RFS 2014 Volume Standards NPRM

September 6, 2013

Agenda

- Short tour of NPRM
- Cellulosic biofuel
- Biomass-based diesel
- Treatment of advanced biofuel and total renewable fuel in light of :
  - Limited availability
  - Ethanol blendwall

Tour of NPRM

Cellulosic Biofuel

Approach to Cellulosic Biofuel

- Basic approach is similar to previous years
  - Contact each company to obtain the most recent information on facility status, funding, and projected startup and rampup
  - Discuss the viability and likely fuel production timeframe for these projects with EIA and DOE's integrated biorefinery program
- We are "taking neutral aim at accuracy" as required from the January court decision
  - We are using ranges for each facility designed to take into account the technology uncertainty and potential for delays in start-up, ramp-up, etc.
  - High end of the range is based on company expectations
    - However, we are using best case benchmarks for facility construction time (2 years) and production ramp-up (six months) to assess the credibility of company estimates
  - Low end of the range more like a worst case scenario assuming potential delays, production challenges, etc.
  - We are proposing a Monte Carlo process that allows us to describe the likelihood that specific volumes within each range will be reached

Cellulosic Facilities and Preliminary Volumes for the 2014 Proposal

Company	Capacity (MGY)	Expected Start-Up	Projected Volume	Ethanol Equivalent Volume
Abengoa	24	1Q 2014	0 – 18	0 – 18
DuPont	30	2H 2014	0 – 2	0 – 2
INEOS Bio	8	3Q 2013	2 – 8	2 – 8
KiOR	11	March 2013	3 – 9.5	4 – 15
Poet	25	1H 2014	0 – 6	0 – 6
Proposed range				13 - 36
Proposed mean				23

- The NPRM also discusses potential additional sources that do not yet have an approved pathway for RIN generation, but may by the time of the final rule
  - The majority of this additional volume is from biogas from landfills, which currently generates advanced biofuel RINs
  - If they pan out, total volume of cellulosic could be 56 - 86 mill gal

Biomass-Based Diesel

BBD for 2014 and 2015

- The CAA specifies BBD volumes up through 2012, and then directs EPA to establish volumes for 2013+ based on a review of the program and consideration of a list of factors
  - Under the statute, the BBD volume must be finalized 14 months before it applies, while the percentage standards are finalized later, 1 month before they are effective
- On Sept 27, 2012 we set the BBD for 2013 at 1.28 bill gal
- The 2014 standards NPRM proposes both the 2014 and 2015 BBD volumes
  - 2014 BBD volume should have been finalized by November 2012
  - 2015 BBD volume should be finalized by November 2013
- We intend to propose that the BBD volume for both 2014 and 2015 be maintained at 1.28 bill gal
  - There is reason to think that some BBD volumes above 1.28 bill gal are possible in 2014
    - Biodiesel could reach 1.7 bill gal in 2013
  - However, since BBD is nested within the advanced biofuel standard, any excess volumes above 1.28 bill gal can compete with other advanced biofuels
    - There is limited availability of other advanced biofuels, which generates opportunities for biodiesel production above 1.28 bill gal to help meet the advanced biofuel standard

