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# **Bioenergy in the United States**

## **Bioenergy Workshop**

**Harry S. Baumes, Ph. D.  
Associate Director  
Office of Energy Policy and New Uses  
United States Department of Agriculture**

**Tuskegee University  
College of Agriculture, Environmental and Natural Sciences  
Kellogg Conference Center**

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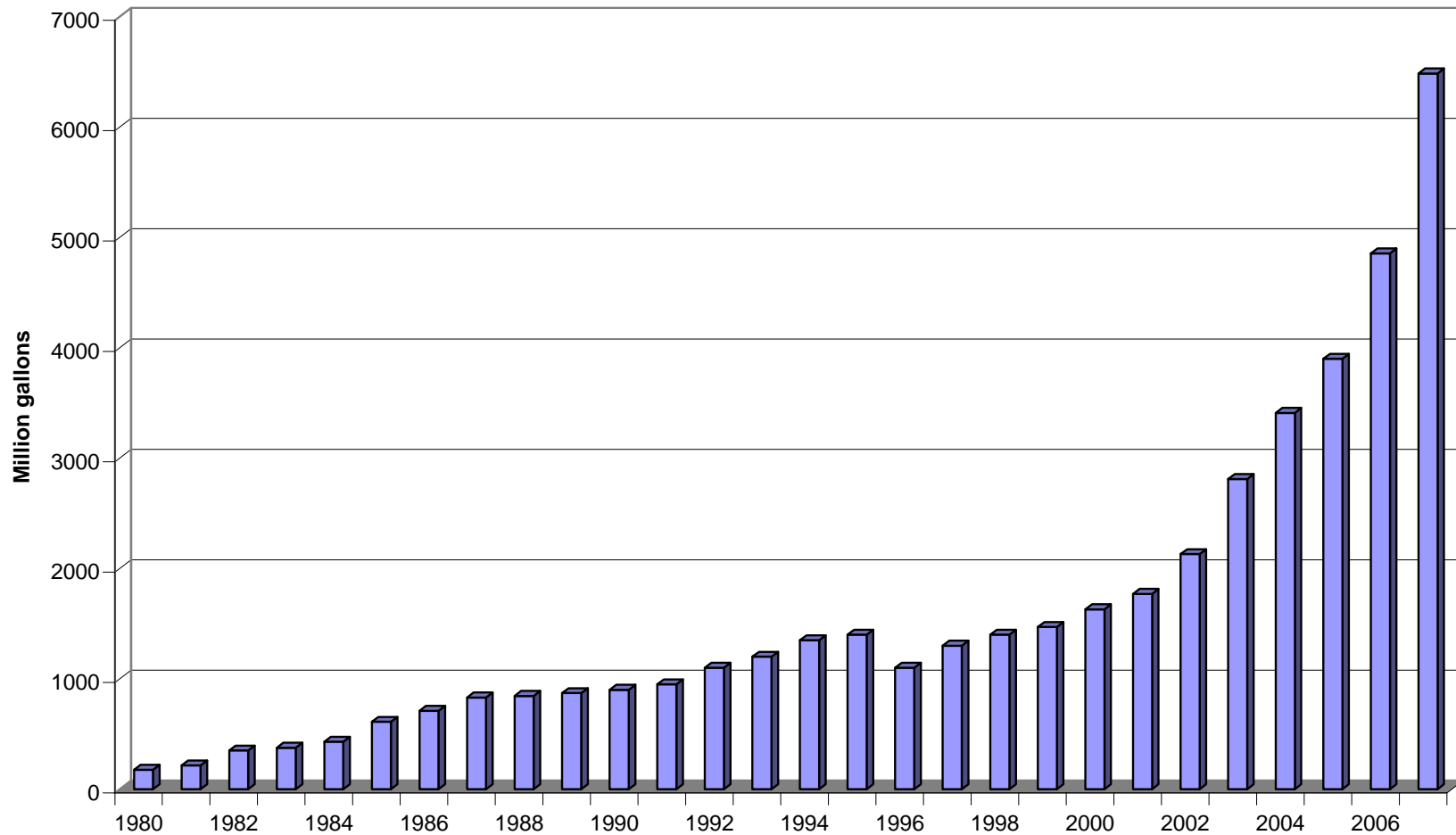
# OVERVIEW

