

RFS2 – A Bridge to a More Sustainable America

(A Really Fast Synopsis, too)



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NTRC/ORNL Presentation

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Agenda

- Introduction
- The 2022 Goal
- RFS2 Volume Requirements
- 22nd digit – 1, 2, now 3-7 (“CBAR7”)
- Grandfathering – plants
- More...
- What’s going on in TN to help meet?

ETCleanFuel's 2010 Founding Partners:

EASTMAN



ALSTOM



History & Brief Intro

- RFS1 came from EPA Act 2005; added section to CAA
- Typical compliance fuel was corn-based ethanol
- “Obligated parties” were petroleum refiners & gasoline importers
- Had to generate the RINs to show compliance
- → → **ENTER RFS2**
- Passed by congress in 2007 through EISA (Energy Independence & Security Act)
- Increase from 12 billion gallons per year (BGY) of renewables under RFS1 to **36 BGY in 2022**
- Expanded to include off-road, locomotive, marine gas + diesel
- Moves from 1 standard to 4 performance-based standards
- Applies to
 - ✓ all renewable fuel produced after July 1, 2010,
 - ✓ all RINs generated on or after July 1, 2010, and
 - ✓ all renewable fuel obligations and compliance periods starting January 1, 2010

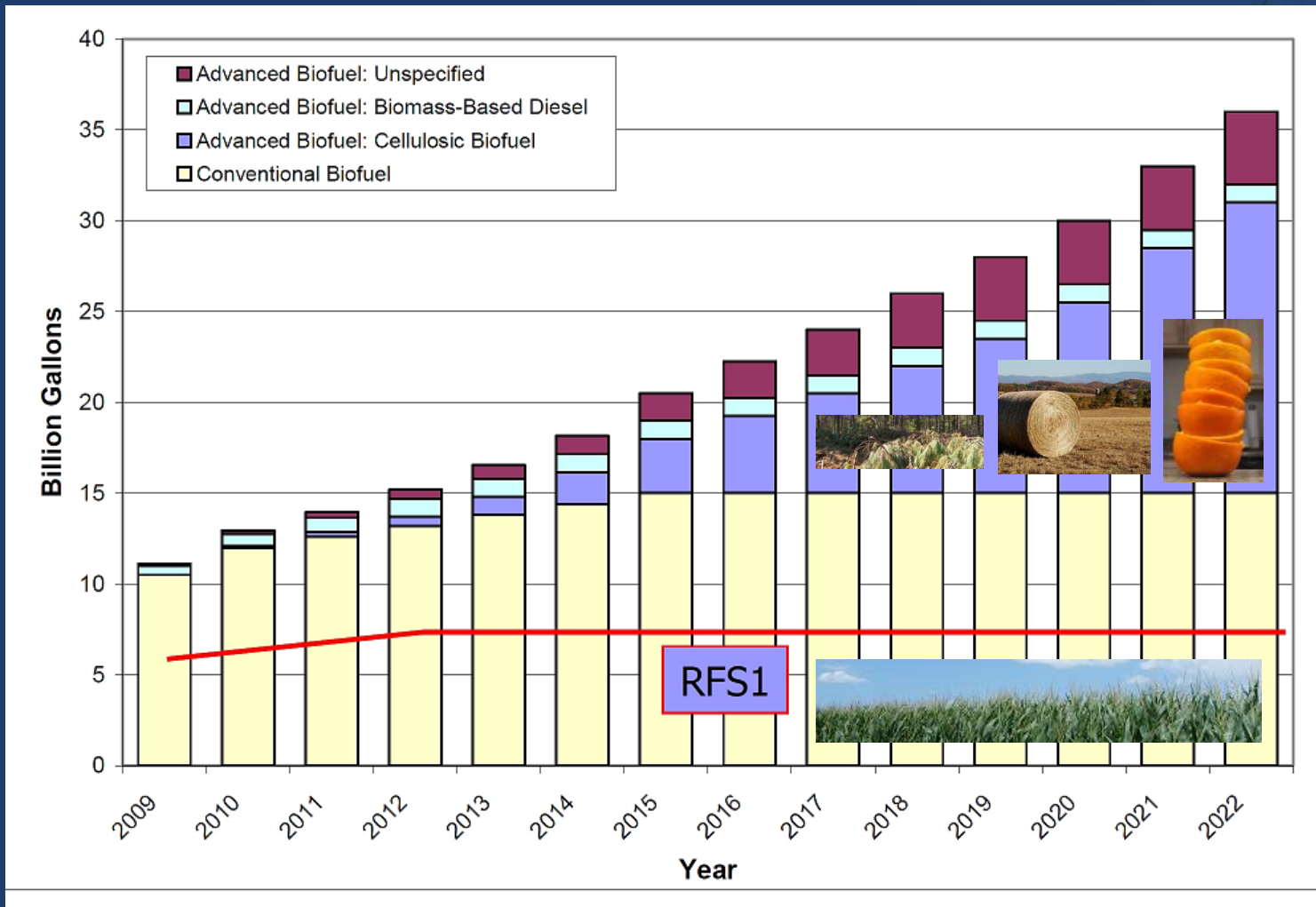


More Intro (Key Pieces)

- Now uses substantial analysis by EPA in GHG arena of thresholds for reduction *compared to petroleum counterpart* – >> **CBAR7** <<
 - ✓ **Type C** – Cellulosic biofuels; 60% GHG reduction