Advanced Biofuel and Total Renewable Fuel

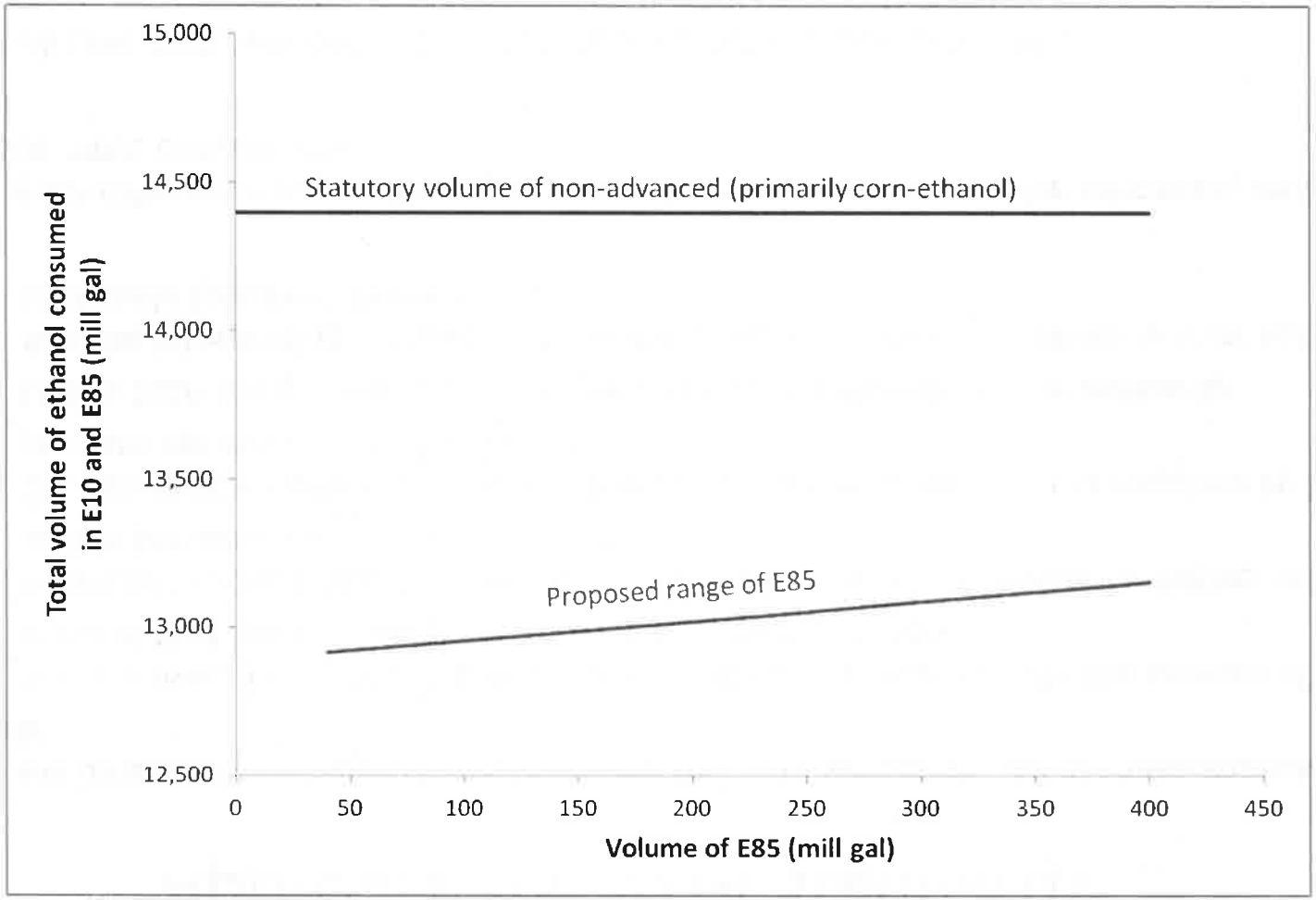
Overview

- Goals for the 2014 Proposal
  - Significantly reduce the required RFS volumes to address both the RFS blendwall and limited availability of advanced biofuels to make up for the shortfall in cellulosic biofuel
  - Establish a durable methodology that could be used in 2015 and beyond to reduce market uncertainty

- Accomplish this by tapping both our legal waiver authorities
  - The cellulosic authority allows us to reduce both advanced and total by up to the amount of the reduction in cellulosic
  - The general waiver authority allows us to further reduce the total renewable fuel standard
    - Intend to use the "inadequate domestic supply" criteria
    - Using *only* the cellulosic waiver authority (without the general waiver authority) would not reduce the overall volume enough to address the blendwall

- The key question for the 2014 proposal is how much we reduce conventional (non-advanced) versus advanced

