National Renewable Fuel Standard Program – 2010 and Beyond

May, 2011

Office of Transportation and Air Quality
US Environmental Protection Agency

Overview

- Overview: History of National Renewable Fuel Standards
  - EPACT 2005 – RFS1
  - EISA 2007 – RFS2
- Key Highlights of the RFS2 Rule
- Details on RFS2
  - General Structure
  - Compliance Overview
  - Renewable Fuel Pathway Determinations
  - Renewable Feedstock Compliance
- Setting the EISA Yearly Standards
- Other Items of Interest
  - Waiver Authorities
  - Report to Congress – 204
  - 206 – Antibacksliding / Tier 3
- E15
- DOE, USDA, BIWG Coordination / Activities
- Questions / Other Issues

EPACT 2005 vs. EISA 2007

- EPACT 2005 RFS1
  - National Standard
  - 7.5 billion gallons
  - 2012 Full Implementation
  - Obligation based on gasoline – onroad only
  - General definition for renewable fuels
  - 250 million gallons of cellulosic biofuels
  - Different qualification for cellulosic fuel – 2.5 Credits (RINs) per gallon of ethanol

- EISA 2007
  - National Standard but with 4 categories of renewable fuels
  - Significantly increased volumes of renewable fuel – to 36 billion gallons
  - 2022 Full Implementation
  - Expanded to on and off-road gasoline and diesel
  - Explicit definitions for renewable fuels to qualify
  - Inclusion of specific types of waivers
  - Legislation allows renewable fuels used in Home Heating Oil and Jet Fuel to count towards RFS2 program

2007 EISA RFS2 Program – Key Aspects

- **Establishes four categories of renewable fuel volume standards:**
  - cellulosic biofuel
  - biomass-based diesel
  - advanced biofuel
  - total renewable fuel

- **Changes to the program include qualification requirements for renewable fuels and feedstocks**
  - Definitions for qualifying fuels / feedstocks for the categories
    - Specifically defines cellulosic, biomass-based diesel, etc.
    - Set minimum lifecycle GHG reduction thresholds for categories
    - Established grandfathering allowances for renewable volumes from certain facilities
    - Applies 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

- **Final rule set full 2010 EISA renewable fuels volume = 12.95 Bg**

- **The RFS2 Regulations went into effect July 1, 2010.**

- **EPA developed a path for transitioning from RFS1 to RFS2**

Details of EISA Categories and Standards

- **Four Separate Standards**
  - **Biomass-Based Diesel: Minimum of 1 Bgal by 2012 and beyond**
    - E.g., Biodiesel, "renewable diesel" if fats and oils not co-processed with petroleum
    - Must meet a 50% lifecycle GHG reduction threshold
  - **Cellulosic Biofuel: Minimum of 16 Bgal by 2022**
    - Renewable fuel produced from cellulose, hemicellulose, or lignin
    - E.g., cellulosic ethanol, BTL diesel, green gasoline, etc.
    - Must meet a 60% lifecycle GHG reduction threshold
  - **Advanced Biofuel: Minimum of 21 Bgal by 2022 (Minimum of 4 billion additional)**
    - Essentially anything but corn starch ethanol
    - Includes cellulosic biofuels and biomass-based diesel
    - Must meet a 50% lifecycle GHG reduction threshold
  - **Total Renewable Biofuel: 36 Bgal by 2022 (Minimum of 15 Bgal additional)**
    - Ethanol derived from corn starch – or any other qualifying renewable fuel
    - Must meet 20% lifecycle GHG reduction threshold – Only applies to fuel produced in new facilities

Lifecycle GHG reduction comparisons are based on a 2005 petroleum baseline as mandated by EISA.

NOTE: Existing biofuel facilities (domestic and foreign) are not required to meet GHG threshold for conventional biofuel category – facilities are "Grandfathered."