- Background: BIOFRENZY
- Current Environment
  - Energy Independence and Security Act of 2007
  - Food, Conservation, and Energy Act of 2008
- Looking Ahead



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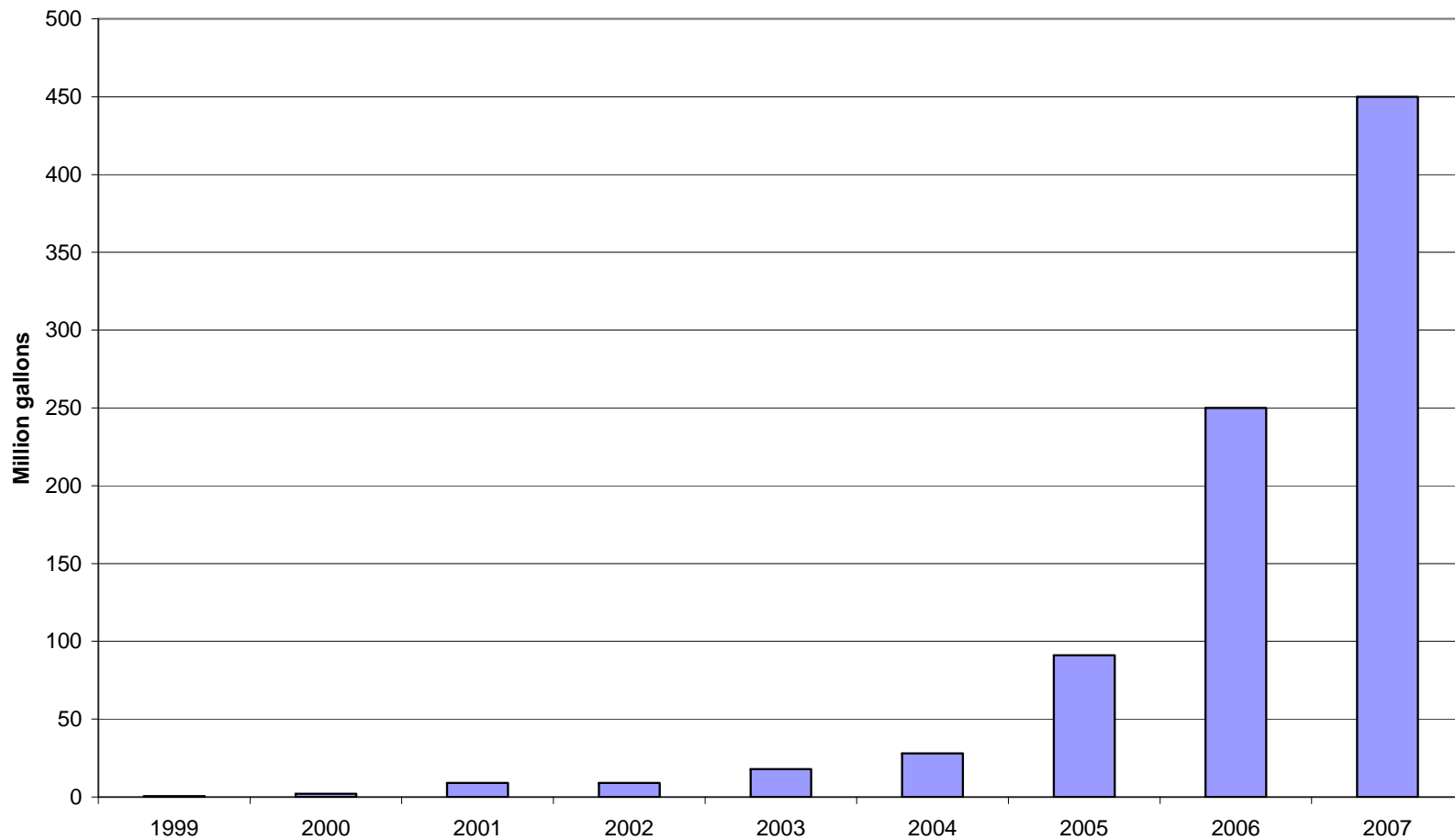
## U.S. Ethanol Production, 1980-2007





