U.S. Bioenergy Programs: Possible Linkages with Global Bioenergy Partnership and other Multilateral Initiatives

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Biomass Program Mission

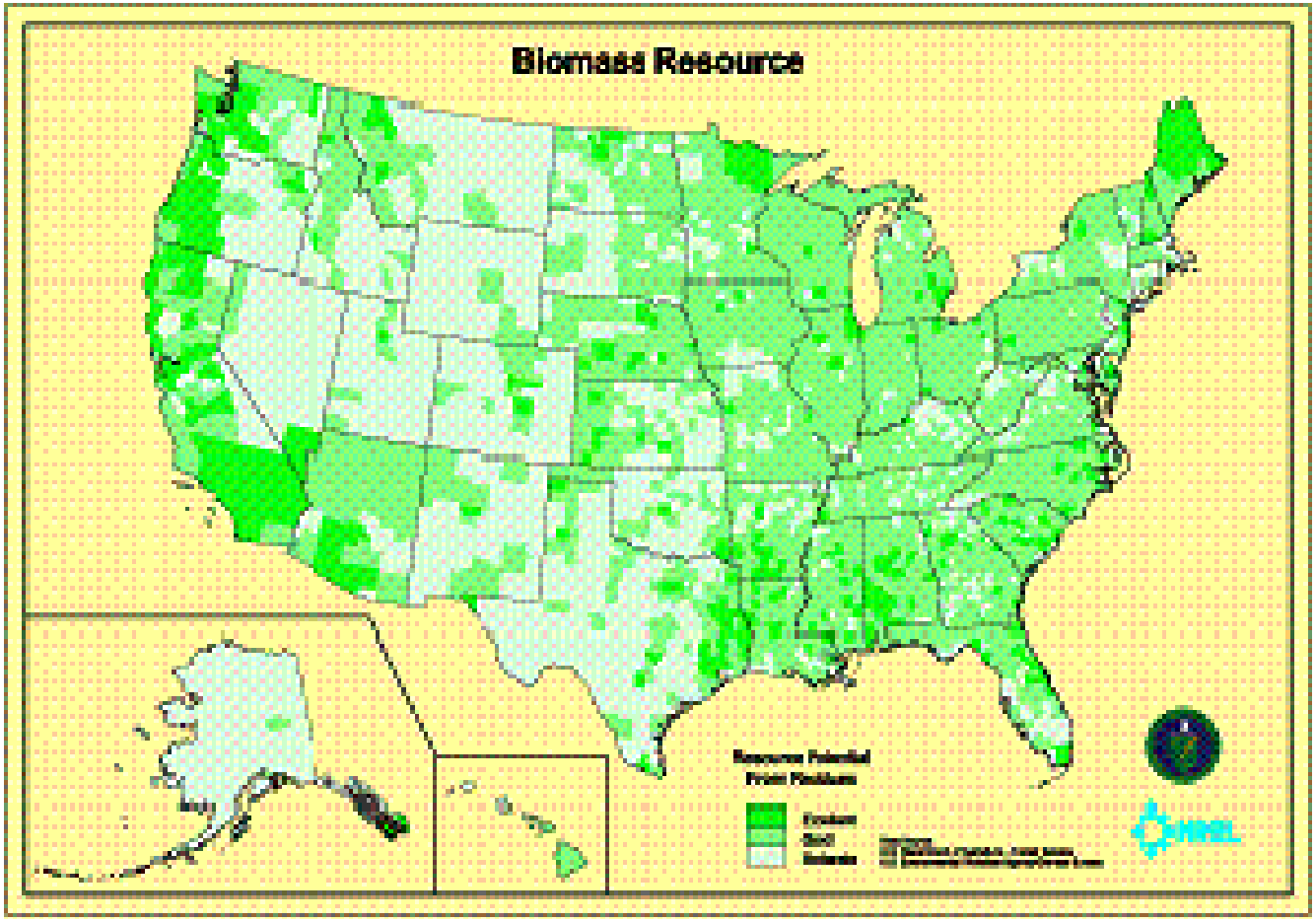
"The mission of Biomass Program is to partner with U.S. industry to foster research and development on advanced technologies that will transform our abundant biomass resources into clean, affordable, and domestically-produced biofuels, biopower and high-value products. The result will be improved economic development, expanded energy supply options, and increased energy security"

Fiscal Year 2005 funding for biomass R&D:

- DOE - $80.8 million
- USDA - $14.4 million

Biomass Resources in the U.S.

Significant biomass resources are available throughout many parts of the United States.