Volume Standards as Set Forth in EISA

(Reminder: EPA Sets Standards Each November – These are the standards published in the Act)

Conventional Renewable Fuels + Total Advanced = Total Renewable Fuel

Advanced Biomass Based Diesel + Non Cellulosic Advanced + Cellulosic Advanced = Total Advanced

Year	Conventional Renewable Fuels (Grandfathered Or 20% Reduction)	Advanced Biofuel NESTED STANDARDS				Total Renewable Fuel
		Biomass-Based Diesel (50% Reduction)	Non Cellulosic Advanced (50% Reduction)	Cellulosic Biofuel (60% Reduction)	Total Advanced Biofuel	
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

Compliance Structure of RFS2 – 2010 Transition

- RINs are the currency of the RFS2 program – used for compliance
- RINS are generated by renewable fuel producer
- Types of Fuels are assigned a D Code – determined by EISA definition, restrictions, GHG evaluation, energy calculation
- RFS2 retains basic RIN handling requirements from the original RFS
- RINs follow product volume
- RIN separation from volume may only be performed by an obligated party
- RIN credits have a two year life – year generated, plus one year
- Program continues to be supplemented by recordkeeping and attest requirements

D value	Meaning under RFS1	Meaning under RFS2
1	Cellulosic biomass ethanol	Not applicable
2	Any renewable fuel that is not cellulosic biomass ethanol	Not applicable
3	Not applicable	Cellulosic biofuel
4	Not applicable	Biomass-based diesel
5	Not applicable	Advanced biofuel
6	Not applicable	Renewable fuel
7	Not applicable	Cellulosic diesel

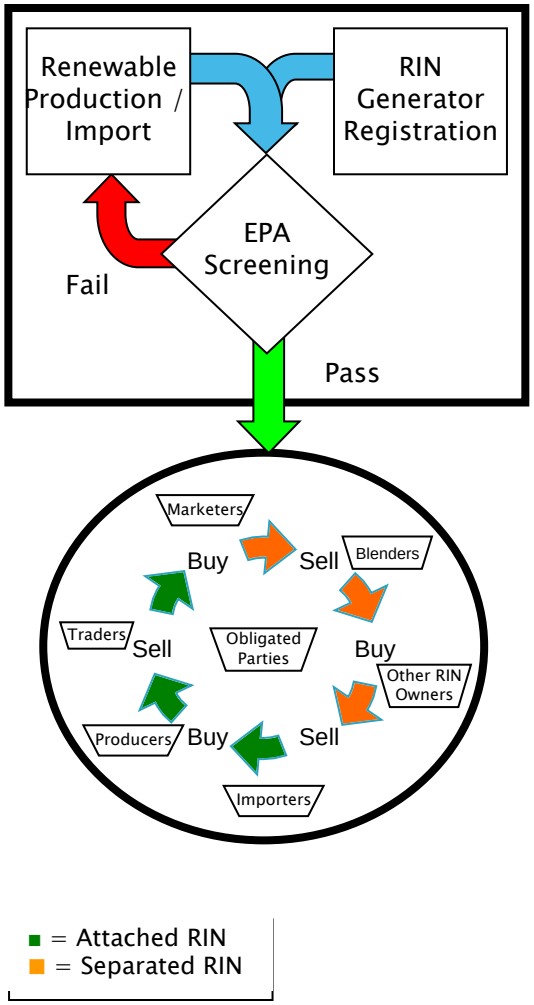
RINs That Can Be Used To Meet Each Standard In RFS2

Standard	Obligation	Allowable D codes
Cellulosic biofuel	RVO_{CB}	3 and 7*
Biomass-based diesel	RVO_{BBD}	4 and 7*
Advanced biofuel	RVO_{AB}	3, 4, 5, and 7
Renewable fuel	RVO_{RF}	3, 4, 5, 6, and 7*

* Plus certain RFS1 RINs for 2010

New Compliance System

- EPA Moderated Transaction System (EMTS):
  - A closed, EPA-managed system that provides: 1) a mechanism for screening and 2) a means for tracking RIN credits
  - Screening process checks that the information provided by the RIN generator is consistent with an existing registration
  - RIN tracking process is similar to a banking system.
    - Accounts are assigned to registered users.
    - Transactions are conducted through EMTS which enforces business rules – e.g. a seller must have a sufficient account balance for a buyer to receive their credits.



