

**PROGRAM ANNOUNCEMENT TO DOE LABORATORIES
FOR SUBMISSION OF PROPOSALS FOR COST SHARE
REASEARCH AND DEVELOPMENT OR
COMMERCIAL DEMONSTRATION PROJECTS**

**OFFICE OF ENERGY EFFICIENCY
AND RENEWABLE ENERGY**



**CHEMICALS AND FOREST PRODUCTS
INDUSTRIES OF THE FUTURE**

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Points of Contact: Dickson Ozokwelu
Phone: (202) 586-8501
Electronic Mail: dickson.ozokwelu@hq.doe.gov

**PROGRAM ANNOUNCEMENT TO
DEPARTMENT OF ENERGY LABORATORIES**

Chemicals and Forest Products Industries of the Future

TABLE of CONTENTS

SUMMARY	3
ELIGIBLE APPLICANTS.....	4
COST SHARE	4
FOR FURTHER INFORMATION OR QUESTIONS AND ANSWERS CONTACT:.....	5
PROPOSALS	7
PROGRAM ANNOUNCEMENT Due Date:.....	7
PROGRAM ANNOUNCEMENT SUBMITTAL ADDRESS:	7
SECTION I: SUPPLEMENTARY INFORMATION	8
A. Background	8
B. Objective.....	8
C. Scope	8
SECTION II. PROPOSAL PREPARATION INSTRUCTIONS	9
A. Proposal Content	9
B. Narrative Structure.....	9
C. Proprietary Proposal Information.....	13
SECTION III: PROPOSAL EVALUATION	13
A. Merit Reviews	13
B. Selection Criteria.....	13
C. Cost Evaluation Criteria	17
D. Weighting of Criteria.....	17
E. Programmatic Selection Considerations	17
SECTION IV: GENERAL CONDITIONS	18
A. Non-governmental Reviewers.....	18
B. Proposal Preparation Costs	18
C. Partial Awards	18
D. Debriefings	18
E. Debarred and Suspended Parties.....	18
F. National Environmental Policy Act (NEPA) Requirements	18
G. Energy Policy Act (EPAct Requirements).....	18
APPENDIX A - CATALYTIC OXIDATION.....	20
APPENDIX B - DISTILLATION	22
APPENDIX C - WOOD/COMPOSITE TECHNOLOGIES	23
APPENDIX D - FIBER RECYCLING	26
APPENDIX E - NEW FOREST-BASED MATERIALS	27
APPENDIX F - ADDITIONAL QUESTIONS FOR PROPOSAL	28
APPENDIX G – ASERTTI MEMBERSHIP LIST	29
APPENDIX H – ENERGY SAVINGS ESTIMATOR INFORMATION	30

AGENCY: Department of Energy, Industrial Technologies Program

ACTION: FY2004 Program Announcement for DOE Laboratories for Chemicals and Forest Products Industries of the Future

SUMMARY

The U.S. Department of Energy (DOE) Industrial Technologies Program (ITP) is seeking proposals from the DOE Laboratories for cost-shared research and development (R&D) or commercial demonstration projects that will reduce energy consumption, enhance economic competitiveness, and reduce environmental impacts of the domestic chemicals and forest products industries. These R&D or commercial demonstration projects should focus primarily on technology development in the areas of Catalytic Oxidation (Appendix A), Distillation (Appendix B), Wood/Composites (Appendix C), Fiber Recycling (Appendix D), and New Forest-Based Materials (Appendix E). Other promising technology areas demonstrating energy efficiency in the chemical industry may be considered in addition to areas indicated specifically above.

DOE laboratories proposing against this Program Announcement are required to develop collaborative project teams involving a minimum of two chemical or forest products organizations. Multiple laboratory teams are encouraged, as well as partnerships with other Federal laboratories, U.S. universities, and U.S. research institutions. (See ELIGIBLE APPLICANTS paragraph below)

All projects funded as a result of this Program Announcement will include requirements for reporting to DOE. Progress and financial status reports will be required on a quarterly basis and review meetings will also be held periodically. Applicants should also assume travel for a kickoff meeting and at least two trips per year for review meetings. A detailed final report will also be required at the conclusion of the project.

Subject to availability of funding in the FY2004 appropriation, the total DOE funding available under this Program Announcement for the first 12 months of selected R&D or commercial demonstration projects will be approximately \$1 million for technology development in Catalytic Oxidation and Distillation, and approximately \$1 million for technology development in Wood/Composites, Fiber Recycling and New Forest-Based Products. Also subject to funding availability in post FY2004 appropriations, a maximum of approximately \$4 million is planned to fund the remaining years of the Chemical projects, and a maximum of approximately \$4 million is planned to fund the remaining years of the Forest Products projects. DOE anticipates selecting two to three proposals for Chemical projects and two to three proposals for Forest Products projects. DOE reserves the right to fund in whole or in part, any, all, or none of the offers submitted in response to this Program Announcement.

Project performance periods should be divided into 12 month periods. After review of performance, DOE may or may not decide to continue funding the project based upon whether the laboratory: (1) demonstrates sufficient progress in the research effort; (2) has completed the objectives in compliance with a mutually agreed upon management plan through meeting milestone objectives identified in the management plan; (3) has submitted timely and informative reports; (4) identifies the objectives planned in the next segment of the project including major milestones and go/no-go decision points (i.e., stage gates); and (5) availability of DOE funding. Expert peer review of the project may result in redirection or cancellation of the project.

Cost sharing in projects is required in order to be considered for funding as a result of this Program Announcement. (See COST SHARE paragraph below)

No funds will be transferred until a signed CRADA (**or equivalent agreement**) is in place, and a maximum time of 3 months will be allowed after the announcement **of the selection of award** to establish a CRADA between all parties before the offer is withdrawn.

ELIGIBLE APPLICANTS

Department of Energy (DOE) Laboratories (limited to those identified in Appendix F) are eligible to submit proposals in response to this Program Announcement. These laboratories must partner with a minimum of two chemical and forest products organizations working in a multi-disciplinary team arrangement. Single organization proposals will not be considered. Eligible partners include, but are not limited to, universities, trade and professional associations, and small businesses that facilitate technology transfer to the private sector, promote commercialization, and enhance U.S. competitiveness. Other DOE Laboratories may also be partners.

