



# **DRAFT**

# **Recommendations**

Biomass R&D

Technical Advisory Committee

June 23-24, 2010

# Feedstocks



## Woody Biomass

Whereas Federally funded research and development projects and Federal permitting have limited the utilization of woody biomass, the Committee recommends that strategies be developed to encourage the utilization of woody biomass derived from federal, state, and private lands, including non-plantation private lands. Possible strategies include:

- Federally funded projects, including R&D projects, should not exclude utilization of these feedstocks;
- Stand establishment date (after enactment of EISA) should not be a factor in determining eligibility; however, environmentally sensitive and old growth forests shall be restricted;
- Long-term (10 year minimum) contracts for utilization of woody biomass from federal lands should be allowed.



## Indirect Land Use

Whereas the Committee observes that the impact of energy feedstock use in the U.S. on land use changes in other countries is greatly influenced by various assumptions, the Committee recommends that more sensitivity analysis, evaluation, and validation of the current indirect land use models needs to be done. Furthermore all indirect land use models should be publicly available (i.e. transparent).

- Example: The impact of rising prices on higher yields has been shown in the FAPRI model to potentially negate all land use changes.
- Further data used in these analyses needs to be current in order to be meaningful.
  - Example: Yield data used in the GTAP model is over 8 years old.

# Feedstocks



## **Environmental, Economic, and Social Impacts**

The Committee recommends an effort be put forth to quantify the environmental, economic and social impacts of increased biomass feedstock supply on a watershed, regional and/or eco-region scale moving from small, replicated field plot trials to larger-size demonstration plantings. One example could be the Regional Feedstock Partnerships be used to develop information on yield, sustainability, social issues, etc. of scale-up biomass feedstock production, monetizing environmental services.

# Feedstocks



## Food and Feed

Whereas opportunities for all crops to be used in biobased products should be explored, the Committee recommends that food and feed crops not be excluded as a feedstock for conducting R&D for conversion to biobased fuels and materials.

## Productivity

The Committee recommends continued R&D on (i) sequencing the genome of plants to identify new genes that will improve productivity of the plant (specifically biofuels yield) and understand the gene function of each gene that improves productivity, (ii) genetically modifying plants, and (iii) breeding programs as part of an integrated crop development effort to improve productivity. Potential crops should be prioritized by the scientific community.

# Feedstocks



## MSW

Whereas MSW is potentially a valuable source of low-cost cellulosic feedstock that can be used for energy conversion and may be used synergistically with agricultural and forestry feedstocks by partially offsetting the relatively higher price of these materials; whereas several private companies are developing technologies to separate and process MSW into an environmentally acceptable cellulosic feedstock for production of energy; and whereas it is noted that no Federal agency is contributing to these and similar efforts, the Committee recommends that DOE, USDA and other Federal agencies document work in the private sector on processing MSW for use as an energy feedstock and include the type of research in future feedstock solicitations.

# Feedstocks

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- Algae as a feedstock
- Market mechanisms for feedstocks
- Maintain Regional Feedstock Partnership funding

# Infrastructure



## Market Creation – General Approach

- In light of the progress that has been made in biofuel technology and production, it is critical that Federal Department and Agency resources be focused on research and policy efforts to create, stabilize, and mature markets for biofuels, specifically ethanol.
- Technological, timing, cost and investment uncertainty concerning the future availability of fungible biofuels (drop-in biofuels) make further delay in market creation efforts for ethanol (and biodiesel) infeasible if U.S. economic, energy independence and CO<sub>2</sub> benefits are to be achieved.



# Infrastructure



## Market Creation – Vehicles

- Agencies and Departments are advised to undertake research and policy actions that will implement flex-fuel vehicle (FFV) technology in all vehicles produced and sold in the United States via incentive or mandate.
- Agencies and Departments are advised to undertake research and policy actions that harmonize FFV technology with tailpipe/evaporative emission, fuel economy/CO<sub>2</sub>, and onboard diagnostic (OBD) requirements administered by the EPA and the CARB in the U.S.

# Infrastructure



## **Market Creation – Non Vehicle End Use Devices**

- Agencies and Departments are advised to undertake research and policy actions to create design requirements establishing a minimum biofuel blend capability in plausible non-vehicle end use devices (marine, outdoor power equipment, other).

# Infrastructure



## **Market Creation – Fuel Blends and Distribution**

- Agencies and Departments are advised to undertake research and policy actions to achieve the implementation of blender pumps that are capable of dispensing fuels to meet the design specification of all plausible end use devices (vehicles, marine, outdoor power equipment).
- Agencies and Departments are advised to undertake research and policy actions to implement technology and education to prevent mis-fueling of end-use devices within the blender pump context.

