

Discussion Panel: Demonstration and Deployment Industry Drivers

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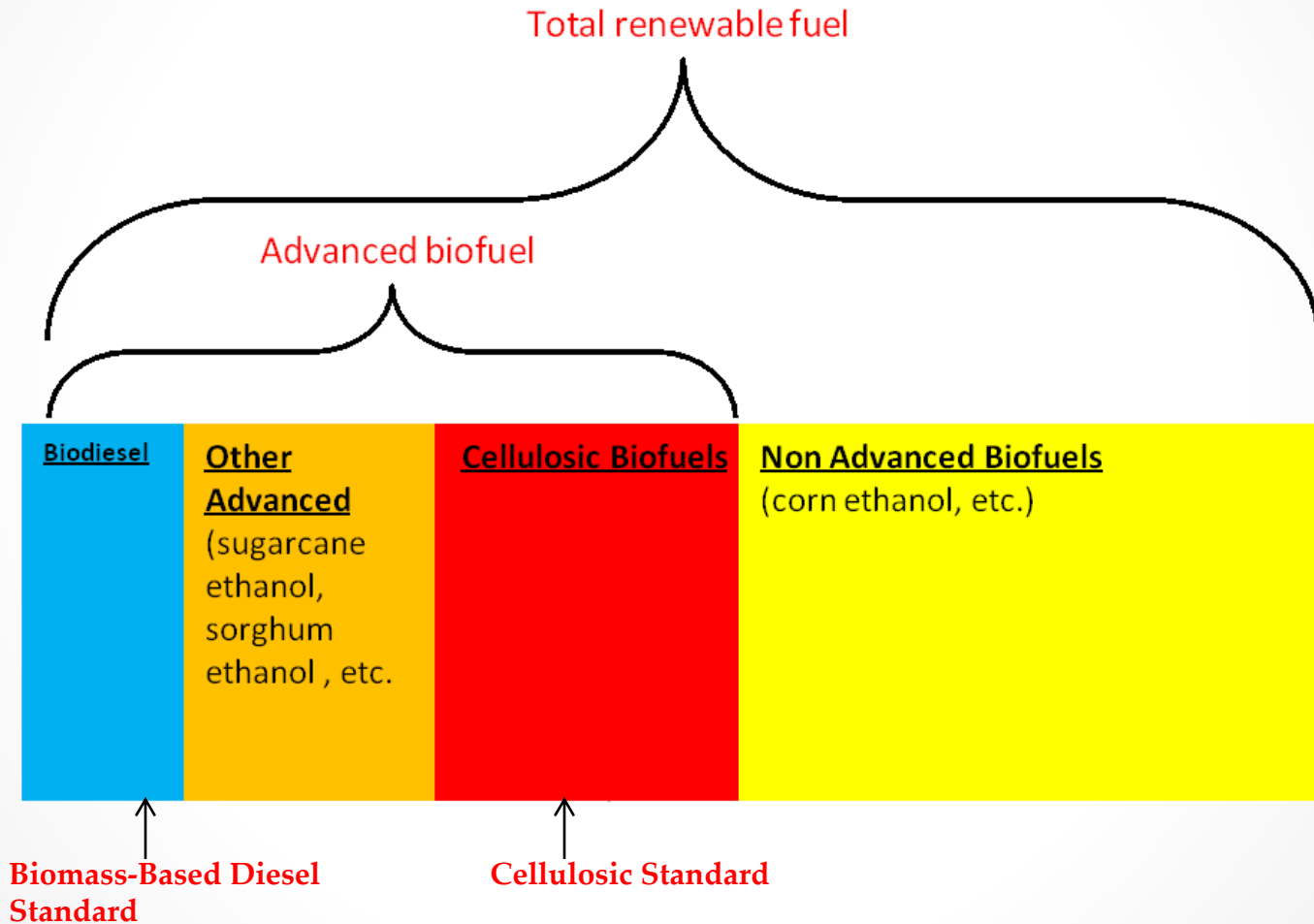


