

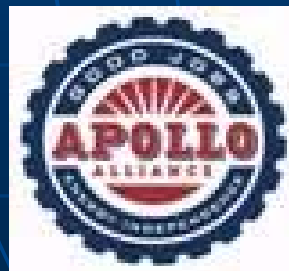
# Biofuels: Crude realities

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We all agree that it's time to ***Set America Free***



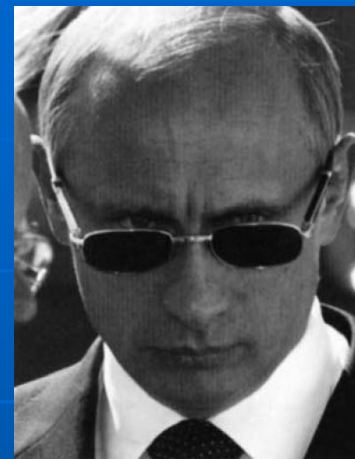
# Key questions

1. Biofuels today make 2% of the transportation market. Can they make a real difference?
2. Can we have a true national market for biofuels or are they only for Mid Westerners?
3. Can we develop transportation and distribution infrastructure?
4. Is our government up to the task?

Alcohol is  
our enemy!



We don't tax fuel coming from them.....



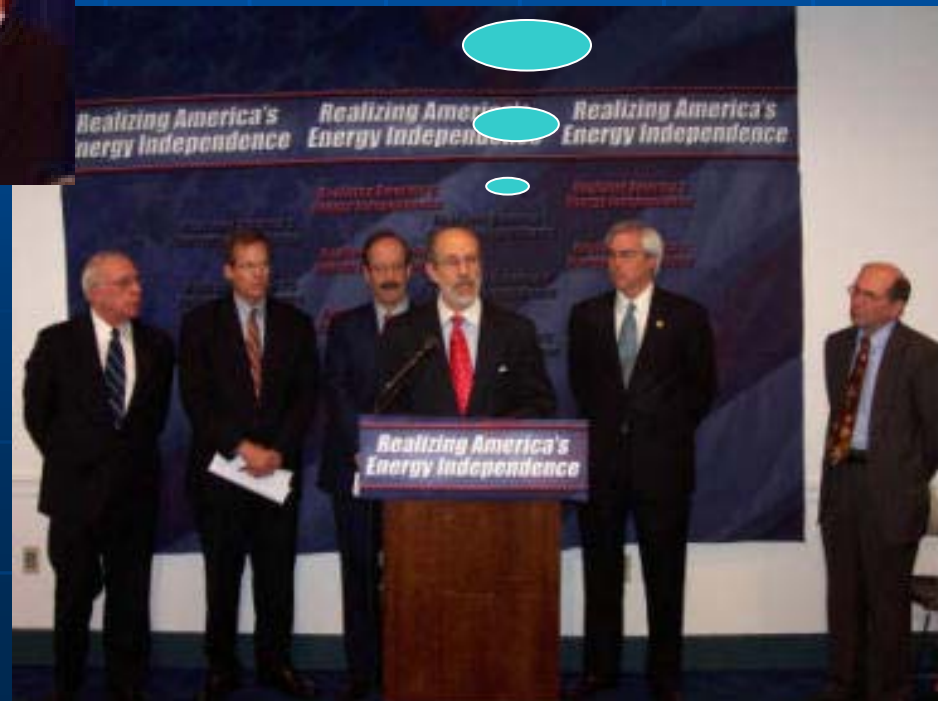
But we tax fuel coming from them.....



I'm going to Iowa



What did I lose there?





# Provide incentives along the supply chain



For under \$3 billion alcohol pumps can be added to a quarter of the nation's service stations. This amounts to only a fraction of the more than \$12 billion that have been spent by the oil industry to introduce reformulated gasoline.

# Every new car sold in the US must be a flexible fuel vehicle



...but...