A “chemical or forest products organization” is defined as a private (profit or non profit) organization that manufactures chemicals and/or petrochemicals and/or forest products, or provides products or services to such manufacturers. In addition to chemical and forest products manufacturers, raw material suppliers, equipment and technology suppliers, architectural and engineering companies, software and consulting firms, trade and professional associations, and research institutes that routinely conduct a minimum of 10% of their business as, with, or for the chemical, forest products industry manufacturers, are all within the scope of the definition.

The proposing team must describe the teaming arrangements that will be used, clarify how intellectual property developed in the project will be handled among the teaming partners, and how intellectual property will be made available to industry. Teaming arrangements include informal collaboration documented by letters from the participants that agree to jointly manage and execute the project. Teaming arrangements may also include more formal collaboration mechanisms such as Cooperative Research and Development Agreements (CRADA). Teaming arrangements must be in place before the work can be initiated. Changes in scope of work during the conduct of work need to be approved by DOE.

COST SHARE

This Program Announcement requires cost share to ensure pro-active industrial involvement, risk-taking by industry, and to encourage enabling technology development for widespread application in industry for the development of energy efficient industrial processes. There will be no waivers of this cost share requirement. DOE Laboratories cannot meet these cost sharing requirements themselves, and must therefore meet them through their industrial partner(s) participation in the project.

Only proposals submitted with the following cost share requirements will be considered:

- 1) For applied research and/or development projects: a 30% minimum cost share from non-federal sources
- 2) For projects involving commercial demonstration of technologies: a 50% minimum cost share from non-federal sources.

As an example, the minimum cost share requirement for a hypothetical project with a total cost of \$500,000 would be:

Total Project Cost:	\$500,000
Non-federal share, 30%	\$150,000
DOE share, 70%	\$350,000

Please note that the required minimum cost share is **not** based on 30% of the DOE share, but is based on 30% of the Total Project Cost.

Cost share contributions need not be monetary (i.e. in-kind contributions are allowed). Industrial and/or supplier involvement and cost sharing above the required minimums is strongly encouraged. In evaluating the cost share, the percentage calculated from the cost information will be rounded to the nearest full percentage. Prior costs (e.g., costs for prior R&D, patents, or to develop technical reports) should not be proposed and will not be considered as cost share. Cost share may not be other federal funding.

If additional DOE Laboratories are teaming partners, their participation will be funded directly by DOE and the costs associated with each laboratory's participation will count towards the Government's cost share. Additionally, the non-federal cost sharing requirement will be based on the total cost of the project including all DOE laboratory portions of the effort, as indicated above.

Proposals should clearly identify the sources and amounts of cost sharing proposed. The applicant must include a summary table showing the cost-sharing breakout for each of the identified portions of the project (as specified above) that are included in their proposal. This will facilitate DOE's evaluation of the proposals.

Responsibility in the event that an industrial partner withdraws: Cost share is due, if the Government shares the cost, even if an industrial partner withdraws from the agreement.

Eligible Association of State Energy Research and Technology Transfer Institutions (ASERTTI) members may be interested in cost sharing some of the research efforts under this Program Announcement. ASERTTI is the association of state-level public interest research, development, demonstration and deployment (RDD&D) organizations. It promotes, funds, and conducts collaborative public interest energy RDD&D at the state, regional, and national levels (See Appendix G for the list of ASERTTI members.) Applicants are encouraged to contact ASERTTI early in the process to see if their research effort is one that an eligible ASERTTI member would be interested in cost sharing (NOTE: DOE Laboratories and other federally funded members are not allowable sources of cost share). The contact for ASERTTI is: Sherry Benzmilller, Energy Center of Wisconsin, 595 Science Drive, Madison, Wisconsin 53711. Phone: (608) 238-8276 ext. 121, E-mail: sbenzmilller@ecw.org, Fax: (608) 238-8733.

FOR FURTHER INFORMATION OR QUESTIONS AND ANSWERS CONTACT:

Any questions associated with this Program Announcement shall be provided via electronic mail to the Dickson Ozokwelu (dickson.ozokwelu@hq.doe.gov) by February 15, 2004. These questions will be sent to designated DOE staff for review and response. The answers to all questions will be posted by DOE to the LCC List-serv (LCC@anl.gov), and it will be the responsibility of the LCC member representative to distribute that information within their respective organizations.

DOE will make all efforts to notify interested DOE laboratories of any amendments or changes to this Program Announcement, to include any extension to the due date indicated below. It is recommended that laboratories submitting proposals contact the DOE Point of Contact indicated above, prior to the submission of their proposals and as considered necessary, to verify that no changes have occurred to the requirements.

PROPOSALS

The proposal is to be prepared for the complete project period. A separate proposal shall be prepared for each project (i.e., do not combine two or more projects in one proposal, if submitting more than one). **Proposals must be accompanied by a draft Field Work Proposal (FWP) cover page and cost summary page.** Technical proposals shall not exceed the page limitations indicated in Section II below. Successful applicants will be required to prepare and submit an updated Field Work Proposal and may be required to prepare a two-page nonproprietary fact sheet of the proposed project including project benefits suitable for public release, before award and updated on an annual basis.

Ten(10) copies of the proposal shall be submitted to the submittal address indicated below, as well as an electronic copy in "MS Word for PC" format (except that any Attachments described as required may also be submitted in pdf format). Electronic versions may be submitted on diskette or CD-ROM. Proposals submitted in other than MS Word for PC format (except for Attachments, as indicated) will be considered non-responsive and will not be considered for an award. DOE is not responsible for reproducing copies of the proposal.

Proposals must be submitted on standard 8-1/2" x 11" letter size paper. Margins on all four sides must not be smaller than 1"; font size must not be smaller than 11 point Arial or equivalent. The front and back sides of a single sheet are counted as 2 pages.

