U.S. Department of Energy
Office of the Biomass Program
Biodiesel and Other Technologies
Summary of Results

Dear Colleagues:

This document discloses the comments provided by a review panel at the:

- U.S. Department of Energy Office of the Biomass Program Peer Review held on November 15-16, 2007 in Baltimore, MD.
- Biodiesel and Other Technologies, held on August 14th and 15th in Golden, Colorado.

The work evaluated in this document supports achieving DOE goals and the results of the review are major inputs used by the Department in making future funding decisions.

The research and development projects presented to the reviewers were organized by the technology area they were investigating (i.e. fuels demonstration, combined heat and power, anaerobic digestion, or communications and outreach). The review agenda is attached to this report as Appendix A.

At the end of both meetings, a collection of summary comments was presented by the reviewer chairperson to the attendees at the end of the meeting. At the specific Review, each PI was invited to provide responses to the initial reviewer feedback at and after the meeting. These summary comments and PI responses are included in the main body of this document.

The table below lists the projects in a ranked order based on the average score received from the Reviewer Panel. The average scores are based on a four point scale, with four being the highest. A full listing of all the reviewers' scores and comments (taken directly from their evaluation forms) is included in the main body of this report. The PIs will be sent the full reviewer comments, scores, and highlighted comments for comment, and any comments received will be added to the final report.

We would like to express our sincere appreciation to the members of the Review Panels. Your diligence and hard work during the review process resulted in many insightful comments that will help us improve our Programs.

Regards,

Mark Decot
Biodiesel Technologies Manager
DOE/EERE, Office of the Biomass Program

Project Title	Relevance	Approach	Progress	Success Factors	Future Plans	Average
Missouri Biodiesel Demonstration Project (S2P5)	3.71	3.71	3.57	3.50	3.17	3.53
Regional Biomass Programs (S5P2)	3.33	3.00	3.20	2.90	3.20	3.13
National Biofuel Energy Laboratory (S2P6)	3.63	3.50	2.88	2.25	3.25	3.10
Alternative Energy Enterprise Program (S4P3)	3.29	3.00	3.14	2.93	2.75	3.02
Mississippi State University Sustainable Energy Center (S2P2)	3.25	2.94	3.00	2.94	2.75	2.98
O2 Diesel Demonstration (S2P3)	2.56	2.63	2.13	2.50	2.50	2.46
New York Biomass/Methane Gas Power Fuel Cell Project (S3P5)	2.13	2.88	2.43	2.63	2.25	2.46
Anaerobic Digestion (Ohio State University) (S3P4)	2.50	3.07	2.00	2.14	2.43	2.43
Ohio Solid Waste Authority Pyramid Resource Center(S4P1)	2.56	2.13	2.56	2.75	2.06	2.41
EERC Center for Biomass Utilization (S3P3)	2.50	2.63	2.38	2.13	2.29	2.38
E-Diesel Test and Research Project (S2P4)	2.19	2.50	2.06	2.25	1.75	2.15
Kentucky Rural Energy Supply Program (S5P1)	2.43	2.50	2.36	1.29	2.00	2.11
New Uses Information and Entrepreneur Development(S4P2)	2.21	2.00	2.21	1.43	2.43	2.06
Canola-based Automotive Oil R&D (S3P1)	2.25	2.00	1.38	2.00	1.38	1.80
Phillips Biomass Combined Heat & Power Facility (S3P2)	1.56	1.75	1.71	1.75	1.75	1.71

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Program Peer Review Platform Results

Platform Direction

Biodiesel and Other Technologies reviewers provided strong consensus on the need for renewed focus on biodiesel and similar areas within the Biomass Program's research and development (R&D) portfolio. The Program recognizes the need for an expanded biofuels scope (beyond cellulosic ethanol) in its Multi-Year Program Plan (MYPP) for 2007-2017. In this document, conversion technology platforms, infrastructure, and market transformation activities are outlined for ten years. Near-term cellulosic ethanol R&D and integrated biorefinery activities are intended to form stepping-stones to a more wide-reaching biofuels platform with industry support. Biodiesel, Bioproducts, and Other Technologies projects, while not the main thrust of the Biomass Program's efforts, continue to receive funding and staff oversight throughout the program.

Key to this approach is the Program's biomass-to-biofuels supply chain model. In line with reviewers' comments that the Program consider the end product and biomass' ability to serve as a petroleum replacement, the supply chain model aligns Program efforts along the chain of necessary events to bring biomass materials from the farmer's field to the consumer's vehicle, including any co-products of the process.

Reviewer concerns about a decrease in outreach activities will be addressed by the Program in the next few years as discussed in the MYPP section on Market Transformation, including educational and public outreach, as well as legislative communication with federal, state, and local entities. Implementation of these efforts will be facilitated by strategic stakeholder partnerships. Additional communication of Program structure to meet its goals has been undertaken in 2008 with increased participation in public expositions and trade shows and distribution of major reports at these events and via the program website.

Platform Funding (in $M):

Because Biodiesel and Other Technologies has not been a discrete Biomass Program Platform, funding for the reviewed projects is allocated across Technologies in the form of Congressionally Directed Projects. Due to the continuing resolution, there were no congressionally directed appropriations in FY 2007. None of the projects reviewed were funded in FY 2007, instead they were operating on carryover from funding in previous years. In FY 2006 these projects were awarded more than $28million.

Specific Platform Responses to Select Reviewer Comments:

Program Peer Review		
Reviewer Comment		**Technology Manager Response**
• The need for middle distillates is known. It seems that a biodiesel or middle distillate platform is needed. • The recognition that the role of biodiesel in OBP is still very much TBD and needs to be significantly improved. • As the presentation indicates, a biodiesel platform does not exist. Much more work is		Achieving the President's Twenty in Ten goal to produce 35 billion gallons of renewable and alternative fuels by 2017 will necessarily include all types of biofuels. The Biomass Program will continue to address middle distillate barriers throughout its portfolio, while collaborating with industry to facilitate policy for increased production and distribution of commercially-

needed on this activity.		viable biofuels such as biodiesel. The Biomass Program seeks to combine its near-term focus on cellulosic ethanol with consideration of alternative biofuel approaches, including Fischer-Tropsch fuels and renewable diesel, in both the biochemical and thermochemical conversion platforms.
Biodiesel ought to be relegated to niche applications, such as mandated usage in recreational vehicles and boating where it is affordable. Biodiesel costs are prohibitive in view of other renewables. It has value to replace petro-diesel in ecologically sensitive areas.		The Biomass Program's support of biodiesel-related projects in recent years focused on infrastructure and testing issues. How biodiesel succeeds in the open market is beyond the scope of the program.
OBP should consider abandoning support for biodiesel (fatty acid esters) and instead focus on renewable diesel as supported by a strengthened thermochemical conversion platform. If the decision is to retain oil based biodiesel, the focus should be on new (as in economically viable) feedstocks.		To achieve the President's Twenty in Ten goal, the Biomass Program will combine its near-term focus on cellulosic ethanol with consideration of alternative biofuel approaches, including Fischer-Tropsch fuels and renewable diesel, in both the biochemical and thermochemical conversion platforms.

Program Peer Review Comments:

Strengths

- This is not a platform, rather a collection of mandated projects. It was a good review of the projects with many good suggestions/recommendations.
- The reviewers performed a valuable service in analyzing these "orphan" projects. Leveraging with private funding is to be commended. Pipeline testing projects may have use to the new infrastructure platform.
- The recognition that the role of biodiesel in OBP is still very much TBD and needs to be significantly improved – if that's a strength.

Weaknesses

- As the presentation indicates, a biodiesel platform does not exist. Much more work is needed on this activity.
- Didn't appear likely that many of the recommendations would be followed.
- There is no platform. Some of the projects could be moved into existing platforms for better review. However, I don't fault the Program for conducting the review in the manner they did.
- No focus.

R&D Portfolio Gaps

- Gaps are not indicated.
- The reviewers' comment that a biodiesel/renewable diesel platform is needed is interesting. I don't think that a separate program is appropriate, but should rather be integrated into existing platforms. That said we did not see much attention to biodiesel this week. As clean diesel engines have certain advantages over gasoline engines for improved fuel use, there is a need to give this some attention (at least a cost analysis). I would suggest that the Program follow up on the suggestion that the Program attempt to bring PIs from these types of projects together early and educate them on the Program goals and useful tools for project success.

- Overall, the projects presented were not focused on DOE Office of the Biomass Programs. Project timelines did not appear to be a major area of concern. As some of the projects were earmarked with a lack of coordination with more stable research programs, accomplishments were minimal. Inadequate data on cost benefits from utilizing biodiesel. Prior to demonstration projects, dollars should be spent on basic aspects of bioconversion and sourcing. Studies on engine performance and responses to regulatory requirements must be conducted. Relevant relationships with biorefineries were not apparent. Project innovations must be listed and acknowledged. Economic analyses are needed to ascertain relevancy to utilization of current and proposed materials.
- Too many to comment on.

Additional Recommendations, Comments and Observations

- Much work is required in this activity.
- The need for middle distillates is known. It seems that a biodiesel or middle distillate platform is needed.
- Biodiesel ought to be relegated to niche applications, such as mandated usage in recreational vehicles and boating where it is affordable. Biodiesel costs are prohibitive in view of other renewables. It has value to replace petro-diesel in ecologically sensitive areas.
- I agree with the ideas presented for managing earmarked projects. They can't hurt, and a few PIs might actually cooperate.
- OBP should consider abandoning support for biodiesel (fatty acid esters) and instead focus on renewable diesel as supported by a strengthened thermochemical conversion platform. If the decision is to retain oil based biodiesel, the focus should be on new (as in economically viable) feedstocks.

Platform Feedback

Specific Responses to Select Comments

Platform Peer Review		
Reviewer Comment		**Technology Manager Response**
The overall Biomass Program structure should change. • Technology Platforms could be based on petroleum replacement segment • Technology R&D should identify benefits in terms of the end product as well as process improvements. • The Biomass Program could broaden its definition of conversion, rather than using subheadings to restrict technology focus. • Congressionally-directed projects which cannot be directly aligned with a technology platform should be separately identified, with their focus technology linked to its respective match in multiple platforms. This approach could facilitate cross-fertilization.		The Biomass Program's current focus is the development of cellulosic ethanol in line with the President's Twenty in Ten Initiative. The Program structure mirrors these technology needs, funding extensive pre-commercial conversion research.

• The Biomass Program should communicate with the legislative branch that they are working hard to do good things with congressionally-directed funding. Support statements and a direct request for technology focus areas should be provided to staffers directly. • Projects could be required to undergo a review of their award and expectations prior to contract signing. Discussion with the Program would help projects to focus and plan their work.		
Project work would benefit from requirement that results be put into public domain		The Biomass Program agrees and will continue our effort to disseminate reports, studies and results on the website www.biofuels.energy.gov.
The Biomass Program should educate the public about its full range of technologies		In fiscal year 2008 the Biomass Program's plans to increase funding in the communication & outreach and has staff dedicated to the effort.
Given the needs of the 20 in 10 goal, the review panel recommended that OBP increase its support for biobased alternatives to petroleum products.		The program agrees that biobased products should continue to receive program support.
OBP should tie to HFCITP/H2A analysis of intense pressure on biomass feedstocks in medium transition years to the Hydrogen economy.		The Biomass Program will consider this recommendation in consultation with the Hydrogen Program.
DOE should pursue greater coordination of state and/or regional resources, with out-of-state review using same-level groups from other states.		The Biomass Program agrees and has included a regional/state/local effort in its new Market Transformation area.
DOE should have clear rule regarding commercial product funding, requiring at least 80 percent cost-share.		Current DOE policy states that EERE will fund process-related R&D that benefits no single company (i.e. specific product improvement). In addition, DOE does have a clear funding structure which requires increased industry cost-share as the R&D nears commercialization. The Biomass Program will continue to operate under these guidelines, while in consideration of industry preference for future solicitations.

General Platform Comments

- The overall Biomass Program structure should change.
  - Technology Platforms could be based on petroleum replacement segment?
  - Technology R&D should identify benefits in terms of the end product as well as process improvements.
  - The Biomass Program could broaden its definition of conversion, rather than using subheadings to restrict technology focus.
  - Congressionally-directed projects which cannot be directly aligned with a technology platform should be separately identified, with their focus technology linked to its respective match in multiple platforms. This approach could facilitate cross-fertilization.
  - The Biomass Program should communicate with the legislative branch that they are working hard to do good things with congressionally-directed funding. Support statements and a direct request for technology focus areas should be provided to staffers directly.

  - Projects could be required to undergo a review of their award and expectations prior to contract signing. Discussion with the Program would help projects to focus and plan their work.

- The Biomass Program should educate the public about its full range of technologies.

- Project work would benefit from requirement that results be put into public domain.

- The Biomass Program should focus on coordinating projects to avoid duplication of effort (and funding): Oxidative Stability, Lubricity, etc.

- Given the needs of the 20 in 10 goal, the review panel recommended that OBP increase its support for biobased alternatives to petroleum products.

- Sludge conversion work could be part of the processing and conversion platform's biochemical area.

- OBP should tie to HFCITP/H2A analysis of intense pressure on biomass feedstocks in medium transition years to the Hydrogen economy.

- DOE should pursue greater coordination of state and/or regional resources, with out-of-state review using same-level groups from other states.

- DOE should have clear rule regarding commercial product funding, requiring at least 80 percent cost-share.

- Encourage DOE to organize workshop with earmarks at project initiation (prior to contract development/final award) to discuss OBP goals and objectives.

- OBP should organize technical information transfer workshops after project work is begun.

- OBP platforms do not encompass broader, public, biomass vision, leading to a vacuum, creating more congressionally-directed projects.

- Potential topics for consideration:
  - Biodiesel
  - Biogas
  - Bio gasification
  - Hydrogen
  - Landfill gas
  - Chemical products
  - etc.

- DOE should establish program with strong management for outreach/regional/state efforts, including kickoff workshop involving all stakeholders. Suggest separate, targeted review for outreach projects.

<u>Comment:</u>

- Based on the projects reviewed by this panel, there appears to be a high level of interest in biodiesel and other alternative fuels that would displace or augment the use of petroleum diesel in the U.S. market. It is difficult for project PI's to address DOE goals and objectives when there is no specific platform for this area of research in the DOE portfolio.

Recommendation:
- Add a component to the multi-year plan that specifically covers research goals and objectives on displacement or augmentation of U.S. market demand for petroleum diesel.

Comment:
- Insufficient time is provided for Peer Review Panel to come to consensus on strengths and weaknesses of projects; similarly, there is insufficient time for PI's to form rebuttal comments.

Comment:
- Petroleum diesel is extensively used in the U.S. market for uses other than transportation fuel. These uses include electric power generation and residential heating. Displacing and augmenting these petroleum diesel uses with biodiesel and other diesel substitutes could substantially help achieve DOE's "20 in 10" goals and objective.

Recommendation:
- Add a component to DOE's multiyear plan to set goals and objectives, including research and development investment, to take advantage of this opportunity in the U.S. market.

- DOE should establish stronger information library, including historical results, for public use, data and information exchange, and elimination of research duplication or overlap:
  - State and university-funded information
  - Private R&D
  - National laboratory results
  - Federal agencies

- Demonstration projects should be required to present life-cycle cost and environmental analysis.

- All projects need to provide detailed statements of work for thorough background information with funding broken down by task

- Projects should be required to present expenditure summary and matching funds detail.

- Reviews can hold poster sessions for public information review, and simultaneous closed sessions to present proprietary information.

Initial Reviewer Feedback – Comment Summaries

Biodiesel and Fuels Demonstration Projects

Project Title - Mississippi State University Sustainable Energy Center

Project Investigator: Rafael Hernandez, Mississippi State University

Strengths

- Wide variety of potential fuels.
- Focused on unique feedstock niches (algae, primary and secondary sludge).
- Research program well laid-out with documented progress.
- Future funding support, meeting multiple objectives, with partners.

Suggestions and/or Weaknesses

- Could use clearer data about amount of biodiesel to be produced.
- Little incentive for ethanol producers' hydrolysate contribution.
- Some more economic analysis would strengthen project work.
- Needs stronger partners in waste industry.
- Acid esterification technology seems poorly focused.

Comments

- Needs overall focus to maximize funding and benefits.

PI Responses

- *Little incentive for ethanol producers' hydrolysate contribution.*
  MSU technology may enhance ethanol manufacturing. Transportation fuel may be maximized from an ethanol facility by utilizing recycle streams and waste streams (C5 sugars) as a source of carbon for oil accumulating microorganisms. The technology allows for economic optimization for markets, similar to how refineries shift yields between gasoline and diesel based on market conditions. MSU's technology permits economic utilization between ethanol to renewable diesel or biodiesel, thus upgrading the facility to a biorefinery.
- *Acid esterification technology seems poorly focused.*
  PI Response: This part of the project is focusing on feedstocks with a high content of free fatty acids. These feedstocks may require unique operating conditions. Most of the biodiesel producers in the U.S are not equipped to handle this type of feedstock.
- *Some more economic analysis would strengthen project work.*
  PI Response: The PIs agree with the reviewers. Funding is being requested from private and government sources to build a pilot system, demonstrate the technology, and improve the economic analysis of producing biodiesel and/or renewable diesel from sewage sludge.

Project Title: O2 Diesel Demonstration

Principal Investigator: Thomas Sopko, 02 Diesel, Ben Kaufman, 02 Diesel

Strengths

- Well-focused commercialization program to reduce regulatory barriers.

Suggestions and/or Weaknesses

- O2 diesel unlikely to become homogenous fuel (low volume).
- Product will have ongoing environmental and safety challenges.
- Define the incremental improvement of adding ethanol to diesel (performance enhancement?).
- Difficult to quantify improvements from adding ethanol to biodiesel blends.
- Environmental improvement data not adequate to justify fuel use.

Comments

- Recommend project achieves at least 50/50 cost-share.
- Project work does not fit biomass program objectives.

PI Responses

- It is well known that O2 Diesel, as a commercial fuel, is targeted solely for use in centrally-fueled fleets which represent at least 50% of the diesel market. Moreover, the components to blend O2 diesel, except for the additive, exist at terminals today, just like rack blending, which would support national efforts for growth in the centrally fueled fleet market. To characterize O2 Diesel as “unlikely to become homogenous fuel” is premature.
- The project has a written safety program which follows NREL guidelines with no instances of safety problems in a variety of fleets and operating environments under millions of hours of in-use testing. The use of flame arrestors in O2 Diesel capable centrally fueled fleet applications is a proven technology, which serves the same function in a number of E-85 flexible fuel-capable vehicles on the road today. Moreover, while complementary with other biomass products, the renewable and proprietary additive components of O2 Diesel provide environmental and energy security benefits beyond current biodiesel formulations.
- Aside from reducing the use of imported oil, O2 Diesel provided data showing significant emissions reduction benefits as compared to ULSD especially with respect to particulate matter and oxides of nitrogen (NOx) emissions. The positive improvements of O2 Diesel on diesel exhaust NOx emissions, as a precursor pollutant in the formation of ground-level ozone, is at a minimum directionally correct and could play an important roll in State Implementation Plans (SIPs) in compliance demonstrations should EPA decide to adopt a more stringent National Ambient Air Quality Standard (NAAQS) for ozone under its pending Notice of Proposed Rulemaking (NPRM). Further, the particulate matter benefit is synergistically improved with biodiesel blends greater than 12%. Based upon the positive data to date, we are encouraged about the potential for O2 Diesel to improve the performance of aftermarket treatment devices and new engine designs. Further research on the effect of ethanol diesel blends on the performance of after treatment devices and new engine designs would be important information.
- Finally, with regards the Comment that O2 Diesel Project work “does not fit the biomass program objectives” is puzzling. As touted on the DOE website “The Office of Energy Efficiency and Renewable Energy's Biomass Program works with industry, academia and our national laboratory partners on a balanced portfolio of research in biomass

feedstocks and conversion technologies. Through research, development, and demonstration efforts geared at the development of integrated biorefineries, the Biomass Program is helping transform the nation's renewable and abundant biomass resources into cost competitive, high performance biofuels, bioproducts, and biopower.

- In particular, our work is focused on
  - Making cellulosic ethanol cost competitive by 2012;
  - Contributing significantly to the Presidential goal of reducing gasoline consumption by 20 percent in 10 years through efficiency and alternative fuels; and,
  - Displacing 30 percent of gasoline consumption with biofuels by 2030."
  - What could be more fitting than the on-going O2 Diesel Projects?

Project Title: E-Diesel Test and Research

Principal Investigator: Nathan Fields, NCGA

Strengths

- Realistic evaluation of project data and appropriate decision to re-direct.
- Strong partnerships and OEM collaboration.

Suggestions and/or Weaknesses

- Nearly 80% of funding unspent.
- Emissions goal not addressed.
- Original durability research lacked follow-through to resolve barrier.

Comments

- Recommend tighter, phased task plans for future funding (outline go/no-go decision points).

