

Comments on State, National & Global Biofuel Policies

Evert Van der Sluis
Department of Economics

Overview

- I. Policy basics
- II. Selected global numbers & policies
- III. U.S. numbers & policies
- IV. State-level policies

What is Policy?

- A guiding principle leading to a
 - Course of government action
 - Specific program pursued by gov't
- Policies affect/determine
 - Gov't actions
 - Gov't decisions
 - E.g.
 - "Free trade"
 - "Energy independence"
- Working definition:
 - "Whatever government chooses to do or not do"

Types of Policy Pursued by Governments

- Economic
- Foreign
- Environmental
- Energy
- Ag & food
- Etc.

Energy policy is connected to other policies

Energy Policy

- Fairly recent direct influence on ag sector:
 - Including ethanol, biodiesel
- Ethanol subsidies in U.S.: since 1978
- Biodiesel subsidies in U.S.: since 2005
 - Tax exemption

Effects of Energy Policies on Ag Sector

- Changes in:
- Commodity price relationships
 - Land use patterns & quantities of commodities produced
 - Commodity flows
 - & petroleum flows
 - Prices of consumer goods
 - & energy

What's Economics Got To Do With It? Gains (& Damages?) from Policies

1. Market impacts:
 - People place value on items purchased
 - i.e., through a market, willing to pay a price for items
2. Non-market impacts:
 - Items we value & care about,
 - But not obtained through markets

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Market Impact Examples

Policies change the way we do:

- Agriculture
- Forestry
- Fisheries
- Water supply
- Energy

Policy changes may cause price & quantity changes

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Non-market Impact Examples

- Ecosystem changes
- Landscape changes
- Amenities & lifestyle changes
- Pollution
- Climate change

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Externality

- Example: climate change & its effects
 - One person's actions impose adverse effects on someone else
- **When externalities are present:**
 - **Competitive markets likely will not generate outcomes that are in public's interest**
 - **So, relying on voluntary actions only to deal with externality will not be satisfactory or useful**

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What Can Be Done About Externalities?

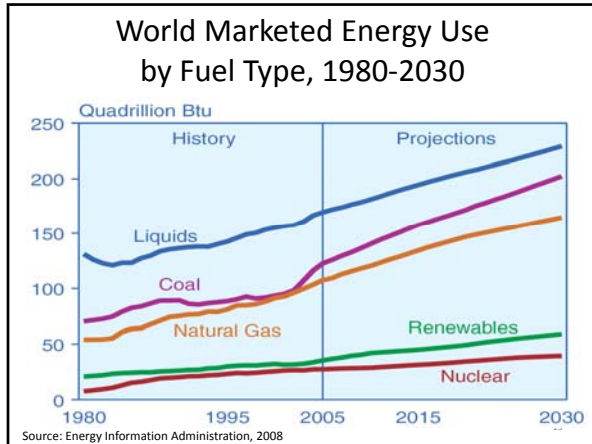
- "Internalize" them into markets
 - Some of the ways:
 - Common law
 - Prohibit practices
 - Prescribe practices
 - Prescribe performance
 - Cost sharing
 - Cross compliance
 - Taxation

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Example: Economics & Climate Change

- Reduce GHG emissions
 - Economic tradeoffs
 - What are the costs?
 - Who pays?
 - What are the benefits?
 - Who gains?
 - Which policies are effective?

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US Energy Department Projections

- World petroleum demand – 1.3% per year ↑
- China's petroleum needs – 3.2% per year ↑
- India's oil requirements – 2.3% per year ↑