The Potential of Biomass Future Use

USDA/DOE "Billion Ton" Study

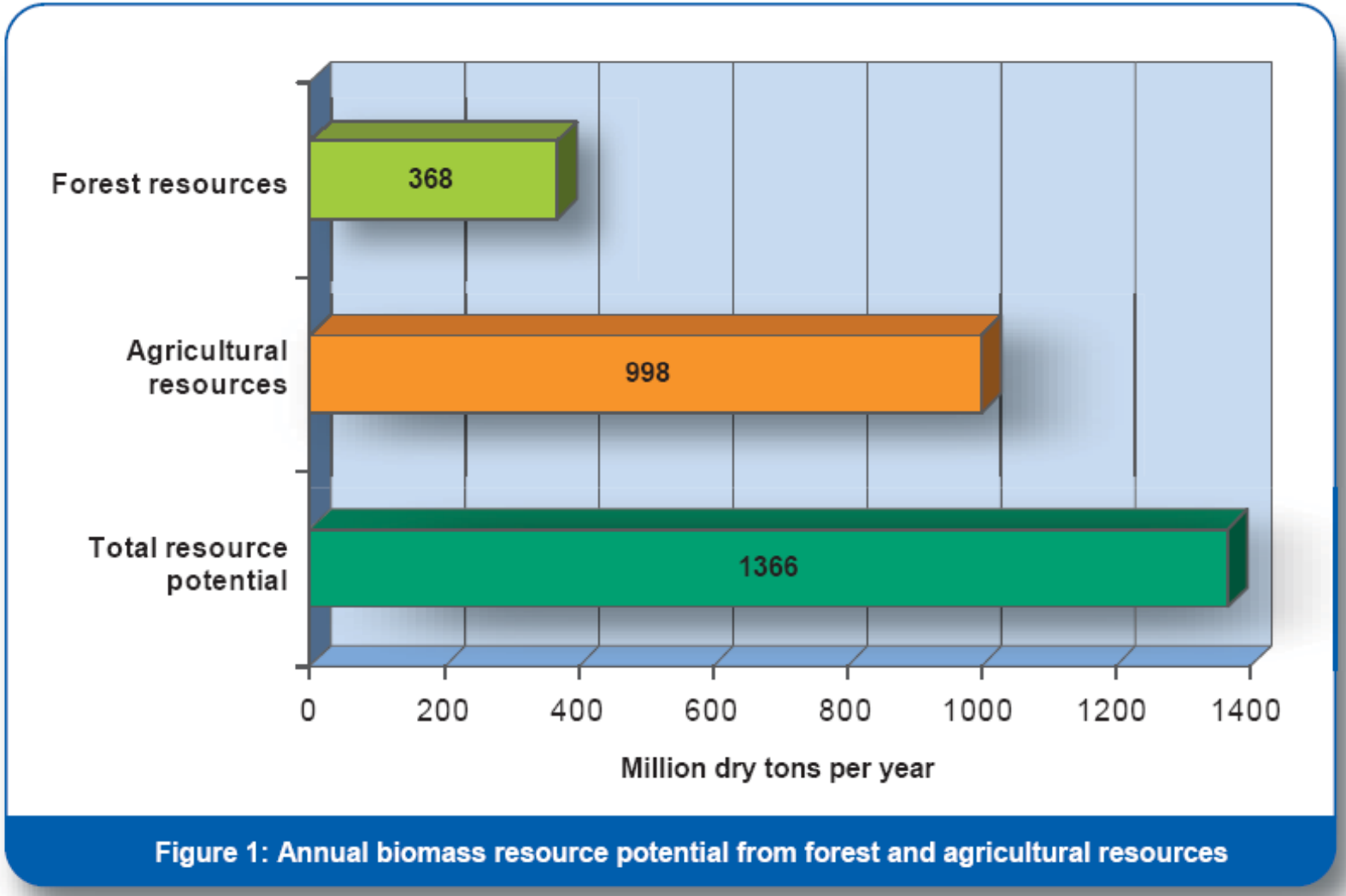


Figure 1: Annual biomass resource potential from forest and agricultural resources

http://feedstockreview.ornl.gov/pdf/billion_ton_vision.pdf

Vision: Next Generation Biorefineries

Will be fully integrated facilities that can process grain or biomass crops into a full range of commodity and consumer products

Biorefinery Concept

Feedstock production, collection, handling & preparation

Hydrolysis
Acids, enzymes
Gasification
High heat, low oxygen
Digestion
Bacteria
Pyrolysis
Catalysis, heat, pressure
Extraction
Mechanical, chemical
Separation
Mechanical, chemical