 - ✓ **Type B** – Biomass-based diesel; 50% GHG reduction
 - ✓ **Type A** – Advanced biofuels; 50% GHG reduction
 - ✓ **Type R** – Renewable fuel; 20% GHG reduction
 - ✓ *Type 7 – Cellulosic biodiesel (distillates); can be ‘C’ or ‘B’ [rare]*
- **RFS2 starts July 1, 2010**
 - ✓ RFS1 RINs will be generated until July 30, 2010, then RFS2 RINs will be generated
 - ✓ They will co-exist, although the EMTS (EPA’s Moderated Transaction System) will only track RFS2 RINs
 - ✓ Transition to complete RFS2 system will run into 2013
 - ✓ Criteria will exist for certain RFS1 RINs to be used for RFS2 compliance
- 38-digit numeric code kept – key digit = 22nd position – was only 1 and 2; now this “D” code adds 3-7 corresponding to “CBAR7”



The Goal – 36 BGY by 2022



RFS2 Volume Requirements

NESTED



	Type C	Type B	Type A	Type R
	Cellulosic Biofuel Requirement	Biomass-Based Diesel Requirement	Advanced Biofuel Requirement	Total Renewable Fuel Requirement
2009	n/a	0.5	0.6	11.1
2010	0.1	0.65	0.95	12.95
2011	0.25	0.80	1.35	13.95
2012	0.5	1.0	2.0	15.2
2013	1.0	a	2.75	16.55
2014	1.75	a	3.75	18.15
2015	3.0	a	5.5	20.5
2016	4.25	a	7.25	22.25
2017	5.5	a	9.0	24.0
2018	7.0	a	11.0	26.0
2019	8.5	a	13.0	28.0
2020	10.5	a	15.0	30.0
2021	13.5	a	18.0	33.0
2022	16.0	a	21.0	36.0
2023+	b	b	b	b



Conventional biofuel gets capped at 15 BGY in 2015.

a To be determined by EPA through a future rulemaking, but no less than 1.0 billion gallons.
 b To be determined by EPA through a future rulemaking.