General – Application of LCA

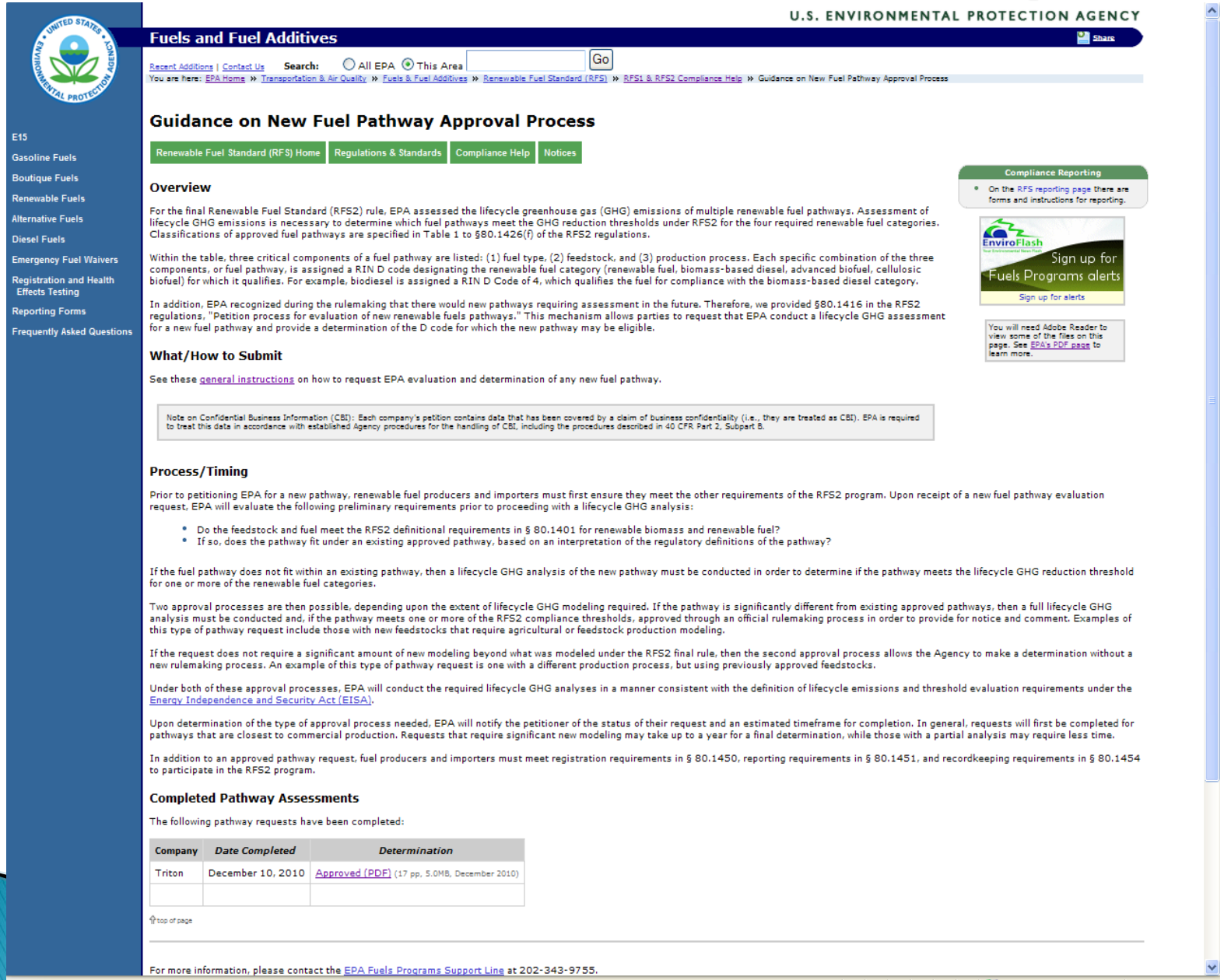
- Act defines lifecycle
- Modeling applies specific definitional requirements in modeling, including indirect land use
- Modeling accounts for typical feedstock and fuel production pathway from which significant production and contribution to RFS2 volumes are expected (2022)
- Accounts for uncertainty
- Modeled numerous fuel pathways
- Results extended to same fuel type and feedstock as a modeled pathway but with feedstock production sources that were not included in the analysis (e.g., corn ethanol and soybean biodiesel produced in another country)
- Results extended to other fuel pathways with low risk of not complying – cellulosic, waste, other
- Threshold determinations for certain other pathways were not possible at time of final rule because sufficient modeling or data not available
- For other fuel pathways not yet modeled, EPA provides a petition process through which the fuel pathway can be analyzed and provided a compliance determination.
- EPA recognizes that the state of scientific knowledge continues to evolve in this area, therefore, the Agency is committing to further reassess determinations and lifecycle estimates going forward