E85 Versus Total Ethanol Consumption



Approach for 2014 Standards

- EPA will describe three approaches to setting the 2014 standards. **All** of these approaches would:
  - Reduce overall volumes to address the blendwall, i.e. require only the amount of ethanol that can reasonably be moved into the fuel supply
  - Maintain biomass-based diesel std at 1.28 Bgal; allow it to compete for higher volumes within the advanced biofuel standard
  - Set cellulosic volumes at the level based on projected production as required by law (current estimate is 13 - 36mill gal)
  - Utilize both our general waiver authority and our cellulosic waiver authority
  - Require interpreting "inadequate domestic supply" under our general waiver authority to include blendwall limitations

- The main difference in the three approaches is that some reduce more advanced, and others reduce more conventional

- We will take comment on all three approaches, but propose only one

- Intend to provide ranges for each approach based on ranges of key fuel volumes, with specific values within those ranges as the proposed volumes

Step 1: Establish Total Renewable Fuel Standard

- Proposed volume for total renewable fuel standard will be based on the **sum of**:
  - The volume of ethanol we believe could be consumed if all gasoline was E10 and the market took reasonable steps to produce and sell some E85; **and**
  - The volume of non-ethanol biofuel we believe will be available
- This step will provide a value for the required volume of total renewable fuel that will address the blendwall
  - A key question will be how much ethanol could be reasonably expected in blends higher than E10

Step 2: Set Advanced Standard

- Once the total renewable volume is set by Step 1, we then determine how much of the 2014 standard would be met with advanced vs. non-advanced (conventional) biofuels

- We will discuss and take comment on options 1 and 2, and propose option 3
  - All three have to same total RFS, BBD, and cellulosic volumes and differ only in the amount of advanced vs conventional biofuel

- Option 1: Base advanced volume on Availability of Advanced
  - Determine the availability of advanced biofuels for that year and set advanced standard accordingly.
  - Emphasizes growth in advanced biofuels, including advanced ethanol biofuels
  - Results in a greater reduction in conventional
- Option 2: Base advanced volume on the Full Reduction in Cellulosic.
  - Set advanced standard by reducing advanced by same amount as cellulosic reduction
  - Minimizes reductions in conventional
- Option 3: Base advanced volume on Availability of Advanced Biofuels but Considering the Blendwall
  - Set the advanced volume at the sum of the cellulosic standard, the BBD standard, and all available volumes of non-ethanol advanced
  - Ensures that both non-advanced and advanced play a role in addressing the blendwall while simultaneously accounting for limited availability
  - Results of Option 3 fall between results of Options 1 and 2

- Once the advanced biofuel standard is set, the market will still decide the exact mix of fuels used to comply
  - E.g., while the advanced standard is set assuming only a certain amount of volume of ethanol is possible due to the blendwall, if more ethanol can be sold as E85, more of the advanced volume could be met with ethanol

Preliminary Ranges for 2014 Proposed Standards (mill gal)

	Statutory volumes for 2014	**Option 1** Availability of Advanced Biofuel	**Option 2** Reduce Advanced by Same as Cellulosic	**Option 3** Advanced is cellulosic + BBD + non-ethanol advanced
Cellulosic biofuel	1,750	13 - 36 23	13 - 36 23	13 - 36 23
Biomass-based diesel	1,280[a]	1,280	1,280	1,280
Advanced biofuel	3,750	2,500 - 3,210 2,840	2,010 - 2,040 2,020	2,010 - 2,510 2,210
Total renewable fuel	18,150	14,980 - 15,530 15,210	14,980 - 15,530 15,210	14,980 - 15,530 15,210
Corn-ethanol	14,400	12,090 - 12,640 12,360	12,940 - 13,500 13,180	12,900 - 13,140 12,990

[a] Statutory volume is 1,000 mill gal; our 2013 standard was 1,280 mill gal

All volumes are ethanol-equivalent except for biomass-based diesel

Preliminary Ranges for Inputs to the 2014 Standards Calculations

- The proposal will use ranges for the input volumes
- We aggregate the ranges using a Monte Carlo analysis, changing the shape of the distributions for each parameter as appropriate