See Section II of this Program Announcement below for proposal preparation instructions, and Section III for Evaluation Criteria and procedures. Section IV identifies additional general requirements that are also applicable.

PROGRAM ANNOUNCEMENT DUE DATE:

The technical proposal must be received by 3:00 p.m. EST on March 5, 2004. **Any proposal received after the due date will not be forwarded for merit review.**

PROGRAM ANNOUNCEMENT SUBMITTAL ADDRESS:

All proposals should be submitted to the following address:

U. S. Department of Energy
Industrial Technologies Program
Attention: Dickson Ozokwelu, EE-2F/Forrestal Building
FY2004 Chemicals and Forest Products Program Announcement
1000 Independence Avenue, S.W.
Washington, DC 20585

Caution: Applicants assume full responsibility for insuring that the proposal is received at the specified place by the specified time and date and with the specified number of copies. Again, DOE is not responsible for reproducing copies of the proposal. DOE personnel will not pick up packages delivered to the local airport. Neither email nor facsimile (fax) proposals will be accepted.

SECTION I: SUPPLEMENTARY INFORMATION

A. Background

The U.S. Department of Energy (DOE) through its Industrial Technologies Program (ITP) supports U.S. industries in their efforts to increase energy efficiency, reduce waste and increase productivity. The goal of ITP is to accelerate the development and use of advanced energy efficient, renewable, and pollution prevention technologies that benefit industry, the environment, and U.S. energy security.

B. Objective

Development and implementation of high risk, new technology is a continuing goal of the ITP. Proposed research should focus on developments robust enough to handle process conditions found in systems of commercial interest. These technologies should be applicable to many sectors of the respective industry, and should achieve energy savings of at least 10 trillion BTUs/yr or more for the Chemical industry and at least 5 trillion BTUs/yr or more for the Forest Products industry, when fully implemented across their respective industry. For the purpose of this RFP, technologies, which displace fossil fuels with renewable energy resources, are considered energy saving technologies. Proposals must show significant advantages over current technology and attractive returns on capital invested.

C. Scope

This Program Announcement seeks proposals for R&D or commercial demonstration projects that will focus primarily on technology development in the areas of Catalytic Oxidation, Distillation, Wood/Composites, Fiber Recycling, and New Forest-Based Materials. Other promising technology areas demonstrating energy efficiency in the chemicals and forest products industries may be considered in addition to areas in Catalytic Oxidation, Distillation, Wood/Composites, Fiber Recycling, and New Forest-Based Materials. Below is a brief discussion of priorities within these areas:

Chemicals and Petrochemicals

Priority areas in the Chemical and Petrochemical industries include the development of new or improved catalytic oxidation and distillation technologies to enhance productivity of chemical and refining processes. Technology needs in these areas have been identified in the following industry roadmaps: Reaction Engineering, New Process Chemistry, and Separations 2000. For further information on these roadmaps, please refer to the following web site: <http://www.oit.doe.gov/chemicals/visions.shtml>.

- Additional information on Catalytic Oxidation research topics is provided in Appendix A.
- Additional information on Distillation research topics is provided in Appendix B.

Forest Products

Priority areas in the Forest Products industry include the development of new or improved **wood/composite and fiber recycling technologies, and new forest-based materials**. Technology needs in these areas have been identified in *Agenda 2020 The Path Forward: An Implementation Plan*. For further information, please refer to <http://www.oit.doe.gov/forest/visions.shtml>

- Additional information on Wood/Composite Technologies research topics is provided in Appendix C.
- Additional information on Fiber Recycling research topics is provided in Appendix D.

- Additional information on New Forest-Based Products research topics is provided in Appendix E.

General Areas of Technology

This Program Announcement seeks proposals for R&D or commercial demonstration projects in the preferred areas of technology identified above. However, it is recognized that other technical areas have the potential to enhance the energy efficiency and productivity of the U.S. chemical and forest products industries. Therefore, proposals for R&D or commercial demonstration projects within the Chemical and Forest Product industries that are outside of the preferred technical areas are acceptable if the Applicant is able to make a strong case for enhanced energy performance along with meeting the other requirements of this Program Announcement. The same evaluation criteria identified in Section II of this Program Announcement will be applied to these proposals.

SECTION II. PROPOSAL PREPARATION INSTRUCTIONS

A. Proposal Content

The overall proposal shall be submitted in sections or distinct files as described below. Proposals for different projects may be submitted against this Program Announcement. Proposals must include the items in the order below.

NOTE: The following sections of this Program Announcement specify page limits for certain portions of the proposal. Any pages that exceed the specified maximum number of pages for any item will be removed and will not be considered during the evaluation.

1) Project Summary (two-page limit)

A one- to two-page summary must be submitted with the proposal that describes, in general terms, the proposed Project and proposing laboratory, and the team members' commitment. The summary should only contain information that is releasable to the public.

2) Narrative (technical proposal) (see page limits below)

The Narrative shall be structured in accordance with the criteria and requirements specified in the detailed instructions below.

3) Attachments (optional; 10-page limit)

Attachments may be included, if deemed necessary by the Applicant, to further clarify key aspects of the proposed work and associated technology. The attachments shall not include additional explanatory text prepared expressly for this Program Announcement (all such material is limited to the Technical Proposal section of the Narrative described below). Allowable attachments include items such as technical papers presented at prior conferences, patents, process flow sheets, equipment drawings, electrical schematics, company informational brochures, maps, layout drawings, etc. At least one reference to each attachment and any associated explanation shall be included in the Technical Proposal section.

B. Narrative Structure

The Narrative shall consist of the following sections, limited to the number of pages where indicated:

- Cover Page
- Table of Contents
- Technical Summary (two-page limit)
- Technical Proposal (20-page limit)
- Resources by Task (no page limit)
- Statement of Commitment (two-page limit per letter)
- Personnel Resumes (two-page limit per resume)
- DOE Laboratory Field Work Proposal
- Attachments

1) Cover Page

The Narrative cover page must indicate the name and type of organization, the Program Announcement Title, the project title and program (i.e. priority areas (Appendices E – I) or “Other”) which the project addresses, and both the technical and business points of contact for the Applicant, denoting the names, titles, addresses, telephone and facsimile numbers, and electronic mail addresses.

