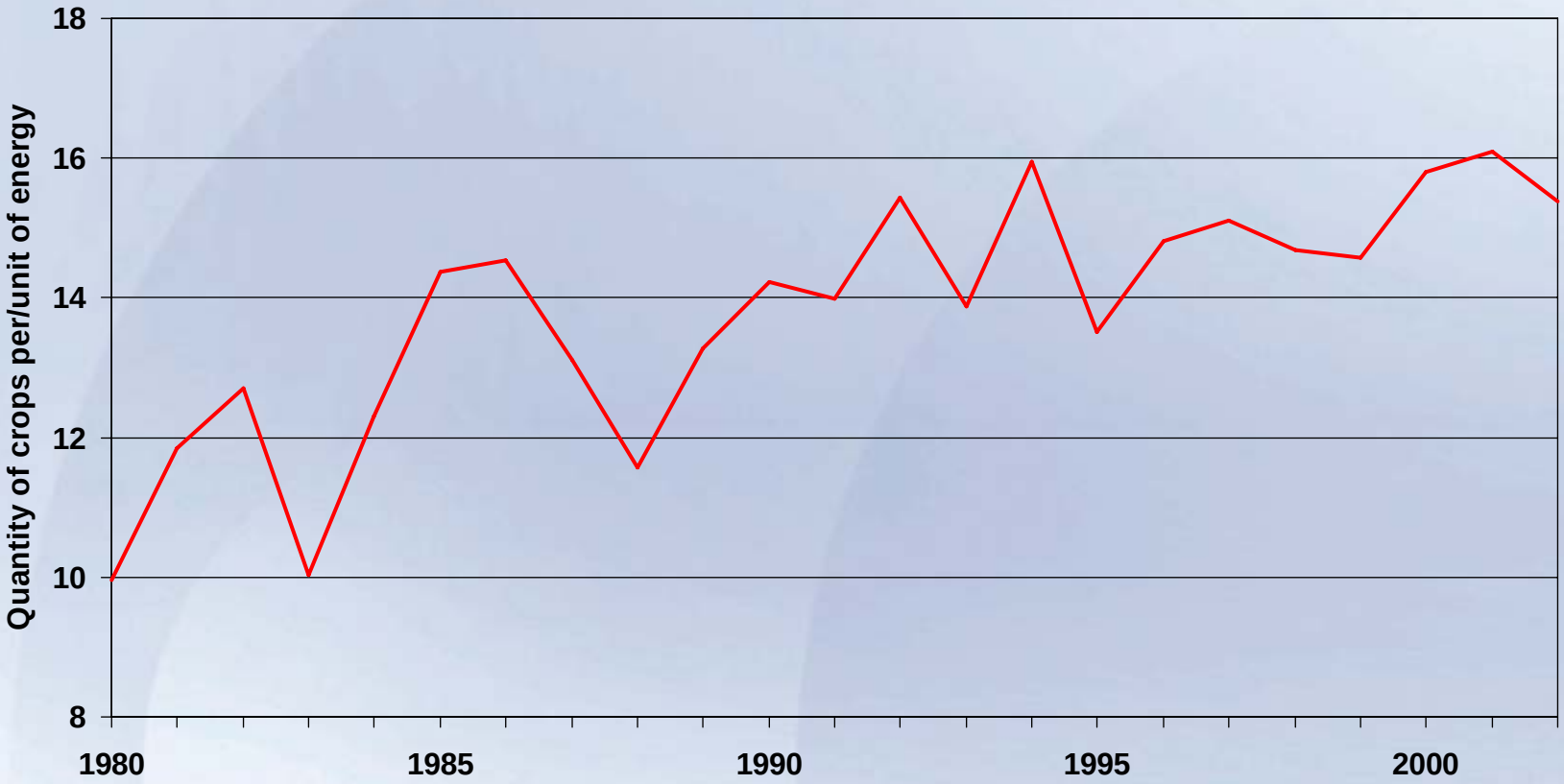
- Agriculture is an energy intensive sector
- Cheap energy facilitated energy intensity historically
- Efficiency gains more important for sector
- Reducing energy use will result from:
  - further efficiency gains
  - compositional change away from high energy use in agricultural subsectors

