Energy In Agriculture:
Managing the Risk

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Farm Foundation

USDA's Office of Energy Policy and New Uses

RMA Risk Management Agency

Energy Risks in U.S. Agriculture

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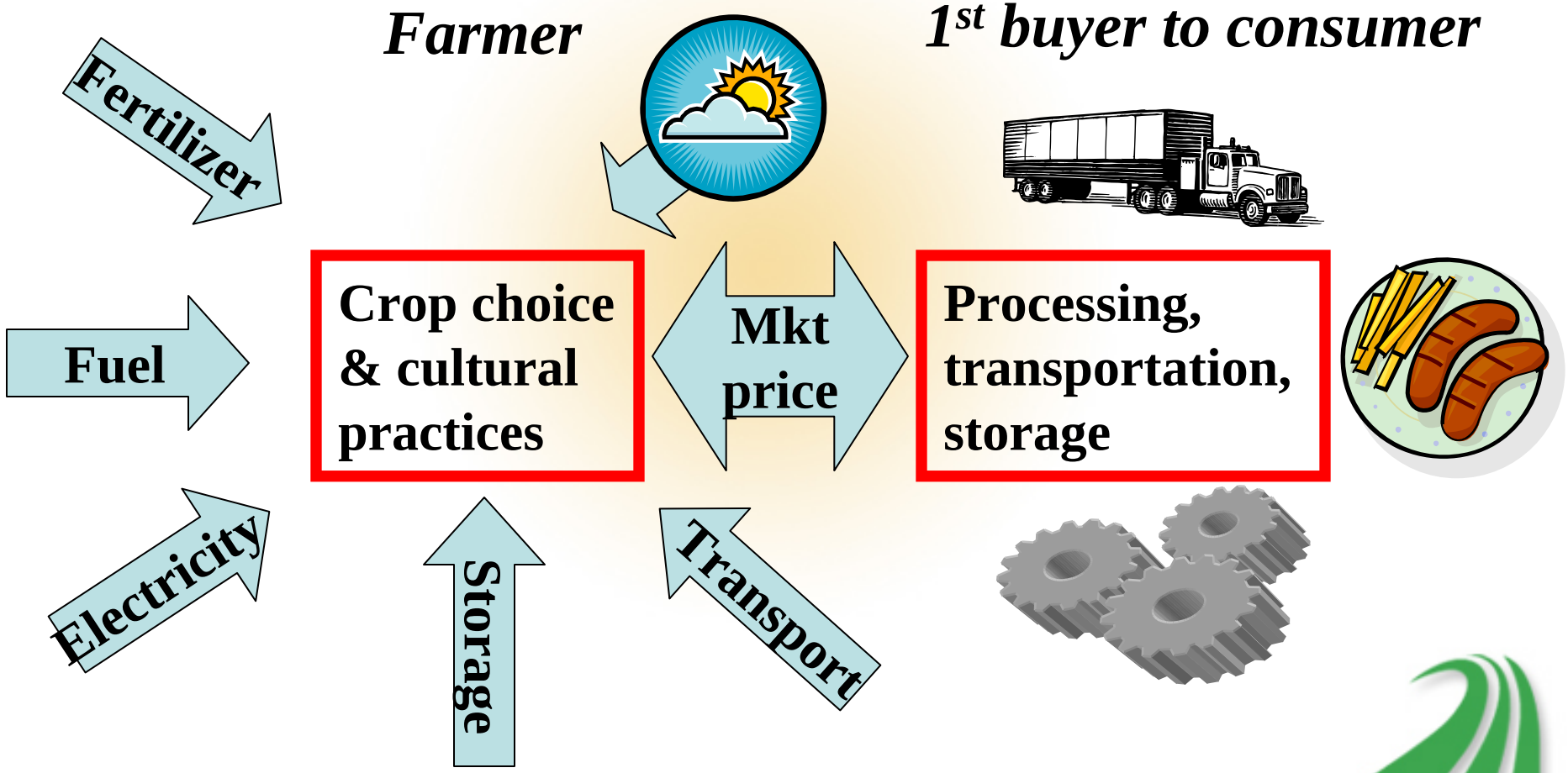
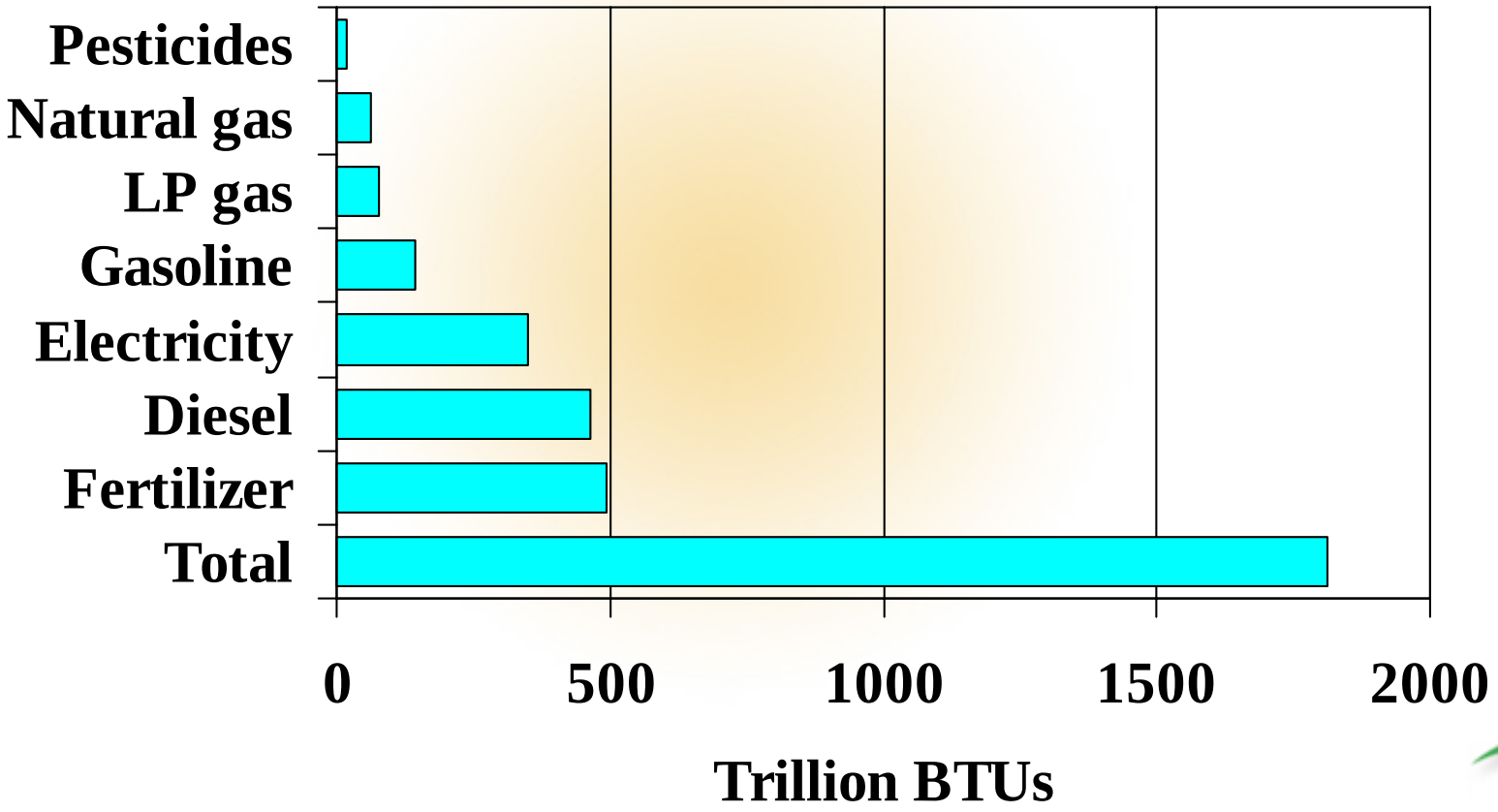
Key Points to Discuss