Sugars and Lignin
Synthesis Gas
Bio-gas
Bio-Oil
Carbon-Rich Chains
Plant Products

USES

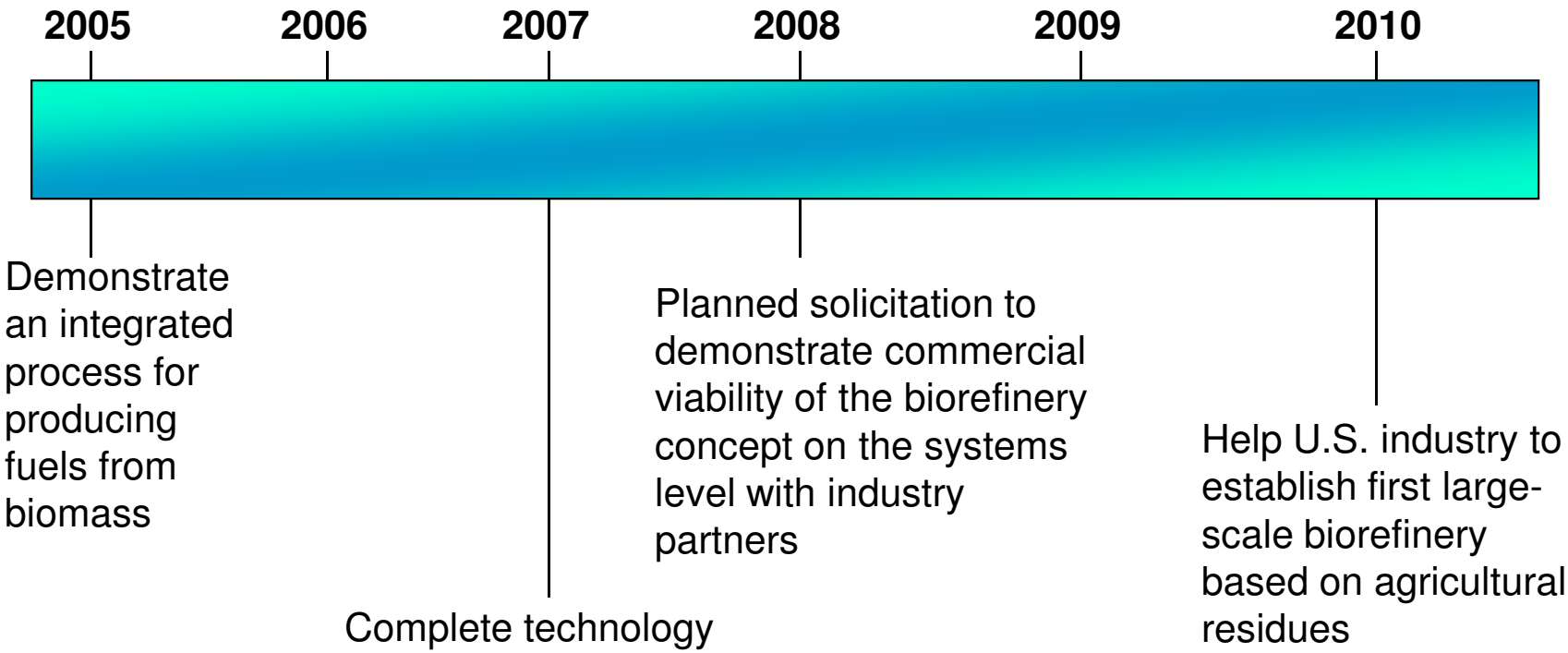
Fuels:
- Ethanol
- Renewable Diesel
- Hydrogen

Power:
- Electricity
- Heat

Chemicals
- Plastics
- Solvents
- Chemical Intermediates
- Phenolics
- Adhesives
- Furfural
- Fatty acids
- Acetic Acid
- Carbon black
- Paints
- Dyes, Pigments, and Ink
- Detergents
- Etc.