	Million gallons
E85[a]	40 - 400
Ethanol in cellulosic	6 - 26
Ethanol in domestic advanced	28 - 142
Imported sugarcane ethanol	300 - 800
Non-ethanol in cellulosic	4 - 15
Biomass-based diesel	1,280 - 1,600
Non-ethanol domestic advanced	24 - 132
Non-ethanol in conventional	1 - 25

[a] Along with E10 volume, this determines the total volume of ethanol that can be consumed (assumes no E15 - E30 for simplicity)

Basis of the Ranges

- The ranges represent the volumes that could reasonably be expected to be available in 2014
  - Volumes outside of the ranges are projected to be much less likely

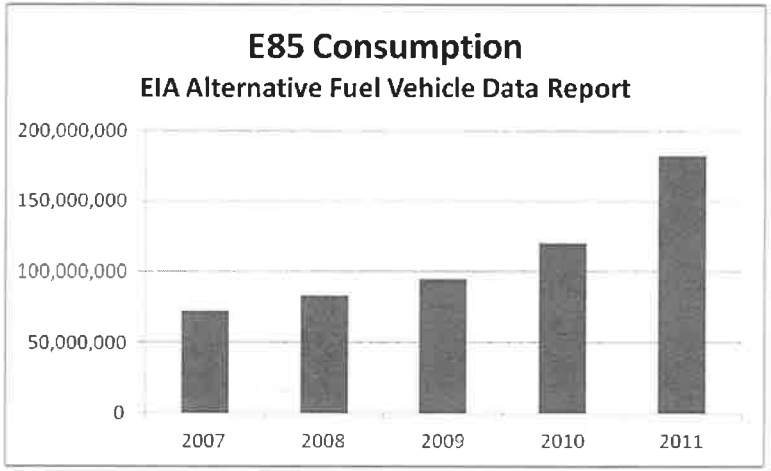
- We used a combination of historical production, Production Outlook Reports, projections made by other parties (e.g. EIA, academia), and our own analyses to determine each range

- Stakeholders are going to have different views regarding what the appropriate volumes should be, but the ranges have been chosen to allow us to acknowledge the full range of those views