PI Responses

- Project recognizes issue with unspent funds. Front-end issues affected the overall project timeline. The planned project re-scope should accelerate targeted fund disbursement.
- Emissions plans were addressed in the original plan of work, with results similar to those of the O2 diesel project, including documented benefits. The presentation failed to include this information.
- The original plan of work included a step to address product durability. Research did not advance past the first phase, and durability work was therefore never fully completed due to the severity of problems encountered and feasibility of 10% ethanol diesel actually reaching the market.

Project Title: Missouri Biodiesel Demonstration

Principal Investigator: Tom Verry, NBB

Strengths

- Well-constructed and implemented project.
- Achieved objectives in a timely manner.
- Results on BQ 9000 testing have industry-wide benefits.
- Strong partnerships with prime industry players including partnership funding.
- Strong outreach and education program.
- Addressed all three critical components: Quality/Distribution/BQ 9000.

Suggestions and/or Weaknesses

- Should have done wintertime pipeline testing.
- Pipeline test did not provide volume justification.
- Could use stronger, long-term future roadmapping.

Comments

- Bioheat is a beneficial market for pipeline use.
- Lubricity benefit comparison testing should include raw oil.

PI Responses

- *Should have done wintertime pipeline testing.*
- The pipeline runs were done at time that was convenient to the pipeline companies, and running in cold vs. warm weather was not an overall objective. The impact of 5% biodiesel on cold weather performance is small and little impacts would be expected even if run in colder weather. Pipeline runs in colder weather for confirmation purposes could be accomplished in future work. Cold weather runs will be more of a factor with higher blends like B20.
- *Pipeline test did not provide volume justification*
- The volumes needed to justify pipeline runs vary from company to company, and may be dependent somewhat on the results of pipeline testing for interface levels with biodiesel blends. At this point, our purpose is more 'proof of concept' on the technical aspects of using multi-product pipelines for biodiesel blends, rather than volume justifications.
- *Could use stronger, long-term future road mapping*
- We agree that stronger, long-term future road mapping would be useful. To a certain extent, the technical 'proof of concept' and implications of the transport of biodiesel blends at various levels are needed in order to develop good long term road mapping.
- *Lubricity benefit comparison testing should include raw oil.*
  We respectfully disagree that lubricity benefit comparison testing should include raw oil. Use of raw vegetable oils or animal fats has been demonstrated to have significant technical problems and should not be used. Please refer to Clean Cities Fact Sheet and Engine Manufacturers Position Statement on use of Raw Oils at http://www.biodiesel.org/resources/fuelfactsheets/ in the 'Engine Manufacturers' section.

Project Title: National Biofuel Energy Laboratory

Principal Investigator: Chuck Moeser

Strengths

- Very clear, targeted program to provide highly relevant information to biodiesel industry. Divided technical solutions among stakeholders well.
- Full industry coordination, including component manufacturers.
- Good technical support for B20 ASTM work.

Suggestions and/or Weaknesses

- Half the funding applied to facility enhancements/construction.
- Unclear how heterogeneous catalysts work in biodiesel production fits with overall goals.
- Did not address showstoppers/success factors.

Comments

- Recommend stronger, national data and information outreach approach.
- Project did not sample nationally to ID regional differences.
- Test should ID whether supply is BQ 9000.

PI Responses

- Project work started without an adequate laboratory. Funding used for construction was detailed as part of the original project proposal. Future plans will channel funding to testing work.
- The overall goal of heterogeneous catalyst work is to understand fuel composition for performance. Understanding of production will improve overall processing techniques, control quality, and render an efficient, competitive product.
- Success factors and showstoppers do exist, but the project acknowledges they strayed from the presentation template and did not include this information.
- The project leads regularly make presentations regarding their data at national conferences and send it to peer-reviewed publications. NextEnergy is conducting its own national event in 2008.
- The project did not address national sampling because NREL has already done similar work, though with unidentified sources.
- Bob Armantrout from NextEnergy, who was not present, would best be able to address BQ 9000 compliance.

Associated Products, Combined Heat and Power, and Other Technologies Projects

Project Title: Canola-based Automotive Oil R&D

Principal Investigator: Ira Pierce, Green Oil Company

Strengths

- Good group of uptake core questions.

Suggestions and/or Weaknesses

- High funding allocation disproportionate to stated project goals.
- Market analysis methodology not described clearly.
- Lacks technical plan.
- Niche market without volume displacement potential.
-

Comments

- Recommend task plan with research barriers, cost assessment.
- Automotive oil application not clearly defined.

PI Responses

- Technical plan in development, to use secondary sources, no laboratory analysis, use others' work.
- Volume displacement numbers not yet agreed upon, but will be large.
- Testing of the product will be a research barrier, because those developed for petroleum are not applicable to bio-oils.
- The product application will be better defined in the future. At this time hydraulic fluid and metalworking applications are the base of a hierarchy to culminate in automotive oils work.

Project Title: Phillips Biomass CHP Facility

Principal Investigator: Carl Nelson, The Green Institute

Strengths

- Good urban outreach for energy efficiency.
- Generated regional biomass inventory data and associated costs.

Suggestions and/or Weaknesses

- Needs biorefinery relationship.
- Needs stronger technical support/development and analysis.
- Project lacks focus, R&D improvements and value-added.

Comments

- Recommend hiring experienced subcontractor with wood power knowledge

PI Responses

- For the work completed so far, we have had subcontractors with strong experience, including some of the top engineering firms in the world with biomass experience
- Due to the second stage of work still being in early development, we still need to build further partnerships and strong subcontractors, which we expect to resolve some of the issues brought up by the panelists.

Project Title: EERC for Biomass Utilization

Principal Investigator: Dr. Bruce Folkedahl, U. North Dakota

Strengths

- Generating regional interest in biofuels.
- Strong education/outreach meetings.
- Many cost-share partners.

Suggestions and/or Weaknesses

- Portfolio of projects too large and unfocused.
- Poor sense of potential economic impact (individual and combined).
- Poor sense of whether projects have chance of moving out of laboratory.
- Low level of project innovation.

Comments

- Future funding route unclear.
- Need fewer, stronger projects with national potential.
- Recommend stronger programmatic control over project portfolio.

PI Responses

- *Portfolio of projects too large and unfocused.*
- In general, because of the number of projects the EERC presented, there simply was not enough time to present all of the information on each project which would have addressed some of the weaknesses cited here. Indeed the portfolio of activities was large (there were ten), but we were trying to spur innovation in high-risk applied research and development in the key areas of biopower, biofuels, and bioproducts using a million dollars and 20% industry cost share. It is very easy to do a large demonstration of one idea but, usually, that type of project is limited in the fundamental sense. We have many partners involved in our work but still stress fundamental applied research. These projects cannot be very large, like a large demonstration, because the lack of cost-share commitment. Additionally, with more activities, there are more opportunities to develop new processes and principles that can lead to large pilot-scale experiments or demonstrations.
- *Poor sense of potential economic impact (individual and combined).*
- Perhaps the reviewer meant for a specific activity, because this statement is simply unfounded. Case in point is our work to develop a 150-kW biomass gasifier for real world uses in distributed energy. The economic impact of this system is well-documented and attested to by four projects going forward for long-term demonstration and real world electricity production. The microturbine for landfill gas also has a detailed economic assessment. Other economic assessments are still being done for laboratory-and pilot-scale experiments and, quite frankly, these activities probably will not generate reliable economic forecasts with respect to markets until scale-up versions can be produced and tested for better economic numbers.
- *Poor sense of whether projects have chance of moving out of laboratory.*
- All principal investigators involved in this overall program (about 10) have clear intentions, aspirations, and partners for moving their innovations out of the laboratory. There probably simply was not time to discuss all activities in detail. For example, the biomass gasification activity discussed above has clearly demonstrated a pathway out of the lab, and a near-commercial version is installed at the Grand Forks Truss Company. A higher-risk project such as the urea fertilizer project has the North Dakota, South

Dakota, and Minnesota Corn Growers anxiously waiting to see concrete results for the innovative electrochemical process testing, to be completed this fall. I don't think this comment is justified, just miss communicated.

- *Low level of project innovation.*
- This comment is fairly subjective. I don't see any 150–300kW biomass gasifiers making electricity anywhere in the United States. I don't see any fertilizer plants in the heartland making nutrients from anything other than 100% natural gas. These two examples are indicative of projects overall.
- *Future funding route unclear.*
- *Need fewer, stronger projects with national potential.*
- *Recommend stronger programmatic control over project portfolio.*
  We agree that the EERC (University of North Dakota) project needs to be more connected to the DOE EERE Office of Biomass Program portfolio. The EERC (UND) will put more attention toward coordinating future projects in conjunction with ongoing work at the DOE EERE Office of Biomass to avoid duplication of effort. We do visit with Golden Field Office and the Washington D.C. office every year to discuss our future direction for project activities. We also agree that fewer activities under one more focused project umbrella is a good idea.

Anaerobic Digestion and Waste Processing Projects

Project Title: Ohio State University - Anaerobic Digestion

Principal Investigator: Floyd Schanbacher

Strengths

- Integrated project into numerous Biomass Program objectives.
- Design and development of advanced controls for self-healing industrial digester beneficial.
- Reactor systems, even at bench level, nicely engineered.
- Good tie between inventory, economics, and energy policy.

Suggestions and/or Weaknesses

- Should coordinate with other high strength influent work to avoid duplicative effort.
- Should identify process improvement goals. Targets, goals, benefits, cost assessments not provided.
- Progress seems slow.
- Lack of fallback position if solid-oxide fuel cell system fails. Not necessary to rest of project.
- Relies heavily on price-to-value of renewable energy without comparisons.

Comments

- Should focus on pre-fuel-cell R&D.
- Bacterial species study might be valuable, if focused on process-improvement controls.
- Using Federal dollars for state-specific resource assessment is parochial.

PI Responses

- Federal dollars were provided for state specific assessments.
- Project includes assessment of food-processing/high strength influent not seen elsewhere, applicable to other states.
- Bacterial study looking at process improvement controls. Consortia is one of the rate limiting steps.
- Composite funding affects progress.
- Appreciate need to coordinate with other high strength influent research programs.

Project Title: New York Biomass/Methane Gas Power Fuel Cell

Principal Investigator: Dr. Caine Finnerty, NanoDynamics

Strengths

- Research plan well-developed and implemented, with progress metrics.
- Project making excellent progress towards stated goals.

Suggestions and/or Weaknesses

- Better path to commercialization needed.
- Need better sense of project's larger energy impacts.
- Lack of economic information provided could be show-stopper.
- Lack of commercial partnerships and solid-oxide consortium participation.

Comments

- Project work best fits in DOE Hydrogen program-solid oxide fuel cell development.
- How does work relate to 20 in 10 goal?

PI Responses

- The project is applicable to the 20 in 10 target, as small scale Solid Oxide Fuel Cell systems in the region of 1-5kW could potentially be used as auxiliary power units (APU's) in a variety of transportation applications, for example larger tractor trailer units idle their engines during the night to provide power for electronics and environmental control, under these operating conditions the engine is operating very inefficiently, a SOFC APU could provide the necessary power whilst reducing emissions, noise and more importantly reducing fuel consumption.
- We are not currently part of consortium, the fuel cell program at ND was developed around a vertically integrated model; however, now we have reached our current phase of development and commercialization we may look into this.
- On the commercial side we are currently pursuing several contracts representing near term markets in excess of $200M, we are confident that we can successfully implement this technology in a commercial arena. Based upon the power density and manufacturing approach associated with our cell technology, we believe that the economics of the NDE solid oxide fuel cell will be very competitive. Management has experience supplying high volume, engineered ceramic components to the energy (nuclear), telecom, and automotive markets and is confident in the scalability and economics of the current approach.

Project Title: Ohio Solid Waste Authority Pyramid Resource Center

Principal Investigator: Tim Berlekamp

Strengths

- Good leverage of DOE funding.
- Good Phase I construction progress.
- Provided good information about project stages.

Suggestions and/or Weaknesses

- No life-cycle cost analysis has been done.
- Lacks commercialization plan, market analysis for CO2;
- Recommend cost and performance analysis for gas cleanup, methanol production.

Comments

- Innovative approach to processing landfill gas.

PI Responses

- Addressing the CO2 sales issue, the project acknowledges its commercialization plan is lagging. Due to ethanol industry supply, CO2 availability is high, reducing the price. The project is working with the Ohio Department of Natural Resources on oil and gas well recovery efforts in Ohio.
- Cost has been an issue. The project realizes internally that additional effort is necessary.

Communications, Outreach, and Partnerships

Project Title: New Uses Information and Entrepreneur Development

Principal Investigator: Mark Williams, Growth Dimensions

Strengths

- Re-focus on bioenergy.
- Strong government and other partnerships.
- Programs like this may identify small opportunities which may otherwise be missed.
- Provide critical business development support.

Suggestions and/or Weaknesses

- Capital awards lack progress.
- Program eligibility requirements narrow, very locally focused.
- Limited success to date.
- Need better leveraging strategy based on needs and benefits.
- Seems to lack strong technical development screening capability – ensure good industrial participants.

Comments

- Future efforts should be directed statewide.

PI Responses

- Growth Dimensions is a private/public economic development agency responsible for economic development in Boone County incorporated by the City of Belvidere, the County of Boone and the
- Belvidere Area Chamber of Commerce, with funding coming from both the private and public sectors of the Boone County area, and therefore is not a statewide agency. Growth Dimensions has spearheaded a regional initiative for the commercialization of new biomass-related products and systems. The strategic goals of the imitative include increasing the value of agricultural biomass and stimulating new manufacturing opportunities.
- Understanding that geographic constraints have limited the number of award proposals, we broadened the geographic region where eligible applicants must agree to relocate to or be primarily domiciled in, from only “Boone County, Illinois” to “Boone, DeKalb, McHenry, Ogle, Stephenson, and Winnebago Counties in Illinois.” The broader region aligns more with the congressional district. Other limiting constraints were removed from the RFP solicitation, including: removing the limitation of the award of $100,000 per award, because there is no award ceiling other than what we have allocated for the Award Program with DOE. Other limiting factors including the required cost share remained the same.
- We also increased the frequency of solicitations to monthly solicitations and broadened marketing outreach to attract more proposals.
- Other barriers that we can’t change that have limited the awards program are associated with
- NEPA requirements making it cost prohibitive with past proposals.
- We have also proposed a scope of work modification to add a contract with Northern Illinois
- University for the purpose of increasing support of the Biomass Product Development

- Commercialization Services and at the same time increasing support to the Capital Awards program by providing hands-on assistance to companies interested in applying to the award program. These increased efforts will add man hours from a part-time basis to a full-time dedicated position focused on moving the project along.
- We believe the review team does include strong technical development screening capability, in addition to key business and community development support crucial for successful implementation. In retrospect, these technical competences may not have been articulated strongly enough in the presentation. The team for reviewing these proposals includes:
- **John Noel**, President Illinois Technology Development Alliance
- **Tom McDunn**, Director of Advanced Manufacturing, Rockford Area Ventures/EigerLab (Manufacturing
- Innovation Center)
- **Greg Brown**, Chairman of AgTech Initiative and President of DareCloud Development
- **Dan Cataldi**, Executive Director for Rock River Valley Entrepreneurship Center (Affiliate Office of the
- Illinois Department of Commerce and Economic Opportunity)
- **Seth Snyder, Ph.D.**, Section Leader of Chemical and Biological Technology Energy Systems Division,
- Argonne National Laboratory
- **Ann Marie Cain**, Manager of Boone County Farm Bureau
- **Mark Williams**, Executive Director of Growth Dimensions (Economic Development)
- **Jerry Zielinski,** Executive Director, Northern Illinois Technology Enterprise Center, former technology
- Commercialization executive with AT&T and Lucent Technologies

Project Title: Alternative Energy Enterprise Program

Principal Investigator: Sumesh Arora, MS Technology Alliance

Strengths

- Well-organized program with clear goals, metrics.
- Good description of impacts resulting from money allocated.
- Strong peer review process including reviewers from outside the state.
- Good alignment of state program with DOE goals.
- Good assessment of showstoppers.

Suggestions and/or Weaknesses

- Private sector involvement was very weak.
- Large amount of goal funding went to universities, did not show potential economic development.
- Did not address specific environmental regulations.
- Relatively few funded projects.

Comments

- Suggest focusing on biomass technologies which lead to significant job creation in state.

PI Responses

- A total of 24 private sector entities are involved in the various projects that are funded through the Strategic Biomass Initiative
- A portion of the project was designed for a university funding approach, but universities were asked to undertake late-stage projects. All university projects have alliances with industrial partners, with four showing strong potential for economic and commercial outcomes.
- All projects underwent a NEPA compliance review. The projects could examine environmental benefits or show-stopping aspects. Due to the project timeline, DOE is not liable if projects are not NEPA compliant when the contract comes to an end.
- A total of 16 individual projects are expected to be completed by the end of the current funding period with awards ranging from $32,000 to approximately $230,000.
- In response to the comment, MTA is an economic development organization whose performance metric is not usually job creation. MTA is a technology-oriented company, which measures commercial outcomes such as technology licensing and company start-ups. The belief is that technology diffusion and company creation lead to job growth.

Project Title: Kentucky Rural Energy Supply Program

Principal Investigator: Cam Metcalf, University of Louisville

Strengths

- Excellent consortium.
- State cash match.
- Development of university program.

Suggestions and/or Weaknesses

- Grant program should more explicitly target industry, small business.
- Poor coordination of supported projects with ongoing biomass program activities.
- Some supported projects not aligned with biomass program.
- Ensure that project redundancy does not occur.
- Needs ongoing independent (outside state) technical review program.

Comments

- Recommend relating all funding to biomass program goals.
- Program would benefit from much more focus.
- Suggest using funding as opportunity to build nationally-competitive research program.

PI Responses

- *Grant program should more explicitly target industry, small business.*
- The consortium's objective was to position Kentucky to better compete for Federal Research dollars – targeting industry and small business would not accomplish this. The funding has been used to aid and build state universities' research capabilities and collaborative efforts. The consortium represents sixty-two organizations including private sector industries and small businesses that share expertise and provide input on our research and development directions. The reviewers' comments suggested using funding as an opportunity to build a nationally-competitive research program which seems to conflict with this weakness.
- *Poor coordination of supported projects with ongoing biomass program activities.*
- All funded projects addressed a DOE roadblock, however since our original funding mandate specified biomass and energy efficiency, not all projects included biomass. The Kentucky Rural Energy Supply Program was put into the biomass program because the majority of our funding targeted biomass.
- *Some supported projects not aligned with biomass program.*
- Because our original mandate from Congress required us to look at renewable energy (including biomass) and energy efficiency projects, not all projects included biomass. Dr. Eric Berson and Dr. Sue Nokes traveled to NREL representing KREC in August 2005 and discussed the overall project and goals with DOE staff. DOE did approve all seven research projects prior to the research beginning. Ensure that project redundancy does not occur.
- The Competitive Grants Program did ensure that there was no project redundancy. The Review Panel make-up included 14 individuals from Universities (10) & Federal Labs (4) from outside of Kentucky. Three reviewers were used on each proposal. This comment does not seem to have merit.
- *Needs ongoing independent (outside state) technical review program.*
- KREC has submitted quarterly reports to DOE NREL for review as an independent and out-of-state entity. DOE should provide feedback on a continuous basis during the

project period. The KREC project ends 12/31/07, so an ongoing independent review is not feasible at this point.

- Comments:
- *Recommend relating all funding to biomass program goals.*
- Because our original mandate from Congress required us to look at renewable energy (including biomass) and energy efficiency projects, not all projects included biomass. This would violate our original mandate from Congress.
- *Program would benefit from much more focus.*
- The KREC objective was to build research collaboration and strength in the State, therefore, the project started with our strong programs to reinforce them.
- *Suggest using funding as opportunity to build nationally-competitive research program.*
- The consortium's objective was to position Kentucky researchers to better compete for Federal Research dollars and the strategy is working. The Sun Grant Initiative did fund one of the KREC supported researchers for $250,000 to progress her R&D project (biomass focus) to the next level.

Project Title: Regional Biomass Programs

Principal Investigator: Rick Handley, CONEG, Fred Kuzel, Coalition of Great Lakes Governors

Strengths

- Has potential to be powerful advocacy entity for biomass program (if program can provide role).
- Extensive involvement with broad stakeholders.
- Future plan for a legacy.

Suggestions and/or Weaknesses

- Funding R&D and demonstration through outreach program needed better coordination with biomass program.
- No defined role in biomass program.
- Poor articulation of project goals.
- Impact study has poor cause/effect relationships, could be more rigorous.
- Funding all 50 states dilutes program resources.

Comments

- Provide budget breakdown/cost-share information for future program reviews.