Food and Feed

Program Goals and Key Targets for the Biorefinery



USDA Biomass Energy and Biobased Products Programs
Opportunities for Agriculture in Sustainable Energy Production

Creating Supply

- Bio-refinery grants
- Renewable energy loan guarantees and grants
- Incentives for new production of ethanol and biodiesel

Generating Demand

- Federal procurement of biobased products
- Education and outreach

Developing Technologies

- Hydrogen fuel cell technology development
- Biomass research and development grants

Energy Policy Act 2005: Bioenergy Highlights

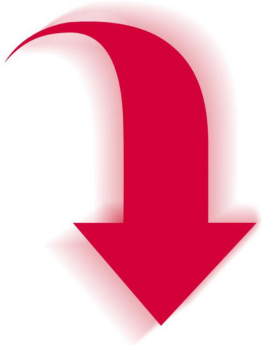
Title XV – Ethanol and Motor Fuels

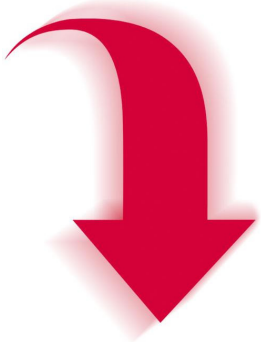
- Sec. 1501: Increases the amount of the renewable content of gasoline from 4.0 billion gallons in 2006 to 7.5 billion gallons in 2012.
- Sec. 1510: Establishes in DOE a loan guarantee program for the construction of biorefining facilities converting MSW and cellulosic biomass into ethanol and other products

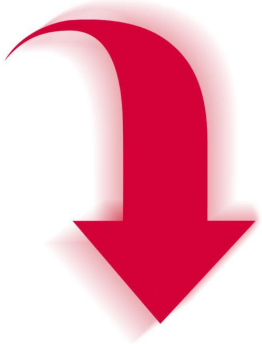
Title XIII – Energy Policy Tax Incentives

- Sec. 1301: Extends renewable energy production tax credit for two years ($2.7 billion over 2005-2015)
- Sec. 1303: Provides up to $800 million in bonds to finance clean renewable energy projects
- Subtitle D: Alternative Motor Vehicles and Fuels Incentives - Contains a variety of tax credits to promote ethanol and biodiesel production and fueling stations, and alternative cars and light trucks.

Possible Linkages with other Multilateral Initiatives







Global Bioenergy Partnership

Linkages with Hydrogen

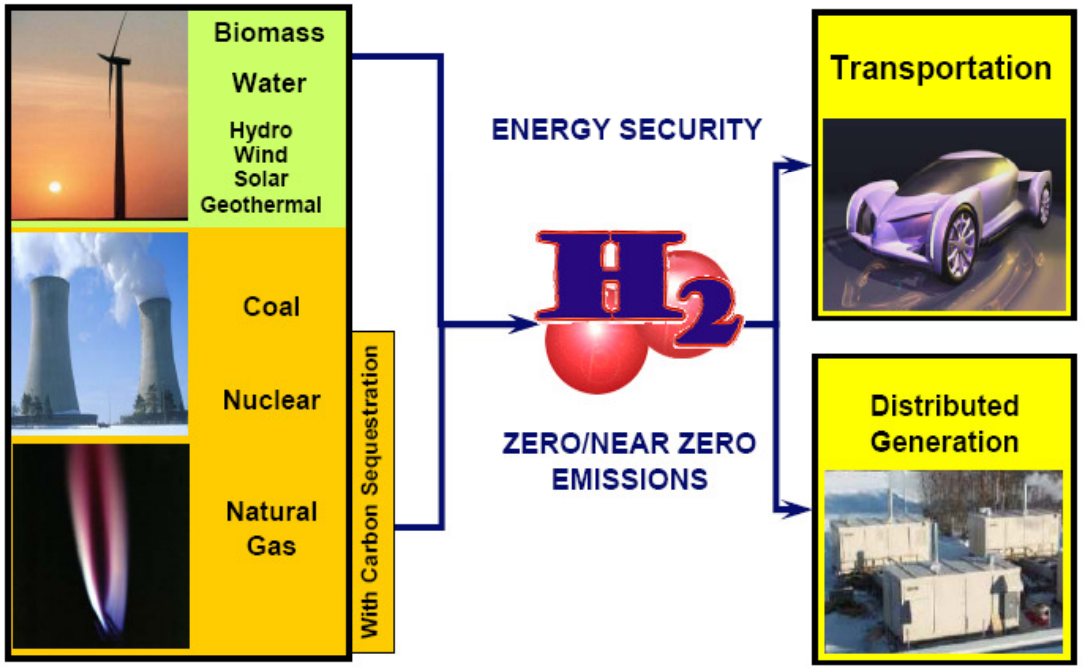
Distributed Production

- Natural Gas: Reforming
- Electrolysis
- Liquids Reforming: ethanol; other sugar derived alcohols; bio-oil; F-T liquids derived from biomass or coal

Central Production

- Coal gasification with carbon sequestration
- Biomass gasification
- Biomass fermentation: aerobic & anaerobic
- Wind/solar based electrolysis
- Photolytic: photobiological & photolytic
- HT thermochemical cycles: nuclear, solar, or other