- **Role of energy in production agriculture**
- **The risk energy markets present**
- **Options for managing energy risks**

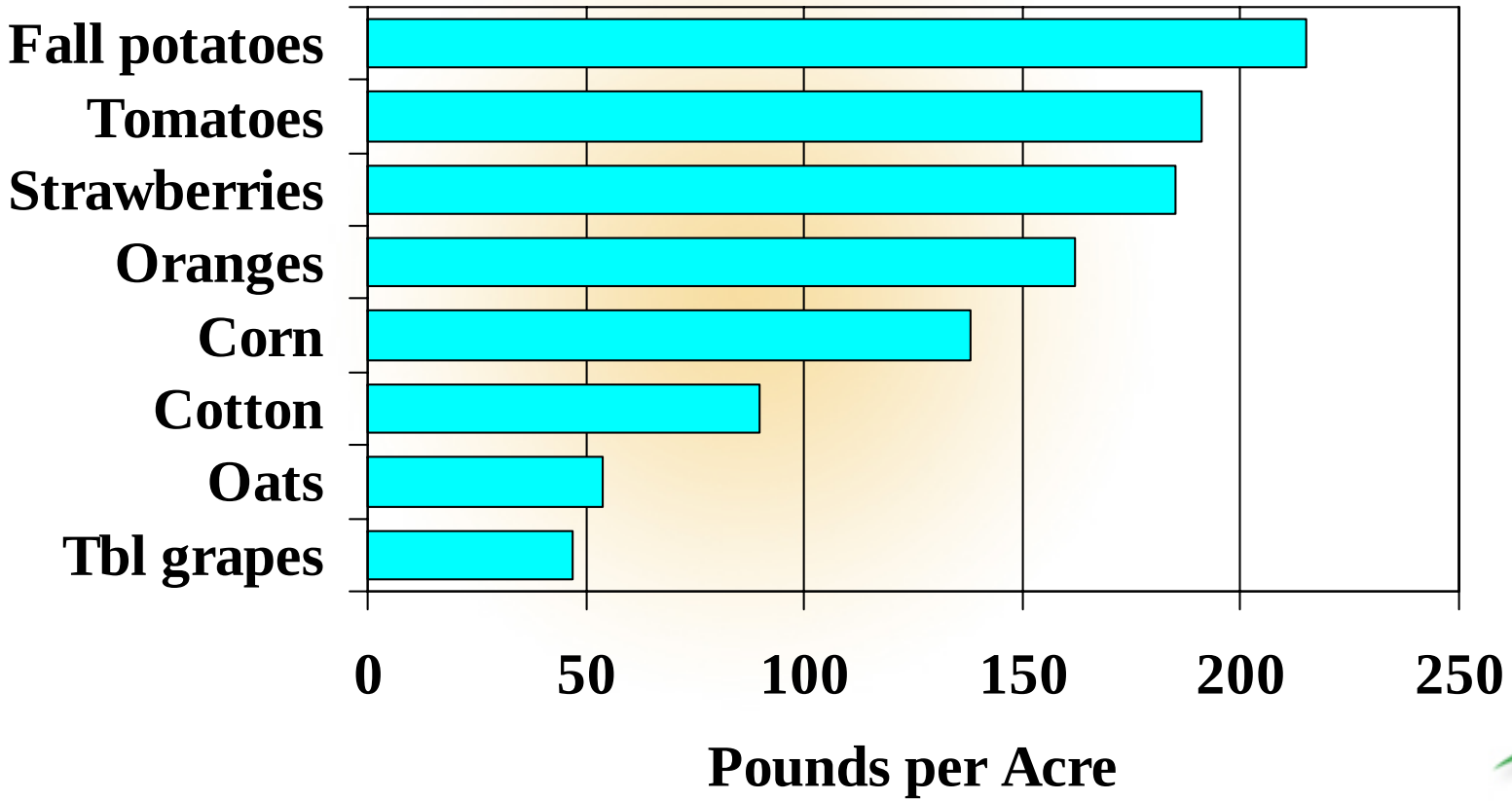
Energy Use in Ag Production



Farm Energy Use, 2002



Typical Nitrogen Application Rates



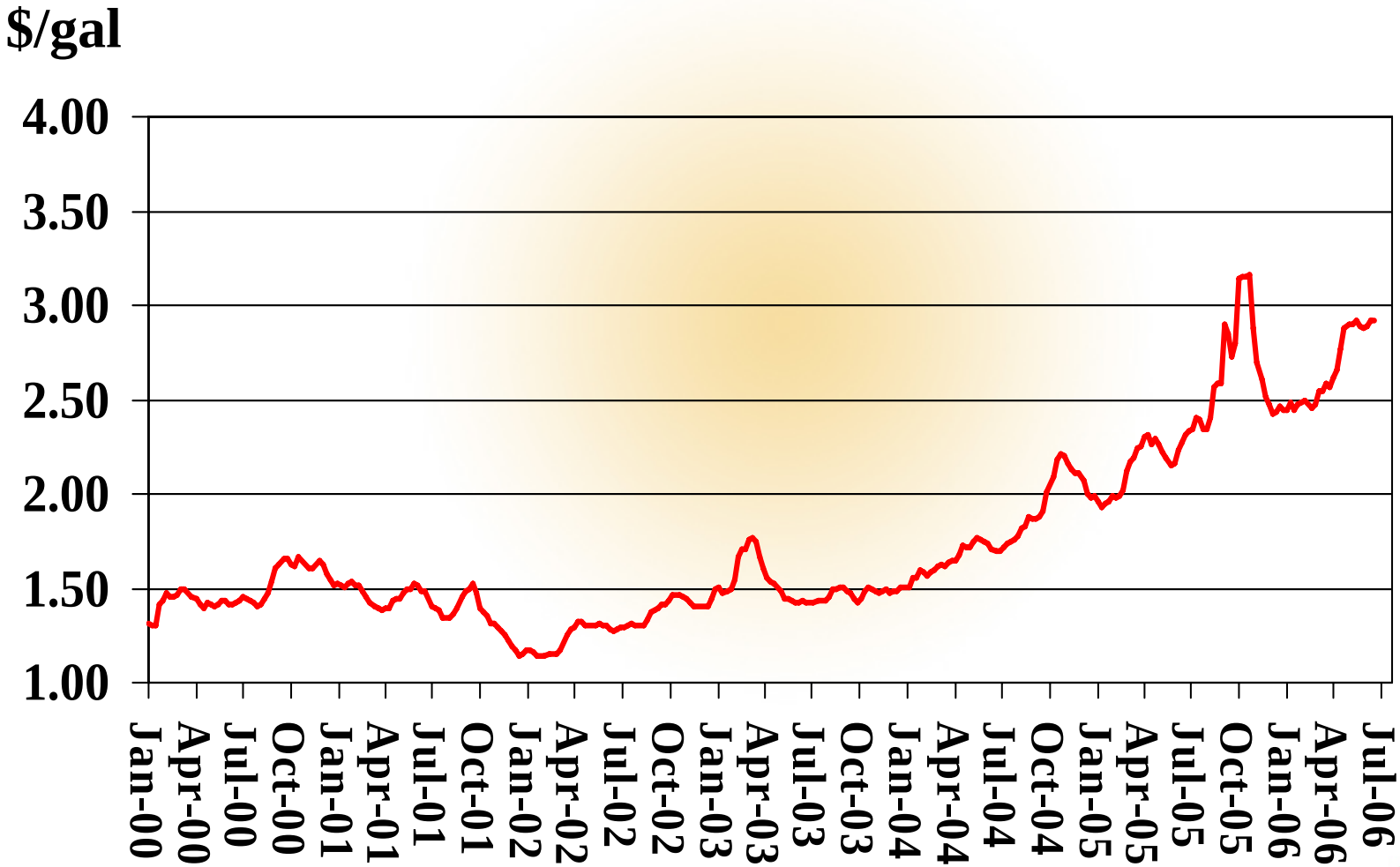
Prices Paid by Farmers

	April 2003	*April 2006*	*Percent change*
Diesel, ($/gal)	**1.24**	**2.28**	**+84**
Unleaded Gas ($/gal)	**1.60**	**2.60**	**+63**
LP gas, ($/gal)	**1.21**	**1.69**	**+40**
Anhydrous am. ($/ton)	**373**	**521**	**+40**
Electricity (¢/kwh) 1/	**8.70**	**9.76**	**+12**