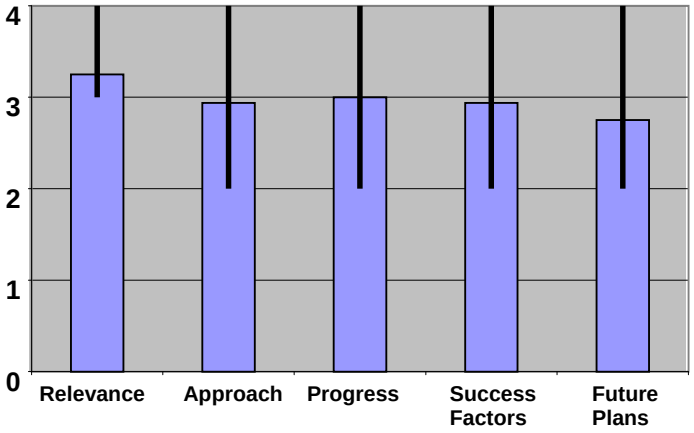
PI Responses

- Would have trouble selling idea to pick/choose which states to fund.
- Not having sufficient funds could be a weakness.
- Not having defined role is a weakness. Have tried communicating with DOE biomass program. A specific contact has not been provided to the regional groups. The projects are willing to coordinate, but have received no program response.
- Funding R&D/demo has not been done recently, mostly past examples. Outreach/policy/education most recent focus.
- Hope will be another program review that involves regional programs.

Biodiesel and Fuels Demonstration Projects

Project Title: Mississippi State University Sustainable Energy Center
Project Investigator: Rafael Hernandez, Mississippi State University
Project Stage: Exploratory

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	3.25	0.25	0.75
Approach	2.94	0.94	1.06
Progress	3.00	1.00	1.00
Success Factors	2.94	0.94	1.06
Future Plans	2.75	0.75	1.25
Average	**2.98**		



Question 1: Relevance to Overall Objectives.

- Biodiesel is needed to meet the President's goal of 20 in 10.
- Lots of biodiesel RD& D work is underway. OBP should re-engage biodiesel.
- $.10/lb is a good target.
- New lipids work
- We strongly need new biodiesel feedstocks.
- This work is right on the mark of targeting new feedstocks.
- The use of waste water streams could be a novel source of biodiesel.
- The focus on the feedstocks is good but they have not done much to evaluate the market potential.
- Overall I rate good to fair
- Considering a range of feedstocks and the processing necessary for each. Most of the alternative feedstocks will not be high volume.
- Goal is ambitious.
- Reviewers made an effort to coordinate their projects with DOE's MYPP and Biodiesel program. Responded to the requests for goals, objectives. Provided some R&D targets
- R&D is focused specifically on biodiesel and biodiesel Feedstocks. There is a large need for biodiesel feedstock.
- The technologies under consideration are very exploratory. The market is attractive and viable. Reviewer is aware of all the potential customers, but did not have one specific one as a partner. Large, 750 MMGY, supply potential.
- Good overall program supported by defensible science.

Question 2: Approach to Performing the R&D.

- Methodical feedstock exploration and development
- Stronger economic analysis and production potential is fully developed would help.
- Nicely organized research program.
- Fair I am concerned that the project is not well focused
- They are trying to do too much

- Clear path: identify lipid sources – extract – convert to
- biodiesel – market development
- Approach is good but seems to focus on small volume sources. From an energy standpoint it does not consider alternative energy uses for the sources. Ex: Electrical power and heat energy from POTW sludges.
- Not a technically focused as typical DOE/NREL program. Project has an overarching economic target, 10 cents/lb lipids, but the technical targets are vague. A little bit of a scatter-gun approach than identifying a meaningful focus that could provide national visibility to their state. Project would benefit for more technical targets, especially on the microorganism development side. Some of the research was linked with cost assessments and value, which was good.
- More cost forecasting of envisioned processes would greatly improve the potential of this effort. Also, provides a critical
- Path development strategy for key R&D areas.

Question 3: Technical Accomplishments and Progress.

- Reasonable progress
- Tackling tough feedstocks – WWTF and tallow sources,
- How much volume in MGY analysis is needed
- Tall oil needs more progress.
- Good progress. Focus on PTOW sludges is interesting but has small yield potential.
- Insofar as there is no biodiesel program, it's hard to say what the progress looks like. However, at the strategic level, this program is making progress against DOE goals.
- Reducing the cost of biodiesel feedstocks
- They have a cost measure in cents per pound
- How will this be measured? It a good target goal but it is not clear how they measure?
- Their focus is expanding feedstock with meets DOE goals for 20-20 targets. Also trying to improve local technology for local producers, but they have not employed known technologies and are reinventing the wheel. They didn't provide enough detail on the research targets, except for feedstock cost per gallon. Local benefits were not identified. Technical barriers need to be better identified. A broader review team of highly technical experts in microorganism development and management technology would improve the project. They need to also refocus to a tighter project and get rid of the unnecessary parts, such as down stream technology which they have little expertise in.
- Good process – particularly given the basic nature of some of these tasks.

Question 4: Success Factors and Showstoppers.

- Oleaginous microorganisms growth a very positive step to improve lipid content and reduce cost at WWTFs
- Amount of biodiesel minimal; little incentive for ethanol plants to provide sugar feedstock to biodiesel plants.
- Some show stoppers have been identified such as the impact of microorganisms on water quality but they have not really looked at the business models for example would P & P industry invest in tall oil collection?
- May lead to multiple niche sources/processes.
- Economics might not be favorable.
- Well defined in presentation.
- Time frame may be too short.

- Reviewers appear to be knowledge about the key legal and EPA barriers in general, but specific barriers are vague. Their focus on non GMO for waste water is probably fine although there are ways to sterilize water before release, similar to the microalgae program issues. No recognition of issues associated with castor oil and meal, e.g., the oil is not really a biodiesel as it will have more than one alcohol on the fatty acids and they will be highly susceptible to polymerization. The meal contains ricin, which is extremely toxic. No discussion the oil or the meal barriers were presented.
- As stated earlier, more economic evaluations should be done much like the work they did with sewage sludge to biodiesel.

Question 5: Proposed Future Research Approach and Relevance.

- Specific Comments:
- Well thought through next steps.
- Keep Tall oil work going – multiple benefits.
- No particularly specific stage gate language used
- Unclear how closely cost targets depend on research success goals
- Focus on waste water lipids may be a poor choice because of the small volume potential of this source.
- Reasonable plans designed for the previous progress and current requirements
- Well thought out – suggest ensuring closer integration with DOE/USDA program objectives.

***Additional Comments*:**

Strengths

- Glad to see this work is going forward
- Very broad range of research
- Co-product nutraceuticals should help commercial economics
- WWTF feedstocks are nation wide in applicability (an important plus).
- Research looks reasonable, and results are being achieved.
- This is potentially a good feedstock market and the ability to collect the lipids or to grow more is a good idea
- I think this research needs to be done
- Broad scope/approach. Good for initial stage.
- Good professional approach to research program planning and executing.
- Progress in use of different oils for biodiesel production.
- Potential generation of more/different oils for biodiesel production.
- Integration of different research areas under one common goal.
- Focus on new feedstocks for biodiesel. Potential to expand supply. Potential to be competitive or reduce costs. Follows instruction and tries to support Program concepts.
- Well thought-out science with good academic flavor.
- Providing an educational foundation for developing more faculty active in biomass to chemicals/fuels along with the education of future biomass-savvy technologists.
- The potential of their novel feedstocks was undersold – I believe that billions of new lipids could be delivered to the market.

Weaknesses

- Need stronger economic and impact analysis – Especially alternative uses of the feedstocks.

- Response on anaerobic digestion alternative weak
- Availability and suitability of novel feedstocks could be a limiting factor.
- The team did not do enough to partner with others or review existing research
- I believe the stated volumes are too high and the potential then is much smaller than stated - this should be verified
- Nutraceuticals extraction relevance was unclear
- Doesn't seem to have a grasp on present operation of POTW's outside of the south.
- Seems to be spread thin across several different projects/programs.
- Need to consider utilizing other/additional resources/partnerships/collaborations to expedite progress with project(s).
- Some areas of research may not provide much of a volume benefit. Focus on biodiesel technology development is reinventing the wheel, has not identified good data from old technology (acid esterification). Some of the focus on the program does not identify key barriers that may either focus their research on or be used to eliminate those parts of the project. No go types of targets and milestones for technology.
- Needs a little more design development to better guide critical R&D initiatives.
- Narrow the focus toward a fewer number of projects that are hard-hitting in terms of establishing an even stronger program.

Technology Transfer/Collaborations

- Some presentations at national level would improve visibility and coordination with others doing similar research.
- Presentation focused almost completely on MSU activities, and there is little information given about tech transfer and collaborative activities.
- Upcoming conference.
- This does not seem to have been addressed adequately.
- Need to somehow get information out to other interested parties about the progress that is being made at MSU in feedstocks and oils.
- Good access to WWT facilities. Not much other interface with local biodiesel plants. The other relationships appear to be at arms length.
- Moderate level of effort – good improvement in program if more of this is initiated. Good to see USEPA involved.

Recommendations for Additions/Deletions to Project Scope

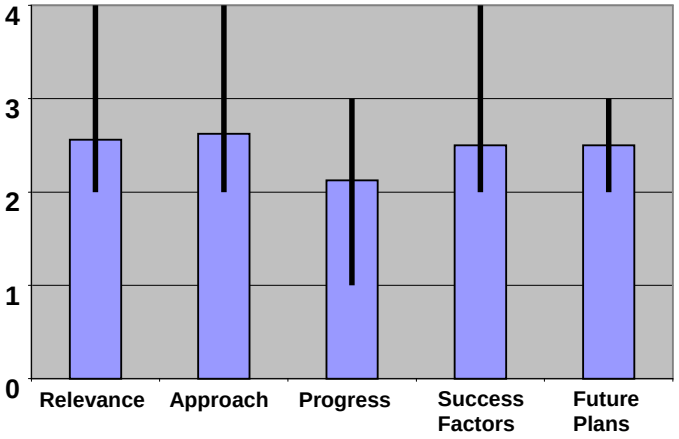
- None. Recommend letting MSU continue its work as planned.
- Validate the potential for biodiesel production
- Seem to be spread very thin across several different projects. May want to concentrate on one project at a time, especially biocrude generation.
- Try to focus the project into tighter focus with better detailed targets and strategies for success based on benefits.
- Determine the realistic potential for full funding in the future, then redirect their resources to the level that prediction yields.

Project Title: O2 Diesel Demonstration

Principal Investigator: Ben Kaufman and Thomas Sopko, O2 Diesel

Project Stage: Development Stage Company/Continuing R & D/Commercial Introduction

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	3.25	1.25	0.75
Approach	3.00	1.00	1.00
Progress	2.75	0.75	0.25
Success Factors	2.33	0.33	0.67
Future Plans	3.50	0.50	0.50
Average	**2.97**		



Question 1: Relevance to Overall Objectives.

- Another use for ethanol as blend to diesel
- Shows fuel improvement
- This technology is maturing to stage that OBP funding is no longer needed,
- What is ethanol displacement of oil additional benefit?
- Project may generate energy, but it is unclear that this is a reasonable process for new fuel development. Advantages are not well laid out.
- The original research was stopped due to problems with fuel injectors
- The plan is to redirect the project
- The proposed redirection is not well defined
- Not at all clear that this project advances cause of increased biomass-based fuel production.
- Appears to be more relevant to air quality concerns associated with petroleum diesel.
- Good relevance to program.
- Project moves DOE ethanol industry to new markets, but those markets are extremely narrow. This type of commercialization project has been industry funded in the past—see NBB EPA registration and ASTM development process. That process was 90% industry funded. Synergy with biodiesel is nice. Some ethanol will displace petro someday, if successful. This project does not lead to a homogenous fuel industry.
- Total market impact will be very limited, in the
- Millions of gal/year <25 because of the fleet limits.
- The topical area fits into the relevance category – yet, this effort does not seem to be adding any significant increase toward the body of knowledge.
- Not a compelling argument for using alcohol dilution when the market for the alcohol is so good right now.

Question 2: Approach to Performing the R&D.

- Good approach to combine demonstrations and research on fuel blend
- In its initial configuration this project did a good job at identifying technical barriers but the “phase II” is not sufficiently developed to know if technical barriers are identified
- Technical approach is sound

- Have demonstrated compliance with performance criteria.
- Strong focus on field performance
- Needs life cycle analysis for total impact of the fuel and additives. Emission reductions need to be balanced with fuel economic impacts. No specialized emission testing was performed which will be necessary to get EPA and CARB registration. Research targets were vague, what types of durability studies and are they the right studies, who is doing fuel injection studies for example. Where are the OEM peer reviewers. They only tested power and field performance. Who is doing the Tier II rat studies? Who is doing the dermal and aquatic toxicity for the additive? What are the remaining lists of environmental tests that have to be done and where is the schedule? Addresses technical barriers but all in very generic. Discussion of biodiesel blends with ethanol and additive confusing
- Unfortunately that no data were presented to justify conclusions.
- Really a product marketing effort.
- Not a lot of new information being produced.

Question 3: Technical Accomplishments and Progress.

- Solidly moving into market by resolving the various new fuel blends questions and issues.
- Lots of emissions testing and results plus lubricity, cold weather durability and handling.
- A material has been made, but its value is questionable. The PIs were not able to isolate the incremental improvements resulting from the use of B20, and the use of ethanol.
- Based on the research to date some progress on barriers has been made but overall it was good to suspend the project
- The Phase II is not well defined and it is unclear how it will benefit the goals
- This project does little to contribute to the 20 in 10 goal.
- Ethanol already has a growing market.
- Adding alcohol to diesel doesn't contribute much to new uses of biomass-based fuels.
- This is all about selling a "proprietary additive."
- Very good progress. Field demonstrations
- Most of this focus is commercial, the industry can afford to pay for this themselves, like the biodiesel industry did. Why should the government fund things that they should do themselves?
- No real performance metrics were provided, no analysis of the amount of ethanol that will be displaced in the petroleum diesel market? No impact on the consumer cost for the fuel? No impact on fuel efficiency. No life cycle analysis.
- Most of the metric claims (listed as goals) were not quantitatively supported.
- Good only if success is viewed as growing the company's potential to enter the market – not that I agree with the benefits of the product.
- Need to use data that also compares B20 along with his other data points.
- Seems to lack defensible data – seems to use opinion without data supported basis.

Question 4: Success Factors and Showstoppers.

- ASTM specification and EPA registration are key next steps.
- Comparative costs will be a problem, and were poorly articulated in the presentation.
- Show stoppers were identified and the project sponsors
- Made a good decision to suspend work
- No information AT ALL concerning nature of additive.
- Cost/source/environmental impacts could all be serious show stoppers.

- U.S. is already suffering immeasurable environmental damage from fuel additives…
- Flammability can be a drawback for diesel use, (Low flash point)
- Need acceptance from OEM. Overall looks to have good potential for technical success but market acceptance not yet established
- Regulatory and legal program as superficial and does not address the complete set of analysis needed to get EPA registration or accept ASTM. Needs a outside peer review group, comprised of OEM, fuel injector manufactures, emission laboratory, and environment management. Some were identified – yet some critical issues, such as safety and water, are not well handled.

Question 5: Proposed Future Research Approach and Relevance.

- Good plan for final commercialization
- Within the context of their program goals, their research plan appears reasonable
- Future work progresses logically from previous activities.
- Not relevant to developmental goals of Biomass Program.
- The plan ahead is appropriate.
- Their future plans are not sufficient to meet EPA registration or ASTM standards. Their progress is good and there was a lot of duplicative testing, but they have not addressed key issues for success such as air toxics, injector durability, life cycle, etc.
- Seems to be moving well toward their commercialization plans. Yet, key issues of overcoming perception of safety and quality appear to be not well handled.

Strengths

- The major success – Approaching full commercialization.
- Several industrial tests ongoing.
- Helping to reduce petroleum diesel emissions – although if diesel is diluted with alcohol, we might expect reduced emissions.
- Good field testing approaches
- Evaluated safety and handling issues.
- Collaborations with multiple stakeholders
- Overcomes some perceived disadvantages of biodiesel,
- Focused commercialization program.
- They appear to be using a decent marketing strategy if E-diesel or E—BD-Diesel is the target.

Weaknesses

- Proprietary additive will be hard for state weights and measures folk to approve. How do you test for this at the pump? What is chemistry? OR situation is example.
- More education and outreach will be needed to fully introduce this new fuel blend.
- Safety
- Really difficult to see benefit of this procedure
- Improvements by adding ethanol poorly quantified, and difficult to justify process
- Relative cost
- “Proprietary additive” is a concern. What is cost of additive? What is feedstock for additive? What are the health/safety/environmental issues associated with the additive
- The actual benefit of the additive is unclear! What are properties/performance of diesel/ethanol, diesel/ethanol/biodiesel mixes without the additive or with other additives.
- Market viability/acceptability of yet another alternative fuel.
- Distribution network.

- Safety implications/issues.
- Niche market (centrally fueled fleet).
- How will weights and measures inspectors handle this?
- Will proprietary additive be a barrier to wide spread adoption?
- TOTAL MARKET IMPACT WILL be very limited, in the Millions of gal/year <25 because of the fleet limits.
- The commercialization program is weak, with little emphasis on the key technical barriers and how to achieve them, they appears to be too heavily dependent on fleet demos and criteria emission tests.
- No plans for rat studies or the other key studies needed by EPA (dermal tox, water tox, soil degradation, live rat studies).
- No data shown about the fuel economy, or other life cycle data needed.
- The safety and quality of product issue is difficult to overcome. Cannot understand the merit of this formulation over using BD blends and ethanol blends in their already established markets.

Technology Transfer/Collaborations

- A lot of education and outreach will be needed for this new fuel blends advantages. Need broad fleet only target marketing. Clean Cities will be a key audience..
- They appear to have made good industrial contacts
- Good collaborations.
- The research could carry-over into other projects.
- Working with public institutions like ASTM.
- Good linkages with industry, although the industry should be paying for this project themselves.
- Seems to be working with critical players – such as OEMs. A large fuel distributor would be a good partner.

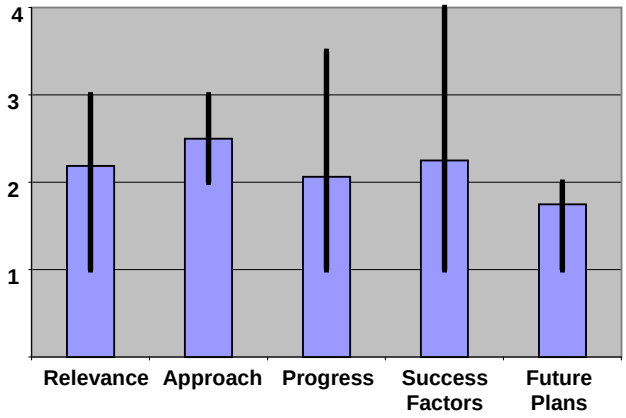
Recommendations for Additions/Deletions to Project Scope

- Role of OBP may be ending as full commercialization is achieved. Recommend strong work with state weights and measures.
- The project team made a good decision to suspend the project on ethanol blending in diesel. The proposed Phase II is not well developed and it is not clear that the project team has the necessary experience to do this
- Redefined work. I recommend that the project team submit a detailed program and justification for co-product research. This justification should include a literature search that demonstrates which areas are not being addressed. The project team should also indicate the experience of the researchers and potential teaming with other researchers
- This should not be a DOE R&D priority.
- It seems this project is a niche product and is designed around finding a use for the *proprietary* additive. While there may be some specific applications for this product, the industry is focusing on biodiesel blends (B-2, B-5, B-20) and is not going to be open to introducing another fuel to the mix. If it's not ASTM biodiesel, and it's not ASTM ethanol, then design- to-market deployment will be difficult. Additionally, O2 funding as a percentage of the total budget seems low.
- Sounds like need for R&D funds has ended and overcoming commercial resistance is now needed.
- NO future funding. Should be self funded. Otherwise, see above.

Project Title: E-Diesel Test and Research Project

Principal Investigator: Nathan Fields, National Corn Growers' Association

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	2.19	1.19	0.81
Approach	2.50	0.50	0.50
Progress	2.06	1.06	1.44
Success Factors	2.25	1.25	1.75
Future Plans	1.75	0.75	0.25
Average	**2.15**		



Question 1: Relevance to Overall Objectives.

- E-10 blend with diesel plus lubricity to replace more oil
- OEM focus for off-road - John Deere
- Rationale for E-diesel is a holdover from a desire to increase ethanol markets. However, it is not clear that this is the best way to get ethanol market increases. Moreover, explosion in ethanol markets obviates this rationale.
- Search for additional ethanol markets not really needed.
- Air quality benefits are questionable without further data.
- The little data presented could be interpreted as improvements
- coming from dilution of diesel – emissions decrease in direct proportion to dilution with alcohol.
- Support is applicable but perhaps on a very small scale
- The original research was stopped due to problems with fuel injectors
- The plan is to redirect the project
- The proposed redirection is not well defined
- The industry needs to commercial ethanol in many new markets. Funded or moved entirely into the DOE program that manages fuel and vehicle testing.
- New focus for remaining funds on biorefinery is a much better fit for the Biomass program.
- Fair because the over-arching goal to displace petro-based fuels is overlooked. The ethanol could go to gasoline displacement – in essence – it has a use already.
- New phase development approach is moving in better direction. Need to ensure that solid data are generated and realistically evaluated.