2) Table of Contents

The Narrative shall include a table of contents and page numbers corresponding to the elements outlined in these guidelines. Certain sections shall be limited to the maximum number of pages specified below.

3) Technical Summary (two-page limit)

A two-page technical summary shall be included in the Narrative to describe the proposed Project in technical terms and explain the proposed Project benefits. The summary may contain information that is not releasable to the public. The name of the Applicant and title of the proposed project shall be indicated at the top of the summary page.

4) Technical Proposal (20-page limit)

The Technical Proposal portion of the Narrative shall be structured in accordance with the following Sections (the structure, order of topics, etc., within a Section are at the discretion of the Applicant). It shall include a Statement of Objectives that provides a task-oriented description of activities that is responsive to the technical requirements of this Program Announcement. Applicants must review Section IV.D, “Evaluation Criteria of Technical Volume,” to be certain that all aspects of the Evaluation Criteria are adequately covered in the Technical Proposal.

a) Research Concept

Discuss the proposed concept and key innovative components of the R&D activities. Describe how the concept addresses the research needs cited in the respective chemical and forest products industry roadmap documents and how it addresses the priority goal of bringing emerging technologies into use that have significant advantages over current technology. Discuss how the proposal integrates across identified technology elements and the technical feasibility of the concept. Identify the hurdles to be overcome by the proposed R&D. Describe domestic and worldwide technology status including emerging technologies. Explain why the domestic industry is not already investigating or implementing the proposed concept and why they will not conduct the R&D without government assistance.

b) Project Plan/Statement of Objectives

Describe the project goals, scope of work, and objectives. Provide a work breakdown structure and a milestone plan and schedule. Identify and describe decision points with go/no-go decision criteria (i.e. stage gate criteria), which includes a milestone for completion of the R&D project and transition to technology demonstration phase. Describe project organization and individual responsibilities. Describe how tasks will be integrated among the participants and the project will be coordinated. Describe the project management structure including implementation and monitoring of the R&D. Discuss the management philosophy for achieving project success.

c) Team Capabilities and Facilities

Provide a summary as to how the multi-disciplinary team members will participate in the proposed R&D activities. Describe the complementary skills and capabilities of the team members, the relevant individual and corporate experience in the area of research; and adequacy of any required facilities and equipment that will be available for this project.

d) Commercialization Plan

Identify the path that will be used by the project team to transfer the technology to industry. Complete the questionnaire found in Appendix H of this Program Announcement, demonstrating that the project team has been selected to optimize commercialization potential. Limit the response to the questionnaire to five pages (does not count against the overall 20-page limit) and include as an Attachment. Describe the unique characteristics that make the project team ideally suited to successfully develop and commercialize the project technology. Describe how the technology will be made available to a wide cross-section of the chemical or forest products industry at the earliest practicable time. Present current and potential partnering strategies, possible follow-on development phases, licensing strategies, economic analyses that show returns on capital invested, and potential market barriers and how the barriers will be overcome.

e) Energy Savings and Other Benefits

Discuss how the respective chemical or forest products industry will benefit from the proposed project in terms of energy savings, environmental performance, and economic benefits. Each is discussed further below:

1) Estimate the energy benefits of your technology using the internet-based *Energy Savings Estimator*, which is available at www.energetics.com/energysavingstool/. This tool enables the user to estimate energy savings for new technologies used in the chemicals and forest products industry. Step-by-step instructions for using the model are included at the website. Data entered at this website is password-protected and only accessible by the user. Assumptions should be clearly stated for all data entered, and expanded in your discussion if necessary. See Appendix I for more information on the Energy Savings Estimator.

A useful resource for estimating energy savings from process systems in the forest products and chemical manufacturing industries can be found at http://www.oit.doe.gov/bestpractices/steam/pdfs/steam_assess_mainreport.pdf.

2) Estimate the environmental benefits of your technology by technology using the internet-based *Energy Savings Estimator*, available at www.energetics.com/energysavingstool/. This tool enables the user to estimate the reductions in pollutant emissions for new technologies used in the chemicals and forest products industry. Step-by-step instructions for using the model are included at the website. Data entered at this website is password-protected and only accessible by the user. Assumptions should be clearly stated for all data entered, and expanded in your discussion if necessary. See Appendix H for more information on the Energy Savings Estimator.

3) Economic benefits of the proposed project should be described including the general applicability, timeliness, and economic viability of the proposed technology (i.e., probability of commercial application), the estimated size of the potential economic impact (i.e. potential market size); and the potential for enhancing the economic competitiveness of the domestic industry.

5) Resources By Task (no page limit)

The Narrative shall include a summary of resources by Statement of Objectives task. The summary must include the following for the Applicant and each industrial partner.

- The job title and number of hours for each of the individual personnel proposed
- The destination and purpose for all travel
- Proposed equipment, materials, and supplies, for each item over \$5,000

6) Statement of Commitment and Cost Sharing (Two page limit)

Firm funding commitments are expected; however only a description of those commitments must be included in the proposal. The commitment description shall identify each industrial partner, percentage of total project, dollar amount, and budget category (for in-kind contributions) for the proposed project. For projects with multiple cost sharing, or multiple partners, summarize information in table format.

By submission of a proposal, the Applicant is certifying that it has signed letters of commitment from all industrial partners that will be providing cost share. If selected for negotiation of an award, letters of commitment, signed by an authorized official, will be required within 14 calendar days of notification.

7) Personnel Resumes (Two-page limit for each resume)

A resume should be provided for Key Personnel for the Applicant and each industrial partner. Each resume is limited to a maximum of two pages. All resumes must be submitted in MS Word for PCs.

8) DOE Laboratory Field Work Proposal

The proposal must include a draft Field Work Proposal for work done by the Applicant DOE FFRDC. This information must be prepared in accordance with Section II.