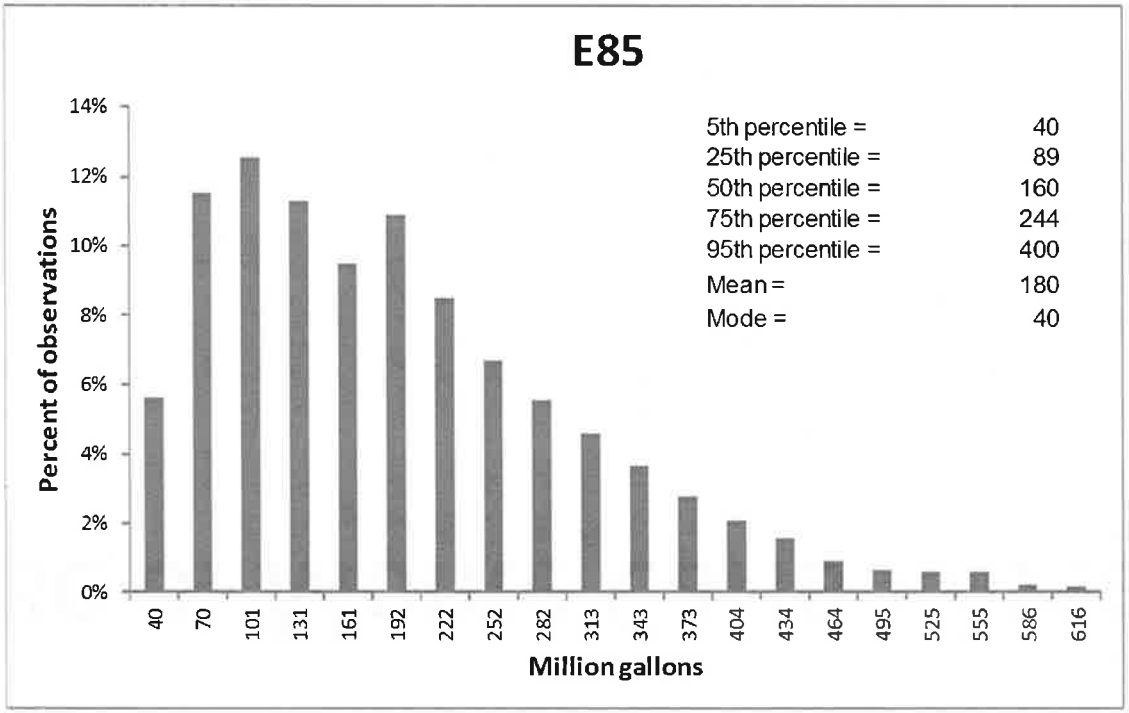
Sources for Projecting E85 in 2014

University of Iowa comments	300 mill gal
July 2013 EIA short term ethanol outlook	~400 mill gal
DOE estimate of maximum throughput from 2012 waiver denial	600 mill gal
Applying 1-in-4 station access estimate from 2010 final rule, and assuming FFVs with access to E85 use it 50% of the time	640 mill gal
DOE estimate of maximum throughput from 2012 waiver denial, adjusted to account for number of 85 stations in 2014	860 mill gal*
AEO2013 projection of 2014 consumption (assumes 2013 standards apply in 2014, and market responds to meet the need for ethanol consumption)	1,021 mill gal*