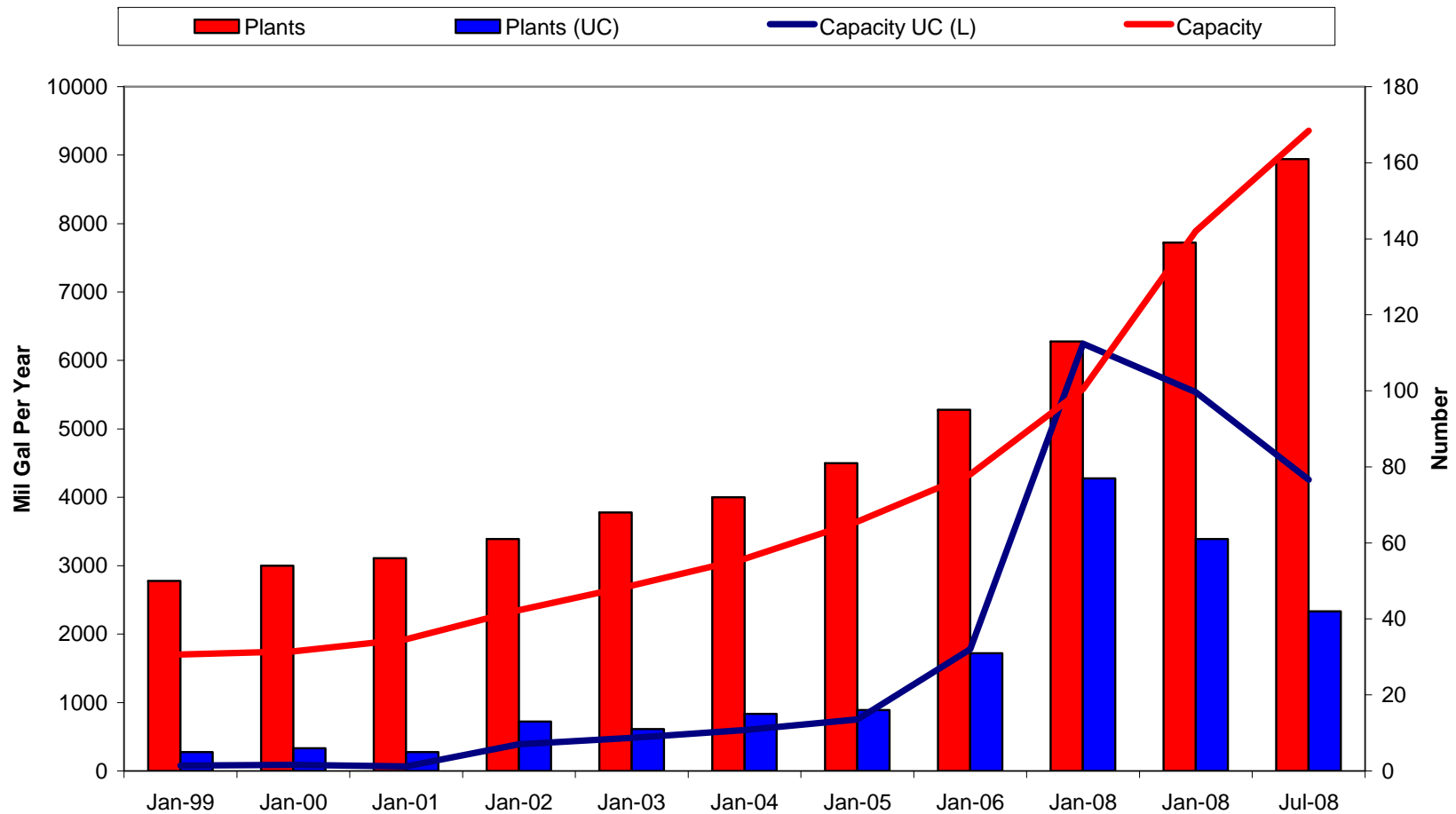
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## U.S. Biodiesel Production, 1999-2007





## Ethanol Industry: Overview



Source: Renewable Fuels Association



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## **BACKGROUND**

- **High Oil and Gasoline Prices**
- **2006, 2007 and 2008 State of the Union Addresses**
- **High Corn and commodity prices**
- **Investment in Biofuels Industry slowing**
- **Global Economic Growth Slowing**



