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## RFS2: Where Are We Now And Where Are We Heading?

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# RFS2: Where Are We Now And Where Are We Heading?

February, 2011

Office of Transportation and Air Quality  
US Environmental Protection Agency

# Overview

- ▶ General Reflections on the Renewable Fuel Standard Program
- ▶ The 2011 Standards
- ▶ Ongoing and Future Actions
  - Yearly Standard Setting Process
- ▶ Higher Blends of Ethanol: E15
- ▶ Questions / Other Issues

# Reflections: EPACT 2005 vs. EISA 2007

## ▶ EPACT 2005 RFS1

- 1 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

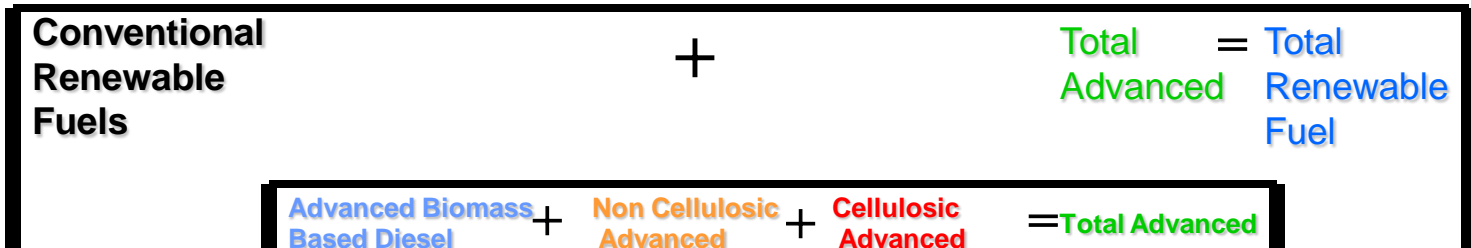
- National Standard but with 4 categories of renewable fuels
- Significantly increased volumes of renewable fuel – to 36 billion gallons
- 2022 Full Implementation
- Expanded to on and off-road gasoline and diesel
- Explicit definitions for renewable fuels to qualify
- Inclusion of specific types of 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 announced February 2010**
  - 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

