

Clean Cities

U.S. DEPARTMENT OF
ENERGY | Energy Efficiency &
Renewable Energy



Status and Issues for Ethanol (E85) in the United States

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September 22, 2009

Petroleum, Emission, and Carbon Benefits

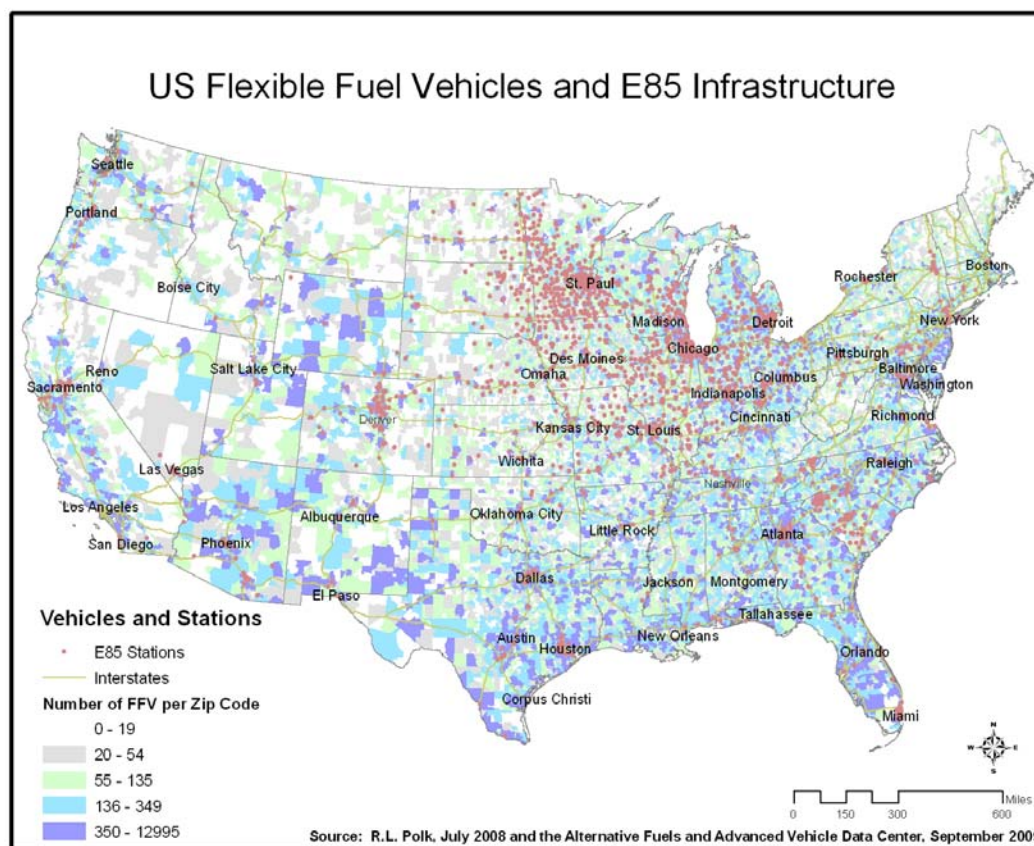
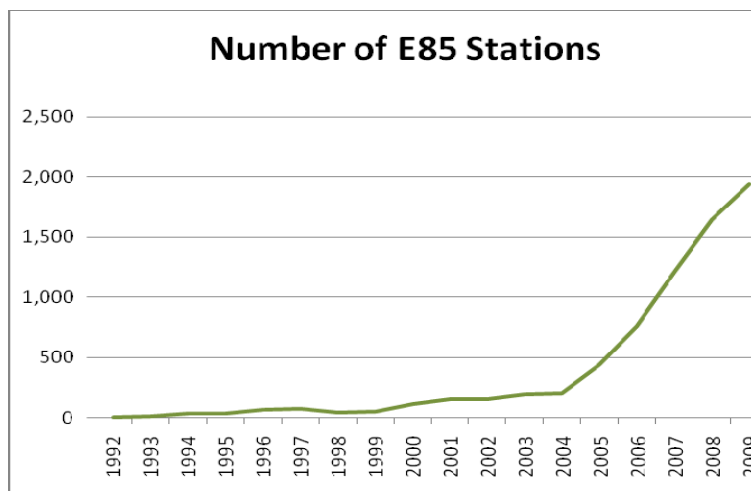
- E85 is substantially non-petroleum, so its use in vehicles greatly reduces petroleum use in transportation
- Fuel used in production effects life-cycle GHG emissions
- Emissions (tailpipe & evaporative) of E85 and E10 are well tested and understood
- Emissions of intermediate blends is not well documented – may or may not be an issue

Ethanol Tailpipe Emissions v. Gasoline	
Emission	E85
Carbon Monoxide (CO)	40% reduction
Nitrogen Oxides	10% reduction
Volatile Organic Compounds (VOCs)	15% reduction
Sulfur Dioxide (SO ₂)	80% reduction
Particulates	20% reduction

Current Market Status

Vehicle and Infrastructure

- 7.3M vehicles on the road (3% of US vehicles)
- Nearly 2,000 stations



Current Market Status

Infrastructure Costs

- Mean cost of \$71,735 for new tank, and new or retrofit dispenser.
- Mean cost of \$21,244 to convert existing tank and new or retrofit dispenser.