Facility Grandfathering

All post-enactment facilities (domestic and foreign) must meet minimum 20% GHG reduction

All pre-enactment facilities (domestic and foreign) are grandfathered for the general renewable fuel category – estimated at ~15 BGY

- Including ethanol facilities that start production in calendar years 2008 and 2009, and are fired with natural gas, biomass, or any combination of the two

Basic approach:

- Grandfathered indefinitely
- Only up to a baseline volume

Baseline volume based on:

- Maximum allowable volume stipulated in air permits
- Lacking air permits, maximum capacity achieved is used
- Also allowing a small tolerance of 5% to account for minor changes due to ongoing maintenance

Volume increases beyond the baseline must meet the 20% threshold like a new facility



Compliance Determinations, 1

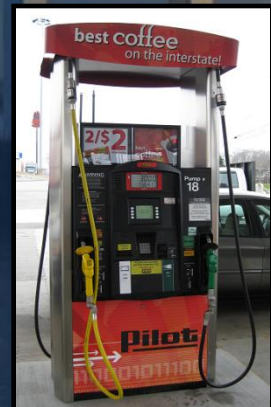
Modeling accounts for the typical feedstock and fuel production pathway from which significant production and contribution to RFS2 volumes are expected (2022)

Modeled fuel pathways that meet compliance:

- Ethanol produced from corn starch at a new natural gas, biomass, or biogas-fired facility using advanced efficient technologies meets 20% threshold (Coal fired will not)
- Butanol from corn starch meets 20% threshold
- Biodiesel (soy, wastes, algae) meets 50% threshold
- Sugarcane ethanol (multiple pathways) meets 50% threshold
- Cellulosic ethanol and diesel fuel (thermal and biochemical from stover, switchgrass) meets 60% threshold

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)

- If agricultural production from a source are significantly different from those modeled and fuel volumes from the source increase, EPA retains the authority to perform a full analysis of the different pathway for compliance determination



Compliance Determinations, 2

Results extended to other fuel pathways with low risk of not complying:

- Crop residues such as corn stover, wheat straw, rice straw, and citrus residue providing starch or cellulosic feedstock
- Forest material including eligible forest thinnings and solid residue remaining from forest product production providing cellulosic feedstock
- Secondary annual crops planted on existing crop land such as winter cover crops and providing cellulosic material, starch, or oil for biofuel production
- Separated food and yard wastes, including food and beverage wastes from food production and processing
- Perennial grasses including switchgrass and miscanthus

Future “Uncertainty” – Sarah Dunham, EPA says...

- “There is inherent uncertainty in these assessments... we thought it was important to try to formally recognize that uncertainty and incorporate it into the analysis. The assessments will be updated over the next two years as more information becomes known.”



RFS2 Miscellany

- EPA changed baseline BTU value of ethanol – 77,750 btu/gal to 77,000
- As EPA took comments on RFS2, they received literally thousands of comments from persons and companies from *both* the conventional *and* renewable fuel sectors.
- EPA has authority to adjust both GHG levels for some fuel types and fuel mandates; already adjusted 2010 cellulosic quantity from 100 million to 6.5 million gallons.
- RVO calculated on straight volume basis for each fuel type *except for 'B,' biomass-based diesel*. Multiplier of 1.5 is used. For 2010 'B' category obligation of 1.15 BGY, obligated parties will actually need to secure and submit for 1.725 billion gallon-RINs.
- Civil penalties = \$37,500 for every day of each violation (+/- econ. benefit). However EPA has only prosecuted a few under RFS1 and those were for willful violations.
- Pro-rata share for obligated parties =
vol. gas imported-produced [Y] / total U.S. consumption [X] * total RF mandate
- 2 states of RIN “association:” assigned, and separated. ‘Assigned’ to fuel, then follows fuel until ‘separation’ where ‘activates.’ Now tradable and serves as the paper credit for compliance.
- New stipulation – all qualifying fuels must be produced with Renewable Biomass. Downstream market participants can be exposed to violations from insufficient due diligence about their source fuel and RINs.