# We need to think beyond ethanol

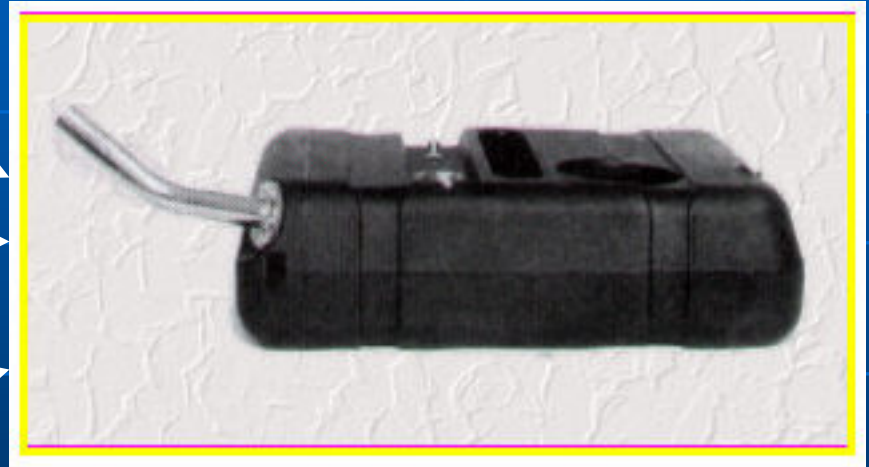
## GEM FFV

One tank can hold them all

G: Gasoline

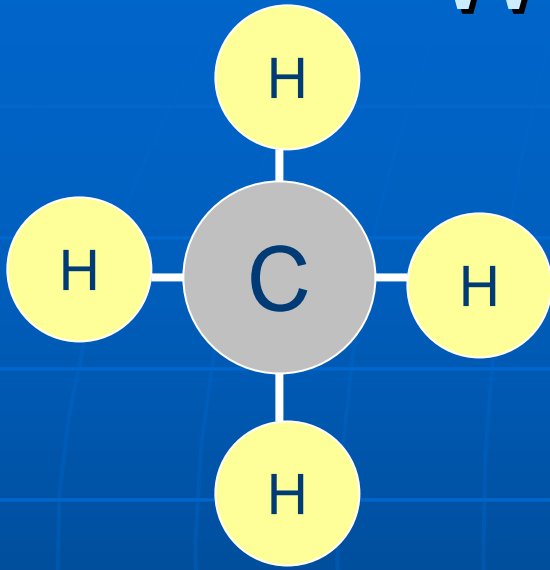
E: Ethanol

M: Methanol



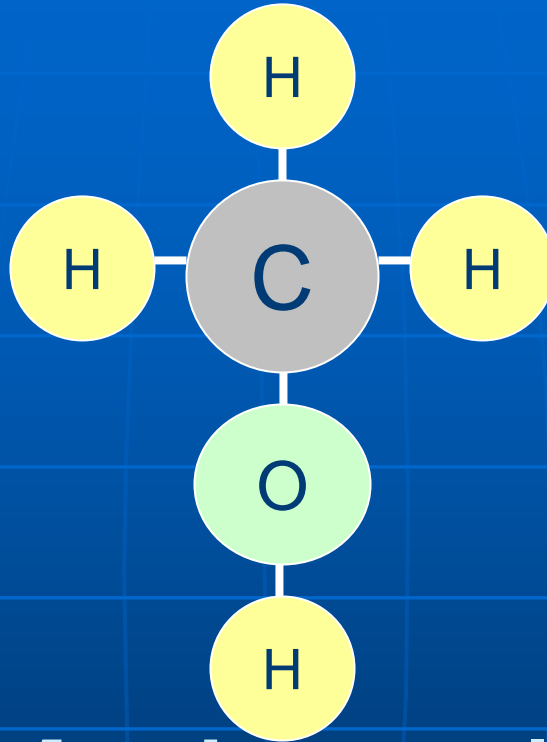


# What is methanol?

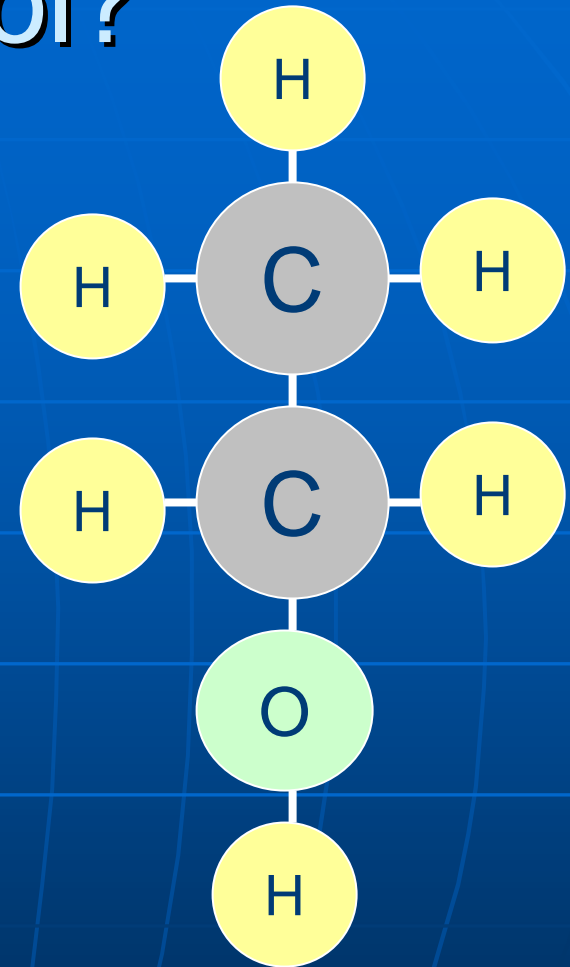


## Methane

Natural gas is scarce as oil and needs special tank

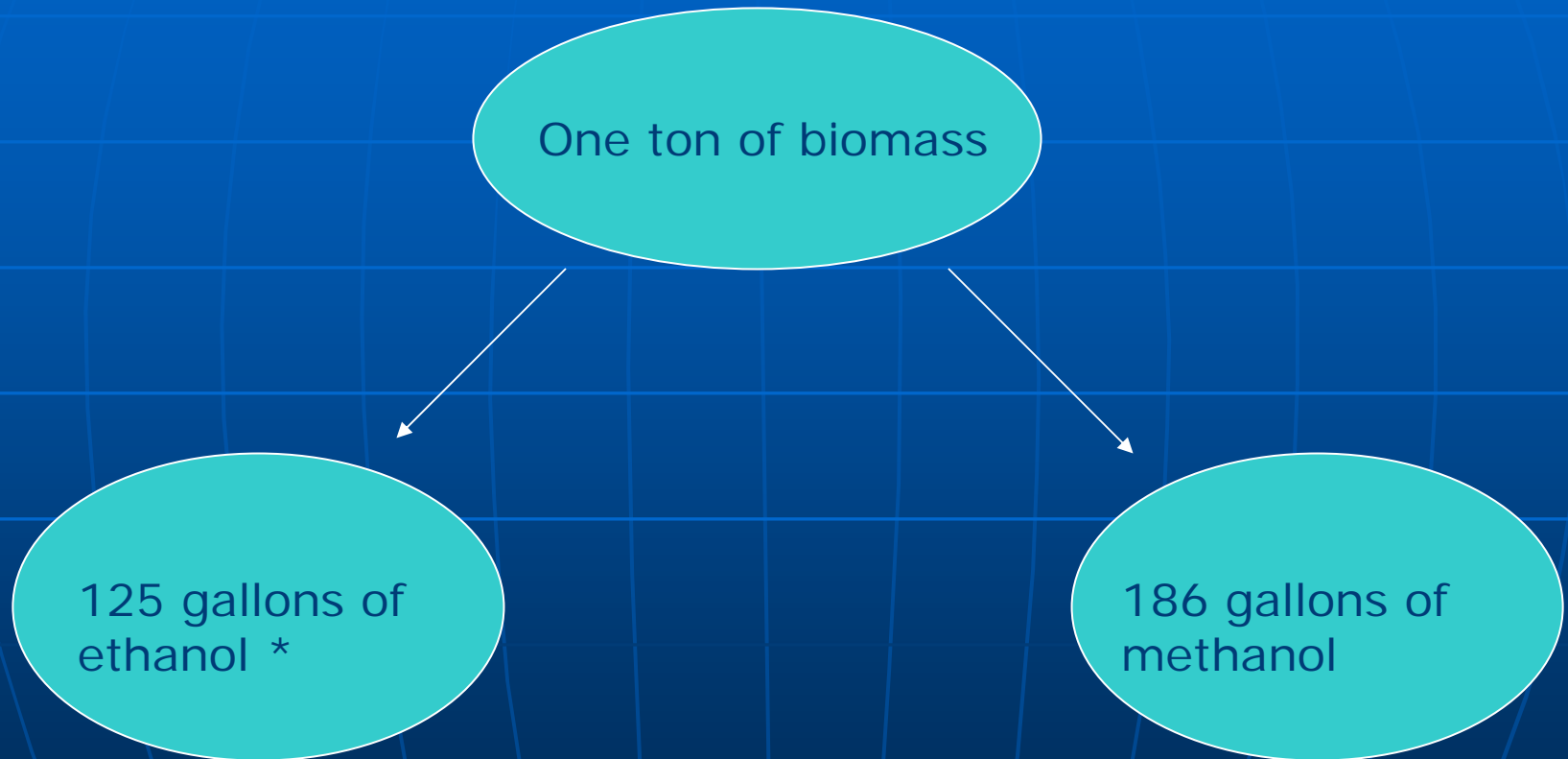


## Methanol



## Ethanol

# Chemistry vs. biology



\*BTU equivalent, based on Iogen technology

# Energy Policy Act 2005: A case of alcohol discrimination

- Number of times ethanol mentioned – 76
- Number of times methanol mentioned - 3



# Crude Realities

1. Corn production is limited.
2. Cellulosic ethanol has a ways to go.
3. If we are serious about expanding ethanol supply, sugar cane is the only game in town.

Energy independence

vs.