Energy use is concentrated in crop production



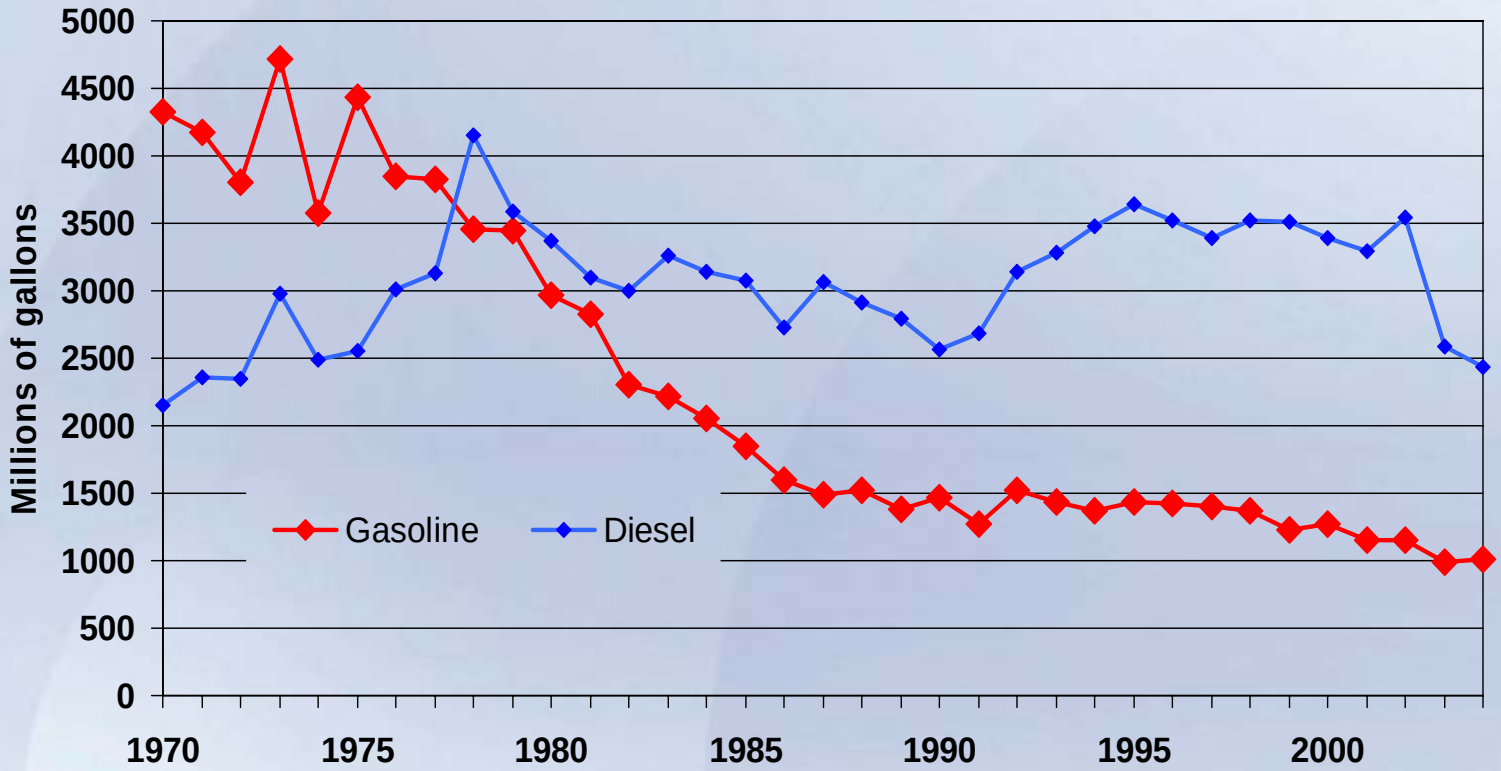
Source: Economic Research Service, USDA

U.S. agriculture has increased energy efficiency over 50 percent since 1980



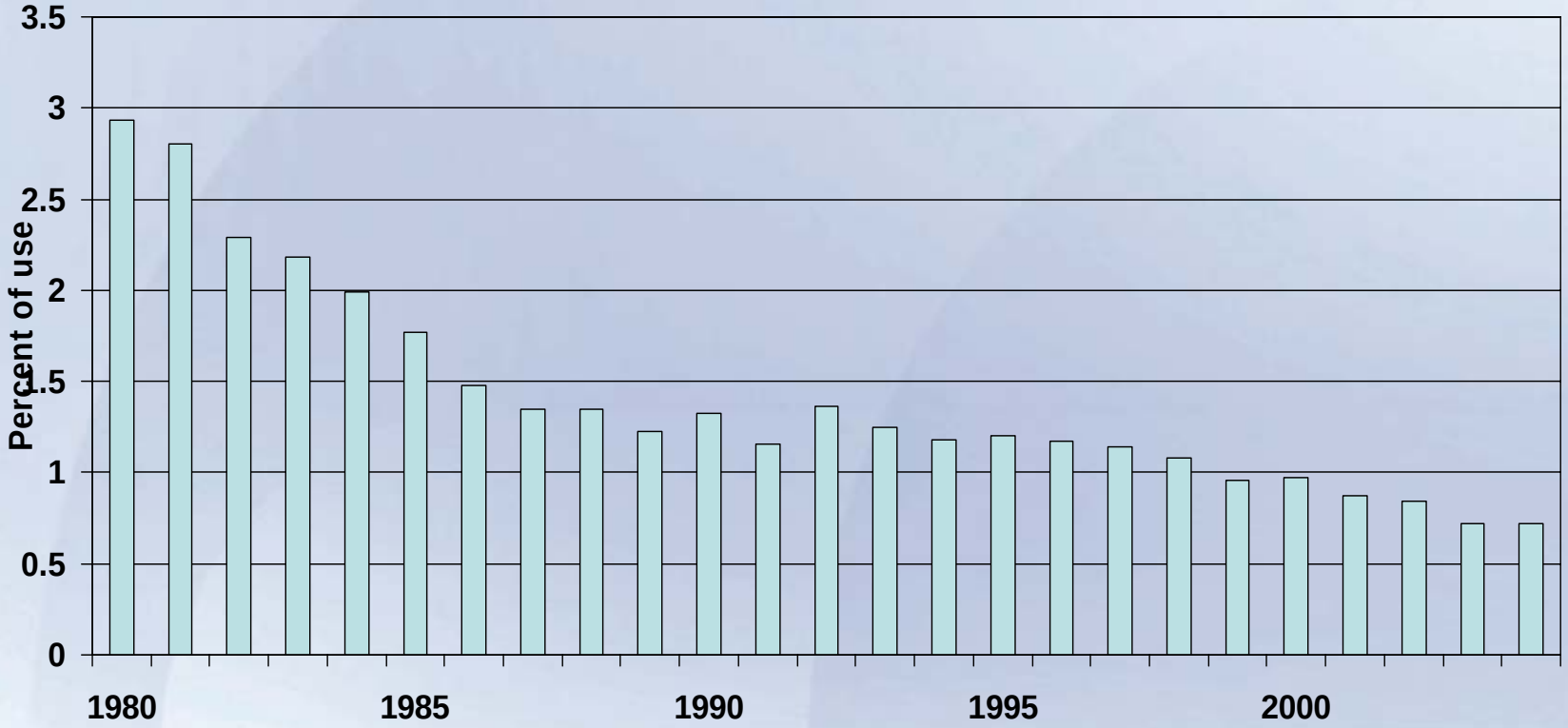
Source: Economic Research Service, USDA

Farmers replace gasoline with diesel