* These estimates are not included in the ranges we use, but are included here to demonstrate that external analysis has suggested upper limits higher than EPA's upper limit



Potential Consumption of E85



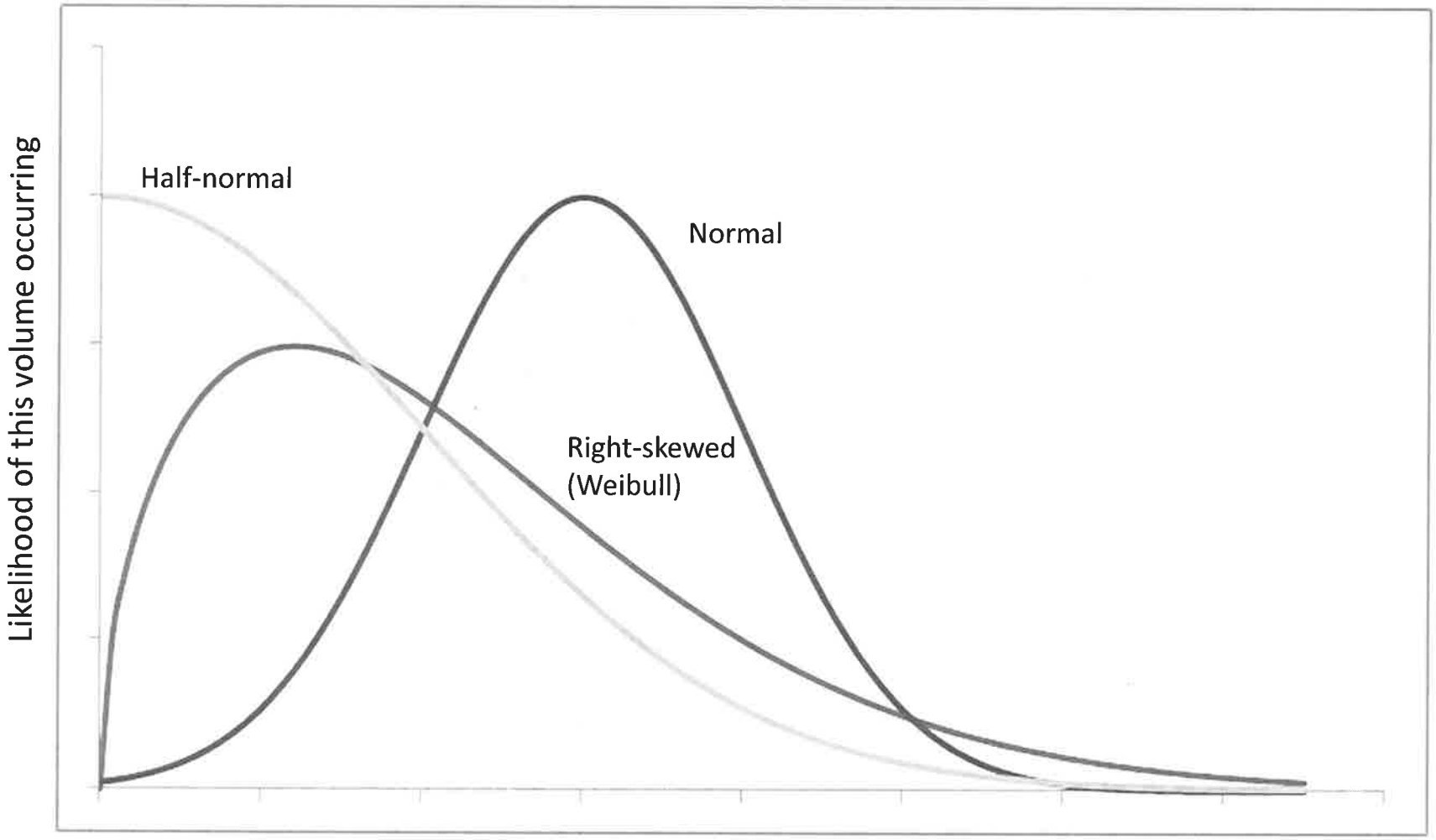
- Range of E85 potential consumption here is assumed to be between 40 and 400 mill gal; and represent the 90% confidence interval
- Proposal will bias the distribution for E85 toward the low end to account for the lack of marketplace experience showing how E85 prices vary with RIN prices and how E85 consumption will vary with its price
- The E85 range is aggregated through the Monte Carlo process to determine the proposed standards