Energy security



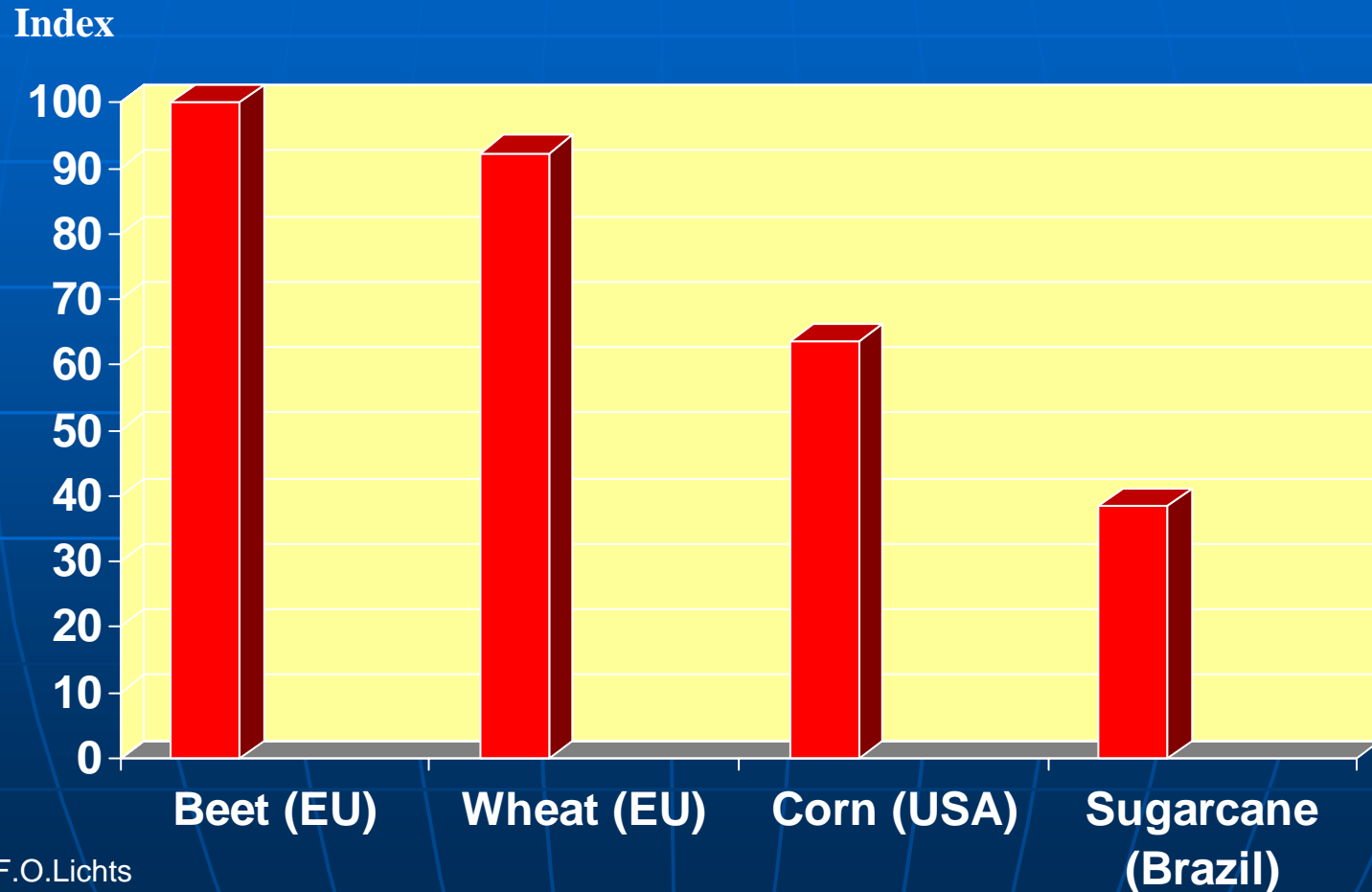
# Ethanol energy balance

Raw Material	Energy Output / Energy Input
Wheat	1.2
Corn	1.3 – 1.8
Sugar Beet	1.9
Sugar Cane	8.3

