

Office of Energy Efficiency and Renewable Energy (EERE)

PLATTS 2nd Annual Advanced Biofuels Conference

Jacques Beaudry-Losique Deputy Assistant Secretary for Renewable Energy U.S. Department of Energy June 4, 2009



Advancing Presidential Priorities



Energy efficiency and renewable energy research, development, and deployment activities help the Nation meet its economic, energy security, and environmental challenges <u>concurrently</u>.

Energy Security

- Deploy the cheapest, cleanest, fastest energy source – energy efficiency
- One million plug-in hybrid cars on the road by 2015
- Develop the next generation of sustainable biofuels and infrastructure
- Increase fuel economy standards



Economic

- Create green jobs through Recovery Act energy projects
- Double renewable energy generation by 2012
- Weatherize one million homes annually

Environmental

- Implement an economy-wide cap-and-trade program to reduce greenhouse gas emissions 80 percent by 2050
- Make the US a leader on climate change
- Establish a national low carbon fuel standard

Office of Energy Efficiency and Renewable Energy



Renewable Energy

- Geothermal
- Wind/ Water Power
- Solar
- Biomass/Biofuels
- Hydrogen

Energy Efficiency

- Building Technologies
- Industrial Technologies
- Weatherization
- Federal Energy Management
- Vehicle Technologies



EERE Mission: Strengthen America's energy security, environmental quality, and economic vitality through R&D and public-private partnerships that diversify the Nation's sources of energy, increase efficiency and productivity of the existing energy infrastructure, bring clean, reliable and affordable energy technologies to the marketplace, and make a difference in the everyday lives of Americans by productively enhancing their energy choices and quality of life

Biomass Program - U.S. Department of Energy Legislative Mandates (selected years)



Biomass Program Mission: "Develop and transform our renewable and abundant biomass resources into cost-competitive, high-performance biofuels, bioproducts, and biopower" focused on non-food biomass resources

Cellulosic and Advanced Biofuels

Cellulosic Biofuels

Access to geographically diverse cellulosic feedstocks will ease the pressure on food-based feedstocks such as corn

Advanced Biofuels

The Department of Energy is exploring advanced biofuels

•Green gasoline •Green/Renewable Diesel •Cellulosic biobutanol •Algal-based fuels

A variety of feedstocks and fuels will make up the next generation of biofuels







Benefits of Next Generation Biofuels

- Maximize renewable biomass resource in a sustainable manner
- Use non-food feedstocks, such as wood, waste and algae
- Minimize environmental footprint
 - -Land and water use
 - -Smaller carbon footprint
- Interchangeable with and generally compatible with current fuel
- Usable in today's refineries, pipelines, and distribution networks

Relative Energy Content









Fuel Summary Table National Renewable Energy Laboratory Innovation for Our Energy Future



| Noar | | Technology Status | Production Barriers | Market Barriers | Top Inhibitor |
|-----------|---------------------------|----------------------|------------------------|--------------------|------------------------------------|
| Term | Biochemical Ethanol | Pilot/Demo | Low | Medium | Feedstock availability |
| | Thermo Mixed Alcohols | Pilot/Demo | Low | Medium | Feedstock availability |
| | Green Diesel | Demo | Low | Low | Feedstock cost vs. oil |
| | Fischer-Tropsch Diesel | Demo | Medium | High | Capital Investment |
| | Methanol-to- Gasoline | Demo | Medium | High | Capital Investment |
| | Renewable Hydrocarbons | Lab/Pilot | Medium | Medium | Feedstock availability |
| ↓ _ona | Pyrolysis oil | Lab | High | Low | Process Technology |
| lerm | Algal Diesel | Lab | Very High | Low | Process Techno l ogy |

Presidential Biofuels Initiative

- Federal effort to increase investment and use of biofuels
- Department of Agriculture to implement financing opportunities from the Food Conservation and Energy Act of 2008 and additional Recovery Act funds for renewable fuels projects
- Biofuels Interagency Working Group
 - Co-chaired by the Secretaries of Agriculture and Energy and the Administrator of the Environmental Protection Agency
 - To coordinate existing policies and identify new policies to support the development of sustainable nextgeneration biofuels production



