

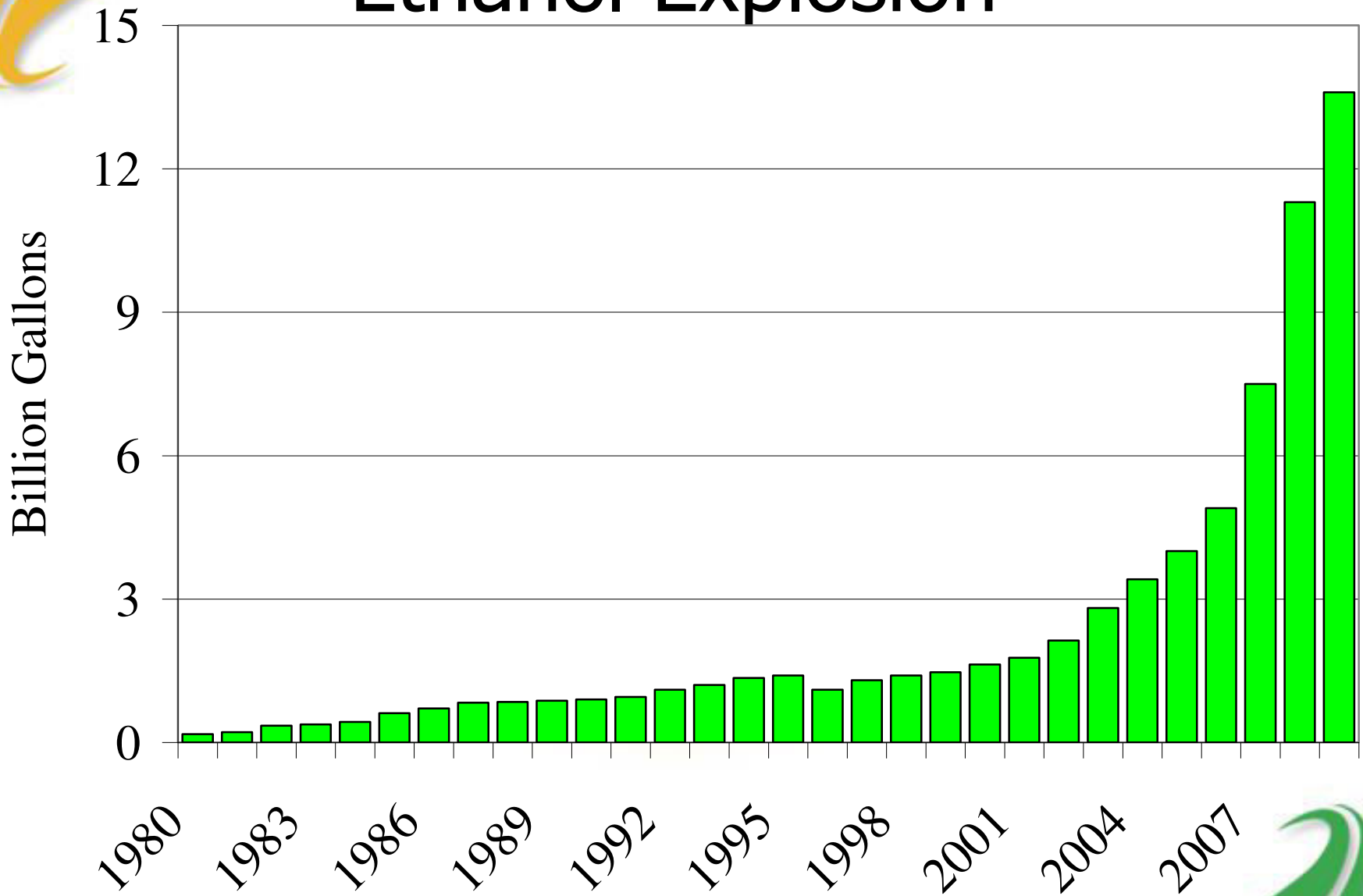


Future of the Bioeconomy and Biofuels: Overview, Industry, and Agriculture?

