

Ethanol Industry Perspective
on
the RFS, “Blend Wall,” and Mid-Level Blends

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About the RFA

- The Renewable Fuels Association (RFA) promotes policies, regulations and research and development initiatives that will lead to the increased production and use of fuel ethanol.
- RFA membership includes a broad cross-section of businesses, individuals and organizations dedicated to the expansion of the U.S. fuel ethanol industry.



Ethanol as a Fuel & Fuel Additive

1. E10 (10% ethanol by volume)

- Approved for use in all vehicles and engines
- ~98% of ethanol consumed as E10
- 80% of U.S. gasoline blended with ethanol

2. E85 (70-85% ethanol by volume)

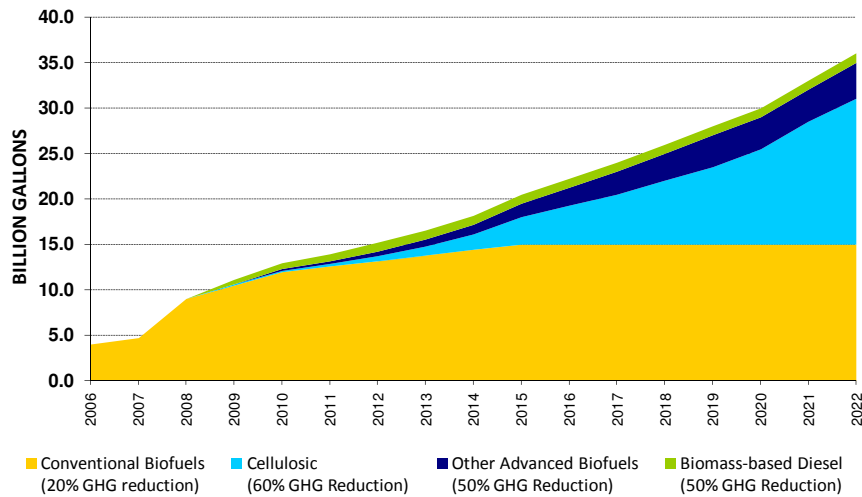
- For use in flex-fuel vehicles (FFVs) only
- 7+ million FFVs; ~2,000 retail outlets
- <2% of ethanol consumed as E85

3. Mid-level blends (20, 30, 40% ethanol by volume)

- For use in FFVs only
- Dispensed by “blender pumps” (<300 stations)
- Specifications, BMPs, etc. under development



Renewable Fuels Standard (RFS)