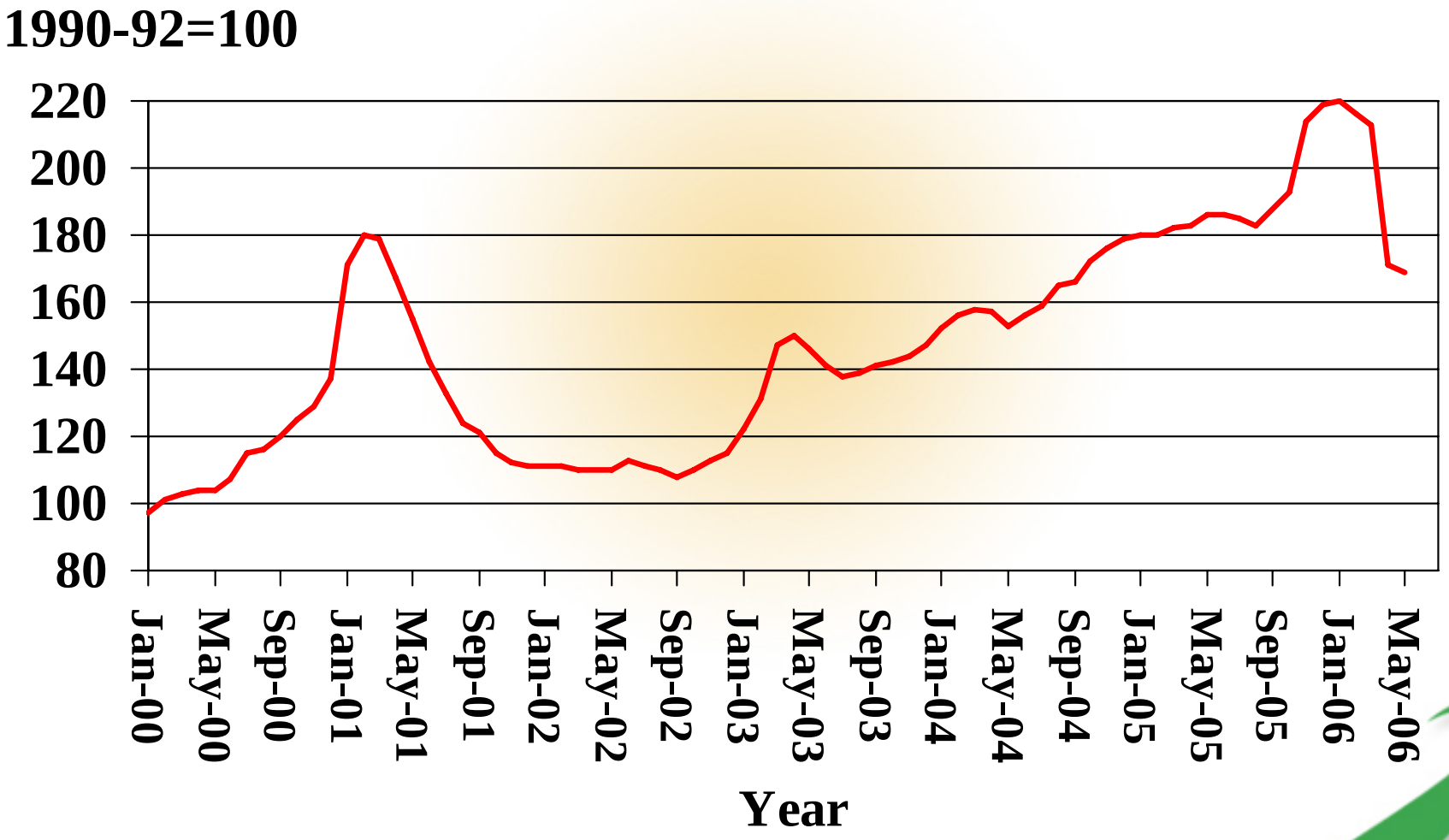
1/ annual US average; 2006 projected

Retail Diesel Prices