Generalized Cost Estimates for E85 Equipment at Existing Stations		
Scenario	Cost	Major Cost Variables
New tank, new or retrofit dispenser(s)	Mean: \$71,735 Median: \$59,153	Dispenser needs, concrete work, excavation, sell-backs, canopy, tank size, location, labor cost, regulations
	\$50K-\$200K	
	\$50K-\$70K	
	>\$50K <\$62,407	
Convert existing tank, new or retrofit dispenser(s)	Mean: \$21,244 Median: \$10,972	Dispenser needs, number of non-compatible components, location, labor cost, regulations
	\$19K to \$30K	
	\$5K-\$30K	
	\$2.5-25K	

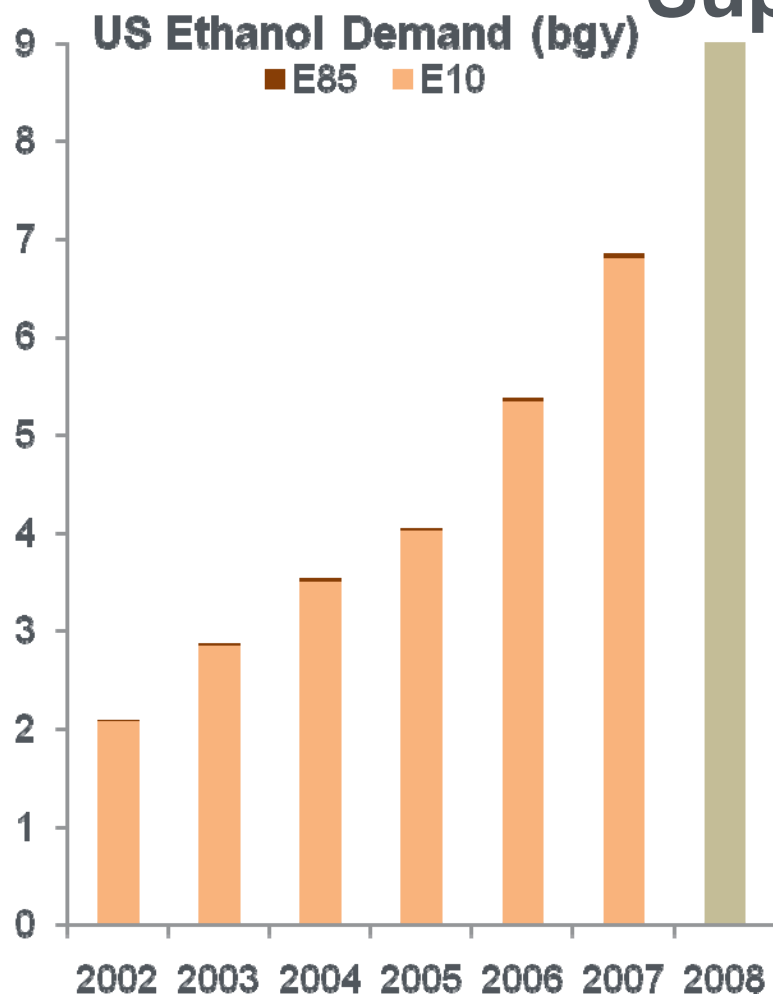
Current Market Status

Vehicle Model Availability

- 31 FFV models available (2009).
- Similar numbers expect in MY 2010.
- In MY 2009 there were almost 3 times as many FFV models that were SUVs/pick-ups compared to sedans. (8 sedans)