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## **BACKGROUND**

- **Energy Independence and Security Act of 2007**
  - RFS 2
  - GHG Reductions
- **Food, Conservation and Energy Act of 2008**
  - Energy Title IX



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## Energy Independence and Security Act of 2007

- Signed December 18, 2007 is Broad Based
  - Reduced Dependency on Oil
  - Corporate Average Fuel Economy (CAFÉ)
    - 35 mpg by 2020 (40% increase)
  - Increase Alternative Fuel Use
    - Mandatory Renewable Fuel Standard (RFS)
    - 36 bg by 2022
    - Caps Corn based ethanol at 15 bgpy
    - Advance Biofuels – cellulosic ethanol account for other 21 bgpy
  - Improve Energy Conservation and Efficiency





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## Energy Independence and Security Act of 2007

Fuel categories must meet greenhouse gas life cycle performance threshold

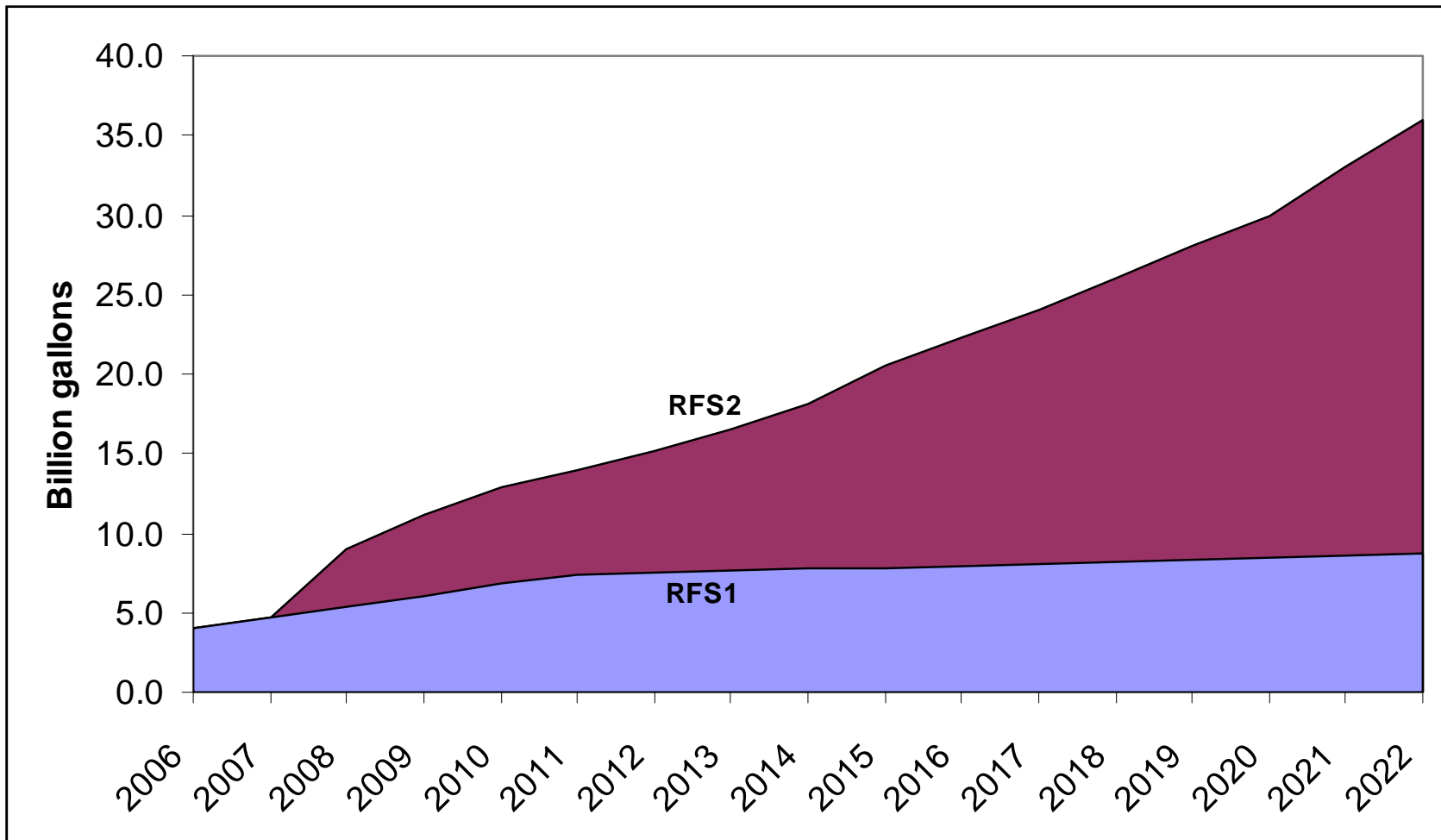
- ❑ 20% life cycle reduction threshold – Conventional Biofuels (ethanol derived from corn starch from new facilities)
- ❑ 50% life cycle reduction threshold – Advanced Biofuels
- ❑ 50% life cycle reduction threshold – Biomass-based Biofuels
- ❑ 60% life cycle reduction threshold – Cellulosic Biofuels