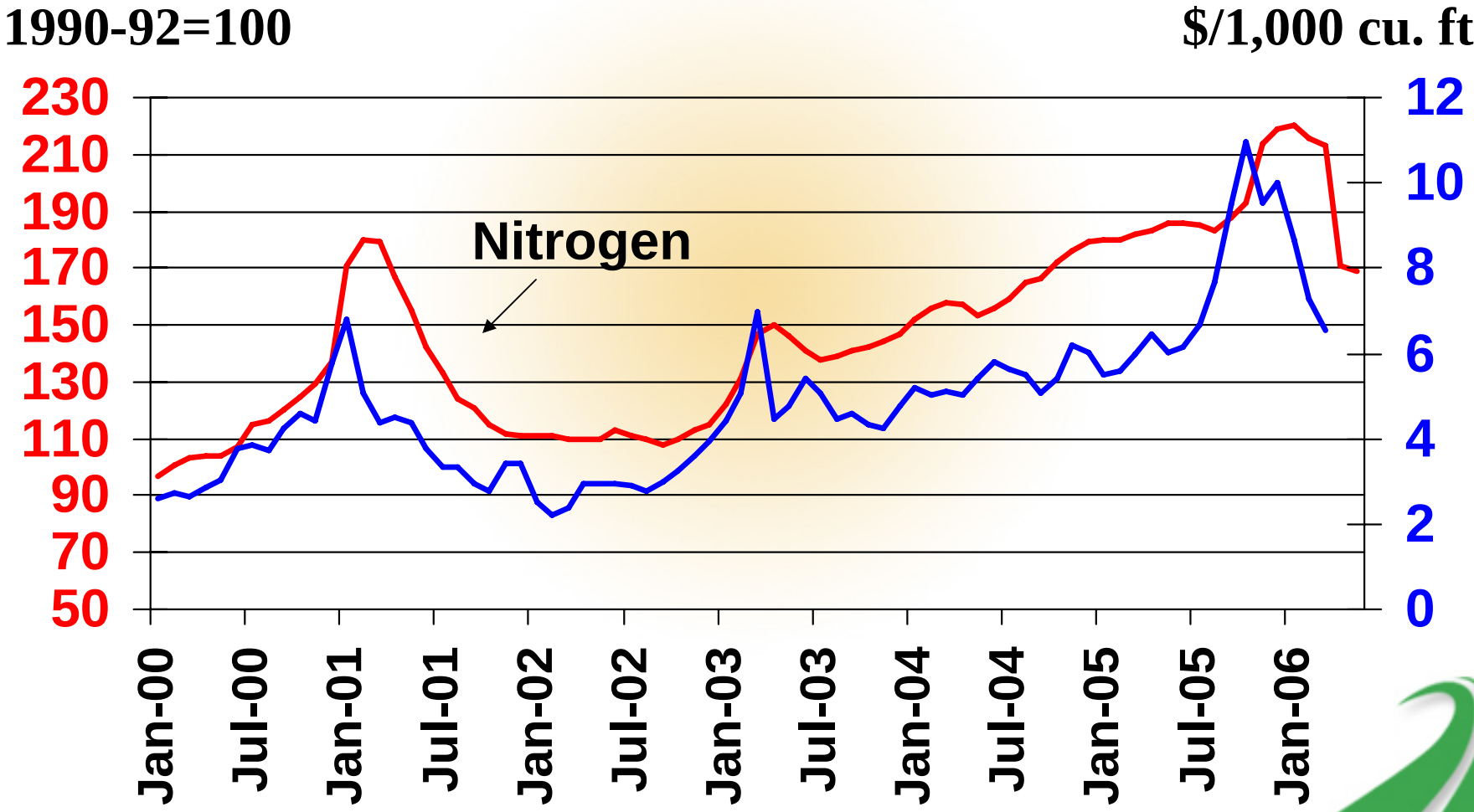
On-Highway, US Average



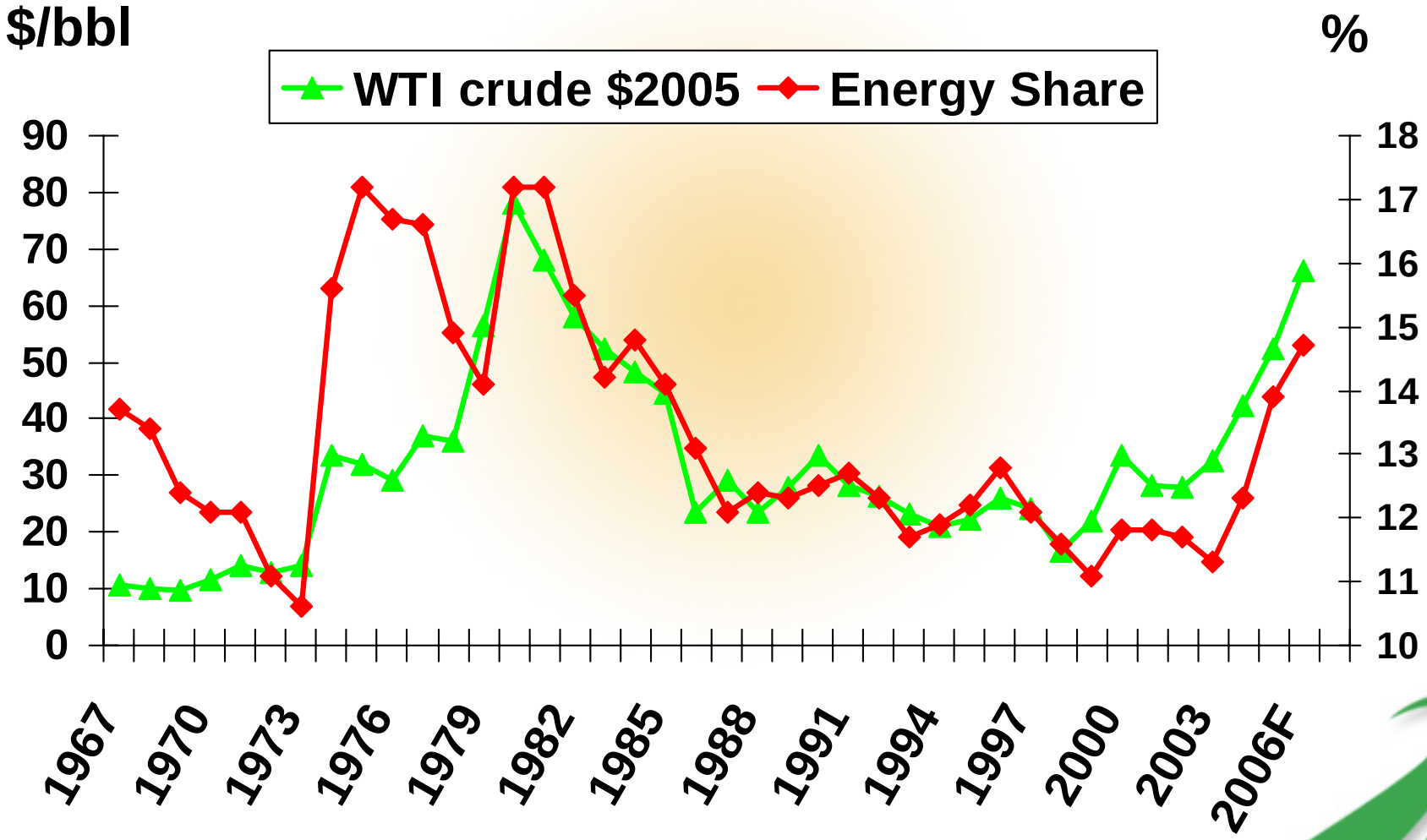