9) Attachments

- Attachment F Questionnaire (5 page limit)

C. Proprietary Proposal Information

Proposals submitted in response to this Program Announcement may contain trade secrets and/or privileged or confidential commercial or financial information which the Applicant and/or his industrial partners do not want to be used or disclosed for any purpose other than evaluation of the proposal. The use and disclosure of such data may be restricted, provided the Applicant marks the cover sheet of the proposal with the following legend, specifying the pages of the proposal which are to be restricted in accordance with the conditions of the legend:

“The data contained in pages _____ of this proposal have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this Applicant receives an award as a result of or in connection with the submission of this proposal, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the Government’s right to use or disclose data obtained without restriction from any source, including the Applicant.”

Further, to protect such data, each page containing such data shall be specifically identified and marked, including each line or paragraph containing the data to be protected with a legend similar to the following:

“Use or disclosure of the data set forth above is subject to the restriction on the cover page of this Proposal.”

It should be noted, however, that data bearing the aforementioned legend may be subject to release under the provisions of the Freedom of Information Act (FOIA), if DOE or a court determines that the material so marked is not actually proprietary and, thus, not exempt under the FOIA. The Government assumes no liability for disclosure or use of unmarked data and may use such data for any purpose.

Applicants are hereby notified that DOE intends to make all proposals submitted available to non-Government personnel (federal research laboratory personnel) for the sole purpose of assisting DOE in its evaluation of the proposals. These individuals will be required to protect the confidentiality of any specifically identified proprietary information obtained as a result of their participation in the evaluation.

SECTION III: PROPOSAL EVALUATION

A. Merit Reviews

All proposals will be evaluated under ITP’s standard Merit Review procedures. Proposals will be rated by the merit review committee and Applicants may be contacted by the merit review committee for clarifications before the committee makes their final recommendation to the Selection Official. Clarifications may be done in person, by videoconference or teleconference.

B. Selection Criteria

All timely Proposals that fulfill the minimum proposal requirements, as determined under the compliance review, will be eligible for comprehensive evaluation.

DOE plans to select for award those proposals judged to provide the greatest public benefit within the estimated available funding. Using the consensus method, the technical and cost proposal information submitted by the Applicant will be evaluated. Proposals will undergo a comprehensive technical evaluation in accordance with the criteria listed below. The Technical Proposal will be numerically point-scored. All work proposed for the total project period will be evaluated in accordance with those criteria.

The technical criteria are significantly more important than cost; however, cost may be a determining factor in making the awards. The DOE Selection Official (SO) will also consider the Programmatic Selection Considerations identified below. In preparing proposals, Applicants should present sufficient evidence to ensure that each criterion is fully addressed. Technical reviewers will base their evaluations only on information contained in the proposal and shall not consider their familiarity (if any) with the firm, its industrial partners and subcontractors (if any) or key individuals.

A Compliance Review will be performed to determine responsiveness to the requirements of the Program Announcement. This review will include determining if all forms and required contents of the proposal (to include page limitation of those documents) and whether Minimum Qualifications have been met. If a demonstrated effort to complete and provide all that is required is ascertained from the information provided, but information has been omitted, the Applicant may be contacted to provide the omitted information. To be considered, the requested information must be submitted promptly upon the DOE request, and prior to Comprehensive Evaluation. Minimum Qualifications include fulfillment of the minimum required cost share contributions identified in Section II above and a Statement of Objectives that is considered to be within the areas of consideration indicated for this Program Announcement, also indicated in Section II above and the Appendices A-E.

The Comprehensive Evaluation will apply the following technical and cost evaluation criteria described as follows:

Technical Evaluation Criteria

The following evaluation criteria will be used in the comprehensive evaluation. For each criterion, the weighting (out of a total of 100) is indicated to show the relative importance of each.

1. Research Concept (Weight: 20)

The factors used to evaluate this criterion are as follows. 1) The research concept's technical merit and the responsiveness of the proposal in addressing the priority goal of bringing emerging technologies that have significant advantages over current technology into use by the chemical and forest products industries. 2) The responsiveness of the proposal to integrate across identified technology elements, and the technical merit and feasibility of the proposed work (i.e., is it based on sound scientific/engineering principles and on an understanding of current state of the art in the industry).

2. Project Plan/Statement of Objectives (Weight: 10)

The factors used to evaluate this criterion are as follows. 1) The completeness and appropriate timing in the project plan, and the clarity, completeness, and adequacy of the statement of objectives. 2) The degree of coordination, interaction, and adequacy of the overall project management plan across all the efforts, disciplines, partners, and objectives of the project. 3) The adequacy and appropriateness of the project plan, principal milestones, decision points, time for each task, and the planned assignment of responsibilities and level of manpower to complete the research.

3. Team Capabilities and Facilities (Weight: 10)

The factors used to evaluate this criterion are as follows. 1) The adequacy of the Applicants's proposed team to address all aspects of the proposed work including the commitment of the team members, the clarity of the roles of the team members; the approach to managing the team, the priority the Applicant and team members will place on the proposed work; and the assistance that will be provided in any specialty area required to solve specific problems and breadth and depth of the collaboration across industry, academia and other partners. 2) The adequacy of the Applicant's proposed facilities and those of proposed subcontractors, the commitment to use those facilities for the proposed program; and the reasonableness of any request for new facilities and equipment.

4. Commercialization Plan (Weight: 10)

The factors used to evaluate this criterion are as follows. 1) The project team's characteristics that make them well suited to successfully develop and enable commercialization of the technology (based in large part on the answers provided in response to questions in Appendix H). 2) The availability of the technology to a wide cross-section of the chemical or forest product industries and the time for it is to be available. 3) The adequacy of current and potential partnering strategies, follow-on development phases, licensing strategies, results of economic analyses that show returns on capital invested, and the plan to overcome market barriers.