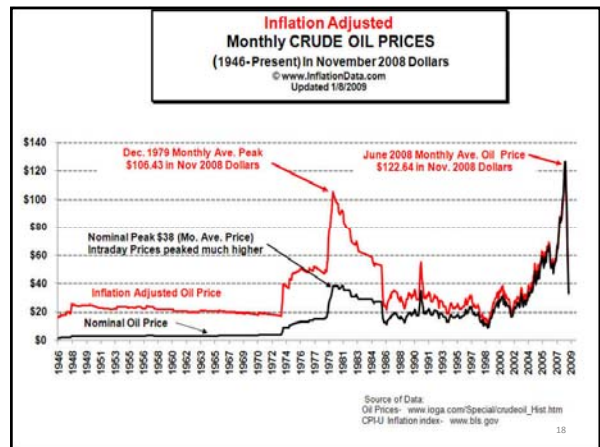
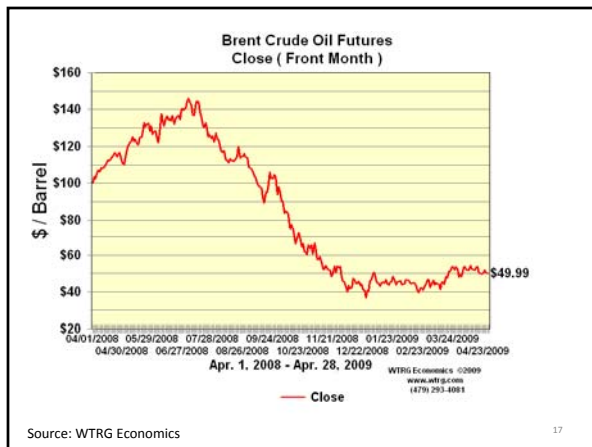
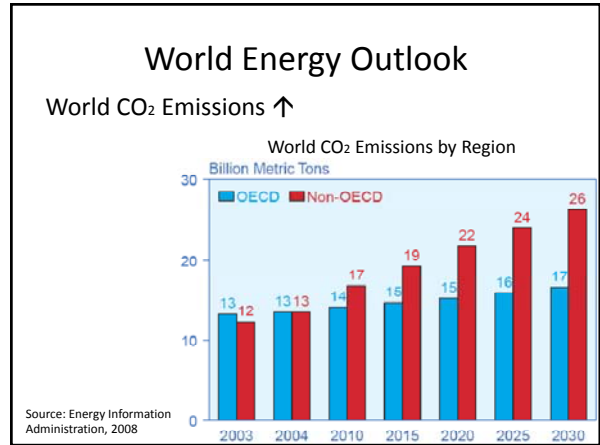
Source: Energy Information Administration, 2008

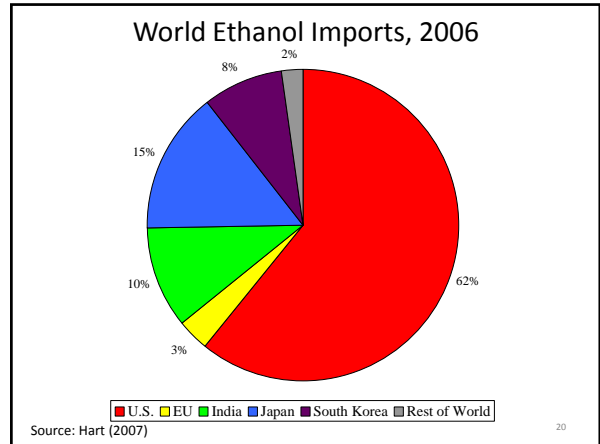
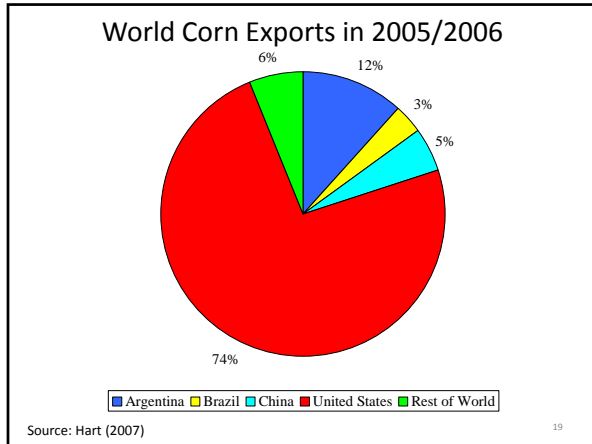
World Energy Outlook

World energy consumption growth

- 70% ↑ by 2030
- 70% ↑ outside OECD countries
- 20% ↑ in China
- 60% ↑ due to transportation
 - 18 cars/1,000 people in China
 - 800 in US

Source: Energy Information Administration, 2008





Given Current Energy Projections ...