Question 2: Approach to Performing the R&D.

- Did not use biodiesel for lubricity and then ran into lubricity issues. Probably should have had a biodiesel blend as part of study.
- Project stopped for re-scoping and rethinking.
- Original project well done, and made some significant discoveries, even though the results were the opposite of what they wanted to see. Potential re-direct, which is almost 80% of remaining funding, is yet to be determined.
- Did not identify causes of failures. Essentially abandoned research.
- Lubricity approached using commercial additives.
- Research needed to address problems discovered, especially injector plugging.
- May need to rethink if this is better than the alternative.

- In its initial configuration this project did a good job at identifying technical barriers but the “phase II” is not sufficiently
- Developed to know if technical barriers are identified
- Very limited focus of research.
- Technical targets were clearly defined, well designed.
- The approach is problematic so far. Needed a better technical review team to help identify the barriers and fine tune the approach to testing those strategies. Gave up on the durability product too easily. Project planning appeared weak, the project took too long to conduct very little research.
- Not sure that team has the technology experience with new program direction which is biorefineries.
- The methods used seem valid and reasonable.
- New to ensure that good science/research methodology are incorporated into Phase 2.

Question 3: Technical Accomplishments and Progress.

- Ethanol helps viscosity so less loss of power than expected
- Injector issue as lubricity broke down.
- Engines struggling at E-10
- A rethinking work is in progress
- The engine test appears to be a good, well designed project with a qualified outside subcontractor, leading to some important E-diesel discoveries.
- Demonstrated unexplained failures of diesel engines using ethanol/diesel blends. Did not address objective re emissions.
- Did not address fleet testing objectives.
- Program stopped for good reason.
- Based on the research to date some progress on barriers
- Has been made but overall it was good to suspend the project
- The Phase II is not well defined and it is unclear how it will benefit the goals
- The effectives, efficiency, cost and benefits of this project were not well define or in some cases defined at all. Barriers were vague and did not appear to take previous R&D into account in a full manner.
- Some good data evaluating the potential of this product.

Question 4: Success Factors and Showstoppers.

- Original plan did not work
- Reasonable evaluation of engine issues w/E-diesel
- They punted.
- Injector plugging and other fuel delivery problems is a problem. Rebuilding engines are an impractical solution.
- Show stoppers were identified and the project sponsors made a good decision to suspend work
- No legal or regulatory issues.
- Focus was limited on technical engine performance and durability barriers. The other showstoppers appear to be poorly defined and the approach to overcome the show stoppers was weak.
- The R&D focus on E-Diesel as a homogenous fuel was good, as it would have achieved a larger impact of oil displacement.
- I sense that the project looked at the data using a realistic viewpoint. I do like the new direction, but showstoppers for Phase 2 must be defined.

Question 5: Proposed Future Research Approach and Relevance.

- Questionable
- Unclear…project is being redirected, and very few details were given. Project could be seen to be fairly diffuse. However, good partners have been chosen.
- Difficult to rate due to radical redirection.
- Future R&D is good start but just a start. No targets, no Research team, no discussion of future plans in detail except list of project areas which are too broad and too aggressive. They need a better step by step program with go no-go types of decision points and a strong independent technical review team.
- Will contract to Michigan State University Chemical Engineering group
- The project appears to be searching in some regard for what to do with the funding – does not some potential.
- Once their new research plans are matured, a better sense of worth can be derived. At least a good R&D team has been selected.

Additional Comments:

Strengths

- Learned what the problems were. Stopped progress and saved the money.
- Good job on E-diesel portion of effort
- Good testing of ethanol/diesel mixes on major OEM engines of varying sizes. Demonstrated problems with fuel delivery in all engines.
- Strong partnerships
- OEM Collaboration
- Tightly focused program on engine durability for E-D. Focus on the homogenous fuel provides larger potential market than O2.
- An honest evaluation was performed and the negative results well handled. I also like the new direction – highly encourage that solid data are generated to support potential new products and good process costing performed to support concepts and drive critical path developmental initiatives that will arise.

Weaknesses

- Future direction unclear but being thought through.
- Missed opportunity to do biodiesel blend.
- Somewhat unclear on redirect, although the program appears to be using reasonable partners.
- Did not address emissions. Did not address fleet studies.
- Barriers may be insurmountable.
- Suggested new program looking at very low volume markets.
- Incorporating yet another alternative fuel into a market that has not yet fully embraced alternative fuel.
- Development of yet another transportation/delivery system for E-10 diesel blend.
- Problems with engine performance/power loss/engine wear.
- Use of additives.
- Off-road focus of project.
- Needs to address emissions

- Not enough planning in avoiding some of the problems in durability with ethanol diesel blends that were known to occur. Project concluded that the original approach is a no go.
- No real ones at this time. Phase 2 will be interesting.

Technology Transfer/Collaborations

- Not ready for major tech transfer other than lessons learned.
- Not yet applicable.
- Project certainly adds value to the Program if for no other reason but to enforce this is not a good direction to pursue. Good information and research.
- Strong partners but we have to ask why there wasn't a better plan with these partners before the testing began.
- Fairly strong.

Recommendations for Additions/Deletions to Project Scope

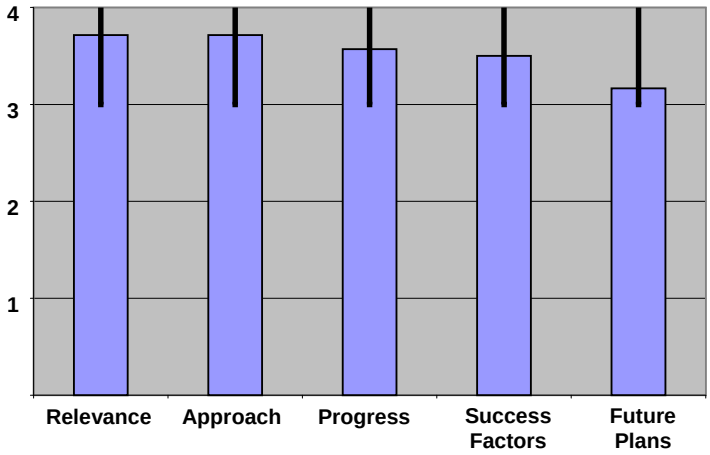
- Engines not designed for E-10 diesel fuel. Would take a determined OEM engine compatibility effort to proceed or other fuel blends to resolve
- New proposed research directions are so different from original, and since original work failed to try and overcome barriers, I would not support DOE money funding this group.
- Delete the project.
- This project seems to not fit well with DOE goals and objectives for the Biofuels Platform.
- The project team made a good decision to suspend the project on ethanol blending in diesel. The proposed Phase II is not well developed and it is not clear that the project team has the necessary experience to do this
- Redefined work. I recommend that the project team submit a detailed program and justification for co-product research. This justification should include a literature search that demonstrates which areas are not being addressed. The project team should also indicate the experience of the researchers and potential teaming with other researchers
- Future R&D is refocused on biorefinery and specifically on coproduct development with MSU. This project will be better focused for the Biomass Program and may add value.

Project Title: Missouri Biodiesel Demonstration Project

Principal Investigator: Tom Verry and Jill Hamilton, National Biodiesel Board

Project Stage: Research completed

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	3.71	0.71	0.29
Approach	3.71	0.71	0.29
Progress	3.57	0.57	0.43
Success Factors	3.50	0.50	0.50
Future Plans	3.17	0.17	0.83
Average	**3.53**		



Question 1: Relevance to Overall Objectives.

- Targeting key biodiesel issues.
- Pipeline use, economics, re-prove lubricity of ULSD, terminal blending capability and fuel quality
- Context – 20 in 10 needs biodiesel
- Critically needed for biodiesel market challenges
- Within context, this program is measuring important criteria of importance to the biodiesel industry. This will result in standards allowing BD to contribute to higher level OBP goals in renewable fuels. DOE link is nice, in that they don't support biodiesel production work, but has a strong interest in qualification of a growing fuel stream.
- Increasing usage requires demonstration and education.
- This project directly addressed these needs.
- This project is very relevant and will help to improve the distribution of biodiesel.
- Large scale development for biofuels will depend on pipelines
- Colonial pipeline was an excellent partner for moving the data
- Into other pipeline firms.
- Project appears premature for the size of the US biodiesel industry. Clear economic benefits from reducing transportation costs.
- Good applied market-driven project that addresses real issues.

Question 2: Approach to Performing the R&D.

- Well thought out set of goals
- BQ-9000 for quality
- Within context, the program appears to be highly focused and directed toward important goals.
- Very careful/deliberate approach covering many limitations.
- Good comprehensive approach to pipeline testing and lubricity evaluation.
- Outreach work well planned and executed.
- The basic Technical barriers were well defined except for cold flow. The detailed technical barriers of pipeline logistics were not included in this study and may appear later as a barrier in the future.
- They should have done the pipeline test in the winter.
- The BQ-9000 education was well defined and met the objectives.
- The lubricity testing was duplicates older data with no new value..
- The petroleum education goals was well conceived but

- The industry should carry it forward.
- For their stated goals, the approach appears good.

Question 3: Technical Accomplishments and Progress.

- Pipeline test successful
- BQ-9000 now self funded
- Tackled MN quality problem head-on.
- Major milestones met, and good data regarding use of BD has been generated.
- Accomplishments well-documented in presentation.
- All testing was completed and satisfactory.
- Outreach activities well received
- The impact on the performance factors was not quantified and there is a real issue with respect to the future volume of fuel produced. We may not ever need a biodiesel pipeline.
- The program in general was well defined with specific goals.
- They appear to have completed what was promised and at the same time appeared to have generated reasonable data of value.

Question 4: Success Factors and Showstoppers.

- All goals are well along
- Reasonable evaluation of showstoppers.
- No show stoppers exist.
- The project moved with clockwork precision and achieved most of their objectives. Legal and regulatory barriers, such as the ASTM standard and fuel quality, were addressed to the benefit of the entire industry.
- This project essentially addresses showstoppers for the industry.

Question 5: Proposed Future Research Approach and Relevance.

- Finishing efforts already underway - jet fuel and pipeline
- Could use more next steps thinking
- Future work is reasonable and continues a nice focused effort on useful questions,.
- No additional research is needed.
- Not enough information was provided, but any issues were obviously resolved in a timely way without impacting the quality of the project.
- No future work is anticipated. The program is ending.
- Really not applicable since the project is almost over.

***Additional Comments*:**

Strengths

- This project has very strong performance in a very challenging time for biodiesel industry growth
- Tightly focused, pertinent questions being addressed on getting biodiesel infrastructure and awareness improved. Testing of key operational and commercialization issues.
- Very practical approaches to overcoming real and perceived limitations to biodiesel usage, including public education and developing new markets, i.e. bioheating oil.

- Clearly one of the best projects reviewed by this panel.
- A very good program that succeeded.

- Strong partnerships with prime industry players, including partnership funding.
- Strong outreach and education program.
- Addressing all three critical components – fuel quality, distribution and BQ-9000
- A well constructed and implemented project. Achieved the objectives in a timely manner. Results generated industry wide benefits (BQ-9000). Colonial pipeline was a strong partner for the project.
- Good practical project that answers some questions for the industry.

Weaknesses

- Stronger roadmapping would help future needs.
- Few
- Pipeline test should have been done in cold winter weather
- Should have run the pipeline test in the winter. May have to be redone now.
- Need to include raw soya oil mixing as a lubricity enhancers in your tests. This will provide some critical data for many folks who are thinking this option.

Technology Transfer/Collaborations

- BQ-9000 workshops and other outreach with MN are real successes.
- Excellent tech transfer and education efforts.
- Outreach activities generated a lot of interest.
- Good dissemination of information to stakeholders.
- Excellent TT partners.
- Very strong given the nature of the organization.

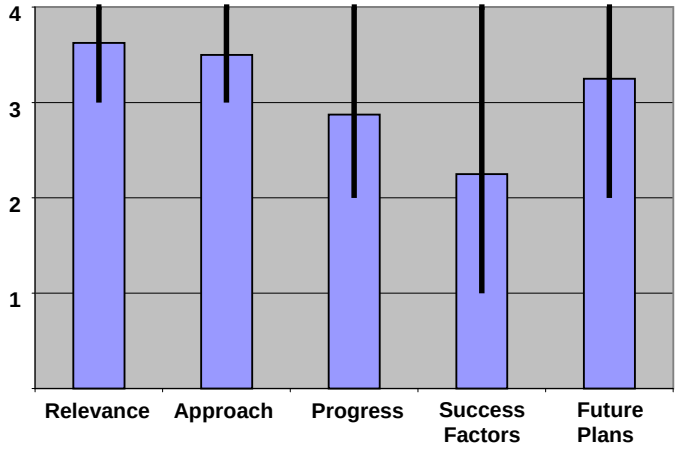
Recommendations for Additions/Deletions to Project Scope

- Recommend continued funding
- **Keep this group funded and applying themselves to other barriers/limitations!**
- Explore the use of untransesterified soy oil on lubricity
- I do appreciate the funding of organizations such as this because they appear to be addressing key market issues – as long as they are true to the data and et conclusions favorable or not become public.

Project Title: National Biofuel Energy Laboratory

Principal Investigator: Chuck Moeser
Project Stage: Various

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	3.63	0.63	0.38
Approach	3.50	0.50	0.50
Progress	2.88	0.88	1.13
Success Factors	2.25	1.25	1.75
Future Plans	3.25	1.25	0.75
Average	**3.10**		



Question 1: Relevance to Overall Objectives.

- Targets feedstock supply issue
- Goal - Feedstock neutral biodiesel with database
- Within the context of high level OBP strategic goals, then this program will provide important information. The lack of a separate biodiesel program makes it harder to place given the current single minded interest in ethanol.
- Good basic data collection re characteristics that are critical to increased use.
- Relevance is pertinent and will provide guidelines for fuel development.
- Given that fuel demand is key to the development of biodiesel production and that fuel and engine compatibility are important for demand – this project is well defined and will help to build market demand for biodiesel.
- These barriers can ultimately derail the biodiesel industry and this testing will provide critical data. The research will benefit the customers directly. May lead to improved engine design and durability. May also be moved into the Advanced vehicle engine program.
- Good experimental effort that is somewhat redundant to other works, but still of value to the Fed mission.

Question 2: Approach to Performing the R&D.

- Sorting out the characteristics of the biodiesel feedstocks is important work and will broaden the feedstock supply
- Strong engine testing and emissions
- The lab appears to have all of the correct components to do extremely relevant data generation for B20.
- Technical approach very clear, very sound, very focused.
- Excellent scientific qualifications and efforts.
- Framework for setting goals and identifying critical factors is sound.
- This is one of the best-designed research projects for biodiesel for on-road applications. It addresses nearly all the key manufactures questions about biodiesel use in diesel engines and for tailpipe emissions, and effects on after treatment equipment
- One of the best defined projects I've seen in a while. The technical design with objectives, targets, partners, and the quality of date and the uniqueness of the data is outstanding.
- Well organized project for the listed goals. Appears to have used sound methods and data handling techniques.

- A significant amount of the project was spent on facilities enhancement and not research.

Question 3: Technical Accomplishments and Progress.

- Precipitates above cloud point by feedstock plus other characteristics is important progress.
- A number of key findings – transition metals, engine testing, SCM
- Project has defined goals and is addressing important questions. However, the catalysis work is a distraction because it's biodiesel production which is not of interest to the program.
- Good basic research to date. Not so much progress re overcoming barriers
- This seemed to be more an identification and, to some extent, quantification of problems, barriers, etc. Some of this was very interesting research but did not support the program. It can lead to additional research that will be supportive of the DOE program.
- It is not clear what the performance metric are for this project and the project has not made significant progress in its research to date with most of the effort focused on establishment of the testing facilities. However this pace does not should not take away from the overall value of the effort
- The goals defined are critical
- Very specific performance targets are being used, with their selection generated by EMA, ASTM, NBB, USDA, and biodiesel producers. The project is focused on discovery at this level.
- I would expect that the next steps are cost effective solution.
- Improving biodiesel use for fuel transportation and its changing EMA technology is critical.
- Generated a significant amount of data – would help if a summary of what the data means for the involved industries.

Question 4: Success Factors and Showstoppers.

- Strong technical basis for ASTM B-20
- Missing
- Success factors and showstoppers not clearly pointed out.
- Little was done to address show stoppers or success factors.
- This project could do a better job at articulating the showstoppers and success factors. One of the difficulties is to separate the success factors of the research project with the success factors of biodiesel use
- The researchers clearly know what the show stoppers are in engine components, emissions, and durability.
- This area could be better presented and potentially better thought-out. Does appear to may be slightly reinventing the wheel so to speak.
- Need to start producing peer-reviewed papers.

Question 5: Proposed Future Research Approach and Relevance.

- Looking forward to future progress and next steps
- Annex to ASTM is needed.
- The lab appears to have established a center that will be a credible clearinghouse for information related to biodiesel properties and impact on engines, performance and markets.

- Limited information presented. Will continue with current approach.
- The future research is well founded. It appears to be more results oriented.
- Very methodical plans with go and no-go decisions and a research plan that produces unique, high value research data that will be critical for biodiesel users across the world.
- Not a lot was presented. The lab has plans to grow their program it appears, but future work via this funding is not well stated.

***Additional Comments*:**

Strengths

- Very clear program to develop vital information of use to the biodiesel industry. Appears to be a good investment of DOE funds related to biodiesel qualification.
- Very good research and progress – Well done in a needed area.
- ASTM spec focus technical support is crucial.
- Industrial partners
- Sound scientific approach to basic data collection on characteristics of biodiesel before, during, and after combustion in engine.
- This data is absolutely necessary for acceptance of fuels by OEMs.
- This will support the ASTM specification work.
- Outstanding partnerships.
- Have divided technical challenges among different stakeholders for solution.
- Good assimilation of information.
- The research proposed under this project is well positioned to help build demand for biodiesel in on-road use. This is important in building national demand for biodiesel and displacing petroleum. The project has assembled a strong project team with good technical capability respect and reputation with the original equipment manufactures.
- Addressing key R&D needs for biodiesel use in engine oils to prevent future barriers that may derail the biodiesel industry. Project plans are focused, based on previous experience in OEM component testing, developed stakeholders to develop the objectives and goals and develop the research agenda and the type of information needed by the customers.
- Solid R&D methods appeared to have been used.

Weaknesses

- What is on the horizon?
- Better public information needed.
- Basic data collection so far. Not much progress to overcoming barriers.
- This project seems to stress process or activity rather than results that support the DOE program.
- Need additional samples from around the country to see if there are regional differences.
- Test does not identify if supply was BQ-9000 or not.
- Limited NOx reduction scope.
- Slow progress to date. Failure to leverage its resources with others such as establishing research facilities
- Defining metrics directly tied to the research project. It would also be good to see a plan to fund the NBFL beyond the initial federal funding.
- Heterogeneous catalyst work does not fit. Need broader samples of existing biodiesel blends or coordinated with the BQ-9000 or not. Not enough address the showstoppers.

- A lot of funds went to facilities enhancement and not developmental activities. Granted, establishing new capability is good for the region – that is appreciated.

Technology Transfer/Collaborations

- B-20 summits are great. This research needs much greater publication of results and outreach. A trove of information broader than just B-20. Some reports and public domain publications are needed
- Excellent industrial partners. Including manufacturers whose products will need to operate successfully with new fuel types.
- Many presentations have been given.
- Outstanding technology transfer to industry.
- Good assortment of industrial partners along with a university.

Recommendations for Additions/Deletions to Project Scope

- Recommended for further funding.
- Expand scope across US. Stratify BQ-9000 fuel against other supplies. Look at other technologies for NOx reduction such as lean-burn, catalytic, etc. Even though original cost of non-SCR NOx reduction technology is higher, may need to perform a lifetime cost analysis to ensure SCR is still the best fit – show analysis in presentation. Work closer with NBB to get information out to public. Need to address emission concerns for using urea SCR (urea slip).
- Plan to continue and or expand the effort beyond federal funding. Metric for the research.
- Needs broader data outreach, SAE, etc.
- Invest more funding on experiments and seek out partnerships with other groups active in the same exact areas.