Sugarcane is the best feedstock for ethanol

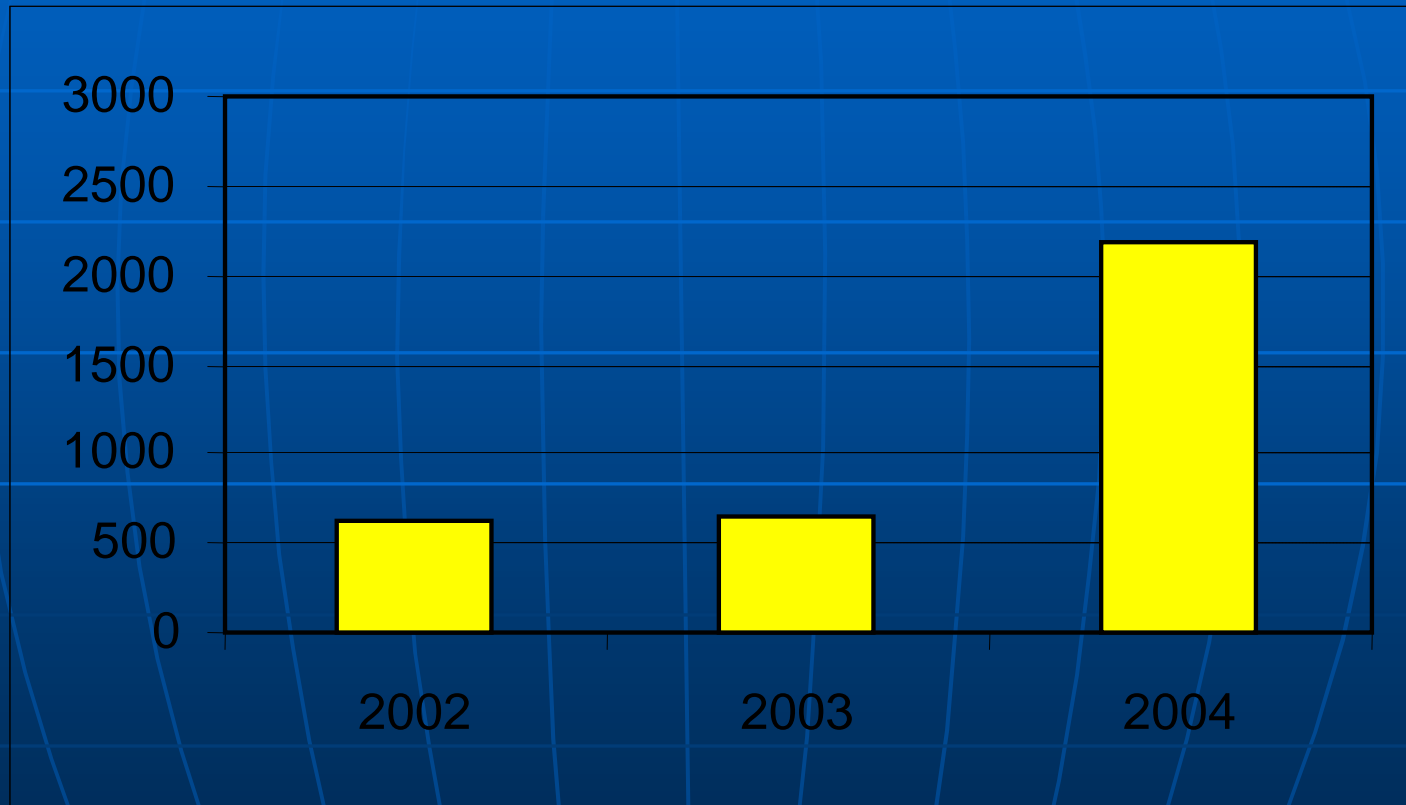
# Sugarcane is the cheapest feedstock

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Source: UNICA, F.O.Lights

# Brazil's ethanol exports are rising (in 1000 kl)



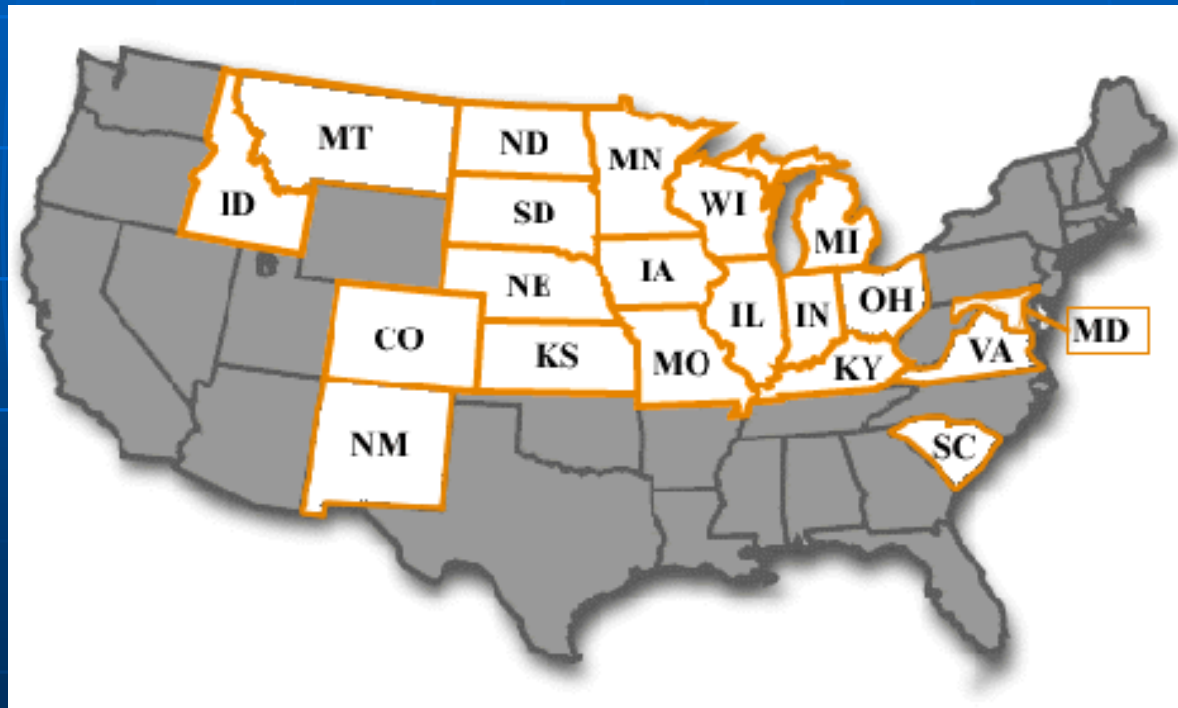
Source: Ministry of Development, Industry and Foreign Trade

# Sugar ethanol is scaleable

"Today no more than 7.5 million acres are used to produce 4.5 billion gallons. But we have in Brazil more than 250 millions acres that can be taken as a potential area to expand agriculture - respecting all preservation areas, specially our rain forests."