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RFS Key Aspects

- The Energy Independence and Security Act of 2007 (EISA) expanded the Renewable Fuel Standards (RFS) and set the volume of renewable fuel that generally must be used in transportation fuel, reaching a total of 36 billion gallons by 2022.
- EISA established four categories of renewable fuels with individual volume standards:
 - cellulosic biofuel
 - biomass-based diesel
 - advanced biofuel
 - total renewable fuel
- EISA set specific qualification requirements for renewable fuels and feedstocks:
 - Set minimum lifecycle GHG reduction thresholds for each category of renewable fuel
 - Applied restrictions on types of feedstocks that can be used to make renewable fuel, and types of land that can be used to grow and harvest feedstocks
 - Established grandfathering allowances for renewable volumes from certain facilities

Interaction Between the Four Standards



Statutory Volumes

	Cellulosic biofuel	Biomass-based diesel	Advanced biofuel	Total renewable fuel	"Conventional" (total renewable minus advanced)
2009	na	0.5	0.6	11.1	10.5
2010	0.1	0.65	0.95	12.95	12
2011	0.25	0.8	1.35	13.95	12.6
2012	0.5	1	2	15.2	13.2
2013	1	a	2.75	16.55	13.8
2014	1.75	a	3.75	18.15	14.4
2015	3	a	5.5	20.5	15
2016	4.25	a	7.25	22.25	15
2017	5.5	a	9	24	15
2018	7	a	11	26	15
2019	8.5	a	13	28	15
2020	10.5	a	15	30	15
2021	13.5	a	18	33	15
2022	16	a	21	36	15

a: statute sets 1b gal minimum, but EPA may raise requirement

RFS Annual Standards

- EISA requires that each year EPA publish the annual standards for use of total, advanced, biomass based diesel, and cellulosic renewable fuels that apply to obligated parties, which are typically refiners and importers of gasoline and diesel.
- EPA sets a percentage requirement for obligated parties based on gasoline and diesel projections from the EIA.
- EISA authorizes EPA to reduce volumes from the statutory requirements under certain circumstances:
 - Cellulosic waiver authority: EPA may reduce total and advanced volumes by up to the same amount as cellulosic reduction
 - General waiver authority: Standards may be waived in whole or in part if ... after public notice and opportunity for comment...EPA determines there is inadequate domestic supply, severe harm to the economy or the environment

2014 RFS Volume Proposal – Key Points

- The rulemaking proposes volume requirements for the RFS program for 2014, and outlines a potential path forward for 2015 and beyond
- 2014 brings a number of new issues that EPA must consider in setting the standards
- A key issue this year is what is commonly referred to as the ethanol “blendwall” – challenges associated with supplying more ethanol to the market than can be provided through blending up to 10% ethanol in gasoline (E10).
- For the first time, EPA proposed adjustments to the total renewable fuel and advanced biofuel standards to address these market issues
- EPA’s intention in this rulemaking is to put the RFS program on a manageable trajectory that will support continued growth in renewable fuels

Fuel Pathways

- For a fuel to generate RINs and be used in the program, EPA must first determine that it meets the GHG emission reductions required by the statute and regulations
- Example of a fuel pathway: renewable diesel produced from soybean oil using a hydrotreating process
- EPA has already approved multiple fuel pathways under the program, under all four categories
- Advanced drop-in pathways already approved include:
 - renewable diesel from camelina oil, soybean oil, or algal oil
 - cellulosic diesel from switchgrass, miscanthus, energy cane, *Arundo donax*, or *Pennisetum purpureum*
 - renewable gasoline made from corn stover, separated food waste or separated MSW
- Many companies continue to petition EPA to approve new pathways, particularly for newer fuels, many made with advanced technologies or with new feedstocks

Role of Drop-In Biofuels

- The statutory target of 18.15 billion gallons total renewable fuel exceeds what fuel system can consume – when considering reasonable expectations of ethanol use in E10 plus other forms such as E15 or E85 and non-ethanol biofuels (drop-in fuels, home heating oil, etc.)
- In the 2014 proposal, for advanced biofuel, EPA discusses various approaches to reducing the RFS volumes to address both the E10 blend wall and limited availability of advanced biofuels to make up for the shortfall in cellulosic biofuel
- Given the limitations on the amount of ethanol that can be used in the US transportation system, the development and deployment of drop-in biofuels will play a significant role in the ability to grow future RFS volumes.