Monthly Nitrogen Prices



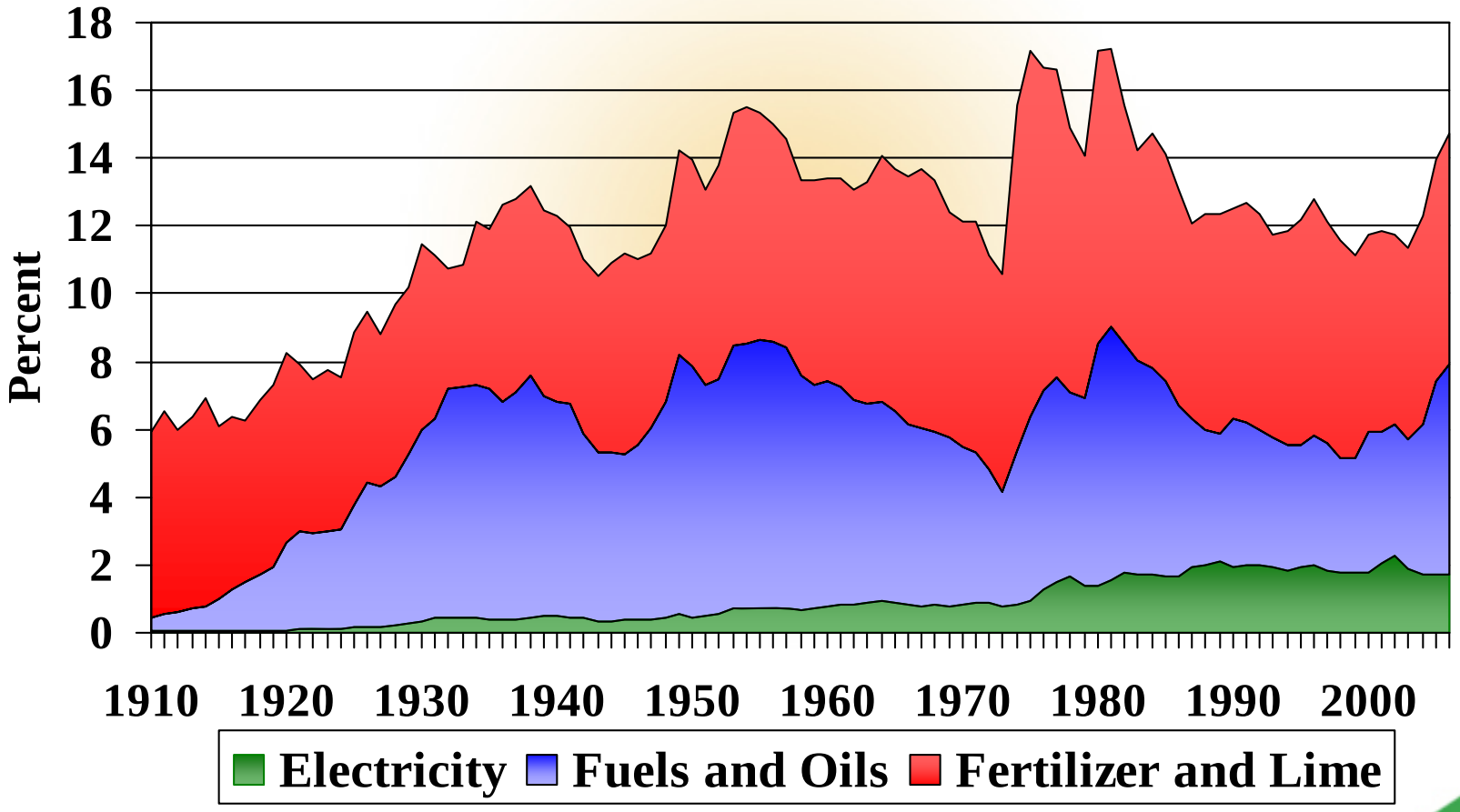
Monthly Nitrogen & Nat. Gas Wellhead Prices



