USDA Agricultural Research Service National Program (NP) 307

Assessment Panel Report

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A panel of five experts and a chairman met on June 21 and 22, 2007, to retrospectively assess "Bioenergy and Energy Alternatives," ARS National Program 307. The panel was provided the Accomplishment Report 1999–2006, written reports by two outside experts, and they met with ARS and NP 307 leadership prior to the review and at the end of the review, at which an exit overview of the panel's conclusions was shared. The panel members used their expertise and in some cases consulted with other experts as a basis for their conclusions. Our overall conclusions and recommendations follow.

Overall Conclusions and Recommendations

- Bioenergy/energy alternatives and biobased chemicals and materials are the major growth opportunity for agriculture and forestry in the 21st century.
- NP 307 is ARS's biofuel effort in this major space.
- Overall, the panel is strongly positive about this starting effort in ethanol, biodiesel, alternative energy and energy crops. A summary of the line-by-line accomplishments reviewed in each area:

	High	Medium	Low
		(%)	
Ethanol	54	22	24
Biodiesel	56	23	21
Energy Alternatives	58	25	17 (two too new to rate)
Energy Crops	61	2	37

- NP 307, the primary ARS R&D effort should integrate/coordinate with bridges to other programs in ARS, *e.g.* 205, 306. Management provided a summary of integration and coordination of intra-ARS, intra-USDA and inter-department activities, that documented substantial activity. ARS should participate in CSREES multi-state activities.
- The panel's recommendation for future prioritization is:
  #1 energy crops and residues for liquid fuels and other energy alternatives
  #2 liquid fuels
  #3 other energy alternatives. ARS needs to greatly expand the scope of its energy crops research, integrating it with biofuels, *e.g.* ethanol, processing technology developments
- Subrecommendations:
  – For agricultural residues, *e.g.* corn stover and grain straw, more information is needed on level of removal consistent with sustainability.

- For perennial grasses, focus on switchgrass, reed canary grass, other region-specific perennial grasses. Energy crops research should focus on crops suitable for less costly lands, pasture lands or marginal soils.
- Biodiesel will not be a significant alternative to diesel without a major increase in crop-oil yields, *e.g.* canola, castor, high-oil soybean. Waste fats and oils are justifiable as biodiesel feedstocks, which need only minor R&D investment.
- Integrate R&D in agricultural and forestry energy-crops and residues.
- Continue research on other energy crops, *e.g.* forage sorghum, energy cane.
- Non-corn starch crops, *e.g.* wheat and barley, should not be pursued as energy crops, and research on corn starch to ethanol no longer needs public R&D funding.

- The panel strongly recommends coordination, from biofeedstock source (crop, tree, residue) to biofuel product, including economic uses of by-products or co-products. All available tools—agronomic, genetic, biological, physical, chemical—should be used to achieve economic and environmental goals and resident socio-economic skills should be incorportated into each team. Economic analysis must be used to guide biofuel research, which has not been done to date.
- ARS should establish an annual one-day report on biofuels for users and other stakeholders.
- ARS's five-year programs should alter course in response to changes in technology, economics, *etc.*, and the scientific program leaders should be responsible for initiating such changes.
- ARS should aggressively redirect its R&D expenditure to the biobased economy (energy, chemicals and materials from biofeedstocks). Seventy-five percent of new hires/replacements of retirees by ARS in the next decade should be those with skills for the biobased economy with biofuels as the dominant quantitative opportunity.
- Government will need to establish public-pilot facilities if not adequate and accessible in the private sector. A task force should examine the potential and future use of such facilities, *e.g.* the National Corn to Ethanol Corn Research Center.
- Concluding Comment: The primary focus of the biofuels program should be on the national mission on biofuels and the role of agriculture, with best use of ARS funds for expeditious achievement of goals, and not on the interest of individual stakeholders.