Life Cycle Analysis must include

- ❑ direct and indirect land use change due to biofuel feedstock production
- ❑ Baseline fuel comparison to gasoline and diesel fuel in 2005



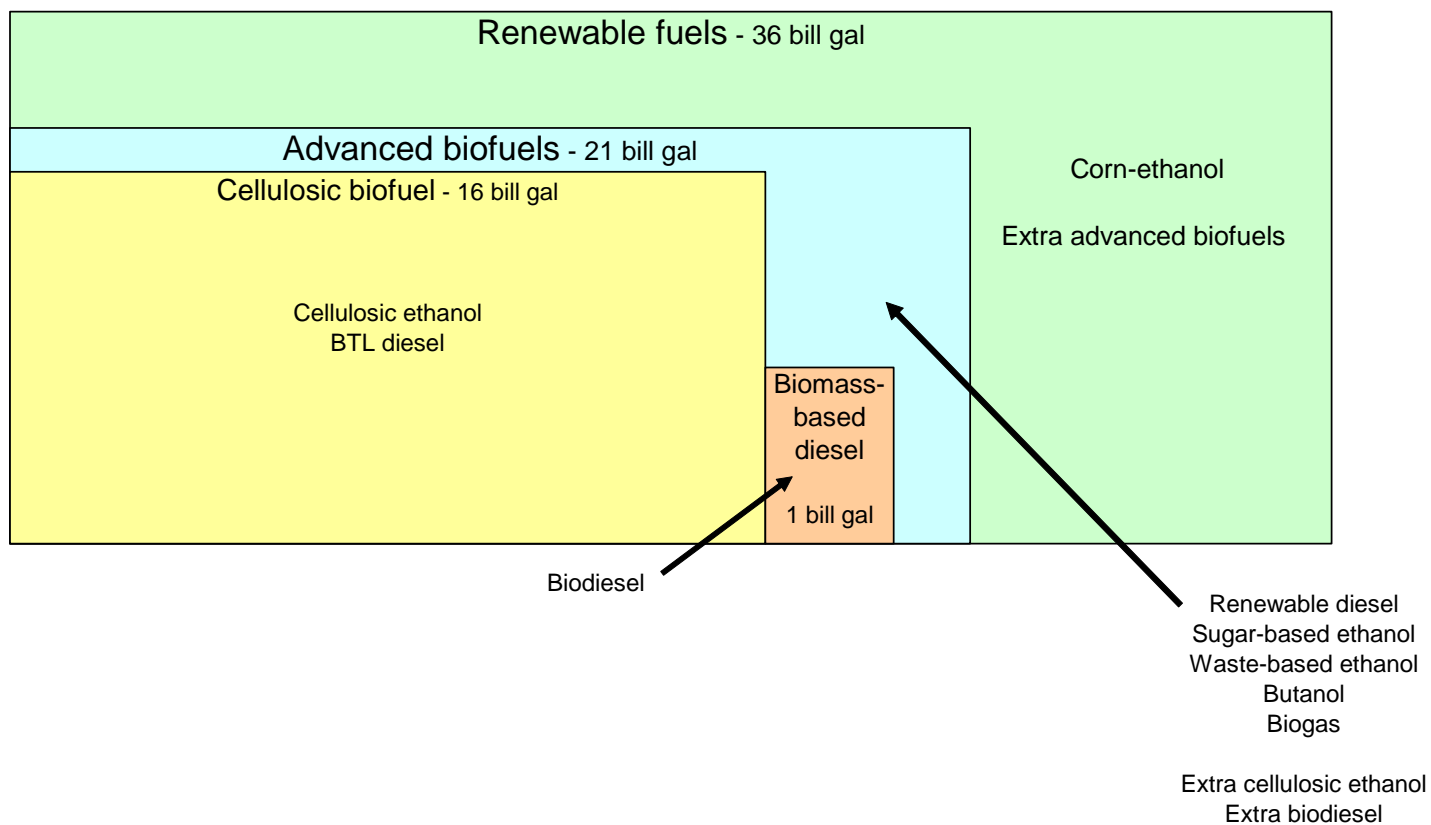
## EISA – EPACT Renewable Fuels Standard