Energy Share of Total Cash Production Expenses



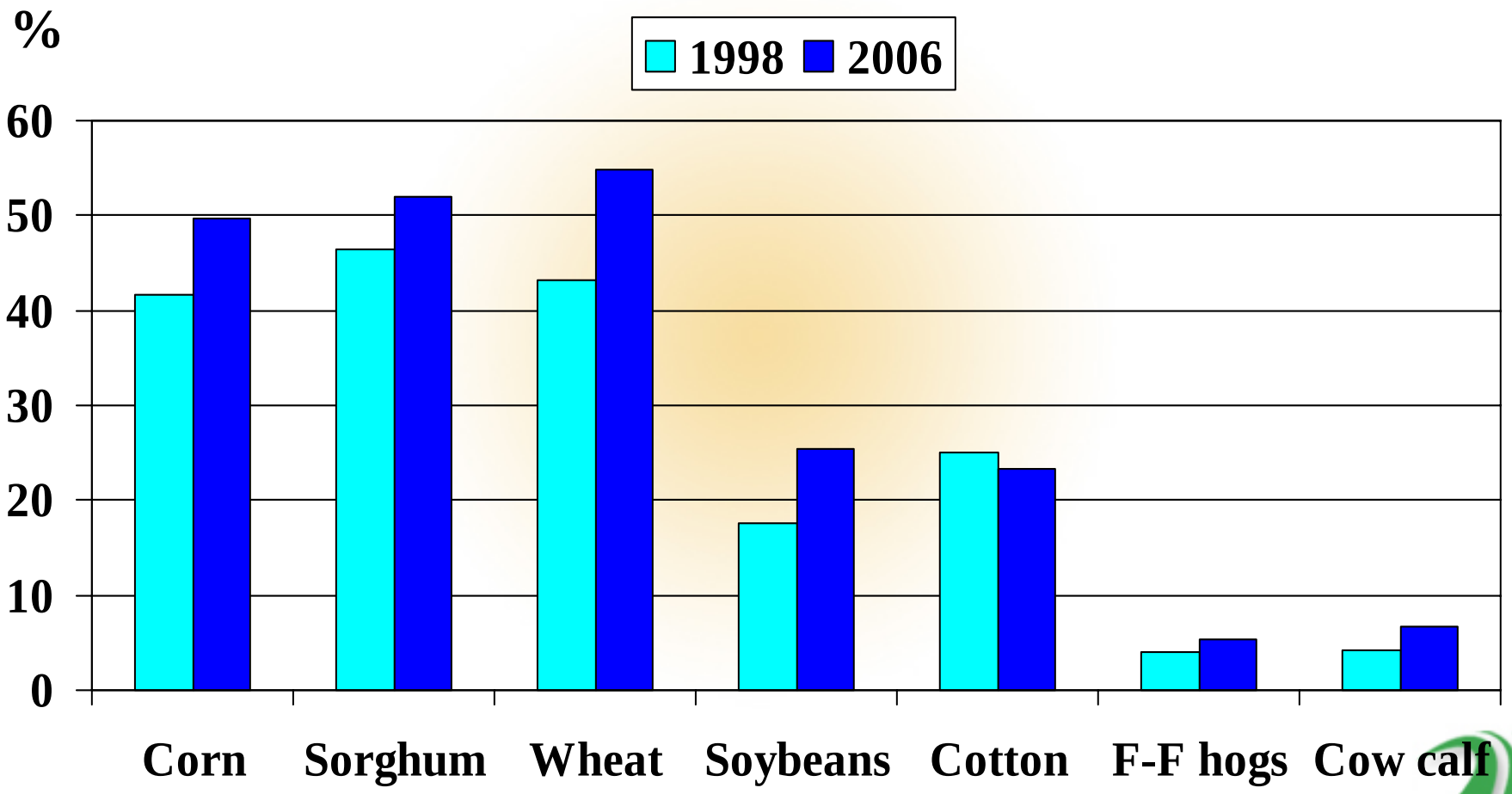
Energy Expenses as a Share of Total Cash Expenses



Total Farm Energy Use per Unit of Ag. Output, 1996=1.0

Source: USDA, Economic Research Service.