- Expect U.S., China, India, EU, Japan, South Korea to be ethanol importers over next decade
- Brazil will be major ethanol exporter
 - Already exports about 25% of production
 - > 1 billion gallons

Source: Hart

Biofuel Feedstocks

- Corn
 - U.S., China
- Sugarcane
 - Brazil, Central & South America, Southeast Asia, India
- Soybean Oil
 - U.S., Brazil
- Rapeseed & sunflower oil
 - Europe
- Palm Oil
 - Malaysia & Indonesia

Sources: Hart, Renault

Countries w/ Biofuel Programs

- U.S.
 - Renewable Fuels Standard
 - Other
- Brazil
 - Ethanol blend requirement
 - Preferential tax policies
- Argentina
 - Requires use of E-5 blend over next 5 years
- India
 - 5% ethanol in all gasoline
- EU
 - 5.75% biofuel (energy content) target by 2010

Sources: Hart, Renault

Biofuel Programs

- Columbia
 - Mandates use of E-10 in big cities
- Venezuela
 - Phase in national E-10 blending mandate
- Japan
 - Long term goal of replacing 20% of oil needs with biofuels or gas-to-liquid fuels
- Canada
 - E-10 in 45% of gasoline by 2010

Sources: Hart, Renault

Biofuel Programs

- Thailand
 - Mandating nationwide E-10 in 2007
- China
 - Mandates E-10 blends in five provinces
- Philippines
 - Will mandate E-5 & 2% biodiesel in 2007

Sources: Hart, Renault

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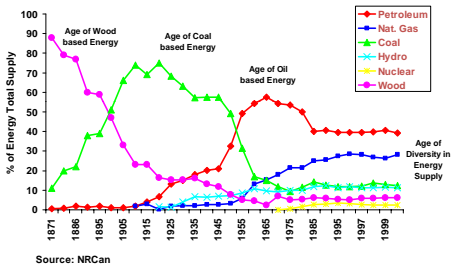
Trade Barriers

- U.S.
 - 2.5% tariff
 - Plus 45 cents per gallon
- Brazil & Argentina –
 - 20% tariff
- European Union
 - 87 cents per gallon tariff
- Canada
 - 19 cents per gallon tariff
- Thailand
 - 30% tariff
- India
 - 186% tariff

Sources: Hart, Renault

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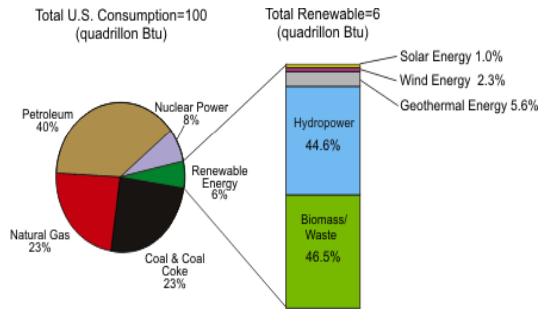
Sources of Energy



Source: Canadian Gas Association

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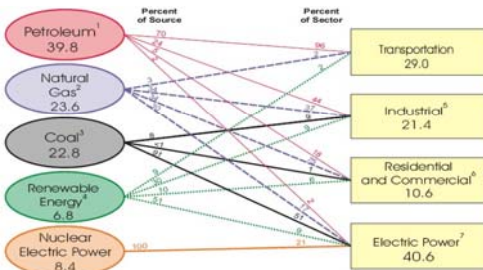
U.S. Energy Sources



Source: EIA

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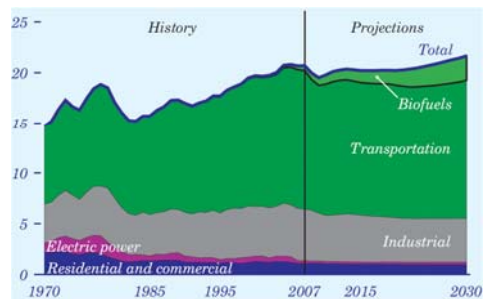
U.S. Primary Energy Consumption by Source and Sector, 2007 (Quadrillion Btu)