Key Fuel Pathways *

Renewable Fuel Category	Example of Qualifying Renewable Fuel
Cellulosic (60% GHG)	**Cellulosic ethanol and diesel fuel (Thermal / Biochemical from Stover and Switchgrass)**
Biomass-based diesel (50% GHG)	**Biodiesel from soy, canola, wastes oils, and algae**
Advanced biofuel (50% GHG)	**Ethanol from sugarcane**
Renewable fuel (20% GHG or Grandfathered)	**Ethanol and Butanol from corn starch (coal-fired does not qualify)**

* Other pathways under evaluation – Palm, Sorghum, etc.

New Renewable Fuel Pathways



U.S. ENVIRONMENTAL PROTECTION AGENCY

Fuels and Fuel Additives

Share

Recent Additions | Contact Us Search: All EPA This Area Go

You are here: EPA Home » Transportation & Air Quality » Fuels & Fuel Additives » Renewable Fuel Standard (RFS) » RFS1 & RFS2 Compliance Help » Guidance on New Fuel Pathway Approval Process

E15
Gasoline Fuels
Boutique Fuels
Renewable Fuels
Alternative Fuels
Diesel Fuels
Emergency Fuel Waivers
Registration and Health Effects Testing
Reporting Forms
Frequently Asked Questions

Guidance on New Fuel Pathway Approval Process

Renewable Fuel Standard (RFS) Home | Regulations & Standards | Compliance Help | Notices

Overview

For the final Renewable Fuel Standard (RFS2) rule, EPA assessed the lifecycle greenhouse gas (GHG) emissions of multiple renewable fuel pathways. Assessment of lifecycle GHG emissions is necessary to determine which fuel pathways meet the GHG reduction thresholds under RFS2 for the four required renewable fuel categories. Classifications of approved fuel pathways are specified in Table 1 to §80.1426(f) of the RFS2 regulations.

Within the table, three critical components of a fuel pathway are listed: (1) fuel type, (2) feedstock, and (3) production process. Each specific combination of the three components, or fuel pathway, is assigned a RIN D code designating the renewable fuel category (renewable fuel, biomass-based diesel, advanced biofuel, cellulosic biofuel) for which it qualifies. For example, biodiesel is assigned a RIN D Code of 4, which qualifies the fuel for compliance with the biomass-based diesel category.

In addition, EPA recognized during the rulemaking that there would new pathways requiring assessment in the future. Therefore, we provided §80.1416 in the RFS2 regulations, "Petition process for evaluation of new renewable fuels pathways." This mechanism allows parties to request that EPA conduct a lifecycle GHG assessment for a new fuel pathway and provide a determination of the D code for which the new pathway may be eligible.

Compliance Reporting
- On the RFS reporting page there are forms and instructions for reporting.

EnviroFlash Sign up for Fuels Programs alerts
Sign up for alerts

You will need Adobe Reader to view some of the files on this page. See EPA's PDF page to learn more.

What/How to Submit

See these general instructions on how to request EPA evaluation and determination of any new fuel pathway.

Note on Confidential Business Information (CBI): Each company's petition contains data that has been covered by a claim of business confidentiality (i.e., they are treated as CBI). EPA is required to treat this data in accordance with established Agency procedures for the handling of CBI, including the procedures described in 40 CFR Part 2, Subpart B.

Process/Timing

Prior to petitioning EPA for a new pathway, renewable fuel producers and importers must first ensure they meet the other requirements of the RFS2 program. Upon receipt of a new fuel pathway evaluation request, EPA will evaluate the following preliminary requirements prior to proceeding with a lifecycle GHG analysis:

- Do the feedstock and fuel meet the RFS2 definitional requirements in § 80.1401 for renewable biomass and renewable fuel?
- If so, does the pathway fit under an existing approved pathway, based on an interpretation of the regulatory definitions of the pathway?

