

# U.S. Department of Energy Biomass Program

*Overview of U.S. Energy Policies*

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# U.S. National Commitment to Ambitious Biofuels Goals



- **“Cost-competitive cellulosic ethanol”**
  - Cost-competitive in the blend market by 2012
- **“20 in 10” (from the 2007 State of the Union address)**
  - Reduce U.S. gasoline\* use by **20%** by 2017 through...
    - o **5%** reduction from enhanced efficiency standards (CAFÉ)
    - o **15%** reduction from new Alternative Fuels Standard at **35 billion** gallons/year (consistent with the current RFS)
- **EISA (Energy Independence & Security Act)**
  - **36 billion** gallons renewable fuel by 2022
    - **21 billion** gallons advanced biofuels
- **30 x 30 (followed from the 2006 SOU)**
  - Longer-term biofuels goal
  - Ramp up the production of biofuels to **60 billion** gallons
  - Displace **30%** of U.S. gasoline consumption\* (based on 2004 use) by 2030

# Policies Accelerating Biofuels Production



## Energy Policy Act of 2005

- Section 932: Commercial Integrated & 10 Percent Demonstration Biorefineries
- Section 942: Incentives for first billion gallons of cellulosic ethanol
  - \$5 million requested for FY 2008
- Title XVII: Loan Guarantees
  - DOE recently selected 6 biomass projects for final applications

## Other Incentives

- Blenders' Credit: \$0.51 cents/gallon (EPAct 1344)
- E85 fueling station payment: 30% of the cost of alternative refueling property, up to \$30,000 for business (EPAct 1342)

***EPAct 2005 goals are integrated into core technology priorities***

# New Policies May Foster Market Expansion



## Extension of ethanol subsidies

- In Draft of new Farm Bill

## Payments to lignocellulosic biomass suppliers for residues and energy crops

- In Draft of new Farm Bill

## Alternative Fuel Standards focused more on renewable biofuels

- In Energy Independence and Security Act of 2007

## National strategy for E-10 (concept stage)

- Mandate or incentives to expand use of 10% blends of ethanol nationwide

## Regional strategy for E-85 (concept stage)

- Mandates or incentives for use of E-85 that consider unique regional opportunities



*Ramp-up of ethanol production will require innovative and focused policies for infrastructure and feedstocks*

# Titles of the Energy Independence and Security Act of 2007



Title Number	Title Name
I	Energy Security Through Improved Vehicle Fuel Economy
II	Energy Security Through Increased Production of Biofuels
III	Energy Savings Through Improved Standards For Appliance and Lighting
IV	Energy Savings in Buildings and Industry
V	Energy Savings in Government and Public Institutions
VI	Accelerated Research and Development
VII	Carbon Capture and Sequestration
VIII	Improved Management of Energy Policy
IX	International Energy Programs
X	Green Jobs
XI	Energy Transportation and Infrastructure
XII	Small Business Energy Programs
XIII	Smart Grid
XIV	Pool and Spa Safety
XV	Revenue Provisions
XVI	Effective Date

Source: Booz | Allen | Hamilton



# EISA Title II\* Defines Multiple Near-Term Activities Requiring Interagency Collaboration



Section of EISA 2007	Agencies	Timeframe	Brief Activity Description
202 – RFS Implementation	EPA, DOE, USDA	1 year	Determination of lifecycle GHG emissions for applicable biofuels and implementation of RFS
203 – Feedstock Impact Study of RFS	DOE, EPA, USDA, National Academy of Sciences	18 months	Impacts of RFS on each industry relating to production of feed grains, livestock, food, forest products, and energy
204 – Environmental and Resource Conservation Impacts	EPA, DOE, USDA	3 years	Current and future impacts of RFS affecting environment and resource conservation issues in the US and abroad
221 – Report on barriers to increasing volume of biodiesel sold in US	DOE, EPA, NIST	180 days	R&D challenges of increased US biodiesel use
222 – Report on Barriers to Using Biogas as a Transportation Fuel	DOE, EPA	180 days	Report on R&D challenges to increasing volumes of biogas and biogas blends sold in the US as transport fuels
225 – FFV E85 Optimization Study	DOE, DOT, EPA	180 days	Study to determine whether optimizing FFVs for E85 would increase fuel efficiency
226 – Study of Engine Durability and Performance with Biodiesel Use	DOE, EPA	24 months (30 days to initiate)	Effects analysis of engine and engine system performance and durability when using pure biodiesel and multiple biodiesel blends