# More Categories of Fuels

Shown with 2022 volumes





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**Section 9006 Funding Activity FY 2003 thru 2007**  
**Renewable Energy/Energy Efficiency**

<i><u>Technology</u></i>	<i><u>No.</u></i>	<i><u>Amount</u></i>	<i><u>Leveraged</u></i>
<i>Biomass</i>	218	\$49,219,744	\$282,508,476
<i>Wind</i>	193	35,800,088	505,221,691
<i>Solar</i>	49	1,862,651	4,519,509
<i>Geothermal</i>	24	1,230,996	3,232,743
<i><u>Hybrid</u></i>	<i><u>13</u></i>	<i><u>2,514,643</u></i>	<i><u>185,649,921</u></i>
<i>Subtotal</i>	497	\$90,628,122	\$981,132,340
<i>Energy Efficiency</i>	762	\$16,493,734	\$42,969,435
<i>Subtotal</i>	1,259	\$107,121,856	\$1,024,101,775
<i>Guaranteed Loans</i>	153	\$91,529,855	\$181,321,296
<i>Grand Total</i>	<i><u>1,412</u></i>	<i><u>\$198,651,711</u></i>	<i><u>\$1,205,423,071</u></i>



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*Rural Development Programs  
Renewable Energy / Energy Efficiency  
Activity FY 2001 – 2007*

*Number and Dollar Amounts Awarded:*

<i>Business and Industry Guaranteed Loans</i>	26	\$212,347,493
<i>Rural Business Enterprise Grants</i>	35	1,823,178
<i>Rural Business Opportunity Grants</i>	10	577,841
<i>Rural Economic Development Loans and Grants</i>	9	4,580,000
<i>Value-Added Producer Grants</i>	181	28,162,860
<i>Section 9006 Renewable Energy Grants</i>	1,115	95,123,871
<i>Section 9006 Renewable Energy Loans</i>	9	70,820,000
<i>9006 Renewable Energy Loan/Grant Combos</i>	144	20,709,855(Loans)
	144	11,967,985(Grants)
<i>Electric Program Loans</i>	16	148,035,544
<i>High Energy Cost Grants</i>	19	22,108,472
<i>9008 Research &amp; Development Grants</i>	<u>55</u>	<u>58,140,531</u>
<i>Totals</i>	1,763	\$674,397,630



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## **Food, Conservation, and Energy Act of 2008 - Title IX – Energy**

- **Federal Procurement of Biomass Products**
- **Biorefineries Assistance**
- **Repowering Assistance:**
- **Rural Energy for America Program**
- **Biomass Research and Development**
- **Community Wood Energy Program**
- **Agricultural Bioenergy Feedstock and Energy Research and Extension Initiative**
- **Agricultural and Rural Transportation Research and Education**



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- Federal Procurement of Biomass Products
  - Federal Agencies purchase biobased products and authorizes voluntary biobased labeling
  - Reauthorized until 2012
  - Mandatory Funding:
    - \* FY 2008 - \$1 Million
    - \* FY 2009 - 2012 - \$2 Million each Fiscal Year