5. Energy Savings and Other Benefits (Overall Weight: 50, with sub-criteria weights as shown below)

a) Energy Benefits (Weight: 30)

The factors used to evaluate this criterion are as follows. 1) Energy benefits considering the potential for the proposed technology to contribute to the reduction of the overall energy consumption and the reduction in the use of fossil based feedstock energy in the U.S. as compared to the current commercial technology to produce the same or similar product(s). Chemical projects are expected to yield energy savings of at least 10 trillion BTUs per year by 2020, and ideally should yield energy savings in excess of 50 trillion BTUs per year by 2020 when fully commercialized across the chemical industry. Forest Products projects are expected to yield energy savings of at least 5 trillion BTUs per year by 2020, and yield energy savings in excess of 10 trillion BTUs when fully implemented across the forest products industry. The energy savings will be evaluated by considering the adequacy, technical merit, assumptions, and completeness of the applicant's energy savings estimates provided through evidence presented by the applicant or by the Energy Savings Estimator tool referenced in Section III.C. 2) The sum of energy savings results for multiple products and markets will be considered, as well as any additional markets identified in the applicant's discussion of energy savings.

b) Environmental Benefits (Weight: 10)

The factor used to evaluate this criterion is as follows. 1) The potential for the proposed technology to contribute to the reduction of the overall environmental impact in the U.S. as compared to the current commercial technology that produces the same or similar product(s).

c) Economic Benefits (Weight 10)

The factors used to evaluate this criterion are as follows. 1) The general applicability, timeliness, and economic viability of the proposed technology (i.e., probability of commercial application). 2) The size of the potential economic impact (i.e. potential market size). 3) The potential for enhancing the economic competitiveness of the domestic industry.

C. Cost Evaluation Criteria

The proposed cost elements will not be point scored or adjectivally rated. However, they will be evaluated to determine if the total proposed amount is commensurate with the proposed effort. Also, the proposed cost will be evaluated to ascertain that the Applicant has met the cost sharing requirements specified in the Program Announcement. As previously indicated, **those proposals not meeting the minimum cost sharing requirements specified in this Program Announcement will be eliminated from further consideration in the initial evaluation for meeting the minimum qualifications.**

The proposed cost elements may also be used during the comprehensive evaluation to assist evaluators in judging the proposal.

D. Weighting of Criteria

The criteria will be based on a maximum of 100 points. The evaluation criteria are weighted as indicated above.

E. Programmatic Selection Considerations

Programmatic Selection Considerations, while not necessarily indicators of a Proposal's individual technical merit, are relevant and essential to the process of selecting Proposals that will best achieve the overall DOE programmatic goals. Upon completion of the technical and cost evaluations, those proposals which are potential candidates for award will be reviewed and further evaluated by the DOE Selection Official based upon the actual DOE funding available and the following Programmatic Selection Considerations. The Government will make selections for negotiations and planned awards from among the highest ranking proposals, using these considerations.

1. The total proposed cost of the project will not be point scored. Applicants are advised, however, that notwithstanding the lower relative importance of the project cost, the cost may become a consideration in selections.
2. An award will not be made to an Applicant whose proposal requires DOE funding in an amount that exceeds the DOE funding available.
3. Programmatic goals include the desire for a portfolio of research projects to be balanced with respect to technical areas, stages of development, and risk (i.e. near-, mid-, and long-term duration).

SECTION IV: GENERAL CONDITIONS

A. Non-governmental Reviewers

In conducting this evaluation, and as indicated above, the Government may utilize assistance and advice from non-Government personnel. Applicants are therefore requested to state on the cover sheet of the proposals if they do not consent to an evaluation by such non-Government personnel. The applicants are further advised that DOE may be unable to give full consideration to a proposal submitted without such consent. DOE reserves the right to support, or not to support, all, or any part of any proposal.

B. Proposal Preparation Costs

DOE is under no obligation, and will not pay, for any costs associated with preparation or submission of proposals.

C. Partial Awards

DOE reserves the right to support, or not to support, all, or any part of any proposal. Unsuccessful proposals will not be returned.

D. Debriefings

Unsuccessful Applicants will be provided a summary of strengths and weaknesses of their proposals in writing from DOE. This shall constitute the debriefing.

E. Debarred and Suspended Parties

Applicants must not make any sub-award or permit any sub-award to any party which is debarred, suspended, or is otherwise excluded from or ineligible for Federal awards. The list of parties excluded from Federal procurement and non-procurement programs can be accessed through the Excluded Parties List System (EPLS) at <http://epls.arnet.gov>.

F. National Environmental Policy Act (NEPA) Requirements

All Applicants selected for negotiations shall complete the necessary NEPA compliance requirements in coordination with their local DOE Field Office. Documentation of the completed NEPA documentation will need to be provided prior to awarding funding for the project. Applicants are restricted from taking an irreversible action prior to DOE reaching a final NEPA decision regarding a proposed project. Irreversible actions include demolition of existing buildings, site clearing, ground breaking, construction, and/or site-specific detailed design. Provided DOE has authorized the work, this restriction does not preclude the Applicant from developing plans, preliminary designs, or performing other necessary support work prior to DOE reaching its final NEPA decision.

G. Energy Policy Act (EPAct Requirements)

Energy Policy Act Requirements apply to this Program Announcement. Industrial partners involved with any project will be required to submit EAct certifications before any DOE funding will be awarded to the Applicant teaming arrangement.

APPENDIX A - CATALYTIC OXIDATION

The *Chemical Industry Vision2020 Technology Partnership* has identified oxidation catalysis as a leading technology for industrial chemical synthesis with the greatest potential for improved feed stock efficiencies, environmental impact and energy savings. New oxidation catalysis will not only provide direct energy savings, improved economic and environmental impact, but will likely provide leading edge science to influence catalytic developments for many other commercial catalytic transformations. The goal of this research area is to develop innovative oxidation catalytic technology to overcome current limitations of selectivity and efficiency with commercial implementation to achieve substantial energy savings. Improved economic performance translates into enhanced utilization of feedstocks, reduced requirements for materials of construction, and sustainable energy savings. Approaches should consider innovative emerging technologies that bring a multidisciplinary scientific basis to address major challenges in oxidation chemistry.

All industrial syntheses of oxygenated compounds from hydrocarbons involve cracking of paraffins to olefins and subsequent direct or indirect addition of oxygen. The direct addition of oxygen to olefins is exothermic and so energy savings result from saving hydrocarbon feedstock through increased selectivity. Indeed, the enhancement of oxidation selectivity is by far the largest potential improvement of energy efficiency in the chemical industry (Parshall, 1994).