# Volume Standards as Set Forth in EISA

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



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

# 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.”**



# Where Are We Now?

## RFS2 Volume Standards for 2011

### Final Volumes for 2011

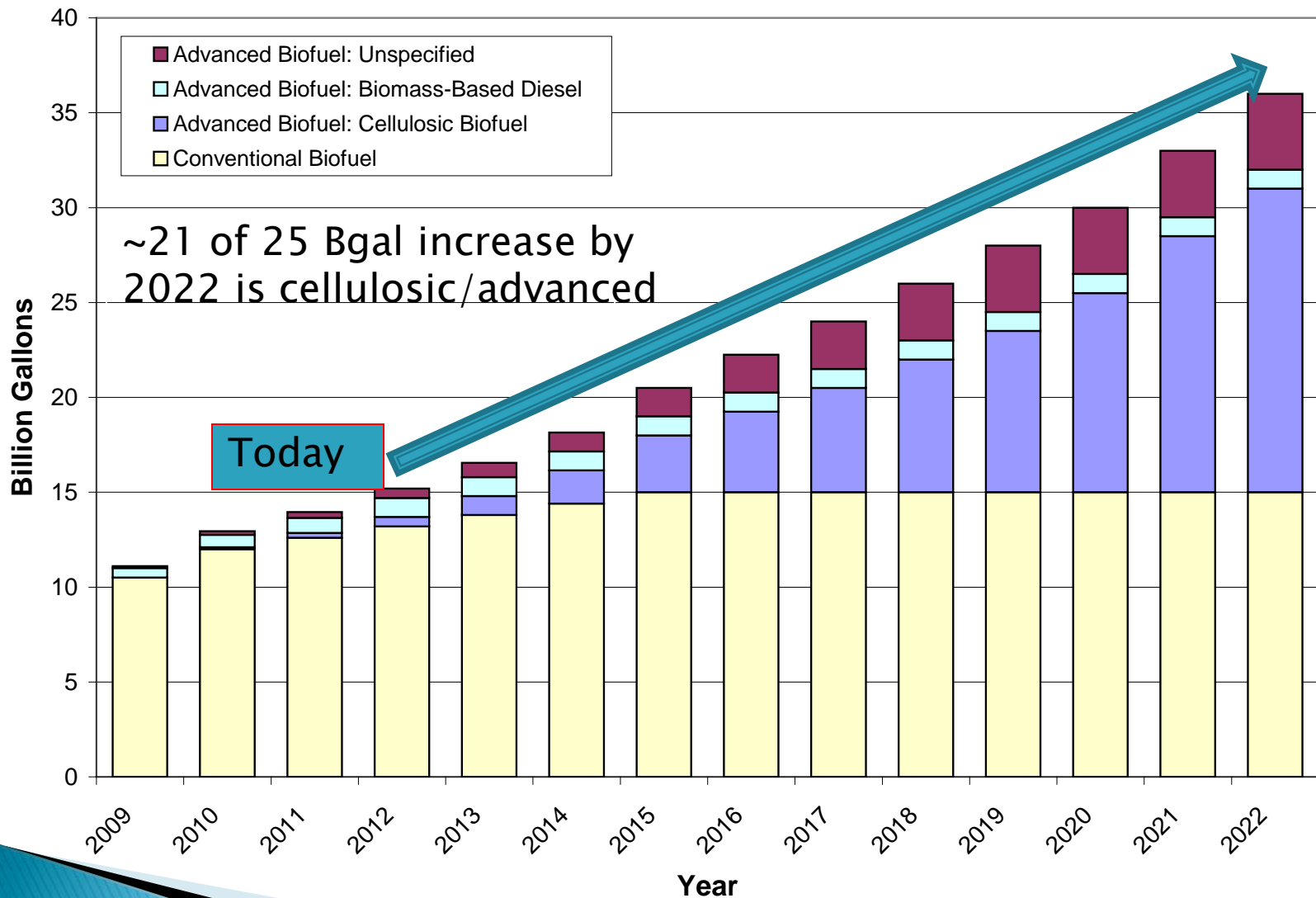
	Actual Volume	Ethanol Equivalent Volume
Cellulosic biofuel	6.6 mill gal	6.0 mill gal
Biomass-based diesel	0.80 bill gal	1.20 bill gal
Advanced biofuel	1.35 bill gal	1.35 bill gal
Renewable fuel	13.95 bill gal	13.95 bill gal