Source: Source: Energy Information Administration

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Total liquid fuels demand by sector (million barrels/day)



Source: Source: Energy Information Administration

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U.S. Energy Policies: Examples

- Energy Improvement & Extension Act of 2008 tax provisions of the Emergency Ec Stabilization Act of 2008 (PL 110-343)
- Biofuel provisions of the Food, Conservation, & Energy Act of 2008 (PL 110-234)
 - Ethanol excise tax credit reduction
 - After ethanol production & imports > 7.5 bln gal add
 - Income tax credit for cellulosic biofuel production

Source: Source: Energy Information Administration 31

U.S. Energy Policies: More Examples

- Energy Policy Act of 2005 (EPACT2005), PL 109-58
 - Mandatory energy conservation standards
 - Tax credits for businesses & individuals
 - Eliminate oxygen content requirement for Federal reformulated gasoline (RFG)
 - Extended royalty relief for offshore oil & natural gas producers
 - Loan guarantees for new or improved technology projects that avoid, reduce, or sequester GHGs

Source: Source: Energy Information Administration 32

...and More U.S. Energy Policy Examples

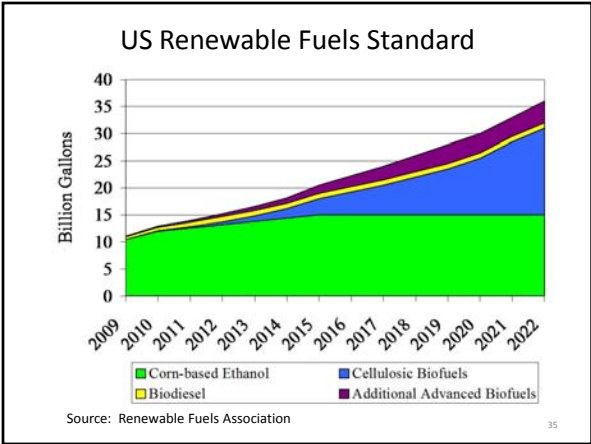
- Military Construction Appropriations Act of 2005 (PL 108-324)
 - Encourages construction of Alaska natural gas pipeline, including Federal loan guarantees during construction
 - State renewable portfolio standard (RPS) programs for renewable electricity generation.

Source: Source: Energy Information Administration 33

Key Policy

- **EISA2007 (Public Law 110-140), including:**
 - **Renewable fuel standard (RFS)**
 - **36 billion gallons of ethanol by 2022;**
 - Corporate average fuel economy (CAFE) standards for cars & trucks of 35 mpg by 2020;
 - CAFE credit trading & transfer program
 - Various appliance efficiency standards;
 - Lighting efficiency standard starting in 2012;
 - Other:
 - Industrial waste heat or natural gas efficiency, energy use in Federal buildings, weatherization assistance, & manufactured housing

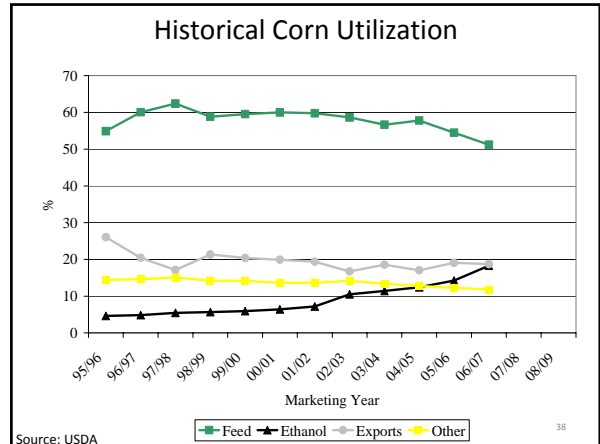
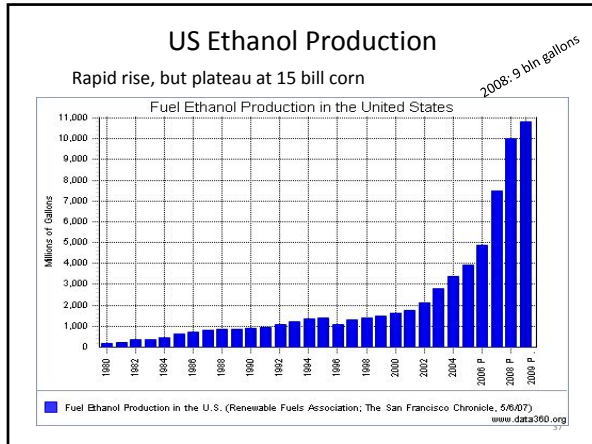
Source: Source: Energy Information Administration 34