Dan Otto
Chad Hart
John A. Miranowski
Iowa State University

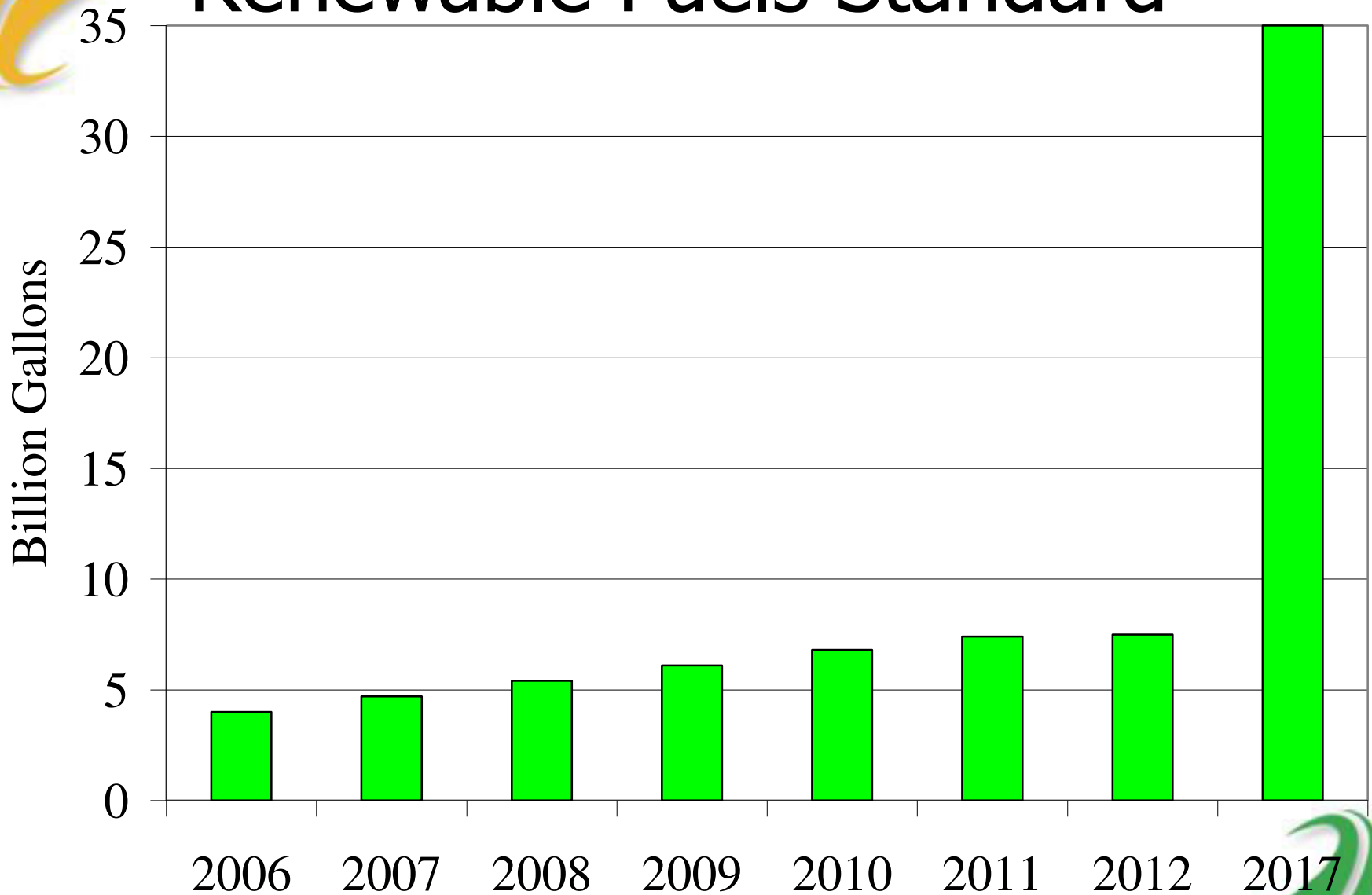


Ethanol Explosion



Source: Renewable Fuels Association and