### 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 ( $0.65 \times 1.5 = 0.975$ )

# Where Are We Heading? EISA Future Volumes



# How Do We Get There?

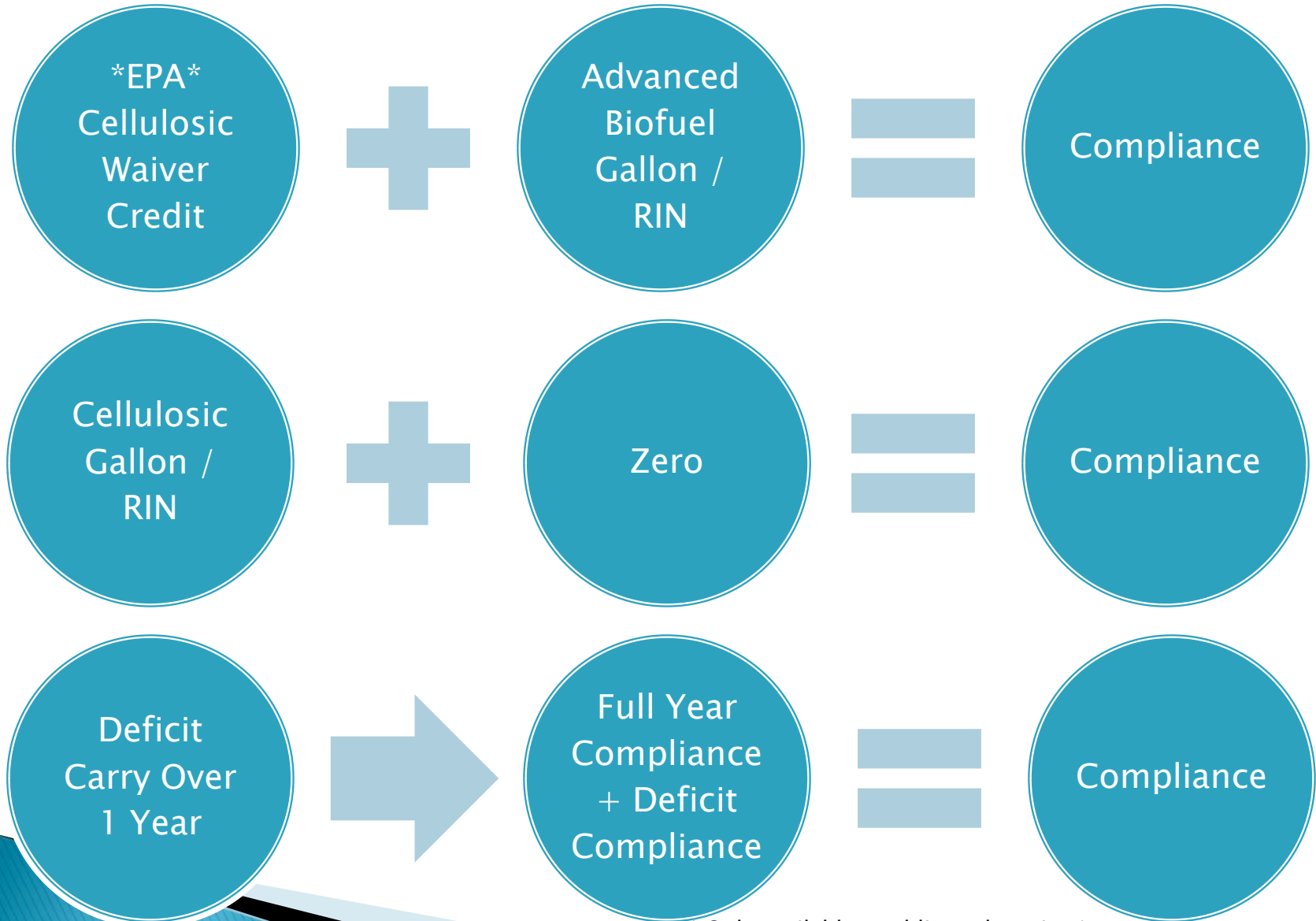
## Setting the EISA RFS2 Standards Each Year

- ▶ **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**

# Cellulosic Compliance Options



\* Only available to obligated parties \*

\* Only good for year of purchase \*

# 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**

# Higher Blends of Ethanol: E15 Waiver Background

- ▶ Ethanol has been allowed in gasoline in blends up to 10 volume percent since the late 1970s
- ▶ EISA RFS program greatly expanded the volume of renewable fuel required in our nation's transportation sector.
  - Ethanol is currently the primary renewable fuel used in the US and as volume expands, at some point the gasoline pool reaches saturation at the current blending allowance of 10 volume percent.
- ▶ Interest grew in expanding the blending allowance for ethanol and in March 2009: Growth Energy applied for a waiver to increase allowable amount of ethanol in gasoline from E10 to E15.
- ▶ Waiver application included some data on the impact of E15 on vehicle emissions, fuel system materials, and driveability.
- ▶ Additional data developed by DOE

# So What's In a Waiver? – Waiver Criteria of Clean Air Act Section 211(f)(4)

- ▶ EPA Requires Automakers to Certify Vehicle Emissions / System
- ▶ Waiver Requires Testing:
  - Exhaust emissions
  - Evaporative emissions
  - Durability:
    - Materials compatibility
    - Driveability or operability
  - Testing needs to include emissions over the full useful life of vehicle or equipment
    - Long-term emissions durability impacts
  - Fuel manufacturer applicant must demonstrate test sample size (for both on and non-road) is sufficient to infer significant portion of fleet will not fail to achieve compliance within the requirements set in the 211(f)(4) waiver