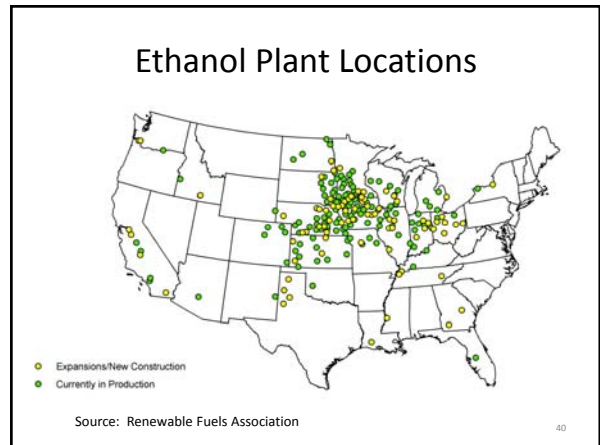
Energy Independence & Security Act of 2007

- 36 billion gals. ethanol by 2022
- Of this, 21 billion from cellulosic
- 36-21 = 15 corn ethanol: is the party over?

Source: Renewable Fuels Association 36

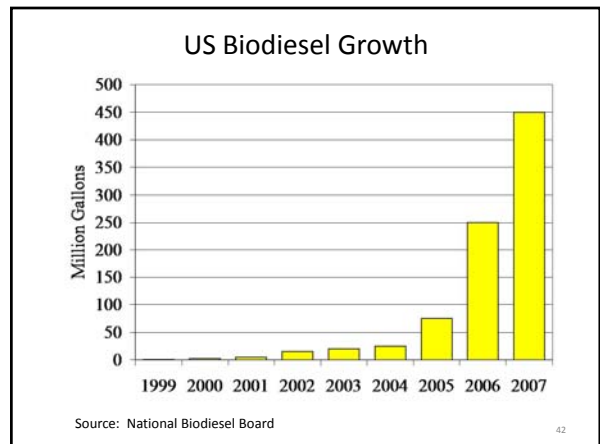


- ### More Ethanol Snapshots (January 2009)
- Production capacity: 10.6 mln gallons
 - Operating Plants: 170
 - Plants under construction: 24
 - States w/ ethanol plant: 26
- Source: Renewable Fuels Association



Ethanol – Production Capacity by State

State	Current Capacity (million gallons)
IA	1,610
IL	834
NE	597
SD	553
MN	543
WI	230
KS	211
MO	155
MI	150
IN	122
CO	88
CA	69
TN	67
KY	35
ND	34



Biodiesel – Production Capacity by State

State	Current Capacity (million gallons)
IA	112
TX	104
MN	63
TN	48
OH	41
MO	36
IL	35
AR	27
CO	27
OK	23
FL	23
GA	19
IN	15
LA	15
MI	15

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Rapid Historical Investment

- Renewable Fuel Standard:
 - Tax credits, import tariffs, blend mandate
 - Motivated industry expansion
- Favorable gasoline/corn price ratio
 - Provided high returns on investment
 - Enabled plants to pay high corn prices
 - \$3 billion of investment capital flowed into ag sector
 - External investment has rural development implications

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Ethanol-Corn Price Spreads



Source: Jason Henderson, KC FRB

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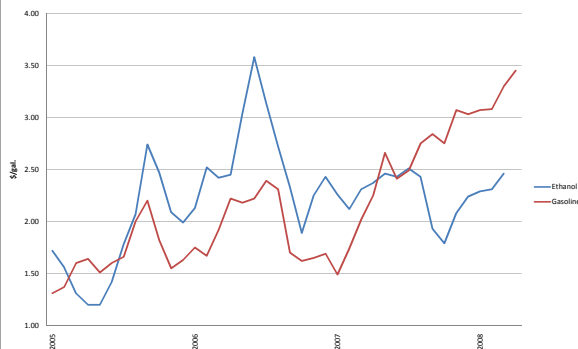
How Much Can an Average Ethanol Plant Pay for Corn?