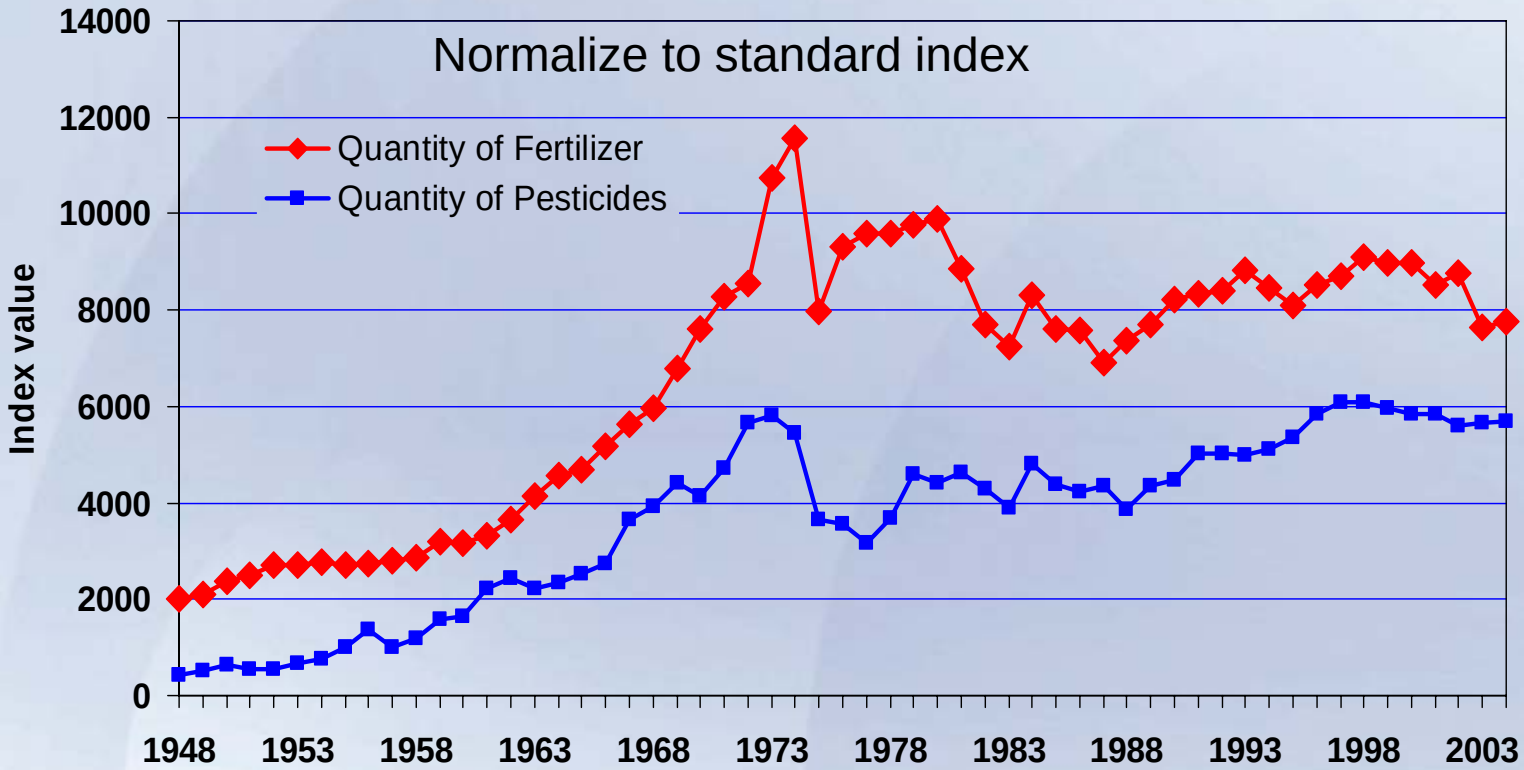
Source: Economic Research Service, USDA

Farm percentage of US gasoline use drops sharply from 1980 to 2004



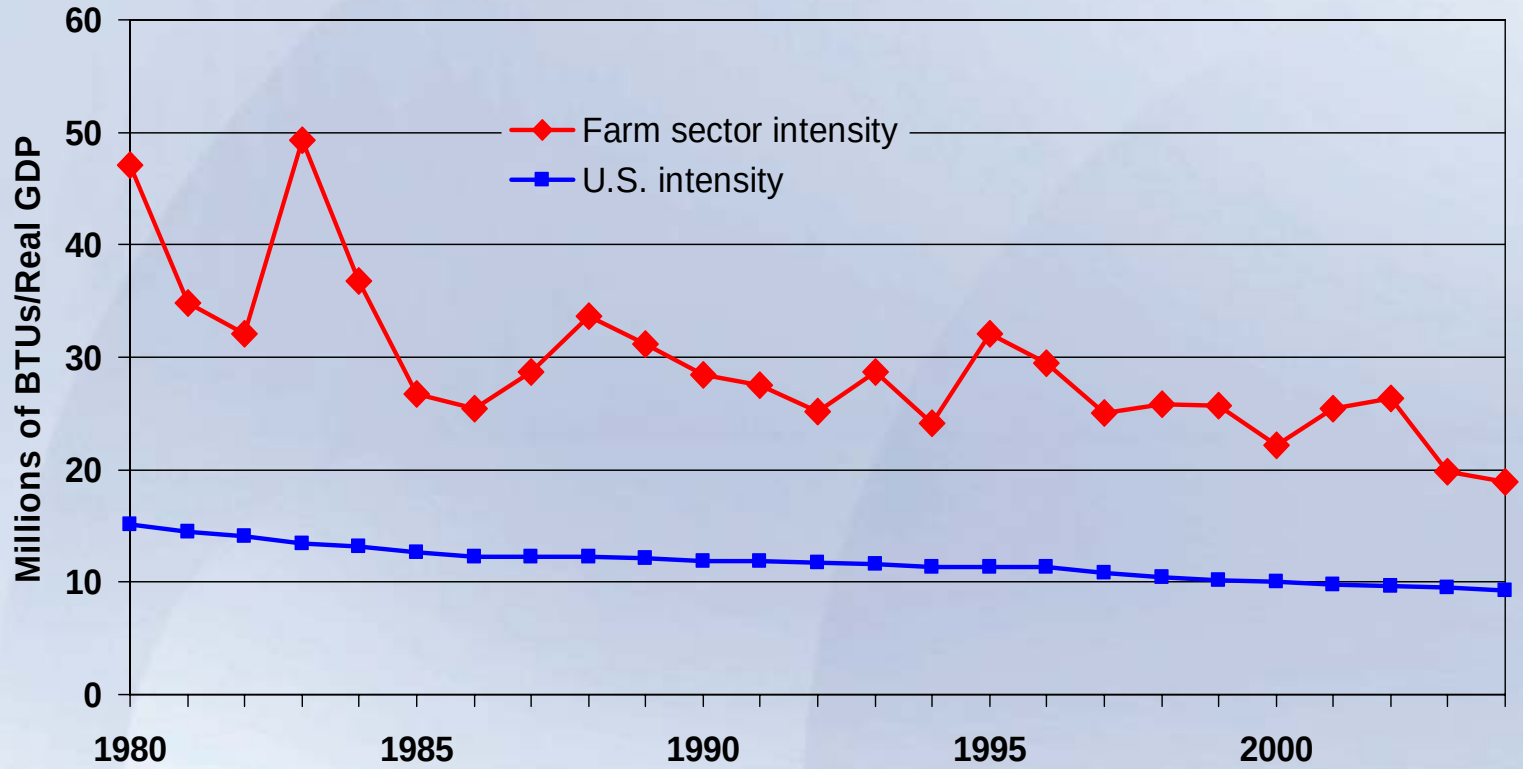
Source: Economic Research Service, USDA

Fertilizer use peaks in 1974 while pesticide use peaks in 1997



Source: Economic Research Service, USDA

Farm energy intensity declined faster than overall U.S energy intensity since 1980, but still more energy intensive



Source: Economic Research Service, USDA and EIA

Emerging patterns of agricultural energy use and efficiency

- Energy will be a major share of farm costs, even as efficiency improves
- High energy costs will be a drag on farm income
- High energy prices will stimulate energy efficiency gains
- High energy costs will encourage production of lower energy crops
- High energy prices will stimulate rapid increases in biofuels

U.S. and Brazil are major biofuels producers

- Biofuel Producers
  - Brazil
  - U.S.
  - EU
  - Poland
  - China
  - India
- More than 75 percent of total produced in U.S. and Brazil