Many pathways to hydrogen



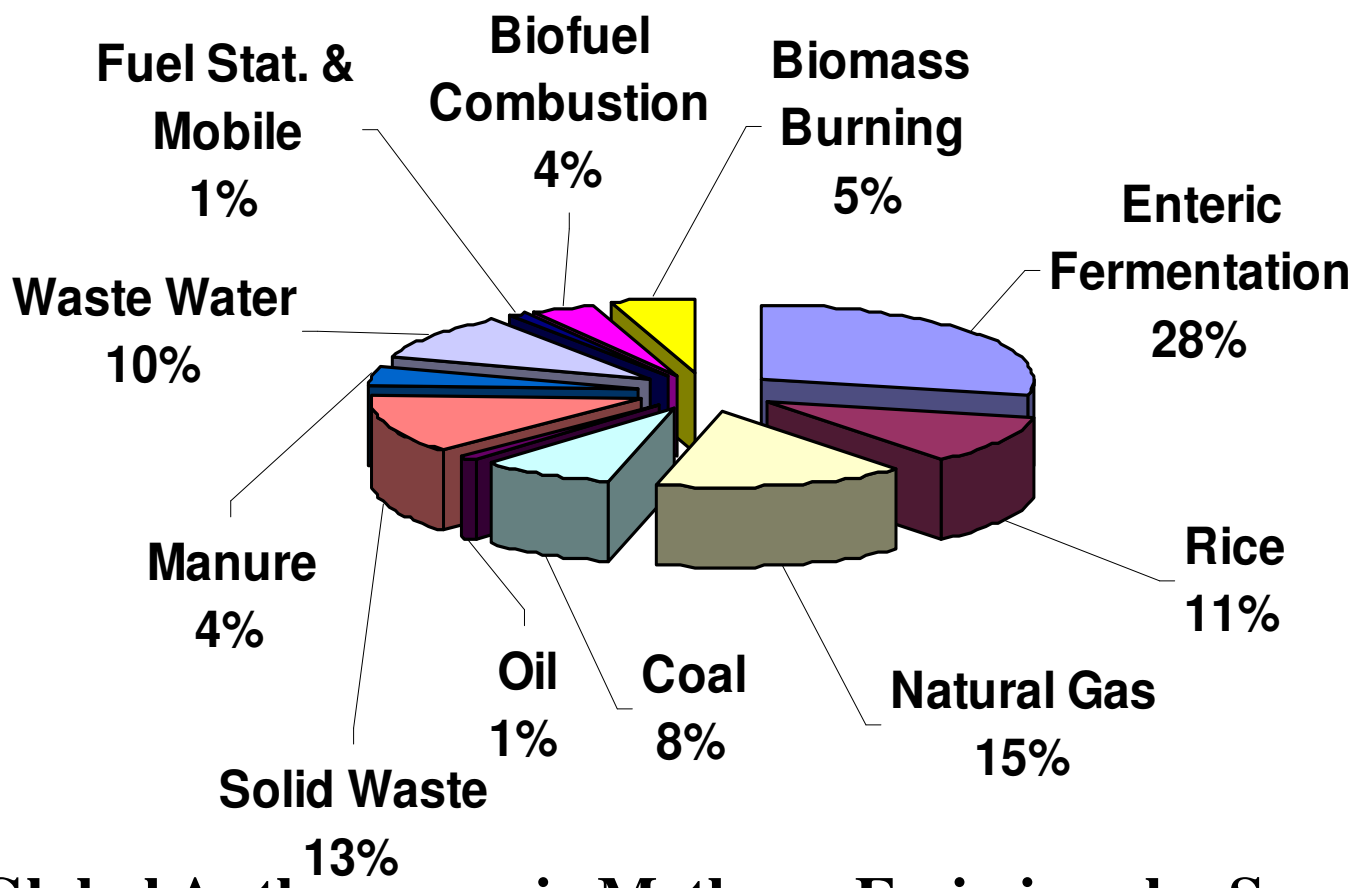
Linkages with REEEP

Linkages with REEEP offer many exciting opportunities including:

- Increased use of bioenergy leads to more renewable energy worldwide
- Bioenergy production leads to economic development a goal of the REEP program and the G8.

renewable energy & energy efficiency partnership

Linkages with Methane to Markets



Global Anthropogenic Methane Emissions by Source

Conclusion

- The U.S. is committed to bioenergy and the Global Bioenergy Partnership
- We believe we have a lot to offer and learn from partners in the bioenergy area
- We also believe that there are many opportunities for synergies with other multilateral initiatives.