Note: 20% reduction for conventional biofuels applies only to new construction



The Bottom Line

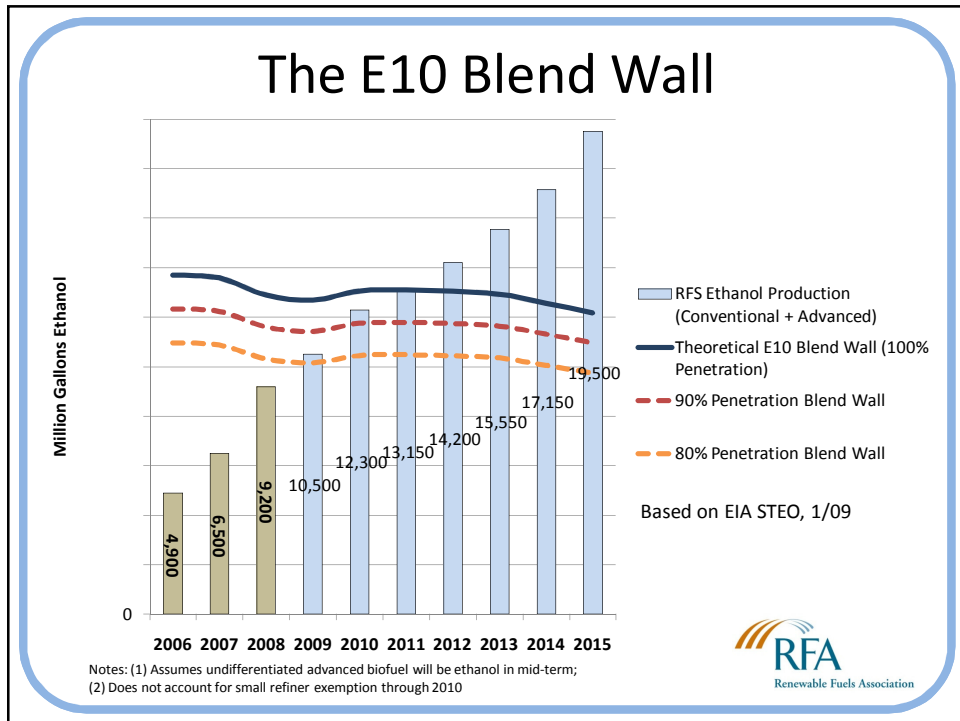
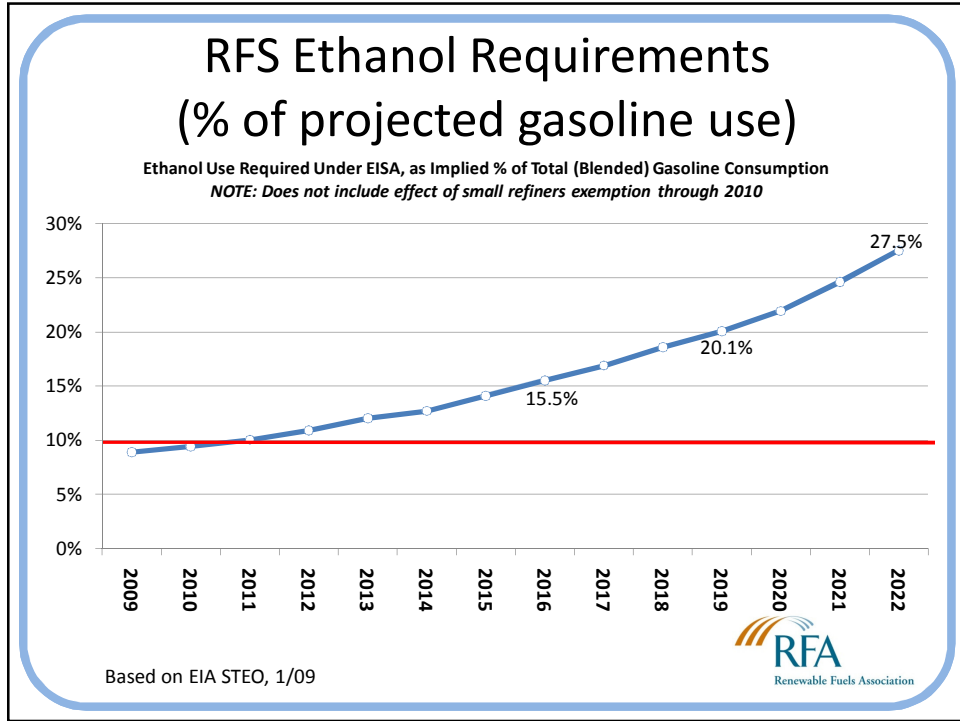
- EISA requires consumption of 36 billion gallons of renewable fuels annually by 2022
- Most of the renewable fuel will be ethanol (~33-34 billion gallons)
- ~34 billion gallons = 27% of 2022 projected gasoline use
- Current law and infrastructure preclude the use of >10% ethanol blends in conventional autos
- ***How will required renewable fuels enter the marketplace once the E10 market is saturated?***



Meeting RFS Ethanol Targets

- E10 reaches saturation at ~12.5-14 billion gals.
 - 2009 RFS = 10.6 bg (conventional + undifferentiated advanced)
 - 2010 RFS = 12.3 bg (conv. + und. advanced + cellulosic)
 - 2011 RFS = **13.15 bg** (conv. + und. advanced + cellulosic)
 - 2012 RFS = **14.2 bg** (conv. + und. advanced + cellulosic)
- Current capacity = ~12.7 bg (+1.8 bg construction)
- Meeting mid- and long-term RFS targets will require:
 - Rapid proliferation of E85 or MLBs (FFVs & infrastructure); **and**
 - Approval of blends >E10 for conventional autos





E85 as an Option

- FFVs can use any combination of gasoline and ethanol up to 85% ethanol (E85) by volume
- FFVs account for 3% of U.S. light duty fleet
- E85 is offered at 1.5% of U.S. retail stations
- Other challenges:
 - Mileage loss
 - Infrastructure cost
 - Specifications & standards
 - Mismatch between FFV density & E85 availability



E85 as an Option

- For E85 to absorb RFS-required ethanol in excess of the E10 market:
 - 60,000 retail outlets will be needed (DOE)
 - 90-110 million FFVs will be needed (DOE)
 - Mileage loss must be offset by discount pricing
- Domestic automakers are committed to FFVs
- Federal and state programs help defray costs of E85 infrastructure installation



Mid-Level Blends as an Option

- 10% ethanol by volume is max level for current conventional auto fleet and fuel supply chain
 - Automobile and small engine warranties
 - Specifications and standards
 - Storage, dispensing infrastructure (?)
- Moving beyond 10% would require:
 - Approval of fuel waiver [CAA Sect. 211 (f)(4)]; or
 - Substantially similar finding [CAA Sect. 211 (f)(1)]
 - Change to auto and small engine warranties
 - *Clear* certification of storage, dispensing equipment



Mid-Level Blends as an Option

“Substantially Similar”

- CAA 211 (f)(1) prohibits use of fuels that are not “substantially similar” to fuels used for cert. tests
- E12 is “substantially similar” to E10
 - Limited regulatory history in determining “sub-sim”
 - Most important variant may be oxygen content
 - Focus on: chemical similarity, drive-ability, materials compatibility, emissions.
 - Most data/research is for E15 or E20
- E12-13 within tolerance levels? [e.g. UL testing]