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- **Biorefineries Assistance**
  - Provides grants for demonstration scale and loan guarantees for commercial scale Biorefineries that produce advanced Biofuel
  - Guaranteed Loan Limitations:
    - \* Up to \$250 million for Biorefineries
  - Grant Limitations:
    - \* Pilot/Demonstration Scale – Up to 50% of project costs
  - Mandatory Funding:
    - \* FY 2009 - \$75 Million
    - \* FY 2010 - \$245 Million available until expended





- Repowering Assistance:
  - Payments to replace fossil fuel used to produce heat or power to operate existing biorefineries
  - Mandatory Funding:
    - FY 09 - \$35 million available until expended



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- Rural Energy for America Program
  - Amends current Section 9006 Renewable Energy Systems and Energy Efficiency Improvement Program
  - Loan Guarantee Limits:
    - \* \$25 million Cap
    - \* Cap Federal share at 75% of project costs
  - Other Provisions:
    - \* Cost share grants for energy audits and feasibility studies (Senate)
    - \* Production incentive program in lieu of grants
  - Funding – mandatory:
    - \* FY 09 - \$55 million
    - \* FY 10 - \$60 million
    - \* FY 11 - \$70 million
    - \* FY 12 - \$70 million
  - Discretionary Funding: \$25 million each fiscal year for FY 09 - 12



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- Biomass Research and Development
  - Repeals Title III of Agriculture Risk Protection Act of 2000 (P.L. 106-224) and reauthorizes it through 2012 under Farm Bill
  - Senate provides some flexibility on distribution of funds between technical areas
- Mandatory Funding:
  - FY 09 - \$20 million
  - FY 10 - \$28 million
  - FY 11 - \$30 million
  - FY 12 - \$40 million
- Discretionary Funding: FY 09 – 12 - \$35 million per fiscal year



- Community Wood Energy Program:
  - Grant program to assist with community wood energy feasibility studies and plans and acquire and upgrade community wood energy system
  - Discretionary Funding:
    - \* \$5 million per year (FY 08–12)



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- Renewable Energy Committee:
  - Committee shall study the scope and effectiveness of research, extension and economics programs affecting renewable energy industry
  - Annually submit a report on findings and recommendations to National Research, Extension, Education and Economics Advisory Board
  - **Consultation with Biomass Research and Development Technical Advisory Committee**



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- Agricultural Bioenergy Feedstock and Energy Research and Extension Initiative:
  - Purpose is to enhance the production of biomass energy crops and energy efficiency of agricultural operation
  - Focus is on improving agricultural biomass production, biomass conversion in biorefineries and biomass use
  - Awards competitive grants in consultation with National Research, Extension, Education and Economic Advisory Board
  - Discretionary Funding: \$50 million end of FY 08 - 12



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- Agricultural and Rural Transportation Research and Education:
  - Research and Education on rural transportation and logistics needs of Ag-producers and related rural businesses including:
    - Transportation of biofuels
    - Export of Ag products
  - Competitive grant awards to institution of higher education in consultative with DOT
  - Discretionary Funding: FY 08-12 - \$5 million annually



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- Specialty Crop Research Initiative:

- Address critical needs of the specialty crops industry by developing and disseminating science-based tools

- Funding:

- Mandatory Funding	FY 08	\$30 million
	FY 09 – 12	\$50 million each FY
- Discretionary Funding	FY 08 – 12	\$100 million annually





## The Current Environment

- Political Environment – state of flux
  - EISA
  - Food and Fuel
  - RFS Waiver Request
- Farm Bill
  - Reduces tax credit for ethanol
  - Research, education, and financial assistance monies available



## Looking Ahead

- Cellulosic Ethanol
  - Research reduce cost – DOE target \$1.10/gal
  - Initial investment cost high - \$600 million
  - Harvest, storage and transport of biomass
- Research
  - Energy Crops: Switch grass, hi-volume sorghum, miscanthus, energy cane, ...
  - Woody Biomass: hybrid poplars, willows
  - Crop Residues
- DOE Funding Pilot Plants



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# Looking Ahead

- Issues
  - Resource Use: Land and Water
  - Environment and conservation
  - Food and Fuel/Renewable Energy



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**THANK  
YOU!**

Contact Information: Harry S. Baumes

[hbaumes@oce.usda.gov](mailto:hbaumes@oce.usda.gov)

202-401-0497