This Program Announcement for R&D for efficiency improvements of industrial catalytic oxidations emphasizes, but is not limited to, the following topical areas:

- Selective oxidation of petroleum feed stocks for commodity chemicals and monomers to enhance efficiency by reducing over oxidation with CO₂ formation.
- Alkane activation for direct oxidation with molecular oxygen; e.g. methane to methanol, alkanes in place of olefins for monomer synthesis, etc.
- Homologation of methane and/or low molecular weight alkanes to commercially useful products, e.g. Fischer Tropsch Chemistry with air or enriched air.
- Improvements in the Syntheses or Use of Reactive Intermediates:
 - Improved efficiency for distributive synthesis of reactive intermediates such as peroxides
 - Advance technology for in situ generation and consumption of reactive intermediates, to achieve steady state benign operations, e.g. phosgene, or
 - Full replacement of these intermediates, e.g. phosgene, HCN, chlorine, etc.
- Direct oxidation of aromatics, such as benzene to phenol
- Heat integration of catalytic oxidations (inorganic and organic) with other exothermic or endothermic processes, for maximum efficiency of energy use in syntheses.

Catalytic oxidation developments of interest may involve a number of specialized technologies, including microorganisms, biological catalysts (enzymes), and traditional catalysis.

Multidisciplinary teams are encouraged to develop the technology to achieve high selectivity and productivity. Research and development at the interface of established disciplines and emerging sciences are of interest to create and implement the fundamental knowledge for the synthesis of new functional catalytic structures. These include, but are not limited to the following:

- Biomimetic catalytic centers that mimic the exceptional selectivity and specificity of enzymes, e.g. bioactive metal centers

- Biocatalytic operating systems that use optimized enzymes with tailored activity/selectivity and ability to operate in non-native environments for conversion of petroleum feed stocks
- Tuning the properties of metal oxide catalysts via surface modification for molecular recognition
- Self-assembly concepts for heterogeneous catalytic centers to achieve high reactivity and better control sintering of supported metals.
- Sol-gel molecular clusters for spatially sequencing different catalytic centers and to control surface properties
- Mesoporous and zeolitic science to develop molecular-scale tubular reactors that make possible the sequential, parallel-processing to achieve high throughput rates and very high selectivity
- Nanotechnology to control both surface composition and molecular environment for sequencing multiple reactions and separation centers

APPENDIX B - DISTILLATION

Significant quantities of inorganic acids, and all commodity organic chemicals, are purified by distillation at some stage in their manufacture. Distillation accounts for more than 60% of the total process energy used for the manufacture of commodity chemicals, and is therefore a meaningful target for improvements in energy efficiency. This Program Announcement seeks R&D for the development of new technology for significant enhancement of energy efficiency of existing distillation systems used in the U.S. for the manufacture of any major commodity chemical, both inorganic and organic, at an attractive cost, while maintaining (or enhancing) system reliability and safety. Promising technology will be capable of retrofit at attractive cost, and meet or exceed performance characteristics demanded of distillation systems. The new technology can be pure hardware, or software, or a combination of these, as long as a complete description of technology implementation (and its cost) is provided.

Opportunities for enhancing the energy efficiency of distillation systems used in the U.S. should be identified, through careful analyses of the inefficiencies. Technical strategies to overcome the inefficiencies should be identified and practical means to address them developed. The cost of applying the new technology, and the ease of technology implementation, should be the paramount considerations of practical technology development. Technical and business teams to develop and deploy the new technology should be formed, with the goal of introduction of the new technology for the broadest possible markets in the U.S.

System integration in commodity chemical manufacture that could be implemented at attractive cost and reduces currently needed distillation capacity is responsive to the Program Announcement, and so is hybridization of distillation with other more efficient means of separation such as membranes. The history of commercial attempts to introduce efficient hybrid distillation systems should be carefully reviewed prior to the development of a proposed approach. The design and development of new column externals, such as the reboiler and the condenser, is responsive to the Program Announcement, as long it can be demonstrated that the replacement of such equipment can be accomplished at acceptable cost and pay back period. The development of processes that can take advantage of excess chemical industry reactive distillation capacity that may result from regulations on oxygenated fuel additives is also encouraged, as long as the new processes enhance energy efficiency of the processes they replace.

Responsive proposals will review the state of the art of the targeted distillation application used in the U.S., and will provide a sound technical basis for the efficiency gains to be derived from the new technology development. Proposals will also identify the number of distillation units in the U.S. that could apply the new technology, and the energy savings that could be derived by reasonable market penetration of the technology from the period of its commercial introduction.

It is important to summarize what is not being solicited. Modeling or simulation of distillation, or the collection of data, or predictive capability of thermodynamic or transport properties of vapor and liquid, without a methodology to implement the knowledge and the potential benefits so acquired, is not responsive to the Program Announcement. Incremental improvement of existing technology for efficiency enhancement of distillation is not solicited, nor is technology that is not broadly applicable to distillation as applied today in commodity chemical manufacture. That is, the technology must not benefit only the proposing company, rather the technology should be designed to benefit the widest possible range of distillation applications in the U.S.

APPENDIX C - WOOD/COMPOSITE TECHNOLOGIES

In Wood/Composite Technologies, there are 5 target areas for research: Wood Processing Energy Reduction, Wood Adhesives, Resins and Composites, Wood Building Systems, Innovative Wood Resources, and Environmental Performance.

Wood Processing Energy Reduction

No focused approach has been undertaken to reduce overall energy consumption for wood processing and manufacturing, despite the fact that energy used in production is the single highest wood processing cost. This RFP is soliciting the development of breakthrough approaches, process technologies and control systems that can reduce energy required by 50%. Specific goals include but are not limited to:

- Developing a system to use waste heat from available engines and motors in drying of wood products
- Increasing the use of residuals for process energy and emissions control by 50%.
- Developing energy-efficient composite processing systems.
- Developing breakthrough technologies to reduce energy consumption from emission control by 50% without impacting production cost or production quality.