Outcome of Presidential Biofuels Directive: New jobs, New Businesses, Reduction of Foreign Oil Dependence



Recovery Act: R&D and Demonstration Projects

- \$480M Pilot & Demonstration-Scale Biorefineries
 Validate technologies for integrated production of advanced biofuels, and bioproducts
 Up to \$25M for each pilot-scale project
 Up to \$50M for each demonstration-scale project
- \$177M Commercial-Scale Biorefineries Increase in funding for prior awards; two or more projects
- \$110M Research Facilities and Consortia

\$25 million – Further support Bioenergy Research Centers and to establish small-scale integrated biorefinery pilot plant

\$50 million – Solicitation will support a consortium to develop algae-based biofuels
\$35 million – Solicitation will support a consortium to develop other third-generation biofuels, such as green gasoline and green diesel

- \$20M Ethanol Infrastructure Research
 Optimize flex-fuel vehicles operating on E85
 Evaluate impacts of intermediate blends
 Upgrade existing infrastructure for compatibility with E85
- \$14M Expand NREL Biochemical Pilot Plant Expand pre-treatment options and capacity



Biorefinery Demonstrations

Expediting Commercialization

Commercial-Scale Biorefineries (up to \$272 M)

 Four cost-shared, integrated biorefinery demonstrations to produce 98 million gallons of cellulosic ethanol in 5 years with variety of conversion technologies and cellulosic feedstocks

10%-Scale Biorefinery Validation (up to \$210 M)

- Cost-shared, integrated biorefinery demonstrations using cellulosic feedstocks to produce renewable fuels at one-tenth of commercial scale
- Eight projects now in progress



Expanded via Recovery Act





Active Solicitations

Advanced Biofuels

- Integrated Pilot-Scale or Demonstration-Scale Biorefinery for Advanced Biofuels and Bioproducts
 - Up to \$480M over 5 years for 10-20 projects
 - Pilot-Scale requires <a>20% cost share
 - Demo-scale requires <a>> 50% cost share
 - Applications due 6/30/09

Feedstock Logistics

- Integrated Feedstock Logistics Demonstration
 - Up to \$15M over 3 years for up to 3 projects
 - Requires <u>></u>20% cost share
 - Application Due Date: Closed







Active Solicitations

- Annual USDA/DOE Joint Solicitation for Biomass Research and Development Initiative
 - Up to \$25M for awards of \$1M-5M for up to 4 years
 - Technical areas for grants:
 - Feedstocks Development
 - Biofuels and Biobased Products Development
 - Biofuels Development Analysis
 - Closed for pre-applications; Selected applications due June 11, 2009

Biofuels Outreach and Education (Clean Cities)

- Subarea focus on expanding infrastructure and markets for ethanol, E85, and biodiesel
 - Up to \$2.6M for up to 10 awards (closed) for 4 years
- Education & Outreach Workshops
 - Up to \$1.8M for up to 4 projects (closed) for 2 years
- Alternative Fuels and Advanced Technology Vehicles Pilot Program
 - Up to \$300M for up to 30 awards for 4 years
 - Applications due: May 29 and September 30







U.S. Department of Energy

American Recovery and Reinvestment Act



- Renewable Energy Loan Guarantee Program: \$6 billion to support loan guarantees for renewable energy projects to promote the rapid deployment of renewable energy systems that generate electricity or thermal energy, electric power transmission systems, and certain leading-edge biofuel projects. Must begin construction by September 30, 2011.
- Tax credits:
 - Extends the Production Tax Credit for biomass and other renewable energy facilities through 2013
 - Extends the Investment Tax Credit, allowing owners of biomass and other renewable technology projects that are eligible for the PTC to use the full 30% ITC previously available only to solar facilities
 - Allows renewable energy project developers to apply for a Treasury Dept. grant equal to 30% of the cost of an eligible project if construction starts in 2009 or 2010 (in lieu of ITC)
- Renewable R&D and Demonstration Projects: \$2.5 billion to support DOE RD&D activities, including biomass technologies (\$800 million)



Thank you