Brazilian Association of Sugar Cane and Ethanol Producers

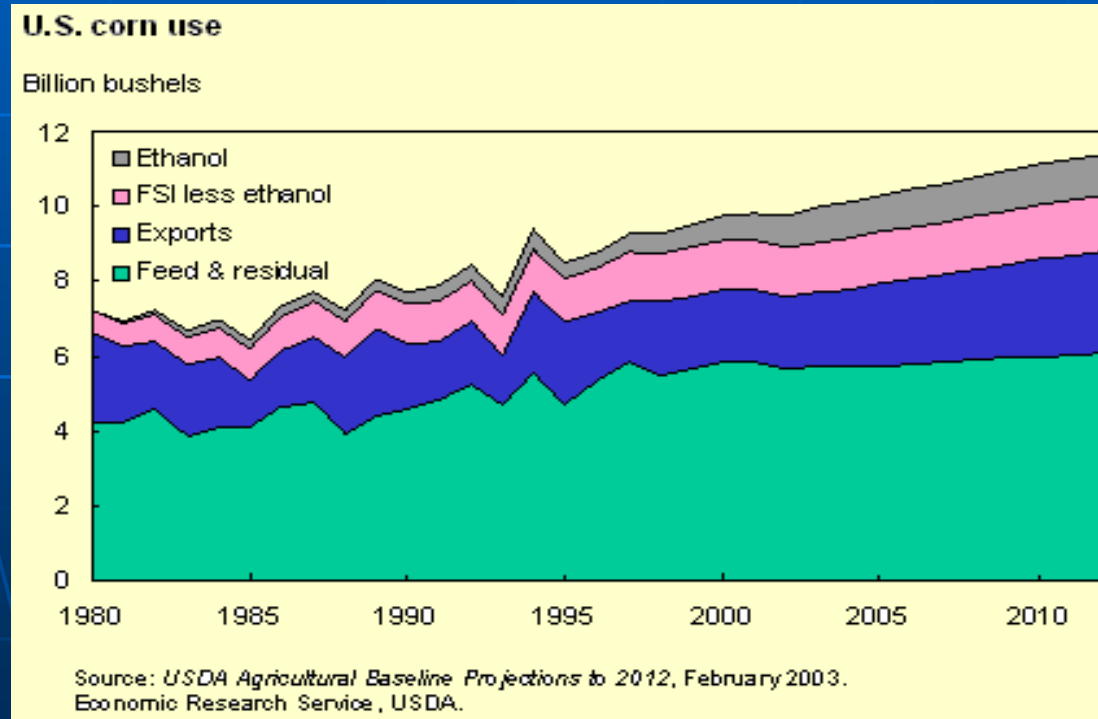
Over 70% of Americans have no access to ethanol



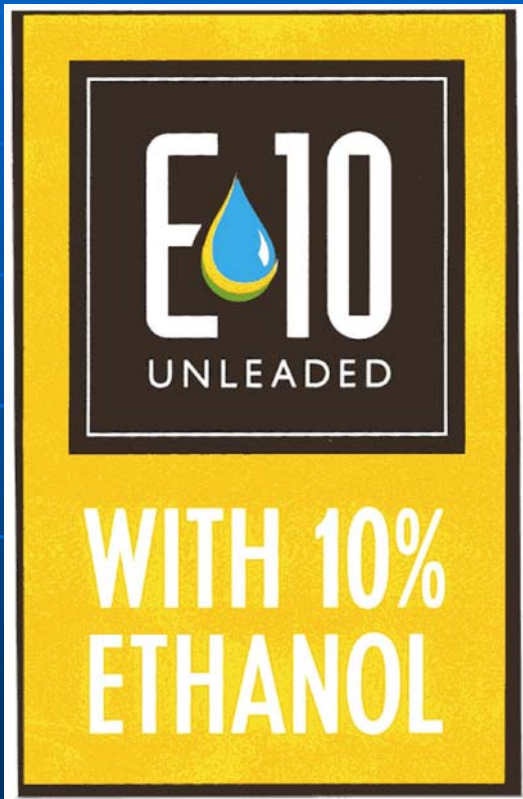


Total current capacity: 103 plants making 4,929 mgy

Under construction/expansions: 50 plants making  
3,015 mgy



# Start with low blends and build from there



**The Brazilian  
experience:  
% ethanol in  
gasoline**

1977:	4.5%
1979:	15%
1981:	20%
1985:	22%
1998:	24%
1999:	20 to 24%
SINCE 2002	25%



# Mapping the interests

**Sodbusters and agribusiness:** only ethanol and preferably from corn. Pro-cellulosic. Keep the tariff and don't touch our farm subsidies.

**Tree huggers:** only ethanol, only high blends, only from renewables and don't touch the rainforests.

**Do gooders:** good for development but no food for oil.

**VCs:** Cellulosic is cool.

**Cheap hawks:** As much as possible of everything and quickly.