\* EISA; Title II; Energy Security Through Increased Production of Biofuels

# The New RFS Mandates Blending 36 billion Gallons Per Year of Renewable Fuel by 2022\*



## “Advanced Biofuels” are required to meet RFS

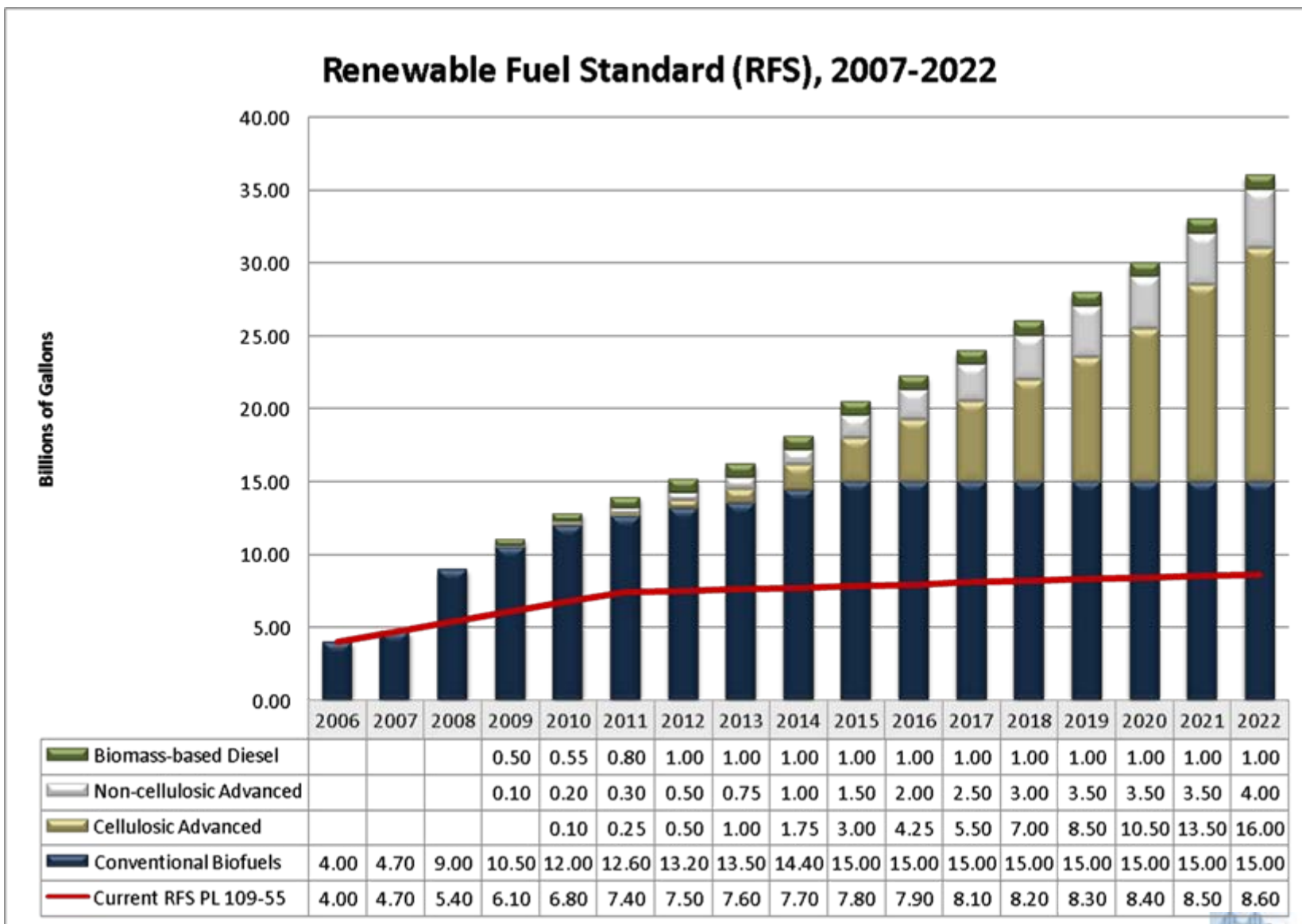
- ▶ All biofuels excluding ethanol from corn starch
- ▶ Must display a  $\geq 50\%$  GHG reduction (from baseline)\*\*
- ▶ 2009 target inception date
- ▶ 21 BGY mandated minimum blending volume by 2022