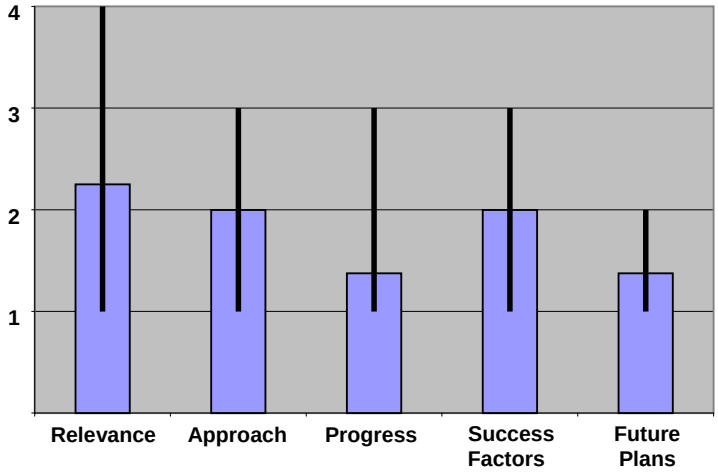
Associated Products, Combined Heat and Power, and Other Technologies Projects

Project Title: Canola-based Automotive Oil R&D

Principal Investigator: Ira Pierce, Green Oil Company

Project Stage:

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	2.25	1.25	1.75
Approach	2.00	1.00	1.00
Progress	1.38	0.38	1.63
Success Factors	2.00	1.00	1.00
Future Plans	1.38	0.38	0.63
Average	**1.80**		



Question 1: Relevance to Overall Objectives.

- Biolubricants – Green Oil company
- Canola
- More lubricity offsets oxidation
- Co-product/petroproduct offset
- Fit to 9002 USDA
- This is a huge expenditure of money without a clear reason why. The PI could gather a lot of the desired information with much less money.
- Minimal relationship to 20 in 10 goals.
- This is primarily about increased biobased product use – not about biofuels.
- Bio-oil is supportive of the DOE goals and programs.
- This project is not well defined with regard to the DOE USDA mission. It did not detail the energy saving potential of its products.
- Did not say what the goals of the program are except “reliable metrics for canola based automotive”
- Type of crop research very vague and no real coordination with USDA and other key stakeholders.
- A lot of money for absolutely not focus or plan
- No estimates of volume production of feedstock
- Only good thing appears as a focus on canola oil
- Does support conversion of petro to biomass-based goals.
- However, the effort does not appear to add any new knowledge to program goals.

Question 2: Approach to Performing the R&D.

- Proved product works and viable but not a market
- Need to get out of batch process so cost competitive and readily available.
- Need 9002 preferable procurement
- Market research – Triad sessions
- For 1.3 million, there should be a much more detailed and integrated approach to analysis. Much more information for the dollar should result.
- Minimal relationship to 20 in 10 goals.
- This is primarily about increased biobased product use – not about biofuels.
- Big issue is cost but process is batch, not continuous.
- No detailed technical plan was presented.

- The focus group approach to markets and customers is sound.
- The presentation was a rambling story rather than a focused discussion on the project. Following the presentation it was not at all clear what the approach would be or why it would be better than alternatives
- Need a more detailed feasibility analysis
- No focus on specific crop R&D goals or objectives, no
- Quantitative targets
- Not sure what the benefits of the survey will be, or how to estimate the value of the survey for the crop project.
- Not much information presented on the exact methods.
- What was presented – a reasonable marketing plan is proposed.

Question 3: Technical Accomplishments and Progress.

- None to date
- The evaluation is very narrow, and applies only to the PIs product and potential impacts.
- No specific objectives.
- Nothing, apparently, has yet been done.
- This reviewer could not determine what if any progress has been made
- No discussion on existing data from USDA and other canola producer --current yields, current pesticides, current cropping programs, current costs and barriers. No discussion of which barriers they are looked at.
- No estimates of benefit of this interest in canola oil.
- Just started.

Question 4: Success Factors and Showstoppers.

- Needs more progress
- Shelf life concerns
- Realistically, economic and market evaluations have few show-stoppers associated with them. One gathers data and presents a conclusion with a short shelf-life. Thus, in that context, the success factors et al appear to have been evaluated.
- Minimal relationship to 20 in 10 goals.
- This is primarily about increased biobased product use – not about biofuels.
- Price is the big show stopper. Other success factors and show stoppers will be identified as the project progresses.
- This project needs to identify the technical and business factors limiting this fuel and feedstock area, including showstoppers, research strategies, and everything else.
- Seems to have identified most – suggest no ignoring the meal issue.

Question 5: Proposed Future Research Approach and Relevance.

- The plan to proceed and the methodology are quite limited. This could be much more effective if one would look at a much broader cross section of biobased products.
- All about marketing one company's product.
- Minimal relationship to 20 in 10 goals.
- This is primarily about increased biobased product use – not about biofuels.
- Marketing study not relevant to Biomass Program goals.
- It is premature to consider future research.
- Need a more detailed planning structure. Not sure how the survey will be translated into future planning.
- Hard to gauge that is was recently initiated.

***Additional Comments*:**

Strengths

- Market analysis was needed
- Good application of biobased products as offset to petroleum-based.
- Improved lubricity is a major strength.
- Strong group of stakeholders/partners.
- Good group of uptake core questions if these questions are not available other places.
- Behavioral Insights subcontractor may be solid, I've heard of them before.
- Will further develop a relatively new market for bio-based lipids.

Weaknesses

- Progress has been slow
- No technical plan
- The amount of funding for a market evaluation study is exorbitant. This could have been done for a tenth of the level of the earmark. Frankly, the amount of money allocated to this activity is outrageous.
- The methodology for the market analysis is very poorly defined. Much clearer description of process is required.
- No details on budget, specific quantitative objectives. What processing is necessary to produce the various lubricants? What are energy inputs, environmental impacts?
- Price is a major weakness.
- Explanation of why Government (DOE) money should be used for Green Oil Company to meet the Preferable Procurement requirements of the 2002 Farm Bill.
- This project appears to be an investigation into and the establishment of metrics to test canola based lubricants
- However there was no discussion of why this metric is need other than to say the consumers would not buy
- This product unless they know it was reliable – despite the fact that the company has been selling the product for 17 years. The discussion alternated between the need for test metrics to encouraging farmers to grow canola, to a marketing survey for biobased lubricants.
- Denigrates DOE and its processes while they expect to take their money. "They don't do feasibility studies correctly. They don't know anything about it."
- Did not follow power point format, so we have a large number of unanswered questions.
- Used too may "buzz" words to confuse the purpose of the study, it took the entire presentation on "off-takes" to understand they want to do a product marketing study.
- The engine oil market is small, very fragmented, highly technical and requires close coordination with the engine manufacturing for large scale production. This project appears to be self serving.
- The project offered nothing of value.
- Not a lot of information presented on methods – get the impression that the method proposed is neither well-defined nor thought-out.
- Not considering the meal nor extraction issues.
- Not offering up a plan to initiate significant testing.
- A niche market – not a lot of volume displacement potential.

Technology Transfer/Collaborations

- Has large industrial clientele
- Nothing was said.
- None I could tell.
- Very minimal - based on the presentation.

Recommendations for Additions/Deletions to Project Scope

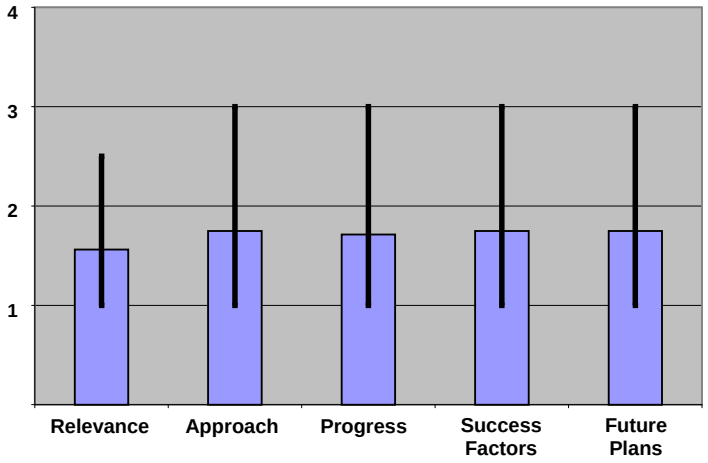
- Large potential market but very fragmented
- This project is not appropriate in this program. It has nothing to do with Biobased fuels or meeting the 20 in 10 goals.
- This project does not seem to fit with DOE's goals and objectives for the Biofuels Program.
- Require a focused test program for canola based lubricants what are the parameters, why are they important, how will they be tested, who are the partners, what are the results.
- Provide a detailed task plan with research barriers, targets for improvements, methodologies for conducting the studies, estimates of benefits if some or all successes occur. I
- Need to really focus on user machinery testing using a well-respected testing service along with considering turn-key issues pertaining to oil production.

Project Title: Phillips Biomass Combined Heat & Power Facility

Principal Investigator: Carl Nelson, The Green Institute

Project Stage:

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	1.56	0.56	0.94
Approach	1.75	0.75	1.25
Progress	1.71	0.71	1.29
Success Factors	1.75	0.75	1.25
Future Plans	1.75	0.75	1.25
Average	**1.71**		



Question 1: Relevance to Overall Objectives.

- Two projects – CHP & then new work plan
- Not good fit to OBP
- Minimal relationship to 20 in 10 goals.
- The project is relevant but is not new. You can go out and buy commercial CHP for this use. There is no R&D involved
- The biomass actions are very fringe to the goals of DOE
- Although a good idea the efficiency work is out of scope
- No justification for government support where a feedstock that receives a tipping fee and a green power rate that averages 25 cents/kwh should be great but major barriers are present (bad site, limited MSW supply, etc.) . No need to commercial a old and well established industry unless they can identify what new development will be included in the technology , such as NOx reduction, or more efficiency, or cheaper drying.
- No integration into liquid biofuels, chemicals, or other coproducts.
- No real technological developed appears to be happening.

Question 2: Approach to Performing the R&D.

- 20 MW CHP for local community with district heating and energy efficiency program through energy coop
- So, shift to anaerobic digestion CHP and pellet wood stove study.
- Upfront analysis missing when originally targeted.
- Clear definition of the project, both the original Phillips activity and the subsequent redirection.
- No R&D at all to date. Some nice community energy-conservation outreach.
- There seem to be no technical barriers. There are other alternatives to the identified biomass boiler. Approach is simple and commercially available.
- Technical barriers -contracts for wood were not addressed
- In fact they are doing the same thing with Rock-Tenn
- No technical barriers were identified, all of their barriers are lack of planning or lack of reality, they want to make it work so they believe it will work. They were really wallowing around looking for answers. Their feasibility study has not well defined, comprehensive or complete. No novel technical barriers are being explored. Their biomass waste wood inventory database is good.
- Very scattered list of activities and little directed focus on an achievable value-added product.
- The inventory of available biomass will provide usable info.

Question 3: Technical Accomplishments and Progress.

- Plan B appears to be better for CHP. No lasting OBP accomplishments to date.
- Original project didn't work out, however, the research team recognized shortcomings and have redirected in a reasonable effort.
- Virtually no accomplishments relative to DOE R&D
- Nice urban energy efficiency outreach
- Just getting started with resource survey.
- No metrics included
- The project need to have a much better fined set of barriers and would benefit for a professional, experienced feasibility development firm.
- Not a lot of substance presented in terms of accomplishments. However, there has been completion of some activities that appeared to have been part of their scope.

Question 4: Success Factors and Showstoppers.

- Spring/Fall district heating and cooling load not there
- MN lowered biopower mandate
- Long term wood waste supply contracts missing
- Evaluation for original and redirected projects seems to spend an appropriate amount of time defining barriers and opportunities.
- Progress based on the possibility of cooperating with ONE commercial entity. No solid technical plans for achieving goals.
- Funded investigators looking for something to do with the money
- A poorly done plan. Not related to DOE goals and objectives in this program.
- This project should have done a sensitivity to the electric
- Revenue and would have realized early on that it was not feasible or at least linked to electric contract
- They have identified some of the key show stoppers but only through trial and error.
- No a significant effort in this critical aspect was presented – quite frankly, it appears that they have funds and looking how to spend it.

Question 5: Proposed Future Research Approach and Relevance.

- CHP biomass supply is uneasy.
- 20 yr financing is uncertain.
- An apparently comprehensive evaluation of inventory, impact, cost, etc. has been carried out to justify the redirection of DOE funds.
- No significant R&D identified.
- Unlikely to contribute ANYTHING to 20 in 10 goals.
- No plan.
- Their plans to continue are poorly defined at this time.
- Minimal value is expected to be gained from more effort other than stimulate regional interest.

***Additional Comments*:**

Strengths

- Stopped original plan when project proved unfeasible.
- Good use of DOE funds for societal impact
- Homework has been done on paper to provide case for redirection of funds

- None. Three+ years into project they don't have a plan.
- The concept is good (although not part of DOE biorefinery platform) the use of biomass for combined heat and power is practical the waste wood inventory was well done
- Generated inventory data. Good community relationships.
- Growing regional interest in alternative E and energy conservation.
- Generated some regional biomass inventory data and associated costs.

Weaknesses

- Needed stronger upfront analysis
- St. Paul district heating competes for urban biomass availability.
- Uncertainties in the infrastructure for collection and delivery of fuel
- Has their project evaluation document been carefully peer reviewed by experts for accuracy?
- Very limited technical progress.
- Planning is not well advanced.
- Infrastructure is not developed.
- Weak, weak overall plan.
- Does not know what type of CHP going to be utilized – if you don't know what generation source you are using then how can you plan for fuel needs.
- No emissions plan.
- No long range fuel plan.
- The project should not have been so large to start with a smaller co-gen project may have been easier to work with. If the wood availability proved to be problematic for the co-gen then it will be for Rock-Tenn too and this project was not a good refocus of this effort
- Everything. No benefits offered to DOE research or even commercialization as R&D barriers were identified. No focus on technology optimization—gasification for liquids and power for example.
- Need technical support.
- Little focus with no real technology development nor advancement expected to occur.

Technology Transfer/Collaborations

- Local energy coop model is a good base to build from in local community.
- Minimal
- Technology transfer was not addressed.
- Questionable
- Minimal – no real collaborations were illustrated.

Recommendations for Additions/Deletions to Project Scope

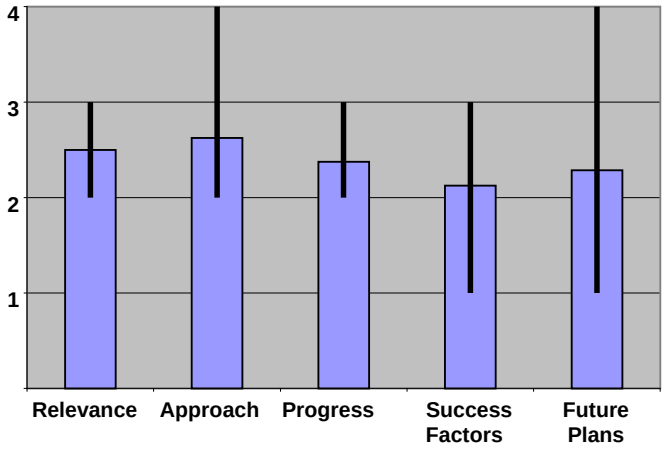
- Strong caution for future funding from OBP.
- Very weak component of this DOE Program…
- Possibly a good example of community outreach/energy efficiency programs.
- Not relevant/does not fit well with DOE goals for the Biofuels and other Technology platform.
- Consider smaller dispersed biomass co-gen projects
- Recommend closing program and returning funding to either US Treasury or other Biomass Program projects.
- Find an area that capitalizes on regional assets and dive into technological development.

Project Title: EERC Center for Biomass Utilization

Principal Investigator: Christopher Zygarlicke and Dr. Bruce Folkedahl, University of North Dakota

Project Stage: Various

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	2.50	0.50	0.50
Approach	2.63	0.63	1.38
Progress	2.38	0.38	0.63
Success Factors	2.13	1.13	0.88
Future Plans	2.29	1.29	1.71
Average	**2.38**		



Question 1: Relevance to Overall Objectives.

- Biofuels, biopower & bioproducts for biorefinery of future
- Many activities-& Cross-cutting
- Cuphia feedstock
- H2 from ethanol plant
- Biojet fuel
- Urea fertilizer as ethanol plant co-product
- Pyrolysis oils
- Hard to see how this eclectic collection of projects combines to make an impact relating to OBP goals.
- Supports a wide variety of approaches to meeting program objectives
- Plan support is not entirely clear and markets not identified in some cases.
- The shotgun approach was bound to hit something.
- The project meets the DOE objectives in the broadest sense
- The customer potential is identified – EERC says they
- Identify projects based on customer need
- The market potential from these project / technologies Is not explored
- Little real focus on specific areas with major impacts.
- Does not try to coordinate with DOE. They show a stage gate but it's not clear that this concept is used in their myriad research programs.
- Not particularly novel developmental effort.

Question 2: Approach to Performing the R&D.

- Multiple pathways
- Issue identification and resolution
- Good list of challenges
- Too many
- Landfill Microturbine CHP is more common than acknowledged
- Barriers seem to be addressed
- Excellent – addressing multiple goals, objectives, and approaches.
- Outstanding number and variety of partners.
- Very scattered number of topics and unrelated. But, everything is moving along well. Biojet fuel is a good goal with a large potential market.

- The approach is “shotgun” at best with little focus
- The barriers are too broadly defined
- There could be more integration with other research
- Technical R&D targets are poorly defined with respect to benefits that may be justified. Appears to be a scatter gun with no focus. NO integration evident. The key barriers and targets are not identified in detail, primarily as they have too many projects involved. Would benefit for a tighter focus on a few number of projects that might achieve something substantial. Some of the testing work does not have any specific targets, but just appear to be demonstrations for additional data. In many cases they are reinventing the wheel, such as steam reforming wet ethanol, demonstrating commercial microturbine applications, etc.
- Very broad scope of activities. Suggest investing more defined focus to gain expertise and a sufficient tech base to contribute to DOE mission and the lab’s growth as well.

Question 3: Technical Accomplishments and Progress.

- Lots of work in progress
- Results forthcoming
- Too many undone activities
- Cuphia – No go
- Generally low level of innovation.
- Good progress on most projects. Landfill methane project is based on fallacy.
- I saw little evidence of metrics in the in the review
- It seem to be almost exclusively based on technical
- Evaluation no cost and benefits
- The project researchers tend to have a cursory evaluation
- Process for efficiency, benefits, risks, etc. but they don’t
- Tend to use the results in a better focused strategy.
- Some benefits may occur but real benefits not clear.
- Good for their planned scope.

Question 4: Success Factors and Showstoppers.

- Hard to name successes
- No indication that this work will offer any new insight into solving barriers in gasification, new products, biodiesel production, etc
- Good Cooperation, commercialization progress.
- Using landfill gas in a microturbine has been proved impractical.
- This project has not looked at regulatory or business showstopper in depth
- This is the key weakness for this project area.
- In some cases, their effort is not very novel therefore does not address showstoppers.

Question 5: Proposed Future Research Approach and Relevance.

- Activity specific completions only
- Unless innovation improves, it’s hard to believe that OS will be supporting this work.
- Clarification on where funding will come from would be useful
- Future plans not clearly delineated.
- This work is mostly preliminary little future work is defined
- The program would benefit for future planning, a future focus and a goal to achieve from the program rather than a random group of projects.

***Additional Comments*:**

Strengths

- Great list of ideas and challenges
- Very nice education and outreach meetings
- Lots of cost share partners
- Diversity
- Good matching of needs and Federal funds with cooperators
- Strong group of both cash cost-share funding partners and in-kind partners.
- Good education program.
- Industry partners good resource capability
- Good partnership and cost share.
- Good educational outreach.
- Building capabilities of the group and expanding regional interest/expertise in biofuels.
- Providing an educational foundation for developing more faculty active in biomass to chemicals/fuels along with the education of future biomass-savvy technologists.

Weaknesses

- Too broad for dollars available – spread too thin
- Too many works in progress – no results
- Way too many projects
- No good sense of economic impact
- Poor sense of whether projects have a realistic chance of moving out of the laboratory
- Very low level of innovation…lots of this has been done again and again
- Diversity
- Too many subprojects.
- Some projects already proved impractical.
- No mention of an emission component to gasifier.
- Too many projects going on at one time – focus.
- Presenter did not address the corrosive effect of landfill gas on microturbines.
- Regional focus
- There is little focus to this project it appears that the Center will do whatever the research dollars will cover
- Portfolio too broad and no sense of benefits or economic value. Some of the projects have been done before.
- Needs to coordinate with DOE Biomass Program to get better value of the project.
- Way too broad – lacks focus. Should spend effort in focused area that fits well with ND region and the DOE interest areas. Also, their work lacks economic analyses.

Technology Transfer/Collaborations

- Annual workshop – Attendance growing,
- Strong panel of partners.
- Excellent
- This project could do a lot more with working with other groups to coordinate it projects. The laboratory and its many partners have substantial intellectual and outreach resources that should be more focused.
- Needs a single big project.
- If needs several projects, then need a gate keeper.

- Appears to have limited direct industrial involvement with research – need to enhance this area.