Ethanol Price	And cover variable costs	And cover variable costs <i>plus int., dep., & taxes</i>
\$1.85/gal. <i>DDG prices stable</i>	\$4.50	\$3.55
\$1.85/gal <i>DDG prices rise</i>	\$5.50	\$4.15
\$2.35/gal <i>DDG prices rise</i>	\$7.50	\$6.10

Source: Keith Collins, USDA

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Ethanol and Unleaded Gasoline Prices, 2005-08, FOB Omaha



Source: Cole Gustafson

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Ethanol Plant Ownership

- Current Plants
 - 47 percent of plants are farmer owned
 - 39 percent of production from farmer owned
- Plants under Construction
 - 12 percent of plants are farmer owned
 - 11 percent of production farmer owned
 - (1 percent ownership loss => 1 less local job)

Cooler Investment Climate

- General economic conditions & investment climate
- Corn price & supply uncertainty
- Construction costs ↑
- Tax credits uncertain
- New concerns about environmental impact, resource demands (water), product quality
- Federal loan programs don't match scale of new plants
- Will new biomass tech make existing corn plant tech obsolete & less profitable?

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Subsidies Types

Subsidies to supply of intermediate inputs	Production Subsidies	Consumption Subsidies	Purchase Subsidies	Byproduct consumption subsidy
Crop and irrigation subsidies	Production-linked payments and tax credits for byproducts	Subsidies to storage and distribution infrastructure for byproduct	Subsidies to purchase of byproduct	Subsidies to consumers of byproducts
Energy subsidies	Tax exemptions for by-products	Subsidies to storage and distribution infrastructure for biofuel	Subsidies to purchase of biofuel	Subsidies to purchase of or operation of vehicle
General water pricing policies	Market price support for byproducts			
Subsidies to value adding factors (land, labor, capital)	Production-linked payments and tax credits for biofuel			
	Tax exemptions for biofuel			
	Market price support for biofuel			

Source: Scofield

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Ethanol Incentives by State

State	Ethanol Production Incentives	Renewable Fuel Standard	Retail Pump Incentives for E10	Retail Pump Incentives for E85	Ethanol Labeling Requirement
Iowa		X	X	X	X
Michigan					
Minnesota	X	X	X		
Illinois	X		X	X	X
Kansas	X		X		
Missouri	X	X	X	X	
South Dakota	X		X	X	X
North Dakota	X		X	X	X
Indiana	X				
Nebraska	X				X
Wisconsin	X				X
Ohio					

Source: Scofield

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Fuel Tax by State, 2007 (¢/gal)

State	Gasoline	E10	E85
Iowa	.203	.19	.19
Michigan	.19	.19	.12
Minnesota	.20	.20	.142
Illinois	.19	.19	.19
Kansas	.24	.24	.17
Missouri	.1755	.1755	.1755
South Dakota	.22	.20	.10
North Dakota	.23	.23	.23
Indiana	.18	.18	.18
Nebraska	.28	.28	.28
Wisconsin	.329	.329	.329
Ohio	.28	.28	.28

Source: Scofield

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State-level Subsidies

- Data difficult to get
 - Not measured
 - Multiple agencies
 - Not transparent

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Concluding Comments

- Energy: Policy-Driven
- Domestic policies have global effects
- Methyl Tertiary Butyl Ether (MTBE) fueled past ethanol boom
- Blender credits ↓ from 51¢ to 45¢/gal
- Tariff on ethanol from Brazil remains
- Renewable fuel standard keeps driving demand for corn & cellulosic ethanol
- Ownership: who will run ethanol plants in the future?

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