# Infrastructure



## Market Creation – Fuel Blend Pricing

- Agencies and Departments are advised to undertake research and policy actions to assure the consumer selection of the highest biofuel blend available to them. This should include blender pump configuration and tax policy.

# Infrastructure



## Market Creation – Post Bio-Refinery Infrastructure

- Agencies and Departments are advised to undertake research and policy actions to establish hydrocarbon fuel blend stock compatibility and delivery/transportation mechanisms that support the blender pump market model. This must include fuel volatility compliance, tankage and transportation issues.

# Infrastructure



## Biopower

- Agencies and Departments are advised to pursue research on the infrastructure needs of non-transportation biopower.
- Agencies and Departments are advised to pursue research on the granularity of biopower plant location and minimum optimum scale.



## Market/Economic Sustainability

Whereas a sustainable renewable fuel effort requires that biofuels enter the market, are adopted by consumers and fulfill criteria to meet the renewable fuel standard, reduce imported fossil fuels and reduce carbon intensity. The Committee recommends research and development in the following areas:

- Biofuels as they blend with fossil fuels especially E20, E85
  - Emissions
  - Mile per gallon
  - Required infrastructure
  - Required infrastructure (see infrastructure recommendations)
- Market research into consumer response and adoption of those blends
- Formulation of an education program and/or platform for all consumers to understand that data in order to
  - Miles per gallon
  - Environmental impact (eg energy star)



## Lifecycle Analysis

A particular limitation to any LCA assessing environmental impacts/benefits is the dearth of actual data, and particular measured greenhouse gas balances ( $\text{CO}_2$ ,  $\text{CH}_4$ ,  $\text{N}_2\text{O}$ ) for both 1<sup>st</sup> and 2<sup>nd</sup> generation feedstocks at the farm level.

Technologies, as used by the DOE sponsored AmeriFlux and standardized with international efforts, are available for continuous measurement of these fluxes. Such measurements are urgently needed to cover the major feedstocks in different geographies and climates, and should remain in place for at least 5 years, to cover the impacts of weather variability. Greenhouse gas balance data should be integrated with measurements of all crop inputs and offtakes, including water use.





## Water Use/Quality

Water utilization in the production of biofuel crops and in the production of biofuels has gained additional scrutiny in recent years. The Committee recommends enhanced and integrated research be conducted by USDA, DOE, and EPA to better understand water use at all stages of biofuels production and ways in which to conserve water, and maintain water quality, throughout this lifecycle.



## Resource Conservation

Whereas each specific geographical area has unique resources of concern (i.e. water conservation, endangered species, soil erosion, etc.) the Committee recommends that there be sufficient R&D on the sustainable production, transportation, processing, and delivery of all biomass feedstocks and finished products to address these specific “resources of concern.”

- Example: Corn stover removal levels that are sustainable in some areas have been shown to reduce soil carbon levels and accelerate soil erosion in other areas of different soil types in the same region.

Refining statement

# Sustainability

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## **Social Sustainability**

Provide analysis of potential impacts and communicate those impacts to the agencies that will be forced to deal with them.

Revisit 2007 recommendation

# Conversion



## **International technology**

- Conduct a study of other conversion technologies worldwide to assess the position of the United States relative to other countries and leverage promising technologies

## **Separations technologies**

- Internal review of the status of separations R&D at DOE and USDA, with the goal of identifying gaps and opportunities. (Separations is an important cost element.)

# Conversion (cross-cutting)



## Data Accessibility

- In the interests of transparency and moving the industry as a whole forward encourage public access to data wherever possible. One possible model may be to emulate requirements at the national labs: Publish data and license technology via patents (no trade secrets).

# Conversion (cross-cutting)



## **Scale of supply/conversion systems**

- Review (for different technology pathways) the optimal (energy, environment and socio-economics) size range of biomass conversion plants from a feedstock supply perspective. (There are conflicting views on this, even among experts.)

# Conversion (cross-cutting)



## More RFS Pathways

- The departments should support accelerated certification by EPA of more biomass/biofuel pathways to eventually qualify or disqualify for RFS. (Private sector will be reluctant to go forward with commercialization if their pathway is not assured status under RFS.)

## Biopreferred program

- Expedite the approval of new materials

# Conversion (cross-cutting)



## Merit Review Process

- Seek to improve the review process in the interest of fairness to all projects and identifying most promising ones. For example,
  - Consider a smaller number of compensated and highly-qualified reviewers to review proposals.
  - Construct solicitations to garner streamlined proposals that focus on technical and business aspects of a project (and less on administrative forms).