If the fuel pathway does not fit within an existing pathway, then a lifecycle GHG analysis of the new pathway must be conducted in order to determine if the pathway meets the lifecycle GHG reduction threshold for one or more of the renewable fuel categories.

Two approval processes are then possible, depending upon the extent of lifecycle GHG modeling required. If the pathway is significantly different from existing approved pathways, then a full lifecycle GHG analysis must be conducted and, if the pathway meets one or more of the RFS2 compliance thresholds, approved through an official rulemaking process in order to provide for notice and comment. Examples of this type of pathway request include those with new feedstocks that require agricultural or feedstock production modeling.

If the request does not require a significant amount of new modeling beyond what was modeled under the RFS2 final rule, then the second approval process allows the Agency to make a determination without a new rulemaking process. An example of this type of pathway request is one with a different production process, but using previously approved feedstocks.

Under both of these approval processes, EPA will conduct the required lifecycle GHG analyses in a manner consistent with the definition of lifecycle emissions and threshold evaluation requirements under the Energy Independence and Security Act (EISA).

Upon determination of the type of approval process needed, EPA will notify the petitioner of the status of their request and an estimated timeframe for completion. In general, requests will first be completed for pathways that are closest to commercial production. Requests that require significant new modeling may take up to a year for a final determination, while those with a partial analysis may require less time.

In addition to an approved pathway request, fuel producers and importers must meet registration requirements in § 80.1450, reporting requirements in § 80.1451, and recordkeeping requirements in § 80.1454 to participate in the RFS2 program.

Completed Pathway Assessments

The following pathway requests have been completed:

Company	*Date Completed*	*Determination*
Triton	December 10, 2010	Approved (PDF) (17 pp, 5.0MB, December 2010)

top of page

For more information, please contact the EPA Fuels Programs Support Line at 202-343-9755.

Local intranet 100%

Renewable Biomass Provisions – Approving Feedstocks

- **EISA restricted where feedstocks can grow and be harvested for use in producing renewable fuels for compliance with the RFS2 program**
  - Planted crops/crop residue from ag land cleared/cultivated prior to Dec. 2007
  - Planted trees/tree residue from nonfederal lands and tree plantations cleared/cultivated prior to Dec. 2007

- **Compliance Options for feedstocks from the Non Agricultural land / Forest land**
  - **All renewable fuel producers using feedstocks from this sector can either**

    1: Individually verify and qualify their feedstocks following specific recordkeeping and reporting requirements OR

    2: Opt to form and participate in a consortium that employs a third party to conduct a verification program that acts to collectively verify and qualify these feedstocks for RFS2 renewable fuel production

- **Compliance Approach for feedstocks from planted crops / agricultural land**
  - For US produced feedstocks, producers can comply under an aggregate compliance approach
  - For Foreign produced ag feedstocks, rule now provides option for other (non-U.S.) sources of feedstocks to use aggregate compliance if source region can provide sufficient data to support aggregate analysis
    - Canada recently petitioned EPA for an aggregate determination
  - Otherwise, producers must verify using one of the options applied in the non-ag / forest sector

RFS2 Volume Standards for 2011

Final Volumes for 2011

	Actual Volume	Ethanol Equivalent Volume
Cellulosic biofuel	6.6 mill gal	6.0 mill gal
Biomass-based diesel	0.80 bill gal	1.20 bill gal
Advanced biofuel	1.35 bill gal	1.35 bill gal
Renewable fuel	13.95 bill gal	13.95 bill gal

Final Percentage Standards for 2011

Cellulosic biofuel	0.003%
Biomass-based diesel	0.69%
Advanced biofuel	0.78%
Renewable fuel	8.01%

- **2011 Total Advanced Standard** – Maintained at 1.35 billion gallons
  - Expected to be met in 2010 with biomass-based diesel compliance (0.65*1.5 = 0.975)