EPA Q-n-A – straight from the source, 1

<http://www.epa.gov/otaq/fuels/renewablefuels/compliancehelp/rfs2-aq.htm>

- Q:** While there is no renewable fuel obligation under the RFS2 program for the production or importation of conventional jet fuel, RINs can be generated for renewable jet fuel. Is that right?
- A:** Only gasoline and diesel fuels produced or imported into the U.S. are subject to the renewable fuel standards. Thus, only gasoline and diesel fuel volumes produced or imported by an obligated party factor into their RVOs (renewable fuel volume obligations). Therefore, jet fuel production or importation is not subject to the renewable fuel standards. However, producers or importers of renewable jet fuel can generate RINs to represent that jet fuel if their fuel meets the definition of renewable fuel and EPA has approved a D code.
- Q:** If a facility is grandfathered, is it also exempt from the requirement that feedstocks must be renewable biomass?
- A:** Even if a facility is exempt from the 20% GHG reduction requirement, in order to generate RINs, the facility is still required to use feedstocks that meet the definition of renewable biomass. The definition of renewable fuel in 80.1401 specifies that renewable fuel be made from renewable biomass, which is also defined in that section.

EPA Q-n-A – straight from the source, 2

<http://www.epa.gov/otaq/fuels/renewablefuels/compliancehelp/rfs2-aq.htm>

Q: Does ethanol derived from cellulosic feedstock or sugar have the same Equivalence Value as ethanol derived from corn starch, i.e. 1.0?

A: Yes. Equivalence Values are based on energy content in the fuel. Ethanol from starch, sugar, and cellulose is all chemically identical, and is all 100% renewable (none of the carbon in the fuel comes from a fossil fuel source). Thus, all such ethanol has the same Equivalence Value.

Q: How do I find a listing of all obligated parties pertaining to the new RFS2 Program?

A: Review the Fuels Programs Registrants list located at <https://cdxnodengn.epa.gov/otaq-reg/list.do>. Any party registered as an importer or refiner for either the gasoline or diesel programs may be an obligated party in any given compliance year.

Q: Where can I find more information and documentation on the EPA Moderated Transaction System (EMTS)?

A: For more information on the EPA Moderated Transaction System (EMTS), please visit the EMTS web page at <http://www.epa.gov/otaq/fuels/renewablefuels/epamts.htm>.

TN “Advanced” Biofuels

Two primary producers in Tennessee

Biodiesel

- **Renewable Fuels LLC**
- Former SunsOil LLC
- 2 MGY
- To (re)open July 2010
- ORNL biodiesel?

Cellulosic Ethanol

- **Genera Energy**
- 25,000 GY
- Cobs now, switchgrass later (Dec. '10)
- 20-30 MGY plant in the 2013 time frame?



Switchgrass Update - 1

Production



Switchgrass Update - 2

The Switchgrass “Experience”

- In 2008, 16 farmers were selected with a total of 720 acres
- In 2009, 34 contracts covering 1,900 acres were added
- 2010 acreage expanding by as much as 4,000 additional acres
 - Current contracts are adding 2,500 additional acres, bringing the total number of farmers enrolled to 60.
- Joint effort of UT Ag Experiment Station, Genera Energy and UT Extension

2009 Harvest

- 1st year yields averaged 2 dry tons per acre (2 farms yielded 4 tons per acre)
- 2nd year yields varied from 3 dry tons per acre to nearly 7 dry tons per acre
- 3rd year switchgrass field yielded 7.6 dry tons per acre



Switchgrass Update - 3

Randall Peters Farm in Vonore – Aerial View



Resources - for more RFS2

EPA's Renewable Fuels Standard Home

- <http://www.epa.gov/otaq/fuels/renewablefuels/index.htm>

Clayton McMartin & Graham Noyes White Paper – Feb. 26, 2010

- <http://www.cfch.com/whitepaper/>

Renewable Fuels Association (RFA) Issues Brief – Summary of RFS2

- http://foodnfuel.3cdn.net/90c1a873be0da22e02_ypm6i2c47.pdf

National Biodiesel Board's (NBB's) RFS2 Website

- <http://www.biodiesel.org/news/RFS/default.shtm>



Questions?

*“Do not follow where the path may lead.
Go, instead, where there is no path
and leave a trail.”*

- Ralph Waldo Emerson

Your Link to Alt Fuels Info in East TN:

ETCleanFuels.org

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