# E15 Decisions

Regulatory Announcement

## EPA Announces E15 Partial Waiver Decision and Fuel Pump Labeling Proposal

The Environmental Protection Agency (EPA) is partially granting a waiver to allow gasoline that contains greater than 10 volume percent ethanol and up to 15 volume percent ethanol (E15) for use in certain motor vehicles. We are partially approving the waiver for and allowing the introduction into commerce of E15 for use only in model year 2007 and newer light-duty motor vehicles, which includes passenger cars, light-duty trucks and sport utility vehicles (SUV). We are not approving the waiver for introduction of E15 for use in model year 2000 and older light-duty motor vehicles, as well as all heavy-duty gasoline engines and motor vehicles, highway and off-highway motorcycles, and nonroad engines, vehicles, and equipment ("nonroad products" such as lawn mowers, chainsaws and boats) because there is currently insufficient test data to support an E15 waiver approval for these vehicles, engines, and products. The Agency is deferring a decision on the applicability of a waiver to model year 2001 through 2006 light-duty motor vehicles until additional test data, currently under development, is available.

This waiver decision includes certain conditions to reduce the potential for misfueling of E15 into vehicles, engines, and products for which it is not approved and to ensure fuel and ethanol quality. In addition, EPA is concurrently issuing a proposed rule with the express purpose of reducing the potential for misfueling of E15 into vehicles, engines, and products for which it is not approved. If finalized, this rule will satisfy the misfueling mitigation conditions of today's partial waiver.



Office of Transportation and Air Quality  
EPA-420-F-10-054  
October 2010

Regulatory Announcement

## EPA Announces E15 Partial Waiver Decision

The Environmental Protection Agency (EPA) is taking additional action on Growth Energy's waiver request application submitted under section 211(f)(4) of the Clean Air Act. Today's partial waiver allows fuel and fuel additive manufacturers to introduce, into commerce, gasoline that contains greater than 10 volume percent (vol%) ethanol (E10) and no more than 15 volume percent ethanol (E15) for use in model year (MY) 2001 through 2006 light-duty motor vehicles, which includes passenger cars, light-duty trucks and sport utility vehicles (SUV), provided certain conditions are fulfilled. In October 2010, EPA granted a partial waiver for E15 for use in MY2007 and newer light-duty motor vehicles subject to the same conditions. Taken together, the two waiver decisions allow the introduction into commerce of E15 for use in MY2001 and newer light-duty motor vehicles if the conditions are met.

The required conditions are designed to reduce the potential for misfueling of E15 into vehicles and engines for which it is not approved and to ensure fuel and ethanol quality.

Along with the October 2010 waiver decision, EPA issued a proposed rule with the express purpose of reducing the potential for misfueling of E15 into vehicles, engines, and products for which it is not approved. EPA held a public hearing on the proposed rule and received many written comments by the end of the public comment period (January 3, 2011). The Agency will address the public's comments in the final rule. When issued, the rule is expected to provide the most practical methods of satisfying the conditions of both partial waiver decisions.

Action on Growth Energy's waiver request is one of many steps that must be completed by various parties before E15 may be distributed and sold. Those steps include