Applicable “Advanced Biofuels”	Minimum GHG Reduction (from baseline)**	Target Inception Date	2022 Mandated Minimum Blending Volume (BGY)
Cellulosic Biofuels – Cellulosic Ethanol Biobutanol Green Diesel Green Gasoline	60%	2010	16 BGY
Biomass-based Diesel	50%	2009	1 BGY

\* EISA; Title II; Subtitle A; Sections 201 and 202

\*\* Average lifecycle greenhouse emissions as determined by EPA Administrator for gasoline or diesel (whichever is being replaced by the renewable fuel) sold or distributed as transportation fuel in 2005

# RFS Minimum Blending Volume Schedule\*



Source: Hart Energy Consulting, Government Affairs, 2007



# 2007 Farm Bill Energy Title



## **Loan Guarantees for Biorefineries and Biofuels Production Plants**

- Provides loan guarantee authority for biorefineries, with half going to loans less than \$100 million, and the other half for loans up to \$250 million.

## **Extends the Small Ethanol Producer Tax Credit**

- Extends the credit through 2012.
- Provides 10 cents per gallon of ethanol produced by a small producer for up to 15 million gallons per year.

## **Creates a Tax Credit for Producers of Fossil-Free Alcohol**

- Provides a new credit of 25 cents per gallon of ethanol produced for up to 60 million gallons per year for a facility for which at least 90% of the energy used to operate the facility is biomass-derived.

# 2007 Farm Bill Energy Title (Continued)



## **Modification of Alcohol Tax Credit**

- After 7.5 billions gallons per year of renewable fuel have been blended into gasoline (previous RFS), the current \$0.51 per gallon credit is reduced to \$0.46 per gallon. (To be modified per EISA?)

## **Extends the Ethanol Tariff**

- Extends through 2010 the \$.054 per gallon tariff and a 2.5% ad valorem tariff on fuel ethanol imports.

## **Creates a Biomass Energy Reserve Program to Develop the Next Generation of Feedstocks for Renewable Energy**

- Establishes a program to encourage the production of feedstocks for cellulosic ethanol and other energy production and provides for 5 year contracts for producers to grow dedicated energy crops.
- Provides for an incentive for producers to harvest, store, and transport biomass to bioenergy facilities.



# Additional Information

# EISA Title I\* Seeks to Improve Vehicle Technology



Section of EISA 2007	Agency	Timeframe	Brief Activity Description
102 – Increased corporate average fuel economy standards**	DOT, DOE, EPA	2020	Increases combined corporate average fuel economy (CAFE) standard to 35 MPG
105 – Consumer Information on the Benefits of Alternative Fueled Vehicles	DOT, DOE, EPA	42 months	Requires manufacturer labeling of AFVs and initiates a consumer education program to inform consumers of the benefits of alternative fuels and their location of sale
109 – Extension of FFV Credit Program	Code Amendment	Immediate	Amends fuel economy increases attributable to dual fueled vehicles and provides a provision in the calculation for the use of B20
131 – Transportation Electrification	DOE	2008 - 2012	Grant program supporting projects to encourage the use of plug-in electric drive vehicles or other emerging electric vehicle technologies
134 – Loan Guarantees for Fuel Efficient Automobile Parts Manufacturers	Code Amendment	Immediate	Loan guarantees for production facilities for the manufacture of fuel efficient vehicles or parts of those vehicles, including electric drive vehicles and advanced diesel vehicles
135 – Advanced Battery Production Loans	DOE	Not specified	Guarantees of loans for the construction of facilities for the manufacture of advanced vehicle batteries and battery systems

\* EISA; Title I; Energy Security Through Improved Vehicle Fuel Economy

\*\* “Ten-in-Ten Fuel Economy Act”