Recommendations for Additions/Deletions to Project Scope

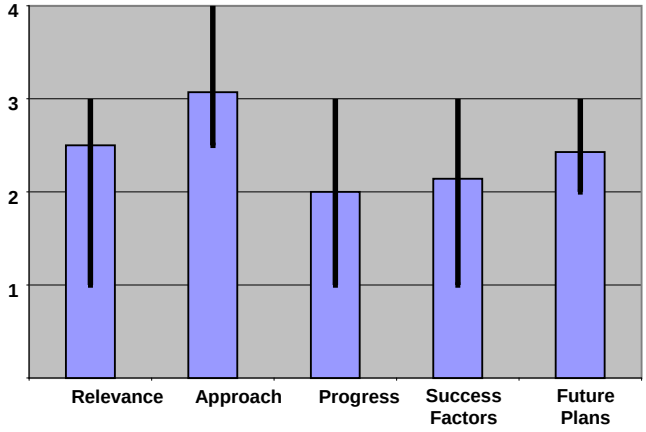
- Need strong focus, Caution on any future funding unless stronger filtering.
- Reduce the number of activities and focus the money on very few promising and high market potential possibilities.
- Narrow focus. Work toward building capabilities that have a future for competitive funding – need to fit DOE and USDA future R&D goals. I also believe that you are missing an opportunity to utilize regional feedstocks and other associated regional assets. Build capability around technologies with a funding future coupled with a strong component of using feedstocks from your region.

Anaerobic Digestion and Waste Processing Projects

Project Title: Anaerobic Digestion (Ohio State University)

Principal Investigator: Floyd Schanbacher
Project Stage: 2 – Detailed Investigation

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	2.50	1.50	0.50
Approach	3.07	0.57	0.93
Progress	2.00	1.00	1.00
Success Factors	2.14	1.14	0.86
Future Plans	2.43	0.43	0.57
Average	**2.43**		



Question 1: Relevance to Overall Objectives.

- The project will generate energy in the larger context of biomass platforms, but the innovation is not particularly high.
- Has integrated project into numerous DOE objectives.
- Excellent partnerships
- Comprehensive
- Relevance is pertinent. Market potential is highly questionable.
- The market potential was not well defined this technology
- Is not farm scale but industrial There is not much outreach and there should be more coordination with other states
- Oil displacement benefits not identified. The market is biopower with novel fuel cell end technology that appears to have good technical justification. Conversion technology appears to benefit a waste stream issue and low cost feedstock.
- No new information being generated. Very redundant effort too many projects already done.

Question 2: Approach to Performing the R&D.

- Performance is reasonable, but innovation is low.
- Well-conceived and integrated project.
- Cost may be the primary barrier.
- Feasibility of fuel cells for processing biogas was proved earlier in other locations.
- I like the research on microbes and the controls
- A self-controlling digester is a good outcome
- more focus should be put in this area and less on the
- resource assessment
- The technical barriers were address only once we dragged that info out of the reviewer with questions. They did not offer key targets at all saying it was premature, while in discussion they clearly had some type of go no-go types of strategies. The self-healing, self diagnostics, self operating digester looked unique but potentially expensive.
- Their approach is good for their stated objectives. The engineering and project plan is well thought out.

Question 3: Technical Accomplishments and Progress.

- Project appears to be moving slowly
- Most effort to date has been planning and facility construction. High potential for valuable contributions in several areas.
- Some progress on bacterial characterization. Optimizing organisms for anaerobic digestion is very important with potential to increase gas yield and improve overall efficiency by possibly reducing energy input requirements.
- Progress is adequate but has not reached the stage of generating data.
- Bacterial species studies may be the most valuable part of this work.
- Why was fish processing waste not included?
- There are no performance indicators it is very difficult to
- Measure any success or progress
- The reviewer did not provide any discussion as to how the project will benefit the 2020 goal, or DOE's program direction, nor did he provide any cost benefit estimates or cost targets, or efficiency targets. Need some economic analysis. The focus on the project is higher efficiency of biogas production and the approve is fairly innovative but needed more specific microbiology R&D.
- Very limited new information will be generated from this effort as planned.

Question 4: Success Factors and Showstoppers.

- Project tried to identify show stoppers, but at a pretty high level. Did not address details.
- Excellent analysis of showstoppers. Honest assessment of success factors.
- Fuel cell component is important, but is not necessary for project to be successful.
- Identified show stoppers are true and good. Did not address alternative energy conversion technologies for biomass.
- The success factors And showstoppers seem to rely on
- Policy and Renewable incentives
- The reviewer provided some justifications for their research direction that looked legitimate. The project has not processed to the point where regulatory barriers or environment barriers are integrated into the project.
- Minimal true show-stoppers have been identified.

Question 5: Proposed Future Research Approach and Relevance.

- Plan forward is reasonable, but is treading well worn ground.
- Good plans.
- The future plan looks good.
- The future plans are a little vague and tended to focus on more operational data and adding another digester to their infrastructure. Neither research target dates nor any research or economic targets were provided.

***Additional Comments*:**

Strengths

- Reasonable coordination between engineering and development of efficient new anaerobes
- Addresses an issue in OH with an available waste stream.
- Reasonable leverage of DOE funds
- Good research plan.
- Results could be very useful but positive result highly unlikely.
- Strong partnership between industry and academia

- Comprehensive focused approach
- Commercial potential with broad appeal to municipals
- Good engineering
- I like the research on microbes this will lead to better understanding and potentially improved efficiency
- I like the controls research and development of better self operated systems
- Novel approaches to better microorganisms and better instrumentation feedback systems to better reliability and higher operability targets.
- Appears to be well engineered systems.
- Well laid out experimental plan for their stated objectives.
- Good outreach initiative with industries who may not seriously consider biogas utilization.
- Building new expertise within their state along with additional R&D capability that could grow their program.
- Providing an education to students who will be biotechnologists of the future.

Weaknesses

- Larger national impact is not clear, as the project is quite OH-centric
- Low innovation – anaerobic digestion is well studied and employed
- Project appears to be moving somewhat slowly. Only at batch scale so far. Two large scale ups still necessary before completion.
- Need not demonstrated
- No fallback position if SOFC fails because of biogas contaminants
- Relies heavily on price/value of renewable energy
- Did not address SOFC generation price/kW
- Did not address kW/gal of digestion or btu/gal of digestion
- Lack of coordination with other researchers
- No assessment of the market potential
- Too much federal dollars for resource assessment
- No R&D targets, no milestones, no quantitative benefits, no feedback loop to DOE, no integration into other researchers in the field.
- Project has been slow.
- Don’t see any significant technology advancement presented thus far.
- Efforts on the dairy wastes are not considered of significant value – already been done by many groups.
- The waste inventory assessment seems of little value.
- The connection of microbial population identification efforts to improved process control/production was not clearly made.
- Lacks process economic analysis and the supporting economic benefits.

Technology Transfer/Collaborations

- Excellent
- Good collaboration with commercial sector.
- Poor
- Reasonably good – like the mix of feedstock producers along with process equipment vendors.

Recommendations for Additions/Deletions to Project Scope

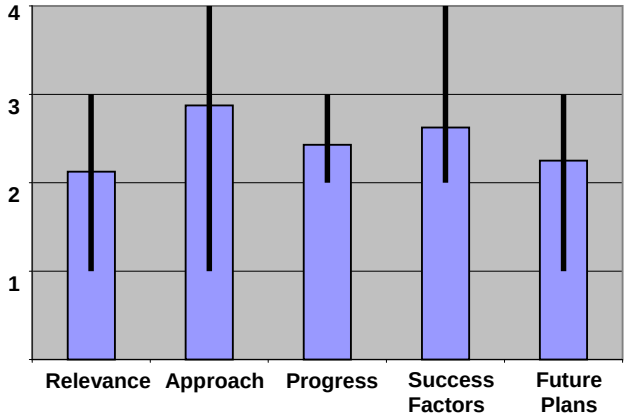
- Fuel cell work does not contribute much to this project. Focus instead on biogas production research.
- Emphasize development of new bacteria.
- Project needs to identify other types of power generation if SOFC fails. Show comparison of cost/kW of other types of power generation. Identify emissions profile of different types of generation.
- Reduce work on resource assessment more focus on controls and interface with fuel cells
- Fine tune the project and provide good quality management processes such as Microsoft project and better technical targets and milestones. How do you know when you succeed or making progress?
- Recommend focusing exclusively on industrial wastes and oriented process automation toward industrial plant operators where their training level is much higher than farmers for process controls, plus their comfort zone for process controls/operations are much more established.
- The project has potential good merit if it strives to break new ground or attempts to bring industries on board that have been hesitant to give this technology a realistic look.
- Ensure that a plan is in place to manage digester residuals – look toward possibly marketing the residuals, i.e. digester tea or fertilizer value – keep in mind that the industry may be concerned about their materials going out into the market.

Project Title: New York Biomass/Methane Gas Power Fuel Cell Project

Principal Investigator: Dr. Caine Finnerty and Praveen Cheekatamarla, NanoDynamics, Inc.

Project Stage: Stage 4: Technology Development

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	2.13	1.13	0.88
Approach	2.88	1.88	1.13
Progress	2.43	0.43	0.57
Success Factors	2.63	0.63	1.38
Future Plans	2.25	1.25	0.75
Average	**2.46**		



Question 1: Relevance to Overall Objectives.

- Belongs in HFCITP portfolio
- SOFC distributed size
- Provides a user of the biogas or even syngas that will be produced from biomass.
- Falls within the hydrogen project
- Relevance is pertinent
- Not closely related to Program objectives.
- Fuel cells have their own program.
- Not biomass related.
- Operation with biogas/syngas is important goal for future fuel cell adoption/use.
- The use of renewable fuel for the fuel cell is a good
- Approach but the focus on biogas and the research is really focused on improving the fuel cell which makes this a better fit in Hydrogen
- PIs gave poor indication of how the project will affect DOE program goals. Difficult to evaluate and PIs need to be more integrated with OBP programming goals.

Question 2: Approach to Performing the R&D.

- Small scale – lab level
- Gel casting is good approach – problem to tackle
- Their experimental approach appears solid for their stated objectives:
- Clear R&D targets, focused strategies for achieving the targets, innovative R&D on materials formulation and practical construction, focus on efficiency conversion, and verbal discussion on capital and operating cost targets. Barriers were fairly well defined but not linked for specific market end application issues.
- Very small scale. One can already buy a bigger one.
- Not clear what the goal is
- Good research plan
- For a fuel cell project this is very well organized and designed
- The performance measures are clear and are being met
- I would have scored higher if the project had been more in line with the OBP program
- Project is highly focused on one thing: making a cell that generates 20W. Activity is at the expense of placing work in larger energy context. However, highly focused research appears to be progressing along a defined path.

Question 3: Technical Accomplishments and Progress.

- Making steady progress from fuel cell development perspective

- Fit issue with OBP
- If this were a HFCITP project would grade higher
- Significant work appears to have been performed and considerable amounts of data were presented.
- No performance target indicators were provided specific to the DOE program and its goals, but the project did have well defined efficiency and cost targets.
- Had good focus on robustness and durability.
- Good progress has been made but it is not clear that this is worthwhile. They seem to be behind other industrial players.
- The reformer catalyst studies and development seem worthwhile.
- Some good progress, but unrelated to needs of this Program.
- Fuel cell development should focus on direct utilization of biogas without reforming step.
- This project has mead very good progress The only thing
- That brings it down from outstanding is that it is more of a
- Fuel cell development than biomass
- Great proportion of effort is on cell design and making one that meets certain parameters with little apparent understanding of what targets should be met on a national scale, and how this technology might address those targets.

Question 4: Success Factors and Showstoppers.

- Planar cells success is important for cost cutting
- I believe this project is well run and moving in a reasonably positive direction.
- Business and regulatory issues were not addressed in detail. Commercialization targets were verbally addressed in feedback (Japanese market).
- Commercial scale up of electrode manufacture not clear.
- Reliability.
- Tolerances may too wide.
- Discussion of biogas neglected to address effects/removal of SO2
- The market for this package appears to be a real showstopper
- That is not addressed. The small fuel cell works well but the
- Biogas fuel to supply the fuel cell in a home is not practical
- By focusing so strongly on cell design, the larger impacts appear to have been ignored. Vague description of eventual deployment and application.

Question 5: Proposed Future Research Approach and Relevance.

- Concept C success is important capstone of work
- Their appeared to have demonstrated a vision for how they will fully meet project goals.
- Not a clear idea of how it is going to commercialize the technology. May need partner, such as GE, to commercialize larger systems (2-5 MW).
- Future plan looked to be somewhat repetitive of what has been done.
- Future work not expecting new innovations – incremental improvements.
- In my opinion the only way to make this be a biomass project is to look at biodiesel as a fuel
- In short term, project needs a much better sense of how their project fits into the larger national energy strategy, quantifying potential opportunities and impacts.

***Additional Comments*:**

Strengths

- Making good progress
- Good SOFC R&D targeting
- Appears to be a well thought-out and implemented project.
- Advances the potential for using biogas for use in fuel cells.
- Also, provides more development work on fuel cells.
- Strong R&D plan has clear goals and objectives, clear plan to achieved, achieved their research in a step by step manner, and reported results that nearly achieved target.
- Good research program
- Uses a wide variety of fuels
- Well-designed project from the fuel cell research side and if the plan was to build bigger fuel cells for stationary power generation then it would be OK
- In depth investigation of cell construction and performance

Weaknesses

- Not partnered with the SOFC development consortium
- Poor fit to OBP
- No economic information was provided – with these technologies – could be your ultimate show-stopper.
- Didn't address sulfur issues.
- The stated technology economics don't match up to the volume of biogas that is produced nor do the costs/scale match up.
- Weak commercialization plan
- Not clear where it is positioned for cost effectiveness or compared with other technologies.
- The way forward (commercialization) was not described.
- Lots of data but few conclusions.
- Questionable scalability to residential application
- No partnerships
- Does not address cost/kW
- Addresses Japan market and not U.S. market
- Too expensive for American market
- Not relevant to this DOE Program
- The potential market is weakness To focus on a small package for homes or apartments makes this project problematic because the biogas can't be generated cost effectively at that scale
- Poor sense of larger impact of work; needs to have a much better idea of path to commercialization, and for DOE, a much better indication of broad energy impact.

Technology Transfer/Collaborations

- No partners
- It appears that they have minimal interaction with other groups.
- Looks like no activity in this area. No clue about target market.
- Fair
- Very poor. Presentation specifically noted no industrial partners, although the Q/A period revealed that some industrial partnerships may be developing.

Recommendations for Additions/Deletions to Project Scope

- Move this project out of OBP to the SOFC effort

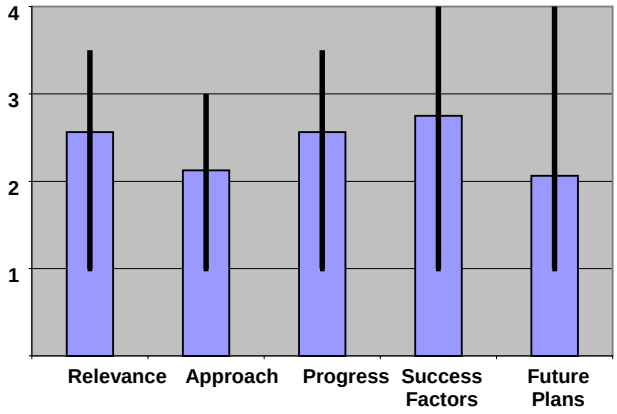
- Need to spent significant time on scale-up and the derived economic benefits.
- Need to address scale-up to match with the biogas sources – a lot of biogas is produced at production facilities with very limited storage capacity – need to ensure that these match up.
- This belongs in the Hydrogen Program.
- Misplaced project – belongs in hydrogen program
- Belongs in another DOE program.

Project Title: Ohio Solid Waste Authority Pyramid Resource Center

Principal Investigator: Tim Berlekamp, Solid Waste Authority Pyramid Resource Center

Project Stage:

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	2.56	1.56	0.94
Approach	2.13	1.13	0.88
Progress	2.56	1.56	0.94
Success Factors	2.75	1.75	1.25
Future Plans	2.06	1.06	1.94
Average	**2.41**		



Question 1: Relevance to Overall Objectives.

- Biopower is not currently in OBP target zone but is in the new Vision document
- The project is successfully tapping an existing but unused fuel source. The project, although of somewhat low innovation, is still doing an excellent job of moving from opportunity toward commercial production of renewable energy.
- The project is a demonstration project not research
- It should have an outreach component
- Good plan and relevance to DOE Biomass programs and
- existing commercial MSW landfills
- Relevance is pertinent.
- Good project but not real linkages to Biomass Program except for expand distribution of green CNG for fueling and possibly for facilitating B20 distribution.
- First commercial scale application of CO2 wash which may be one of the solutions for gasification clean up.
- Provides a developmental program that will demonstrate renewable fuel production technology.

Question 2: Approach to Performing the R&D.

- Good commercialization of biogas scrubbing – CO2 Wash
- Uses refrigeration to separate CO2 from methane
- Closed loop energy system
- Methane to methanol as feed to biodiesel
- Very integrated including CNG fueling for garbage trucks
- Scaling for small landfills and large
- Project is well designed, focused, and is on a path to convert a generally untapped fuel source. Variability of landfill gas pressure could be a problem.
- The technical barriers – small landfills don't have the technology At a scale to develop
- It is not clear no comparison of # of landfills and comparison to more typical LFG generation projects
- Reduction of NOx
- Very thorough.
- Everything seems to depend on trademarked "CO2 wash."
- Landfill gas clean up to methane is existing technology.
- This approach may be a little different but the result is the same.

- Rated poor because the project is not needed to reach the goal.
- Technical targets were not provided, nor does the implementation plan show any coordination with the DOE program. The team has very experienced technical people involved and the project is well designed and appears to be technically feasible. For a demonstration project, we don't know how to measure it to see if it's successful. No real economic research targets either.
- Their Phase II program with methane to methanol conversion production and their biodiesel production facility needs to be better justified economically.
- Limited actual approach was presented – appears to be reasonable – however, little justification of scrubber choice was presented.

Question 3: Technical Accomplishments and Progress.

- Almost complete as first generation commercialization
- Project is well described and quantifiable, and presentation is able to deal with key questions.
- This is not a biorefinery it is more of a waste reduction recycling project
- The fuel / petroleum reduction will be small
- The environmental benefits could be a positive factor
- Planning, design, and installation for Phase I nearly complete. Not yet operational.
- Good progress being made
- Some performance metrics were discussed such as natural gas and kWh green production. The methanol production would reduce fossil fuel imports. Cost appears to be effective at really low Btu cost from landfill gas production. No discussion about how this technology can role out nationally and what that benefit might be.
- Appears reasonable for stated goals.

Question 4: Success Factors and Showstoppers.

- Good sense of economic impact and potential problems in dealing with this source of energy.
- It seems that the only success factor was if the project sponsors could make this a commercial technology
- Everything seems to depend on trademarked "CO2 wash."
- Market for CO2 critical for success?
- Applicability to lesser-managed landfills?
- Operator skills, time requirements?
- Most listed showstoppers were overcome 10 years ago in California. The other showstoppers are unique to Ohio.
- Some success factors and show stoppers were identified but without any quantitative numbers. Regulatory and legal issues are high with this project but the team appears to be experienced to overcome these.
- I believe that they have not adequately addressed project cost benefit for this project.

Question 5: Proposed Future Research Approach and Relevance.

- Very good plan to make green methanol for biodiesel plant
- Plan for additional activities are focused on commercialization, and construction is proceeding to develop a fuel production and distribution facility.
- The CO2 sales was not well addressed – what happens to the commercial value if the CO2 market is lost
- Still waiting for demonstration of concept for Phase I. Ambitious plans for phase II, scaling and marketing to various-sized landfills

- Phase II can also be achieved with existing technology.
- The project is overly complex and does not have any go/no-go decision points. Needs a better planning process for why some of the down stream sections are included. Their progress on construction to date is good, but plans for going forward were generic.
- Not many real future activities were presented.

***Additional Comments*:**

Strengths

- Commercialization of potentially needed product in biogas scrubbing – CO2 wash
- The small scale is especially appreciated for smaller landfills – new market
- Renewable methanol
- Very good leverage of DOE funding: 40% federal/60% private
- Excellent progress toward commercialization.
- Team is highly informed regarding all technical, regulatory and production issues surrounding their process.
- Nice demonstration of moving from concept to commercial reality
- Good cost sharing
- Good plan to produce CLEAN, multi-use fuels from landfill gas. Possibility of CO2 capture is worth exploiting – though not part of DOE program. Decrease in greenhouse gas emissions also important.
- Strong partnerships
- Good environmental benefits of this technology
- Variability of CO2 Wash btu output
- Strong team with good commercial technology.
- Good project with little benefit to the nation over all, but maybe good benefit to Ohio.
- Using an energetic resource that is currently wasted.
- Expanding utility of landfill gases.
- Demonstration of new technologies.