Office of Transportation and Air Quality  
EPA-420-F-11-003  
January 2011

# Summary of Waiver Decisions

- ▶ Waivers allow introduction of up to 15 vol% ethanol (E15) into commerce
  - Model year (MY) 2001 and newer light-duty motor vehicles
- ▶ Waiver is subject to several conditions.
- ▶ Two Decisions:
  - October 13, 2010: waiver for E15 for use in MY2007 and newer light-duty vehicles (i.e., cars, light-duty trucks and medium-duty passenger vehicles).
  - January 21, 2011: waiver for E15 for use in MY2001–2006 light-duty motor vehicles.
- ▶ Decisions based on test results provided by the U.S. Department of Energy (DOE) and other information regarding the potential effect of E15 on vehicle emissions.
  - 2008 – began testing for potential impacts of various ethanol-gasoline blends on emissions of MY2007 and newer light-duty motor vehicles.
  - Testing followed enactment of the Energy Independence and Security Act of 2007, which calls for significantly increasing the amount of biofuels, such as ethanol, in transportation fuel.
  -
- ▶ Actions allow, but do not require, E15 if conditions for mitigating misfueling and ensuring fuel quality are met.
- ▶ Waiver does not include MY2000 and older light-duty motor vehicles or any other vehicles, engines or equipment not covered by the decision.

# Specific Application of Waiver

## ▶ **What Vehicles May Use E15?**

- Flexible-fuel vehicles (FFVs).
- MY2001 and newer cars.
- MY2001 and newer light-duty trucks.
- MY2001 and newer medium-duty passenger vehicles (SUVs).

## ▶ **What Vehicles and Engines May Not Use E15?**

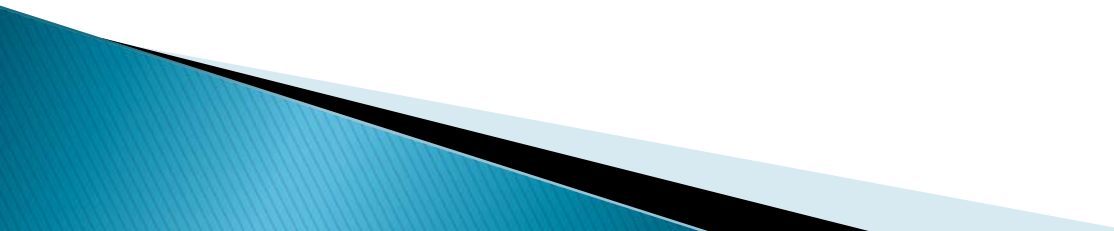
- Motorcycles.
- All vehicles with heavy-duty engines, such as school buses, transit buses, and delivery trucks.
- All off-road vehicles, such as boats and snowmobiles.
- All engines in off-road equipment, such as lawnmowers and chain saws.
- All MY2000 and older cars, light-duty trucks, and medium-duty passenger vehicles (SUVs).

# Conditions of the Waiver

## ▶ **Fuel quality conditions:**

- Ethanol used for E15 must meet ASTM International D4806–10.
- The Reid Vapor Pressure for E15 limited to 9.0 psi in summertime.

## ▶ **Misfueling mitigation conditions:**

- Labels on E15 retail dispensers indicating use is only for MY2001 and newer motor vehicles.
  - Product Transfer Documents (PTDs) must accompany all transfers of fuels for E15 use.
  - Parties involved in the manufacture of E15 must participate in a survey of compliance at fuel retail dispensing facilities to ensure proper labeling of dispensers.
  - Parties must submit a plan addressing conditions to EPA for approval.
- 

# Next Steps

- ▶ Finalize Rule – Supports application of conditions of the waiver.
  - Expect final rule in April / May
- ▶ Industry Submission of Fuel Registration Package
  - Prior to distribution and use of E15, fuel and fuel additive manufacturers are required to register the fuel with EPA.
  - Documentation Submitted Friday – Under Evaluation
- ▶ Other Potential Actions
  - Changes to various state and local laws
  - Underground Storage Tank Policy Guidance
  - Consumer outreach / education

# Market “Opportunity”

- ▶ 2011
  - More than 150 million light-duty vehicles able to fuel with E15
  - ~74% of gasoline consumption
- ▶ 2014
  - More than 187 million vehicles
  - ~85% of fuel consumption

HOWEVER >>>>>>>>>>

# REALITY?



Blendwall?

Market Transition?

OTHER ISSUES?

Process?

# Questions



**Thank you**

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