preliminary CARD projections

Renewable Fuels Standard



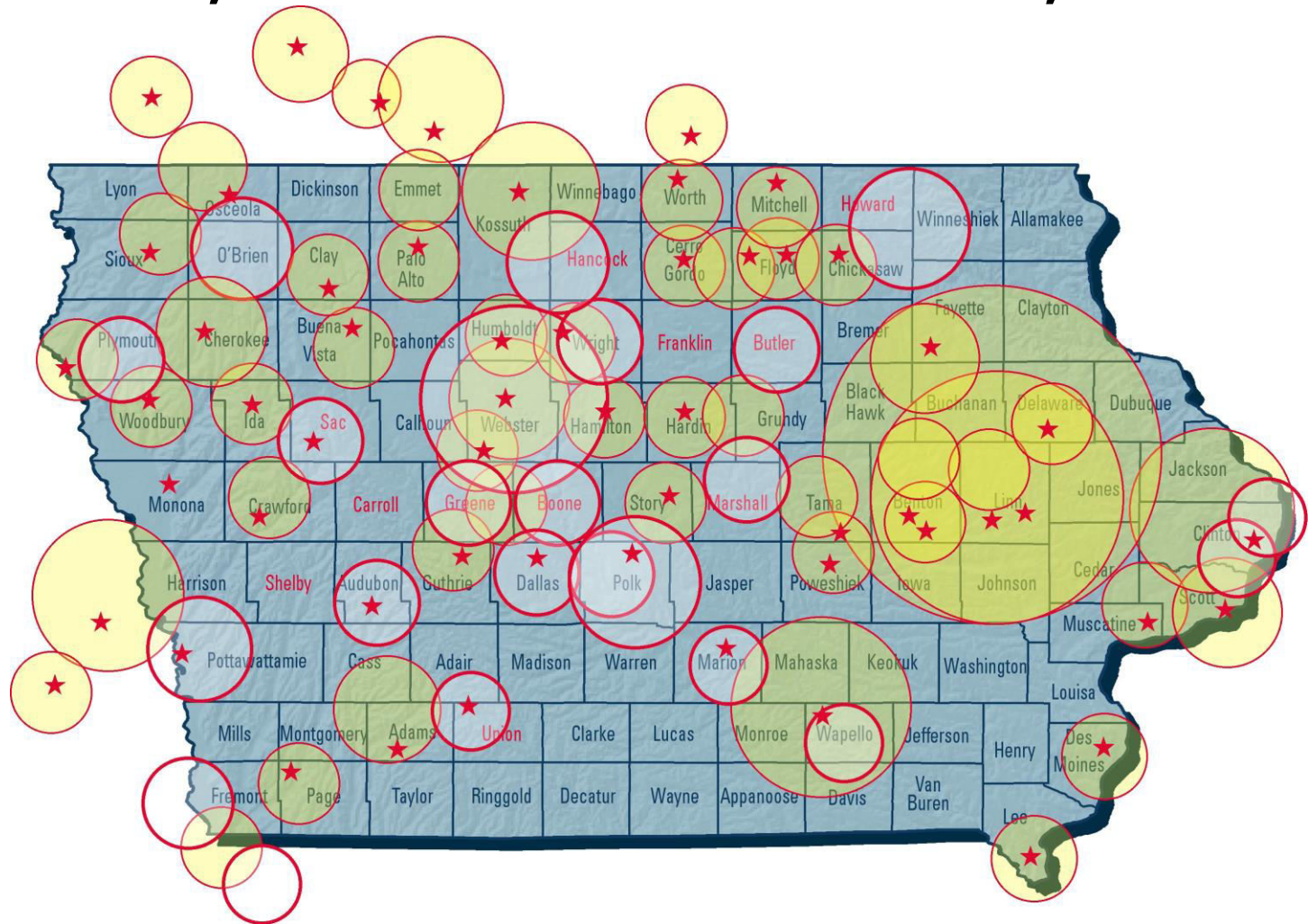
Source: Renewable Fuels Association and the State of the Union Address