Weaknesses

- Stronger economic analysis needed for easier commercialization
- The ideas are not new, except for the CO2 wash, but the progress and potential impact mediates this issue.
- This is an expensive project Given the barriers that the sponsors say they will be addressing why did they need to build such a large installation? Most of these issues have or are being addressed – this is more of a commercial project designed to sell additional units.
- Everything seems to depend on trademarked “CO2 wash.” Unclear why they are specifically tied to this technology.
- Verbally expressed energy recovery efficiencies seem wildly optimistic considering the compression, refrigeration, etc. steps in processing.
- Market/use for “purified CO2”?
- Little discussion of byproduct CO2 that is heavily contaminated with LFG components.
- Need to address cost/kW of micro turbine vs. other types of generation
- Acceptance of these synthetic fuels, both Biodiesel and CNG
- Presented not cost/benefit projection or performance analysis
- Nothing new in this project
- Market may be very limited.

- Land fill gas only lasts so long, and no real consideration to adding a gasifier in the future has been considered.
- Minimal new technology development is being accomplished.
- No life-cycle cost analysis has been done.
- A mass balance analysis of carbon particularly considering methanol and methane volume calculations should be presented.

Technology Transfer/Collaborations

- Good partnership team
- Appropriate team to carry out the research and development activities.
- Although they have a number of partners they don't have outreach partners Where is the EPA LMOP program?
- Good partnerships/collaboration.
- Fair/poor
- There appears to be a good interface for technology, but no activity was proposed.
- Seems to have significant collaborations. Strong vision toward future partnering.

Recommendations for Additions/Deletions to Project Scope

- Add economic analysis component
- It would be best if DOE could get some benefit from its investment
- What are the "problematic" CNG fuel specs?
- What LFG Vehicle Fuel commercial issues need to be explored?
- What is the market potential?
- Not sure this project belongs under this platform
- Badly need to perform an IRR analysis of project life cycle.
- Consider other types of carbon dioxide scrubbing units.
- NOTE: The CO2-laden stream derived from your process cannot be considered an equal stream, chemically composition-wise/quality, as those generated from ethanol plants – significant health issues if the stream is intended for human consumption/application markets – will have to prove your stream safe (likely via FDA)

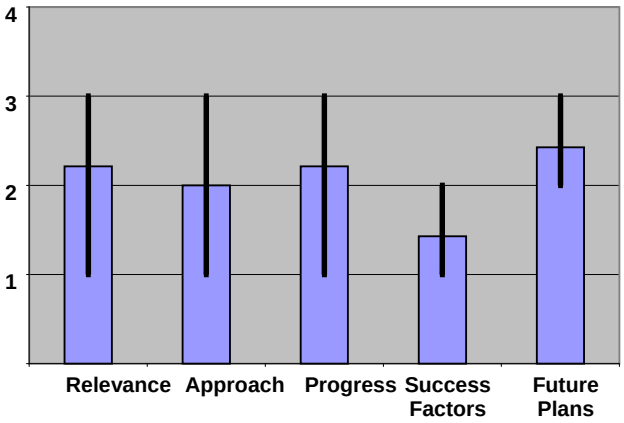
Communications, Outreach, and Partnerships

Project Title: New Uses Information and Entrepreneur Development

Principal Investigator: Mark Williams

Project Stage: Project Management of Biomass Commercialization Awards and Full-time focus on commercialization support services

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	2.21	1.21	0.79
Approach	2.00	1.00	1.00
Progress	2.21	1.21	0.79
Success Factors	1.43	0.43	0.57
Future Plans	2.43	0.43	0.57
Average	**2.06**		



Question 1: Relevance to Overall Objectives.

- Bioenergy business development cross-cutting fit
- Working in bioproducts area improves fit
- Program may be duplicating existing funding efforts that are part of the normal DOE funding opportunities. However, the program may also be able to identify groups that are inexperienced in finding federal funding to support new commercial opportunities.
- Need to develop markets for biobased fuels.
- This project is more focused on biobased products.
- Will not contribute much to 20 in 10 goals.
- Relevance OK.
- Limited program eligibility requirements
- The project is too narrow—one county—to have a significant impact on a national program. They need to broaden out their focus on bio-based products to a support biorefinery development. They need to develop some way to measure the attractiveness of their market projects and a better way to identify customers.
- Some of their projects were counter productive, for example, the Biodiesel symposium was a forum for the NBB to develop stakeholders to reduce incentives on the Renewable diesel industry.
- Addressing commercialization within a region – which is good, but not really part of the focus or the DOE Biomass Program.
- Information provide makes it difficult to asses further.

Question 2: Approach to Performing the R&D.

- Economic development award program targeted to biomass
- Looking for existing IP for commercialization
- A bit scattered
- The barriers were not particularly well defined, nor were the approaches to their solution. The programs were described, but the actual process for allocating funding could have had a clearer explanation.
- This project seems to duplicate services/programs already offered by many universities/small business development programs.

- The approach is pertinent to the goals. Education of inventors in these areas is very worthwhile.
- Capital Awards element may need more attention and rework
- They are integrating into a broad group of similar or related organizations (universities, economic dev., private industry, manufacturing association) to broaden out their expertise. Their use of angel investment groups and other support agencies are good. Once they get a project though, they are weak on the identification of barriers, research targets, economic analysis to achieve those targets, etc.
- Difficult to assess with information presented.

Question 3: Technical Accomplishments and Progress.

- Not a lot of businesses up and running due to this effort
- Work in progress
- Re-tooling awards program
- It may be important to provide an opportunity for groups that might get overlooked to have access to funding, however, this group should focus strictly on the small entrepreneur, rather than providing funding to large, existing companies well versed in finding their own funding, or supporting the work internally. None of the projects described appeared to be high risk.
- Excellent progress in forming partnerships, increasing public awareness, and specific product/industry projects.
- However most of these are not relevant to Biomass Program
- Will not contribute to 20 in 10 goals.
- Local outreach effective with media and targeted partners.
- They have not developed key metrics for their program. They have not developed any way to measure their benefit.
- Addresses outreach.

Question 4: Success Factors and Showstoppers.

- Not a good set of success factors
- Not part of presentation
- Hard to tell. The program is quite straightforward: provide support and funding to new biomass opportunities, thus, there aren't many showstoppers to be identified.
- Not well-defined.
- Presenter did not address these factors.
- Capital Award element needs attention to avoid becoming a show stopper.
- The identification of key barriers and their relationships to the bioproducts and DOE goals is weak.
- Project tea, appears to be working with their companies in terms of helping them ID stoppers along with providing services to address them.

Question 5: Proposed Future Research Approach and Relevance.

- Given the stated goals of the project, the team has defined a reasonable path forward.
- Future planned work is a logical extension of past work and will strengthen the program.
- Continuing what they have already started.
- More fully integrate partners with entrepreneurs.
- They take what is a general business outreach and entrepreneurial organization and refocus it on biomass energy commercialization. However, Not much planning is shown, it seems to be very serendipity. They do have plans for a symposium for biobased

products in Chicago that has the potential to develop projects, but good projects will depend on who speaks at the symposium and who attends.
- Reasonable for the type of program this is.

***Additional Comments*:**

Strengths
- Has an awards program with $$ for business development
- Biobased products is good area
- May identify small opportunities that may not have experience in finding support for promising programs.
- Local focus increases effectiveness.
- Strong partnerships with government and others
- Might help some opportunities which could drop between the cracks
- Focusing in regional economic development using biomass.
- Program design does provide critical business development support.

Weaknesses
- Need to focus more
- It is unclear how this group's role differs from existing funding opportunities for potential commercial opportunities.
- Their "clients" also include very large companies (Chemtool). Did Chemtool try the traditional routes and fail?
- Does not contribute to 20 in 10 goals.
- VERY locally-focused.
- Some funding supports efforts of LARGE company…
- Duplicative of other resources already available to entrepreneurs.
- Staffing may a bit under funded.
- Very narrow program eligibility requirements
- Local focus
- Limited success to date (only one joint venture accomplished)
- Duplication of effort with other state/national funding opportunities (SBA, USDA, etc.)
- Relatively weak project, with only a fuzzy idea of what to do with it. No metrics to speak of, little focused planning is occurring, no barriers (regulatory, economic, technical) are being identified with any consistency.
- Focus on one county too small, and limits their potential impact for the program for DOE.
- Seems to lack strong technology development screening capability to ensure good industrial participants are involved.
- Have not presented any info on IP.

Technology Transfer/Collaborations
- Partnerships are solid – Argonne, USDA, universities, local government
- This is a strength of the program.
- Poor
- Very strong given the nature of this project.

Recommendations for Additions/Deletions to Project Scope
- Future funding should be state and local
- Not relevant to DOE Biomass Program.

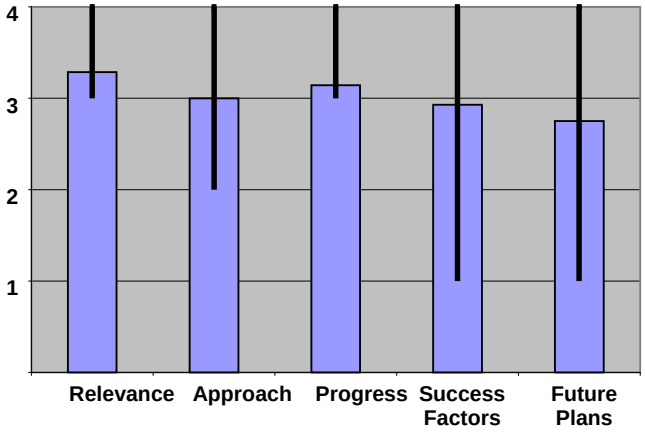
- My opinion is this is questionable/poor use of federal funds. This project should be funded at the State or even local level and not with federal tax dollars.
- Increase access of industrial participants to university expertise – ensure the university side is properly supported to ensure critical investment interest from the faculty/staff.

Project Title: Alternative Energy Enterprise Program

Principal Investigator: Sumesh Arora, Mississippi Enterprise Institute

Project Stage:

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	3.29	0.29	0.71
Approach	3.00	1.00	1.00
Progress	3.14	0.14	0.86
Success Factors	2.93	1.93	1.07
Future Plans	2.75	1.75	1.25
Average	**3.02**		



Question 1: Relevance to Overall Objectives.

- Cross cutting
- Biofuels focus – Cellulosic and biodiesel
- This project is an excellent example of how to set up a state program lined up with DOE goals.
- Addresses overcoming limits to commercialization of biomass-energy projects and economic development.
- Relevance OK
- Tightly coordinated with DOE Biomass Program goals, 2525 initiative, becoming self funded, estimating benefits, using quantitative metrics, etc.
- Supporting 10 (5 Ethanol, 5 Biodiesel) projects.
- Biorefinery focus.
- Project could be a template for other state outreach programs. The project is focused biomass and biodiesel feedstock, conversion technology, and commercialization.
- Somewhat Advancing biomass-based industrial development.
- Not an outreach program.
- Does focus on projects that are within program goals.

Question 2: Approach to Performing the R&D.

- Good understanding of Mississippi feedstocks
- Region appropriate
- Advisory board
- Funding to get things done – both R&D and business start-up
- Scaled for region
- The project has done a good job of picking projects that are aligned with DOE/OBP goals, and also has a nice management system in place to make sure that those research paths are maintained.
- Organization is appropriate to the goals and operations.
- University partners are appropriate but private sector
- Involvement is weak
- Very well designed program, clear metrics and very strong project portfolio management. Their approach is very well integrated into DOE research and how to take those needs and screen the various projects to select only the projects that also meets DOE. The barriers that would have been addressed will be reduced through this project.
- Presented a reasonable path to implement their program.

- Good business development presence.
- Not comfortable with the level of oversight for the individual projects.

Question 3: Technical Accomplishments and Progress.

- 14 projects selected
- Glycerin – commercially saleable product
- Slash bundler - John Deere
- Just getting started
- The project is well organized and appears to be aligned with the goals of the DOE/OBP programs.
- Good start forming partnerships and a few funded projects
- 12 projects thus far.
- Good outreach effort.
- Providing access to capital
- Program measures metrics, measures benefits, identifies goals and objectives and how they were identified, quantified and achieved. There is a clearly defined, documented progress in this project. It has great integration with business partners, cost share funding, audit trails. Etc.
- Reasonable program development has been accomplished.

Question 4: Success Factors and Showstoppers.

- Effective Communications
- Low price of fossil fuel alternatives. Analytical list
- Very clear articulation of the showstoppers, which are harder to define for a research support function, rather than an actual hands on research investigation.
- Most identified.
- Doesn't mention environmental regulations, which, if not
- explicitly considered, might inadvertently inhibit progress.
- Appeared to be aware of legal and regulatory barriers, although more specific types of contingency planning might improve the project.
- Not well defined - appears to need work in this area.

Question 5: Proposed Future Research Approach and Relevance.

- Late start impacts future work
- At beginning stage
- The plan forward is reasonable based on the activities that are currently supported.
- Continue what they are doing.
- Not so crazy about funding universities with these $$$. Universities have many funding sources. Should go to assist small private entities.
- Fund universities only as partners with commercial entities.
- This topic was not addressed.
- Plans to become self-sufficient are excellent. Has a clear view for future planning and succession. I did not get enough input about how the resources are allocated or whether the schedule is on time, etc.
- Reasonable plan to advance the project.

***Additional Comments*:**

Strengths

- Has funding for university R&D and for business development
- Partnerships and advisory board
- Well organized program with clear goals, and a good description of impacts resulting from money allocated.
- Broad state based activity, with attempts to move more widely into SE region.
- Good alignment of state program with DOE goals
- Best of the various state projects evaluated.
- Well balanced program.
- Strong list of partners including universities and private-sector
- Use of an outside-the-state advisory board
- Broad commercialization opportunities
- Regional approach is national and not local (southeastern U.S. vs. local counties)
- Tracking/auditing funds after awards are given
- 501 (c)(3) status
- Strong outreach network with many partners, great metrics, tight integration into Biomass Program goals and objectives. Shows budget allocation and cost shares. Does an enormous amount of work for a short period of time. Covers both ethanol and biodiesel projects and avoids investment in too much power, gasification, etc. Has a very nice set of out-of-state technical reviewers that reduce domestic policy influences that might dilute the program goals.
- Good mix of technology development stakeholders.
- Outside review.
- Competitive program.

Weaknesses

- Need to focus on results of 14 funded projects – What happens? Not just financial audit
- Local focus without local funding
- Private sector funding is lacking, very few non-university projects funded
- Too much money to universities.
- Seems to significant private sector funded projects – the stated goal.
- Not showing a strong model of how the universities are dramatically impacting economic development.

Technology Transfer/Collaborations

- Good outreach efforts noted
- This is a strength of the program.
- Excellent
- Seems to be good – but needs more industry involvement

Recommendations for Additions/Deletions to Project Scope

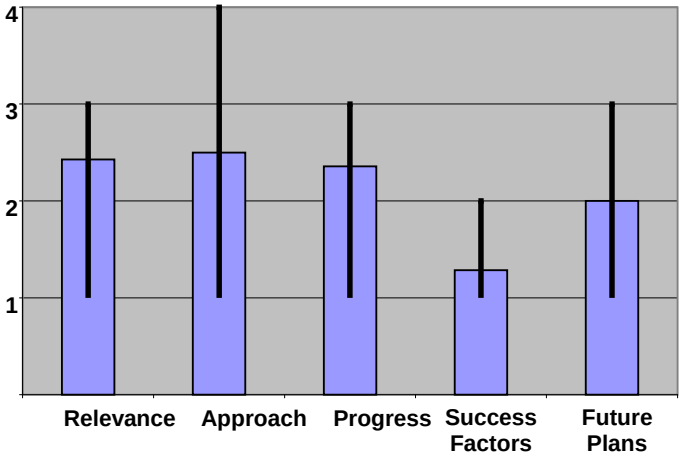
- Future funding should be state and local
- I'm not completely comfortable with federal tax dollars/funding going toward a local initiative program. This should be funded with State and local funds.
- Carry on.
- Try to encourage more technology development that will result in a larger job creation potential – seem to have a lot of little companies with minimal experience with business development.

Project Title: Kentucky Rural Energy Supply Program

Principal Investigator: Cameron Metcalf, Kentucky Pollution Control

Project Stage: Exploratory Research

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	2.43	1.43	0.57
Approach	2.50	1.50	1.50
Progress	2.36	1.36	0.64
Success Factors	1.29	0.29	0.71
Future Plans	2.00	1.00	1.00
Average	**2.11**		



Question 1: Relevance to Overall Objectives.

- Energy efficiency and biobased products
- Beyond OBP for some of work
- Used OBP platform for review and selection
- Several of projects funded with OBP money are used to support KY projects that would be placed in other non-biomass parts of DOE
- Good advisory board membership.
- Education and support of biobased energy and product development
- Relevance is pertinent.
- No industry participate just university funding and the governor's office. No focus on providing projects that might benefit DOE, too much money to solar, and energy efficiency, and other non-biomass program. Obviously not strong enough to direct the project to meet DOE goals and objectives and does not appear to know what those are or how to achieve it. Showed a stage gate picture, but they clearly do not know how to use the process to help improve their projects.
- A portion of the work fits within the program.
- However, some projects did not fit within the mission.

Question 2: Approach to Performing the R&D.

- Lots of organization structure and coordination
- Tech assistance and clearinghouse
- External review of funds
- IAC
- Project seems to be a reasonable attempt to seed and develop additional biomass programs for the state, but there is poor technical control over the programs WRT alignment with OBP goals and program directions.
- Need more focused program.
- Need better technical oversight/review of funded projects.
- Too much funding to universities. In just the few cases shown during presentation, the same investigator appears in several projects – implies that either few Kentucky universities have interested/qualified researchers, or good review - effort to incorporate other approaches is lacking.
- Program plan is reasonable.
- Communications with private sector is good.
- Strongly based on university research projects.
- Better technical reviewer would improve technology, also tighter management for selection in better focus projects on projects to support DOE's program. Too many

projects that don't do anything for biomass, and too much charlatans, such as the Bio-oil people, which many people have tested and found that the product is unreacted soy oil despite their claims. Has no technical goals for the projects and little understanding of the technologies and cannot develop a strategy to achieve those goals. Project director does not bring enough technical support and does not have any.
- Scattered program with little in common, does not appear to be much oversight for university researchers.
- Lacks program oversight of R&D activities.

Question 3: Technical Accomplishments and Progress.
- 7 funded projects
- Microbes at higher concentrations of ethanol – One of two in the world
- Catalytic upgrade of BioOil – Found catalyst for deoxygenation
- And now moving to commercialization
- Corn stover pre-treatment
- Biomass briquettes
- Developed soy based transformer oil
- Several projects seem duplicative of work that OBP is already paying for. Better coordination needed at the project level with ongoing DOE projects.
- Good partnerships
- Some projects beginning to show results.
- Progress on specific projects is good.
- No benefit analysis, no efficiency improvement or any other metrics to show that the projects invested will make any R&D progress.
- Little information was presented to make this decision.

Question 4: Success Factors and Showstoppers.
- No presentation on this topic
- Showstoppers and success factor assessment pretty weak
- Not addressed in presentation.
- None were addressed.
- Legal and regulatory issues were not address even though potential lawsuits over the Bio-oil claims might have resulted from this investment. No milestones are provided, no show stopper provided.
- Program does not address these issues based on the presentation.

Question 5: Proposed Future Research Approach and Relevance.
- 25 X '25 roadmap coming – state funding
- Project appears complete, in that all the allocated money appears to have been sent out, but project choice needed better control and oversight.
- Plan to continue what they have been doing.
- Need to focus on biomass-based fuels. Not solar, etc.
- Future plan is to continue on same path.
- Project is poorly planned, funded non biomass R&D and does not a strategy or a focus to try to build a biomass-based capability in KY.
- Not much information presented addressing this factor.

***Additional Comments*:**

Strengths

- Competitive grants R&D program with cash cost share from state
- Biobased products
- Economics and net energy balance
- Good project targeting and economic impact analysis
- Good research team chosen as a result of grant program
- Good oversight activities, meetings, reporting program, energy impact assessment program…not frequently seen in other projects evaluated
- Implementation is generally good.
- University and government partnership in addition to consortium members
- Must apply through State for funding
- Consortium Advisory Board
- Developed a vision statement - focus
- Developing capability within KY universities.

Weaknesses

- Too broad – All of EE plus OBP
- Build capability
- Future planning needed
- Grant program should have more explicitly targeted industry and small business
- Supported projects duplicate ongoing DOE research
- Poor coordination of supported projects with ongoing DOE activities
- Some funded projects do not fit within OBP goals, and align much more closely with other programs within DOE
- Bio-transformer oil is already a commercial product
- Use of federal dollars to fund State projects – this project should be a State funded.
- Should target small business concerns
- Way too broad – needs to focus
- Needs independent, outside review of projects (too much opportunity for a breach of integrity)
- No planning, funding way too much non-biomass money spend to useless projects. No multiple or focused biomass solicitations after the first solicitation failed to generate much interest. No real focus on the DOE program even though he did intend to focus, there wasn't any follow through. Too much money to universities and not enough money to private partners. No research targets, identification of barriers, or strategies to achieve the barriers or research goals.
- Lacks close integration with industries.
- Lacks focus.
- Basically, another university R&D funding mechanism with minimal commercialization potential presented.
- Lacks strong and knowledgeable technical oversight.