Supply Trends

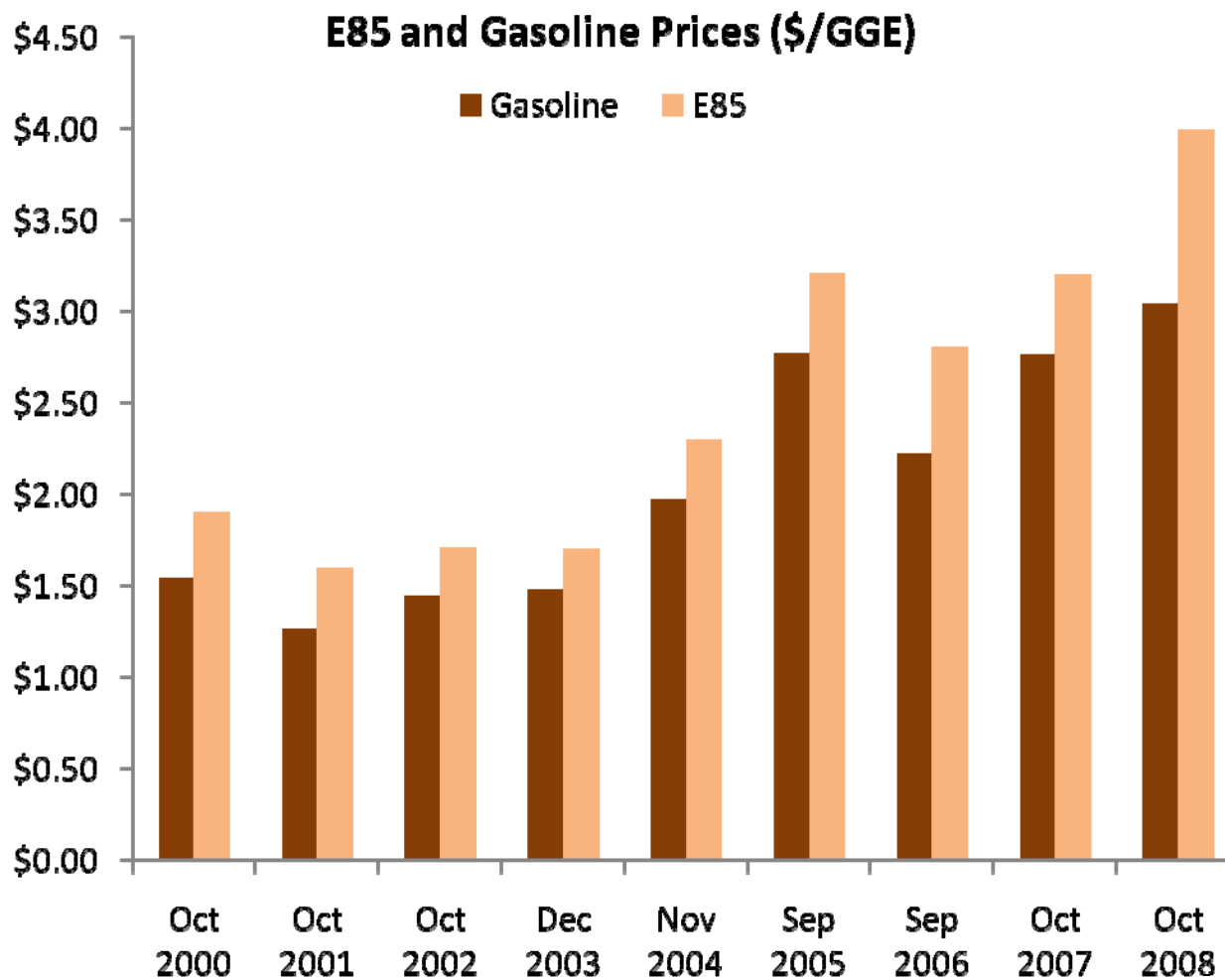


Current and Potential Supply

- 2008 US capacity is approximately 13.8 billion gallons annually (98% corn-based)
- Capable of producing enough ethanol to supply E10 nationwide
- E10 market predicted to be saturated between 2011 and 2013
- Actual 2008 ethanol production was around 9 billion gallons (RFA)

Source: EIA, RFA

Supply Trends



Barriers and Technology Needs

Research and Development

- Questions about direct and indirect land use changes continue to surface.
- Moving cellulosic into commercial production

Economic

- Fuel economy penalty for E85 is not overcome by pricing

Barriers and Technology Needs

Implementation

- Infrastructure business case with low vehicle concentrations
- Terminals with E85 are limited
- UL dispenser listing is needed
- Rapid deployment of blender pumps may cause confusion for drivers

Niche Markets

No niche markets for FFVs, however vehicles are generally light-duty consumer models

Current Activities

- Retailer workshops to bring regulated and voluntary fleets together to “share” infrastructure
- Public and stakeholder outreach and education (AFDC, fueleconomy.gov, other industry activities)
- Research on Cellulosic ethanol production
- Federal funding for deployment of infrastructure
- UL dispenser task force
- Technical training and support (DOE and other industry stakeholders)

Opportunities in the Marketplace

- Improve E85 capabilities at terminals
- Continue or expand federal grants
- Piggyback successful past performance
- Provide implementation support for grant recipients and others
- Work with OEMs and dealerships to educate sales staff on FFVs and E85 fueling in their locality
- Support stations through localized education and outreach to drivers



U. S. Department of Energy

For More Information

- Alternative Fuel and Advanced Vehicle Data Center (AFDC):
www.afdc.energy.gov
- Fuel Economy Guide: fueleconomy.gov
- Wendy Dafoe, wendy.dafoe@nrel.gov
- Margo Melendez, margo.melendez@nrel.gov
- Wendy Clark, wendy.clark@nrel.gov