Use of Monte Carlo Process

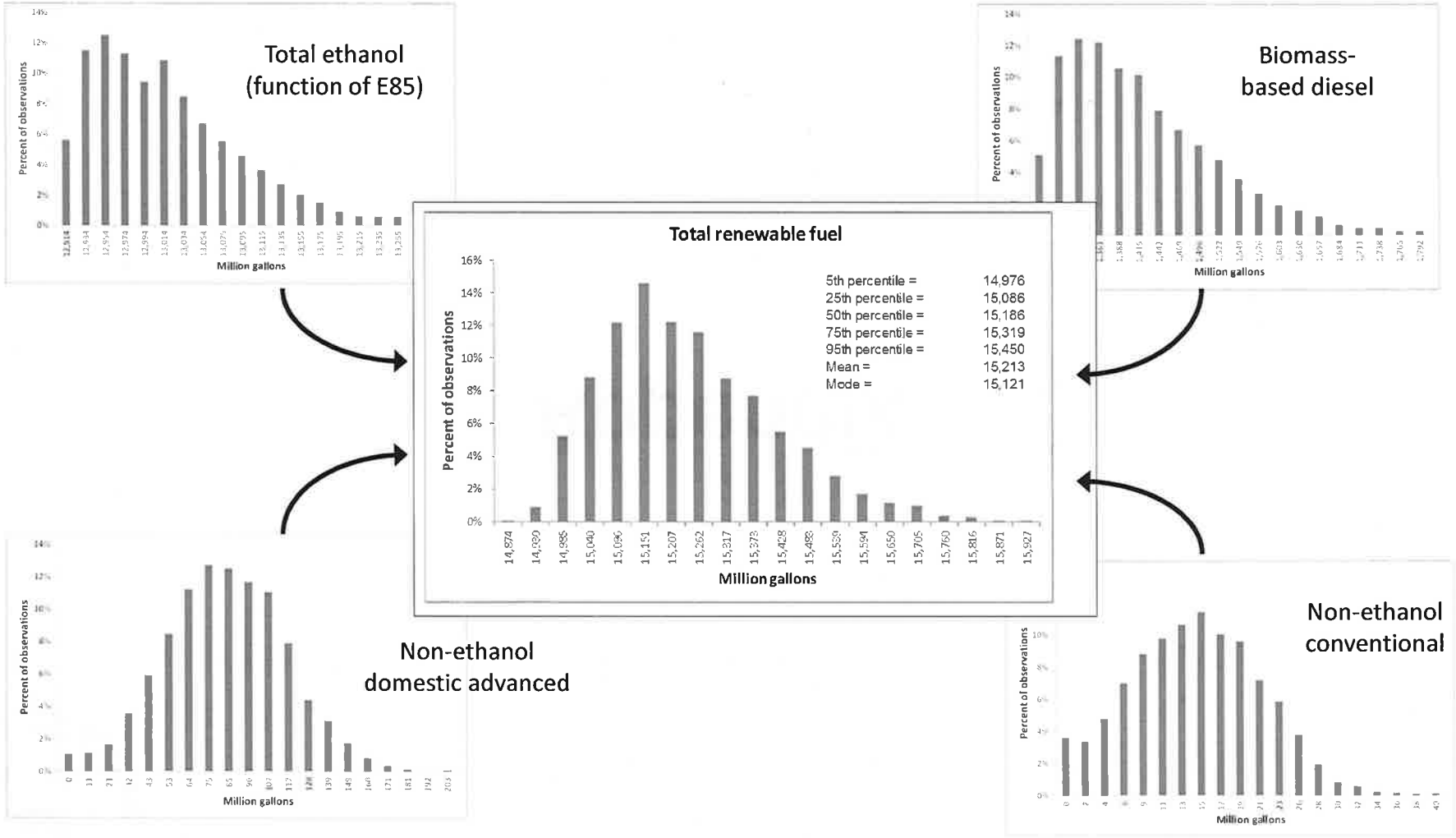
Treatment of Uncertainty and Determination of Ranges for Proposed Standards