Technology Transfer/Collaborations

- KY consortium and advisory board website
- Good if information is widely disseminated
- A lot of government entities, however – needs more industry partners.

Recommendations for Additions/Deletions to Project Scope

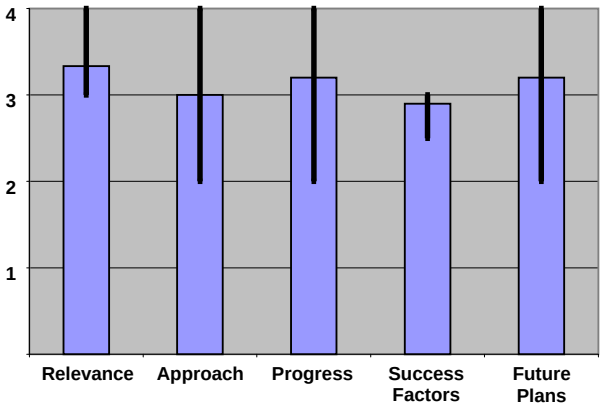
- Need to have some type of federal oversight with these federally funded, state run programs
- Need to recommend to OMB for elimination. If you have to keep it, then: see above for all.
- Attempt to position each university with a large focused group that can position themselves to be more competitive on a national basis.
- Suggest significant tightening up program focus.
- Badly need to have industries directly involved.

Project Title: Regional Biomass Programs

Principal Investigator: Rick Handley, Coalition of Northeastern Governors, Frederick Kuzel, Coalition of Great Lakes Governors

Project Stage:

Project	Average Score	Delta Minimum	Delta Maximum
Relevance	3.33	0.33	0.67
Approach	3.00	1.00	1.00
Progress	3.20	1.20	0.80
Success Factors	2.90	0.40	0.10
Future Plans	3.20	1.20	0.80
Average	**3.13**		



Question 1: Relevance to Overall Objectives.

- It is a reasonable investment of money to find a way to connect biomass opportunities within a region with policy makers needing information.
- Critical need for this level of coordination, education, outreach, policy, and economic development.
- Very supportive. Funded by DOE.
- Good focus on issues
- At this time, the RBEP is tightly linked with the Biomass Program and has tried to "direct" local and state towards ethanol and lignocellulosic R&D, but the way the "each state gets a piece of the pie" approach was used, directed solicitation did not occur. The funding provided by the Program and each Region was insufficient.
- The change from R&D and demo was good but too slow. The program did not have 2-3 key objectives and goals that were tightly linked to the success of the outreach effort. Part of this problem is the inability for DOE to identify these goals that could be developed in a 1-5 year timeframe that will support the introduction of a technology towards the end of that timeframe. Obviously the highly technical side of the DOE program has a disconnect to the marketing and outreach side, but DOE failed to consider a broader vision and balance for the whole and how to benefit from the RBEP infrastructure.
- Provides effective coordinator among governmental entities and industry interest groups.

Question 2: Approach to Performing the R&D.

- Program very diffuse and needs better focus in order to address barriers effectively.
- Good "high-level" barriers assessment.
- Good national-level partners
- Communications with many state and NGO organizations.
- Prepare technical reports.
- Collect and analyze data. Outreach and analysis.
- Regional networking groups and direct technical assistance to states.
- These results are a mix, some of the projects were well tightly selected, targets, goals, metrics, results, and approaches were well designed. And some of the projects were scattergun approaches which resulted by the "state pieces of the pies" approach. The Regional programs has been very successful, and would be improved by developing a broad pool of experts, good experts, selected by DOE, NREL, ORNL, PNL, etc., (such

as 150 to 200 researchers) to bring in technical support and program review. This approach would also provide better value to DOE.
- Appears to be a good effort toward meeting goals of the project along with assisting DOE with key coordination of efforts.
- Really need to show the breakdown of just how the funds are allocated.

Question 3: Technical Accomplishments and Progress.
- The metrics evaluation and its cause/effect conclusions are poorly justified. The PIs were unable to address this issue as they felt that Antares and their method was imposed upon them.
- The impact evaluation needs to be compared to other groups that are well established in market analysis.
- Partnerships led to inclusion of biomass in state policies
- The RBEP's projects begin adding metrics in 2000 and were integrated into the state proposal or project proposals slowly and the quality of those numbers were weak. Over time these metrics improved, but a better technical group of reviewers could improve the quality of the results of the projects as well as the metrics produced. RBEP should have developed a better set of metrics for the 2-3 key directions used in their program.
- RBEP has an excellent idea of commercialization barriers, the understanding of the technical barriers is weak, but once again, a broad group of technical reviewers would be improved. Many of the RBEP projects were slow to finish. Better project management skills may be needed through training or an expert consultant.
- Appears to have accomplished goals and advanced communication among involved parties.

Question 4: Success Factors and Showstoppers.
- Critical success factors and showstoppers are not well defined. The Antares evaluation does not appear to be a valid method of evaluation, based on the information presented.
- Good, realistic assessment
- Policy can be a show stopper. As can consumer awareness.
- Few show stoppers for a very complex program
- RBEP has an excellent network of regulatory and environmental agencies, NFP organizations, and legal network. Many of these issues were employed in commercial development, demonstrations, etc.
- Good leverage of federal funding but the quantification of the leverage was not always fully quantified.
- There wasn't enough funding to be successful, and internal struggles for funding between R&D and outreach were poorly managed by DOE and damaged the program. At least $5 million for the five regions are required.
- Eliminating the program will cause 50 states to begin contacting DOE directly for anything they need.
- Work with key trade organizations for biodiesel and RBEP accelerated the progress of the industry and the favorable development of local policies for biodiesel can be directly linked to the state in with RBEP and NREL worked together with the State soybean boards and NBB. A similar focus on ethanol distribution can be shown where RBEP partnerships with Clean Cities broaden out the Clean Cities programs into biofuels and predictable expansion in biofuel sales. Program did not have specific research target goals or barriers to eliminate because their focus was too broad. Needed to refocus program into 2-3 key barriers to succeed.
- Works well with constituency to ensure barriers are addressed and identified.

Question 5: Proposed Future Research Approach and Relevance.

- The value of the program so far is unclear, but diffuse and unfocused nature of program indicates a need for more targeted future programming.
- The RBEP has planned its final funding very carefully, and they are currently trying to transition their dying program into NSEO and governor coalition groups. Details about the transition were vague.
- I like the "creating legacy" view to the future
- With some redefining, this program could be an asset to overall program goals.

***Additional Comments*:**

Strengths

- Reasonable to have activities coordinating government interest with information providers in various regions
- Proven track record of accomplishments
- Regional approach
- Independent review of program
- Good effort to try and bring in all biomass stakeholders
- Strong partnerships with different states and federal governments including universities, farmers, petroleum
- industry and consumers
- Principals hold meetings on a consistent basis
- Excellent approach to project (forums, workshops, conferences, technical reports, etc.)
- RBEP has the potential to be a powerful advocate program for the Biomass Program if the Biomass Program can direct what is needed.
- Properly directed, REBP could reduce the earmarks and the confusion of having 50 individual and uncoordinated states doing their own thing, particularly where some of these earmarks are duplicative of the outreach program.
- Has a tremendous network of contacts and stakeholders.
- Has the potential to be a leader and a catalyst for state policy makers, regulatory agencies, and economic development groups.
- Has the potential to bridge the Vision of Biomass Program (e.g., just ethanol) and convey that message to the public which has a different and much broader vision (power, gasification, biogas, biodiesel, etc.).
- Provides critical interchange of information between involved parties.
- Long history of involvement and contacts which allows a potential high level of success.

Weaknesses

- Poor articulation of project goals, and unreasonable time overrun in presentation. Unfair to other speakers.
- Low innovation in chosen activities
- Impact of chosen activities unclear despite the metrics. They've been involved with several projects, but the cause/effect relationship is not there. What evidence is there in the Antares report that can credibly allow credit to be given to the partnership that cannot be attributed to other factors or advocacy groups? Especially in the period described, when biomass was growing? Cause and effect is hard to justify.
- No link to OBP.
- No defined role from DOE

- No breakdown on where money was spent including cost-share information
- Not enough technical support to help manage the R&D part of the projects.
- Too much diffusion of funding to make each state happy.
- Should provide better quality metrics, differentiate short term impacts (1 year) vs longer term (5 yr)
- Did not become a leader in the regions in all cases. DOE needed stronger oversight on personnel selection.
- Should have shown budget distribution.
- Hard to determine goals.
- Mission is somewhat weak – very broad and not easy to clearly define from a reviewer perspective

Technology Transfer/Collaborations

- This is a major strength of the program.
- Excellent
- A lot of partnerships – which is good.

Recommendations for Additions/Deletions to Project Scope

- Expand the partnership by incorporating new stakeholders into program
- Need to review information on PowerPoint slides to make sure it is correct, current and easily explainable
- Need cost-share requirement from DOE and report cost-share requirements from states
- DOE has squandered its opportunity to make and deploy a powerful outreach tool for biomass feedstock, production, and distribution that could have grown federal funding for the Biomass Program.
- DOE needed to identify a HQ leader that could direct the program is a tightly integrated manner with a clear purpose, 2-3 key targets, strategies for achievement, and quantifiable measurement of metrics.
- A powerful program would have prevented the growing earmarks for similar, discrete programs for each state, or even within each state. For example, the earmark money for the IL, KY, and MS outreach funding would have been sufficient.
- Recommend placing a DOE HQ rep and a DOE lab rep – a USDA one would be good as well.

APPENDIX A

Agenda

Denver West Marriott
1717 Denver West Blvd.
Golden, CO 80401 USA
303-279-9100

Day 1 – Wednesday, August 15th

Welcome and Platform Overview		
8:30 – 8:40	Welcome	*Mark Decot, Biodiesel Technologies, Office of the Biomass Program*
8:40 – 8:50	Program Biodiesel Overview	*Bob McCormick, National Renewable Energy Laboratory*
8:50 – 9:00	Process Overview	*Leslie Pezzullo, BCS, Incorporated*

Biodiesel and Fuels Demonstration		
9:00 – 9:20	Session Overview	*Roxanne Dempsey, Golden Field Office*
9:20 – 12:00 (10:20 – 10:30 Break)	Presentations* on Biodiesel and Fuels Demonstration Projects	
	➢ Mississippi State University Sustainable Energy Center (MS)	*William D. Batchelor, Mississippi State University*
	➢ Oxydiesel Demonstration in California and Nevada	*Thomas Sopko, O2 Diesel*
	➢ E-Diesel Test and Research Project	*Nathan Fields, National Corn Growers' Association*
	➢ Missouri Biodiesel Demonstration Project (MO)	*Tom Verry and Jill Hamilton, National Biodiesel Board*
	➢ National Biofuel Energy Laboratory	*Chuck Moeser, NextEnergy*
12:00 – 1:00 Lunch		

*Each Presentation – ca. 20 minutes; Reviewer Q&A – 5 minutes; Quiet Time for Reviewer Note keeping – 5 minutes

Associated Products, Combined Heat and Power, and Other Technologies		
1:00 – 1:20	Session Overview	*Golden Field Office*
1:20 – 1:50	Presentation* on Products ➢ Canola-based Automotive Oil R&D (PA)	*Ira Pierce, The Green Oil Company*
1:50 – 2:20	Presentation* on Combined Heat and Power Projects ➢ Phillips Biomass CHP Facility	*Carl Nelson, The Green Institute*
2:20 – 2:30 Break		
2:30 – 3:00	Presentation* on Other Technologies ➢ EERC Center for Biomass Utilization 2005	*Dr. Bruce Folkedahl, University of North Dakota, Energy & Environmental Research Center (EERC)*
3:00 – 4:00 Break		

*Each Presentation – ca. 20 minutes; Reviewer Q&A – 5 minutes; Quiet Time for Reviewer Note keeping – 5 minutes

Plenary Session		
4:00 – 5:00	Day 1: Review Chair Report-out and Project Investigator Rebuttals	*Shaine Tyson, Review Chair*
5:00	Adjourn	

Day 2 – Thursday, August 16th

Anaerobic Digestion		
8:30 – 8:50	Session Overview	*Golden Field Office*
8:50 – 10:20	Presentations* of Anaerobic Digestion Projects	
	➢ Research on Anaerobic Digestion: Optimization and Scalability of Anaerobic Digestion of Mixed High Strength Food Processing Wastes for Renewable Biogas Energy	*Floyd L. Schanbacher, The Ohio State University Research Foundation*
	➢ New York Biomass/Methane Gas Power Fuel Cell Project	*Dr. Caine Finnerty, Nanodynamics, Inc.*
	➢ Ohio Solid Waste Authority Pyramid Resource Center	*Tim Berlekamp, Solid Waste Authority of Central Ohio (SWACO)*
10:20 – 10:30 Break		

*Each Presentation – ca. 20 minutes; Reviewer Q&A – 5 minutes; Quiet Time for Reviewer Note keeping – 5 minutes

Communications, Outreach, and Partnerships		
10:30 – 10:50	Session Overview	*Golden Field Office*
10:50 – 1:50 (11:50 – 12:50 Lunch)	Presentations* of Communications, Outreach, and Partnerships Projects	
	➢ New Uses Information and Entrepreneur Development	*C. Mark Williams, Growth Dimensions, Inc.*
	➢ Alternative Energy Enterprise Program	*Sumesh Arora, Mississippi Technology Alliance*
	➢ Kentucky Rural Energy Supply Program	*Cameron Metcalf, University of Louisville Research Foundation, Inc.*
	➢ Regional Biomass Programs: · Coalition of Northeastern Governors · Council of Great Lakes Governors · Southeastern Biomass State & Regional Partnerships · Western Governors' Association	*Rick Handley, CONEG Policy Research Center, Inc. and Frederic Kuzel, Council of Great Lakes Governors*
2:20 – 3:15 Break		

*Each Presentation – ca. 20 minutes; Reviewer Q&A – 5 minutes; Quiet Time for Reviewer Note keeping – 5 minutes

Plenary Session		
3:15 – 4:15	Day 2: Review Chair Report-out and Project Investigator Rebuttals	*Shaine Tyson, Review Chair*
4:15	Adjourn	

APPENDIX B

Conflict of Interest Form

DOE Conflict-of-Interest Policy and Agreement

(Please forward this form, along with your Curricula Vita, to the DOE Review Leader – Mark Decot)
Please copy Harriet Foster (harriet.foster@ee.doe.gov)

You have been invited to serve as a Reviewer for the DOE Thermochemical Platform Review. Your participation in this review is greatly appreciated. However, it is possible that your personal affiliations and involvement in certain activities could pose a conflict of interest or create the appearance that you lack impartiality in your evaluations and recommendations for this review. In order to assess if you have a real or perceived conflict of interest in regard to the program/projects that will be evaluated in this review, please complete the information below. This information will be reviewed by the review leader in order to identify potential conflicts of interest.

SECTION 1: AFFILIATIONS, ACTIVITIES AND PROGRAM INVOLVEMENT

At the end of this section you will be asked to identify those specific projects or areas on the agenda where a conflict or appearance of conflict could exist and briefly explain the nature of that conflict. A conflict does not exclude you from serving as a reviewer. However the review leader may call you for more information.

Affiliations or activities that could potentially lead to conflicts of interest may include:

a) work or known future work for parties that could be affected by your judgments on projects that you have been asked to review;

b) your personal benefit (or benefit of your employer, spouse or dependent child) from the developments of the program/projects you have been asked to review;

c) any previous involvement you have had with the program/projects you have been asked to review;

d) any financial interest held by you (or your employer, spouse or dependent child) that could be affected by your participation in this matter; and

e) any financial relationship you have or have had with DOE such as research grants or cooperative agreements.

Personal involvement with the research program or with other DOE program areas:

	Yes	**No**
I previously was involved in research funded by this program/project	_____	_____
I am currently funded through a DOE program, or in some way might be seen as involved in work competing with this program/project	_____	_____
I reviewed this program/project previously.	_____	_____
I am a former professor, student, or co-worker of a Principal Investigator	_____	_____
I previously collaborated with the Principal Investigator in a research activity in program/project area.	_____	_____

Technical Area or Project on Review Agenda	Nature of conflict of interest (Leave blank if none)

SECTION 2: CONFLICT OF INTEREST AGREEMENT

CONFLICT OF INTEREST AGREEMENT

This agreement must be completed by individuals prior to their participation in DOE peer reviews. Please contact the DOE Review Leader – Mark Decot (202-586-6501) if you want to discuss any potential conflict of interest disclosure issues.

I have reviewed the information contained on this form and to the best of my knowledge I have disclosed any actual or potential conflicts of interest that I may have in regard to the program/projects that I have been invited to evaluate. In addition, prior to my participation as a reviewer, I agree to disclose any actual or perceived conflicts of interest as soon as I am aware of the conflict.

_____ _____

Signature Date

_____

Printed Name

APPENDIX C

Reviewer Evaluation Form

Project Evaluation Form

Session: 2 3 4 **Reviewer Name**: _____

Title of Project: _____

Presenter Name: _____

Reviewer Self Assessment of Subject Knowledge (Circle One)**: None Novice Intermediate Expert**

Proposed Stage Placement (Circle One)**: A B 2 3 4 NA**

Reviewer Recommended Stage (Circle One)**: A B 2 3 4 NA**

Comments on Stage Placement: _____

_____

Using the following criteria, rate the work presented in the context of the program objectives and provide **specific, concise** comments to support your evaluation.

Write/print **clearly** please

1. **Relevance** to overall objectives.

The degree to which 1) the project supports the goals and objectives of the DOE Biomass Program Multi-Year Technical Plan or the missions and objectives of USDA Programs, and 2) the market potential is attractive and customers are identified for project outputs.

4-Outstanding. The project is critical to and fully supports plan objectives. Customers/Markets are identified and critical.		Specific Comments:
3-Good. Most aspects of the project align with the plan objectives. Customers/Markets are identified and important.		
2-Fair. The project partially supports the plan objectives. Customers/Markets are identified.		
1.-Poor. The project provides little support to the plan objectives. Customers/Markets not identified.		

2. **Approach to Performing the R&D.**

The degree to which technical barriers are addressed, the project is well-designed, technically feasible, and integrated with other research. Also, it is clear why the approach is better than alternatives.

4-Outstanding. The project is sharply focused on one or more key technical barriers. Difficult for the approach to be improved significantly.		Specific Comments:
3-Good. The approach is generally well thought out and effective but could be improved in a few areas. Most aspects of the project will contribute to progress in overcoming the barriers.		
2-Fair. Some aspects of the project may lead to progress in overcoming some barriers, but the approach has significant weaknesses.		
1.-Poor. The approach is not responsive to project objectives and unlikely to make significant contributions to overcoming the barriers.		

Project Evaluation Form

3. **Technical Accomplishments and Progress**

Toward overall project and DOE or USDA goals – the degree to which research progress is measured against performance indicators and to which the project elicits improved performance (effectiveness, efficiency, cost, and benefits).

4-Outstanding. The project has made excellent progress towards DOE goals and objectives and overcoming one or more key technical barriers. Progress to date suggests that the barrier(s) will be overcome.		Specific Comments:
3-Good. The project has shown significant progress toward against DOE goals and objectives and to overcoming one or more technical barriers.		
2-Fair. The project has shown modest progress in overcoming barriers, and the rate of progress has been slow.		
1.-Poor. The project has demonstrated little or no progress towards its objectives or any barriers.		

4. **Success Factors and Showstoppers**

The degree to which the project has identified and addressed the most critical technical or business factors impacting or impeding achievement of the project goals. Factors include legal or regulatory issues that may be barriers to commercialization.

4-Outstanding. All critical success factors and showstoppers are identified and reasonable strategies developed to overcome showstoppers.		Specific Comments:
3-Good. Most critical success factors and showstoppers are identified and possible strategies developed to overcome showstoppers.		
2-Fair. Some critical success factors and showstoppers are identified. Strategies to overcome showstoppers are very high level or not developed.		
1.-Poor. Little to no identification of critical success factors or showstoppers. Little to no recognition of relative importance or prioritization of activities.		

Project Evaluation Form

5. **Proposed Future Research Approach and Relevance** (as defined in the project).

Stage Gate Criteria 7: Plan to Proceed

The degree to which the project has effectively planned its future, considered contingencies, understands resource or schedule requirements, built in optional paths or off ramps, etc.

4-Outstanding. The future work plan clearly builds on past progress and is sharply focused on one or more key technical barriers in a timely manner.		Specific Comments:
3-Good. Future work plans build on past progress and generally address removing or diminishing barriers in a reasonable period.		
2-Fair. The future work plan may lead to improvements, but should be better focused on removing/diminishing key barriers in a reasonable timeframe.		
1.-Poor. Future work plans have little relevance or benefit toward eliminating barriers or advancing the program.		

Provide Comments on Overall Strengths and Weaknesses

Strengths

Weaknesses

Technology Transfer/Collaborations - the degree to which the project interacts, interfaces, or coordinates with other institutions and projects, providing additional benefits to the Program.

Recommendations for Additions/Deletions to Project Scope