Current Status - Ethanol

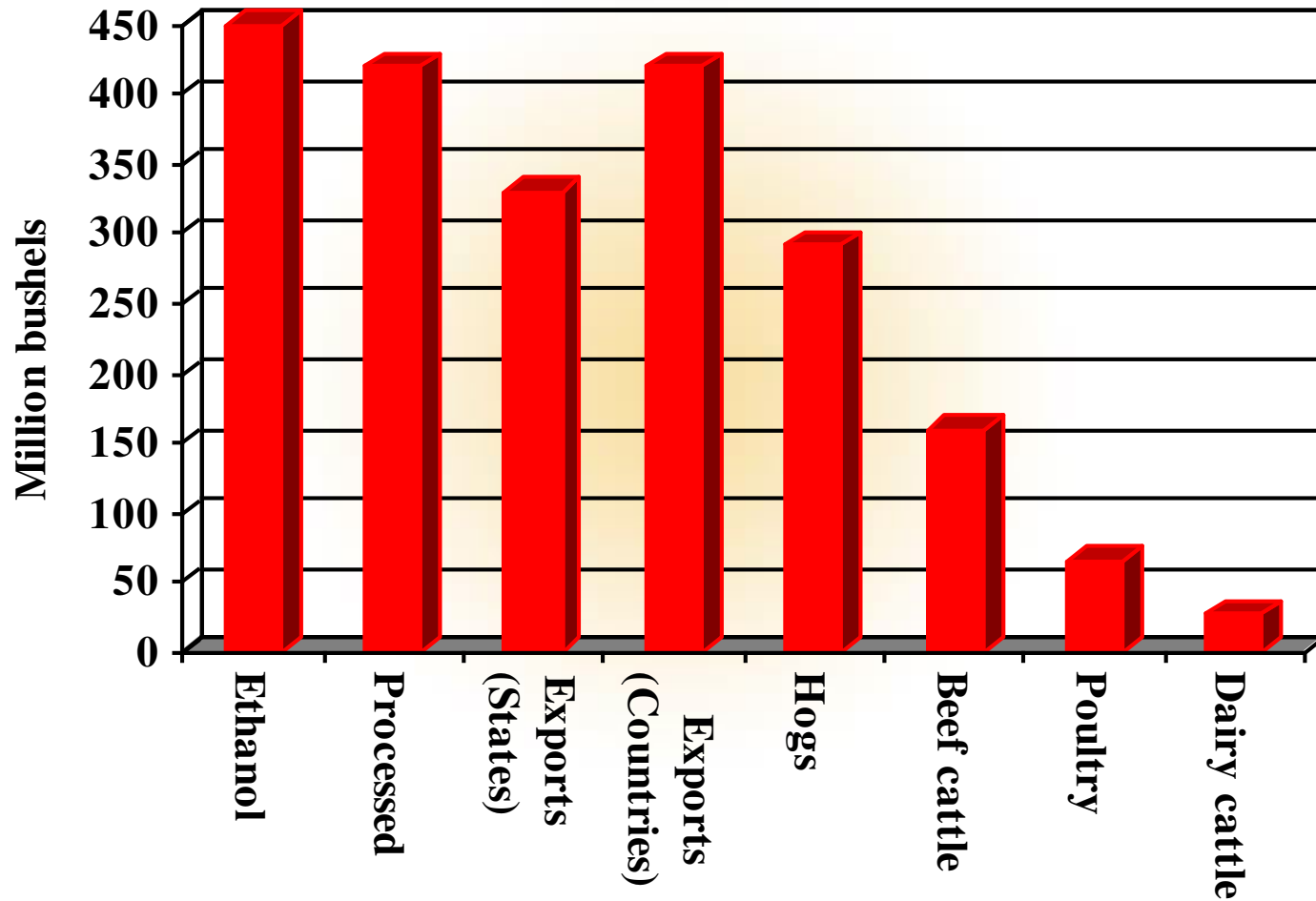


November, 2006

Iowa Corn Processing & Ethanol Plants, Current & Planned, 11-06



Use of Iowa corn – 2005-2006



Source: Iowa Corn Growers Association

Possibilities for Increasing Corn Acreage?

State	2000-2006 Average		Percentage of Acreage in Corn	If the States Followed a 2/1 Rotation	
	Corn	Soybeans		Corn	Soybeans
	(acres)			(acres)	
Illinois	11,421	10,236	53%	14,438	7,219
Indiana	5,657	5,571	50%	7,486	3,743
Iowa	12,386	10,450	54%	15,224	7,612
Kansas	3,314	2,850	54%	4,110	2,055
Kentucky	1,217	1,279	49%	1,664	832
Michigan	2,221	2,036	52%	2,838	1,419
Minnesota	7,214	7,257	50%	9,648	4,824
Missouri	2,864	5,050	36%	5,276	2,638
Nebraska	8,307	4,743	64%	8,700	4,350
Ohio	3,371	4,493	43%	5,243	2,621
South Dakota	4,350	4,179	51%	5,686	2,843
Wisconsin	3,636	1,610	69%	3,497	1,749




Outlook for Crude Oil Prices

- Crude oil futures contract prices for delivery through 2011 – \$60-65/bbl
 - Energy prices likely in \$60-68/bbl range – Global Insight
 - Real and perceived risk
 - Surplus production capacity
 - Economic growth
 - Growing global demand
 - Important caveat with rapid ethanol supply expansion
- 




Biofuel Industry Issues

- Corn-based ethanol facing increasing capital costs with rapid expansion
 - Ethanol and co-product transportation challenge
 - Structural change and industry “shake-outs”
 - Initially, fragmented local firms for local growth
 - Growing spatial, vertical, and product integration