Energy Share of Operating Expenses

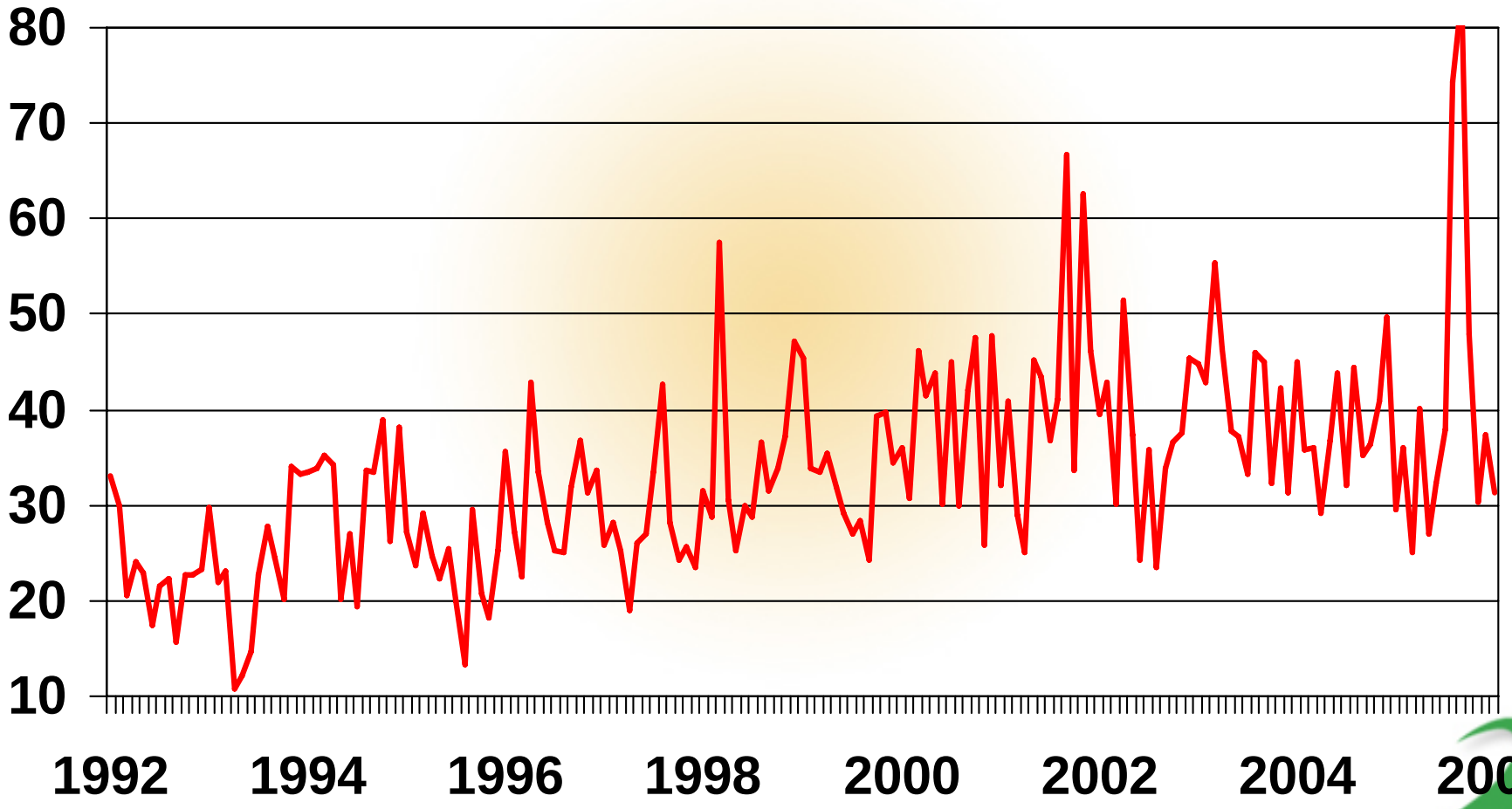


Sources of Production Cost Variability

S.E. of Trend Regression, 1996-2005, for U.S. corn avg. prod. costs, $/acre:

Hired Labor	0.16	
Custom operations	0.33	
Taxes	0.47	
Chemicals	0.86	
Interest	1.08	
Seed	1.16	
Repairs	1.29	
Land rent	1.73	
Fuel, lube, elec.	5.29	10.03
Fertilizer	5.80	

Unleaded Gasoline Volatility



Managing Energy Risk

(1) Reduce energy use:

--Crop selection
--Cultural practices (3 click tools):
reduced tillage
nutrient, pest, irrigation mgmt
--Use energy efficient equipment:
fuel switching
precision ag
--Energy audits

Managing Energy Risk

(2) Diversify Products (Ag + energy/environmental services):

--Manure application
--Methane digesters
--Biofuel production
--Wind energy
--Environmental credits

Managing Energy Risk

(3) Manage with tools:

--Futures
--Derivatives/structured products
--Forward purchases
--Physical storage
--Off-peak use
--Negotiated prices/scale purchases (e.g., coops)
--Insurance

Available Futures Contracts

Product	*Where?*	*Size*	*~Value*
Ethanol	CBOT	29,000 gal	$90,000
Ethanol	MERC	30,000 gal	$90,000
Crude oil	NYMEX	1,000 bbl	$70,000
Nat. gas	NYMEX	10,000 mbtu	$70,000
Gasoline	NYMEX	42,000 gal	$85,000
Urea, UAN, DAP	MERC	100 tons	$25,000

Producer Purchase Practices

2004 ARMS shows for producers:

- **24% lock in fuel price before delivery**
- **21% negotiated fuel price discounts**
- **31% negotiate fertilizer price discounts**
- **8% use fuel and fertilizer contracts**
- **20% buy fuel and fertilizer through cooperatives**

Conclusions

- Energy costs squeezing some producers
- Market will force behavioral change, as it has done in the past
- Strategies to mitigate risks may reduce variability in short run but may not override secular trends
- Potential for further adaptation of existing tools to farm level uses