# EISA Title I\* Seeks to Improve Vehicle Technology (continued)



Section of EISA 2007	Agency	Timeframe	Brief Activity Description
136 – Advanced Technology Vehicles Manufacturing Incentives	DOE	2008 - 2012	Facility funding awards to automobile manufacturers and component suppliers to pay not more than 30 percent of the cost of reequipping, expanding, or establishing a manufacturing facility in the US to produce qualifying advanced technology vehicles or qualifying components
141 – Federal Vehicle Fleet	EPA Guidance	Not specified	No Federal agency shall acquire a light duty motor vehicle or medium duty passenger vehicle that is not a low greenhouse gas emitting vehicle
142 – Federal Fleet Conservation Requirements	DOE	Begin – 2010; Deadline – October 1, 2015	Beginning in fiscal year 2010, each Federal agency shall reduce petroleum consumption and increase alternative fuel consumption each year by an amount necessary to meet the goals of each Federal agency achieving at least a 20 percent reduction in annual petroleum consumption and a 10 percent increase in annual alternative fuel consumption not later than October 1, 2015

\* EISA; Title I; Energy Security Through Improved Vehicle Fuel Economy



# EISA Title II\* Defines Multiple Near-Term Activities Requiring Interagency Collaboration (continued)



Section of EISA 2007	Agencies	Timeframe	Brief Activity Description
227– Study on Optimizing Natural Gas Vehicles for Biogas	DOE, EPA, DOT	180 days	Study on increased vehicle efficiency by optimizing natural gas vehicles to operate on biogas
229 – Biofuels and Biorefinery Information Center	DOE, USDA	Not specified	Develop a biofuels information repository housing data relating to all facets of renewable fuels
232 – Modifies Biomass Research and Development Act of 2000	DOE, USDA, EPA	Not specified	Directs R&D efforts to include lifecycle GHG emissions, environmental impacts of RFS, and on-farm biofuels production
242 – Reports on Market Penetration of FFVs and E85 Availability	DOE, DOT	FFV – annually; E85 – 24 months	Geographic analysis of FFV population and E85 availability
243 – Dedicated Ethanol Pipeline Feasibility Study	DOE, DOT	15 months	Assess market, technical, regulatory, financial, and other factors associated with ethanol pipelines
245 – Biofuels Transportation Infrastructure Adequacy Study	DOE, DOT	180 days	Study of adequacy of existing biofuels infrastructure to transport domestically produced renewable fuels by rail and other modes
248 – Biofuels Distribution and Advanced Biofuels Infrastructure	DOE, DOT, EPA	Not specified	RD&D program to test physical and chemical properties of biofuels as they relate to existing and new distribution infrastructure

\* EISA; Title II; Energy Security Through Increased Production of Biofuels

# EISA Title II\* also Defines Federal Agency-Specific Activities Relating to Biofuels (continued)



Section of EISA 2007	Agency	Timeframe	Brief Activity Description
206 – RFS Renewable Energy Credits for Electric Vehicles 2000	EPA	18 Months	Feasibility study on issuing RFS credits for to electric vehicles powered by renewable electricity
207 – Grants for Advanced Fuels with 80% GHG Reduction	DOE	2008 - 2015	Advanced biofuel technology development
209 – RFS Vehicle Emissions Impacts on Air Quality	EPA	18 months	Includes analysis of multiple blend levels, renewable fuel types, and vehicle technologies requiring cross-industry participation
223 – Grants for Biofuels Production Technology R&D in Low Ethanol-producing States	DOE	2008-2010	Biofuels conversion technology advancement in low ethanol production areas of the US
224 – RD&D Program for Energy Efficiency Increase in Existing Corn Based Biorefineries	DOE	Not specified	Includes retrofit technologies for conversion of existing grain facilities to cellulosic biomass
230 – Grants for Universities to collaborate with Bioenergy Centers	DOE	Initiates in 2008	Cellulosic ethanol and biofuels research and development
231 – Adds Funding for Commercial Section 932 Projects in 2010	DOE	2010	Augments funding for existing initiative being implemented by DOE
233 – Increases the Number of Bioenergy Centers to Seven	DOE	5 year grants	Expands biofuels R&D efforts to every PADD and to seven total facilities