- To address uncertainty, we are not only proposing ranges for each of the sources of renewable fuel, but we are also identifying a distribution that represents the likelihood of outcomes within those ranges
  - See standard distributions on next slide
  - Each range for each source of renewable fuel is treated as representing the 90% confidence interval in its distribution
- We can then use a Monte Carlo process to combine ranges for each of the input volumes into a range for the standards
  - The 90% confidence interval of the new distribution defines the proposed range for standard
  - We have a precedent in our use of Monte Carlo analyses in our lifecycle assessments
- In addition, the Monte Carlo process provides a mechanism for choosing a value within the proposed ranges
  - We intend to propose the mean, but comments from stakeholders are going to be all over the map
  - Therefore we will also take comment on using the mode, 50th percentile, or other for the final rule

Standard Uncertainty Distributions

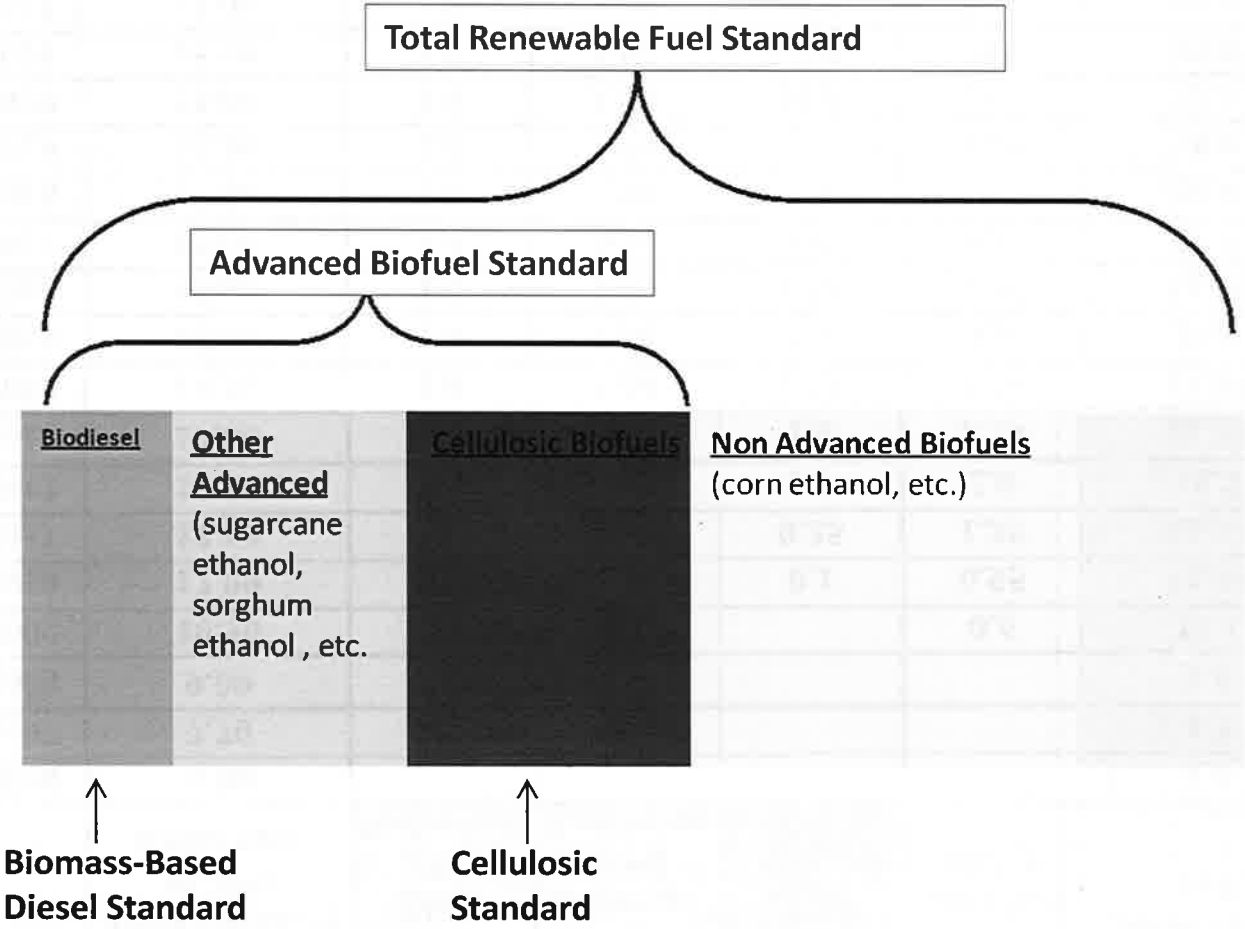


Use of Monte Carlo to Generate the Total Renewable Fuel Volume



Appendix

Interaction Between Standards



- Reductions in cellulosic require an increase in "other" advanced and/or BBD if the advanced biofuel standard is not reduced
- Also, if BBD increases and the advanced standard remains unchanged, there is less need for sugarcane ethanol

Statutory Volumes

Year	Conventional Biofuels (Grandfathered or 20% Reduction)	Advanced Biofuel				Total Renewable Fuel
		Biomass-Based Diesel (50% Reduction)	Non Cellulosic Advanced* (50% Reduction)	Cellulosic Biofuel (60% Reduction)	Total Advanced Biofuel	
2006	4.00					4.0
2007	7.70					4.7
2008	9.00					9.0
2009	10.50	0.5	0.1		0.6	11.1
2010	12.00	0.65	0.2	0.1	0.95	12.95
2011	12.60	0.80	0.3	0.25	1.35	13.95
2012	13.20	1.0	0.5	0.5	2.0	15.2
2013	13.80	1.0	0.75	1.0	2.75	16.55
2014	14.50	1.0	1.00	1.75	3.75	18.15
2015	15.00	1.0	1.50	3.0	5.5	20.5
2016	15.00	1.0	2.00	4.25	7.25	22.25
2017	15.00	1.0	2.50	5.5	9.0	24.0
2018	15.00	1.0	3.00	7.0	11.0	26.0
2019	15.00	1.0	3.50	8.5	13.0	28.0
2020	15.00	1.0	3.50	10.5	15.0	30.0
2021	15.00	1.0	3.50	13.5	18.0	33.0
2022	15.00	1.0	4.00	16.0	21.0	36.0

* Not a separate mandate - Calculated by subtracting BBD and cellulosic from the total advanced biofuel volume