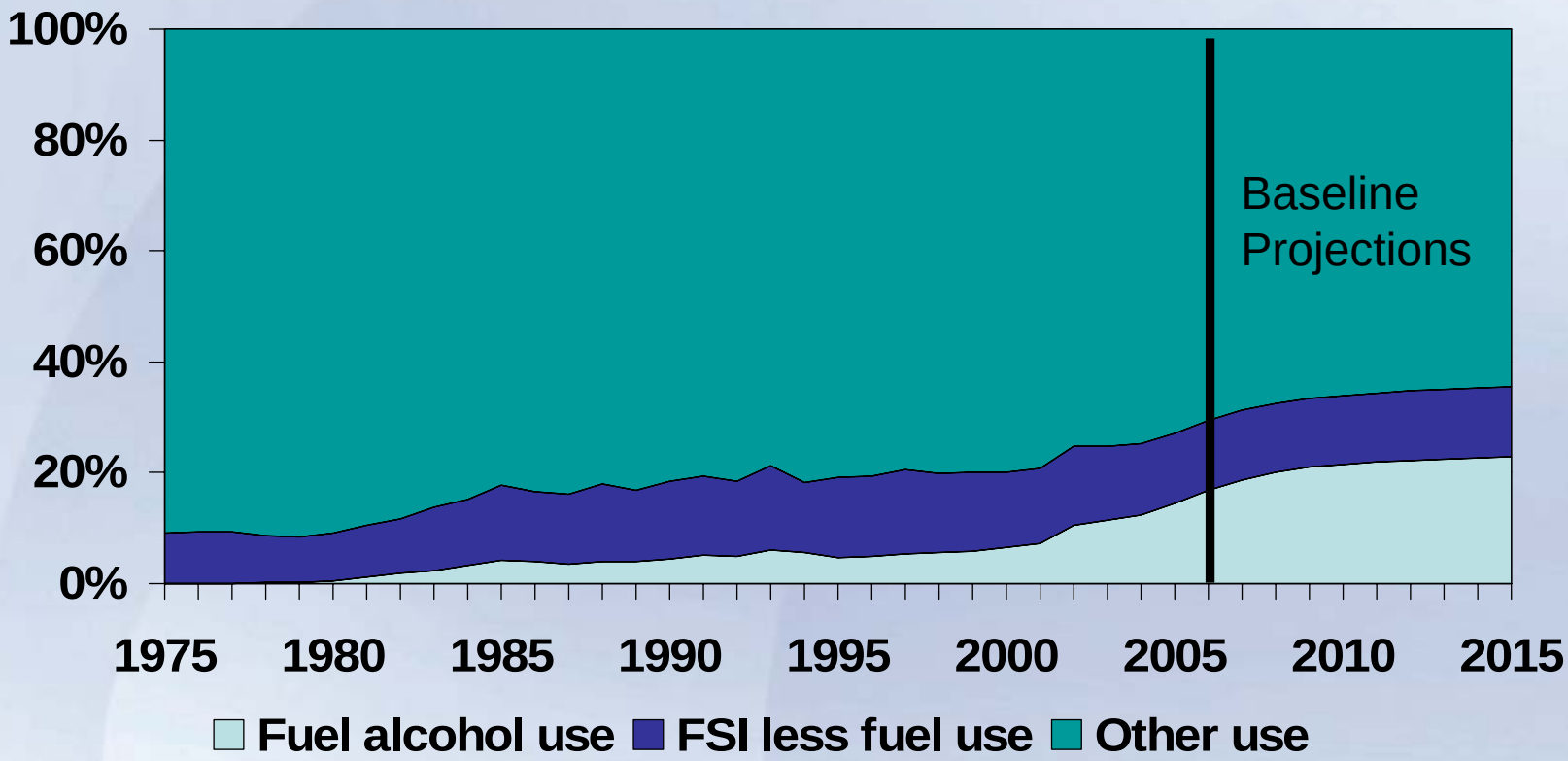
Brazil and U.S. are low cost producers

Table 1: Production Costs of Ethanol in Major Producing Countries, 2004, $ per liter

Country\Type of Raw Material	Wheat	Corn	Sugar Cane	Sugar Beets
United States	0.545	**0.289**		
Canada	0.563	0.335		0.560
EU-15	0.573	0.448		0.546
Poland	0.530	0.337		
Brazil			**0.219**	

Source: OECD (2005), Table 1, p.11.

Ethanol use of maize (corn) in the U.S. has been increasing at an increasing rate



Source: ERS, USDA with Baseline Projections

Share of biofuel except in Brazil is a constraint on supply

- U.S.—15 % of use generates 3 % of transport fuel supply
- Brazil—6 % of use generates 21.6 % of transport fuel

Current biofuels provide large and growing market for agriculture

- Current technologies are limited in supply
- High energy price makes biofuel profitable at least for some countries and commodities
- Future supplies from cellulosic and other biomass processes show greater promise of larger, less constrained, and less competitive biofuel supply