 - Few large firms will likely drive the industry
 - Local economic growth and job tradeoffs
 - Food, feed, and fuel tradeoffs
 - Environmental and climate impacts
- 




Is Biomass Feedstock the Answer and When?

- Significant R&D challenges for biomass feedstock?
 - Yield, fertility, and soil?
 - Biomass harvesting, transport, and storage?
 - Enzymes, catalysts?
 - Conversion platform and biofuel form?
 - Production from pilot plants beginning in 2009
 - Select most efficient platform for commercialization in 2013
 - Scale-up industry with commercial impact about 2015
 - Impacts corn price when significant to fuel market
- 



Outlook for Biofuel Industry

- Potential of corn-based ethanol industry to contribute to energy security
 - CARD long run equilibrium $\sim 30\text{B}$ gal at \$4 corn
 - 14B gal constraint with conventional engine; FFV?
 - Biofuel industry maturing
 - Large integrated businesses
 - Efficient local firms
 - More stable biofuel market
 - Biomass feedstock important after 2015
- 



Current Iowa Policies and Incentives

Ethanol Infrastructure Cost-Share Program

Alternative Fuel Vehicle Grants

Ethanol and Biodiesel Tax Credits

Biofuels Infrastructure Grants

Alternative Fuel Loan Program

E85 Fuel Exclusivity Contract Regulations

State Renewable Fuels Standard

Alternative Fuel Vehicle Acquisition Requirements

Alternative Fuel Use Policies

Alternative Fuel Tax Rates

Alternative Fuel Labeling Requirements