Mid-Level Blends as an Option

Fuel Waiver

- To qualify for a waiver, applicant must show fuel or fuel additive will not *“cause or contribute to a failure of any emission control device or system...”*
- To date, no such failure has occurred in automotive testing for mid-level blends (mostly E15 and E20)
- Applicant data should include: materials compatibility; drive-ability; durability; emissions
- Considerable amount of data available
- Significant work under way (CRC, DOE, trades)



E15 Fuel Waiver

- Submitted to EPA March 5
- Applicant was Growth Energy on behalf of certain ethanol cos. (fuel/additive providers)
- Thousands of comments received during public comment period
- EPA ruled in early Dec. to “punt” decision to mid-2010
- Catalyst durability data still needed

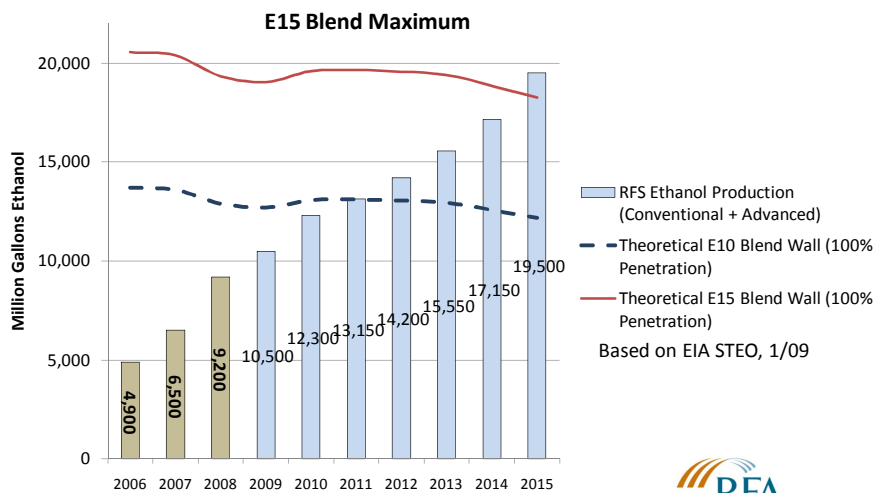


Mid-Level Blends in FFVs

- BYO Ethanol Program (“Blend Your Own”)
- RFA, ACE, and corn grower organizations
- \$1 million joint program
- Goal to increase blender pumps to 5,000
- Program includes:
 - Educational Seminars.
 - More events, trade shows & speaking engagements.
 - More advertising in petroleum industry pubs.
 - More coordination w/ petroleum industry.
 - Website: www.BYOethanol.com
 - Materials:
 - Sell Kit – can be used by anyone.
 - Consumer Brochure
 - New display, debuted at ACE Conf.
 - Potential assistance from DOE.



Impact of E15 Approval on Ethanol Market and RFS Compliance

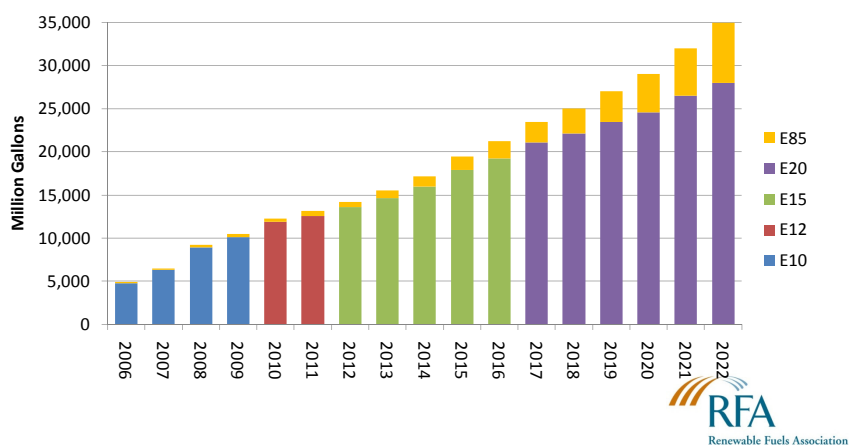


Notes: (1) Assumes undifferentiated advanced biofuel will be ethanol in mid-term;
 (2) Does not account for small refiner exemption through 2010



Long-term goals likely to require mid-level blends higher than E15

A Possible RFS Compliance Path for Ethanol? (Illustrative Only)



Summary

- The E10 “Blend Wall” is rapidly approaching
- E85 is an important long-term strategy, but is unlikely to absorb large quantities of ethanol above E10 market saturation in short term
- Approval of mid-level blends necessary for RFS compliance in near- and mid-term
- Long-term RFS compliance will require combination of mid-level blend approval **and** rapid E85 proliferation
- Considerable automotive research has already been completed with no “show-stoppers”
- Additional research continues
- *We can successfully break through the “Blend Wall” and meet RFS goals*