\* EISA; Title II; Energy Security Through Increased Production of Biofuels

# EISA Title II\* also Defines Federal Agency-Specific Activities Relating to Biofuels (continued)



Section of EISA 2007	Agency	Timeframe	Brief Activity Description
234 – University Renewable Energy R&D Program	DOE	Not specified	Promotes advanced technology R&D
241 – Prohibition of Franchise Agreement Restrictions Relating to Renewable Fuel Infrastructure	Private Sector	Not specified	Alleviates franchise restrictions to retail biofuels sales
244 – Renewable Fuel Infrastructure Development Grants	DOE	12 months – selection criteria; 24 months first pilot program; annual reporting	Covers infrastructure development, technical and marketing assistance, and promotes the construction of refueling infrastructure corridors
246 – Federal Fleet Fueling Infrastructure	All Federal Agencies	Jan 1, 2010	One renewable fuel pump must be installed at each Federal refueling center in the US
247 – Standard Specification for Biodiesel and Biodiesel Blend Inspection and Enforcement Program	EPA	1 yr. rulemaking; 18 months final rule; 180 days to develop inspection and enforcement program	If ASTM does not develop B5 and B20 specifications in the next year, EPA shall initiate a rulemaking to develop standards; EPA will develop an inspection and enforcement program for biodiesel blends
251 – Waiver for Fuel or Fuel Additives	EPA	Immediate	Extends application final action timeframe to 270 days

\* EISA; Title II; Energy Security Through Increased Production of Biofuels

# Additional EISA Titles also Define Federal Agency-Specific Activities Relating to Biomass



Title/Section of EISA 2007	Agency	Timeframe	Brief Activity Description
Title V; 502 – Capital Complex E85 Refueling Station	Architect of the Capitol	Not specified	The Architect of the Capitol may construct a fuel tank and pumping system for E-85 at or near the Capitol Grounds Fuel Station available for use by all legislative branches
Title VI; 656 – Renewable Energy Innovation Manufacturing	DOE	Not specified	Assistance awards for RD&D relating to the manufacturing of renewable energy technologies
Title VIII; 801 – National Media Campaign	DOE	2008 – 2018	Develop and conduct a national media campaign to decrease oil consumption in the United States over the next ten years
Title VIII; 803 – Renewable Energy Deployment	DOE	180 days	Grants for renewable energy projects, meaning a project for the commercial generation of electricity from various renewable sources including biomass
Title VIII; 806 – Sense of Congress on Renewable Resources for Energy (support of 25x25)	Congress	Not specified	It is the sense of Congress that it is the goal of the US that, not later than January 1, 2025, the agricultural, forestry, and working land of the US should 1) provide from renewable resources not less than 25 percent of the total energy consumed in the US; and 2) continue to produce safe abundant, affordable food, feed, fiber
Title XII; 1207 – Renewable Fuel Capital Investment Pilot Program	Small Business Administration	2 year program	Develops a Renewable Fuel Capital Investment Pilot Program to encourage venture capital investment in small businesses that generate or support the production of renewable energy



# EISA Title IX\* Seeks to Enhance International Partnership in Renewable Energy



Section of EISA 2007	Agency	Timeframe	Brief Activity Description
916 – Task Force on International Cooperation for Clean and Efficient Energy Technologies	Interagency**	Establish within 90 days	Develop and assist in the implementation of a strategy to develop, demonstrate, and deploy clean and efficient energy technologies internationally; examine relevant policy issues to help open markets and improve the export of clean and efficient energy technologies from the United States
917 – US-Israel Energy Cooperation***	DOE	Not specified	Establish a grant program to support joint US-Israel research to promote renewable energy, including biomass
923 – International Clean Energy Foundation	Interagency****	Report on implementation by March 31, 2008	Make grants to promote international projects to reduce GHG emissions, solicit countries for funding, harness global expertise, and create a repository of information on best practices on the use of clean and efficient technologies, while promoting use of American technologies

\* EISA; Title IX; International Energy Programs

\*\*Established by the President, composed of representatives from Council on Environmental Quality, DOE, DOC, Treasury, State, EPA, USAID, E-I Bank of the US, Overseas Private Investment Corporation, Trade and Development Agency, SBA, Office of the US Trade Representative, and other Federal agencies as determined by the President

\*\*\*Requires a cost share of not less than 20 percent for research and development and not less than 50 percent for demonstration and commercial application activities

\*\*\*\*Board of Directors will be Secretary of State, Secretary of Energy, Administrator of USAID, plus four others with relevant experience