Setting the EISA RFS2 Standards Each Year

- **EPA Sets EISA Standards Every Year**
  - Based on projected gasoline / diesel projections
- **Formula used per regulations to determine the 4 obligations in terms of a percentage of production and EISA volume standards applied for each category**
- **Spring Proposal – Setting Following Year RFS2 Volume Standards**
  - EISA Volumes converted into percent of gasoline and diesel production expected for following year
  - Standards that apply to refiners, importers, gasoline blenders
  - Cellulosic standard set based on EIA projections, our market assessment and info through notice and comment
- **Standards Announced Every November**

Cellulosic Biofuel –Credit Provisions

- **Cellulosic Biofuel Standard: Irrespective of the volumes required in the Act**
  - Administrator must set the cellulosic standard each November for the following year
  - Evaluation based on an updated market analysis considering
    - Detailed information from pilot and demonstration scale plants
    - Energy Information Administration analysis
    - Other publically and privately available market information, we

- **If standard is set less than volume required in Act – EPA must make EPA-credits available for sale to obligated parties at the greater of:**
  - 25 cent/gallon – or value greater than 25 c/gal based on EISA Formula:
  - $3.00 per gallon less the wholesale price of gasoline (adjusted for inflation)
    - Value was set at $1.13 for 2011

- **If the cellulosic standard is lowered, EPA can lower the volume standards for advanced biofuel and total renewable fuel accordingly**

What's Next – 2012 Standards

- **For the final rule, EPA will choose a single cellulosic value from within proposed range**

- **EISA set other applicable volumes**
  - Biomass-based diesel, non-cellulosic advanced, renewable fuel and total advanced biofuel, and total renewable fuel
  - EPA has authority to lower total renewable and total advance in whole or in part if cellulosic standard is lowered
  - EPA proposed to maintain total advanced and total renewable fuel as specified in the statute

- **Standards set by law each year for forthcoming year**
  - EPA doing so by notice and comment

- **Optimistic about late 2011 / 2012-2013 volume increases for cellulosic biofuels**

Impacts of the RFS2 in 2022

- Reduce GHG Emissions by 138 MMT – equivalent of 27 million vehicles
- Displace ~7% of petroleum gasoline and diesel consumption
- Increase Net Farm Income by $13 B
- Emissions and Air Quality:
  - Increases in NOx, VOC, ethanol, acetaldehyde emissions
  - Decreases in benzene and CO
  - Emissions and air quality impacts vary by area

Environmental Considerations and Reports

- Antibacksliding: Section 206 of EISA directs the agency to further evaluate potential Air Quality impacts and to mitigate, to the extent possible, any adverse impacts
- Comprehensive Environmental Report: Section 204 – First report just release for public review and peer review – Required every 3 years

What Ifs: EISA Waiver Authorities

- General: **Anyone subject to requirements can petition waiver or relaxation of the four standards**
  - Severe harm to the economy; Inadequate supply
  - EPA must approve or disapprove within 90 days but requires opportunity for notice and comment
  - Limited to one year, but can be renewed

- Biomass Based Diesel: **EPA can lower the standard in the Act**
  - If significant supply or other market circumstances lead to high prices
  - Up to 15% or 30% if renewed
  - Can reduce advanced biofuel and total renewable fuel standards accordingly

- Cellulosic Biofuel Standard: **Irrespective of the volumes required in the Act**
  - Administrator must set the cellulosic standard each November for the following year "Based on" October EIA projections
  - If cellulosic standard is set less than volume required in Act EPA must make EPA Cellulosic Biofuel Credits available for sale at the greater of
    - 25 cent/gallon – or value greater than 25 c/gal based on calculation:
    - $3.00 per gallon less the wholesale price of gasoline (adjusted for inflation)
    - (Example 1: $3.00 – 2.82 = .18 c/gal) – Since this is less than 25c/g, it would default to .25 c/gal
    - Example 2: (Example 1: $3.00 – 1.80 = 1.20 c/gal) – Since this is more than 25c/g, the credit would sell for $1.20 c/gal
  - EPA can reduce the standards for advanced biofuel and total renewable fuel accordingly

Questions?

- For Additional information: http://www.epa.gov/otaq/renewablefuels/index.htm
  - Includes Factsheets
  - RFS2 Rulemaking Package
    - Preamble
    - Regulations
    - Regulatory Impact Analysis
  - Links to Other Information
  - Frequently Asked Questions

- Send new questions to: EPAFuelsPrograms@epa.gov