Wood Adhesives, Resins & Composites

Breakthrough technologies in the production of resins, adhesives and composites will substantially reduce energy requirements, reduce costs, allow penetration into new markets, improve competitiveness and reduce the environmental impact of wood and wood-based products. Today's resins and adhesives lack adequate strength, stiffness, durability and reasonable life-cycle costs to revolutionize composite and construction methods. This portion of the Program Announcement seeks the development of new adhesives, resins and composites based on materials such as agricultural fibers and plastics, and using advanced materials and techniques such as synthetic fibers and embedded sensors.

Specific goals include but are not limited to:

- Developing durable composite resins that use renewable resources, cost less, cure faster at lower temperatures and higher moisture content, which significantly helps reduce energy requirements, reduce costs and improve environmental performance.
- Enhancing product performance by modifying wood surfaces to improve adhesive systems, paint adhesion, bonding of wood and plastics, and the use of wood fibers for filters, thereby reducing labor and energy requirements.
- Developing improved adhesive fastener systems to facilitate more uniform building practices to reduce labor requirements, thereby reducing energy requirements.
- Combining wood and non-wood materials to meet new market needs and facilitate environmental and energy efficiencies.
- Increasing use of bio-based composites, such as replacing non-renewable petroleum-based plastics with renewable bio-based plastics, in wood-plastic composites.

- Incorporating advanced materials into wood-based composites to enhance performance, including energy performance.
- Using advanced sensor technology and developing smart materials that adapt to their environment, thereby improving energy efficiency.

Wood Building Systems

New approaches to design and manufacture of wood building systems are needed to improve the durability of wood frame buildings from common problems of moisture and mold damage as well as extraordinary events like floods or hurricanes. In addition, today's structural buildings are energy and resource inefficient. New approaches to design and manufacture of wood building systems are needed to substantially improve durability, disaster resistance, increase energy efficiency and occupant health, reduce construction time and labor, and reduce the environmental impact of wood and wood-based products.

Specific goals include but are not limited to:

- Developing designs for new, multi-material hybrid structural systems that will significantly enhance the overall system performance of wood structures, including energy performance.
- Through design improvements, substantially increasing the building performance of wood structures during natural disasters, thereby reducing post-disaster recovery energy requirements.
- Improving performance of wood and wood-based products in wet environments, thereby reducing energy requirements for replacement or remediation.
- Developing environmentally benign, fire-retardant, and preservative systems, thereby reducing environmental impact of disposal and preserving the fuel value of the wood.

Innovative Wood Resources

Today's wood products do not adequately make use of reused or recycled wood. Substantial expansion of the use of recycled and reused wood from deconstruction (some of which is treated with preservatives) will dramatically reduce the environmental demand of wood and wood based products and preserve the energy value of wood.

In addition, wood is not currently grown with predictable wood properties or cross sections. Genetic engineering should be developed to control material properties and cross sections.

Specific goals include but are not limited to:

- Developing methods to permit recycling of 80% of all construction and demolition wood-waste generated, including preservative treated wood, thereby reducing environmental impact of disposal and preserving the fuel value of the wood.
- Providing for the use of wood in round form for structural purposes, thereby reducing energy needs for processing.
- Using biotechnology to grow trees with controllable properties (mechanical, geometric) that will reduce costs and energy demands of processing into lumber, veneer, strands particles and fibers by 50%.

- Incorporating manufactured goods disposal and recycling into the design stage for wood products, thereby reducing life cycle and energy costs of wood products by 30%.

Environmental Performance

Current methods for controlling VOC and HAP emissions from wood products manufacturing are generally effective, but expensive and resource intensive. Furthermore, wood products VOC/HAP control technologies require improvements in their effectiveness.

Although current research into the use of low-temperature plasma could reduce VOC emissions for less cost and energy consumption, there is a strong need for creative research into chemical pathways that convert VOC and HAP precursors into a form that remains with the product, and ways to produce purer, more concentrated forms of specific VOCs that are suitable for sale as a by-product. To be widely accepted, the technologies must be capable of cost-effective and highly efficient control of methanol, acetaldehyde, formaldehyde, and methyl ethyl ketone and require much less energy to implement.

Specific goals include but are not limited to:

- Developing trees with reduced amounts of VOC and HAP precursors which can reduce or eliminate the industry's need for costly emission control devices
- Producing technologies that minimize the conversion of VOC and HAP precursors or which use less VOC and HAP generating materials.
- Developing methods to capture VOCs and HAPs to yield competitively priced byproducts or fuels.
- Developing highly efficient VOC and HAP destruction technologies are needed that are less costly and more resource efficient than thermal oxidation technologies.

APPENDIX D - FIBER RECYCLING

There has not been sufficient advancement in recycling technology to meet present and future needs for energy reductions, operating cost reductions and quality improvements. Furthermore, increasing use of low quality feedstocks (e.g. single stream collection, foreign OCC) presents challenges to making quality goods from recycled materials.

There are also opportunities to increase the resource efficiency at the mill to reduce the amount of out-of-spec material that is produced. The production of out-of-spec materials results in lower yield, loss of chemicals and a significant increase in energy consumption.

Gross contamination and mixes of fiber types that the recycling mill cannot handle are increasing. Glass contamination in particular, causes difficulties because of equipment abrasions. In addition, once inappropriate fibers like unbleachables in white ledger grade get into the pulper, the subsequent processing equipment cannot remove or bleach them. There is currently a lack of effective grade specifications relevant to recycle mill operations and lack of low-cost technologies to monitor and sort contaminants and paper types.

The Forest Products industry lacks effective repulping methods that retain or regain fiber performance properties. The existing repulping, screening and cleaning, and deinking equipment has been around for decades. There are no new and interesting ways of processing fiber that cuts costs and reduces energy consumption. In addition, the strength/cost ratio of recycled paper must be improved.

Specific goals include but are not limited to:

- Developing technologies that result in higher product uniformity in the mill including clear separation of fiber types.
- Developing technologies that remove gross contamination from recycled paper.
- Developing technologies that lower energy use like novel chemical, enzyme or other treatments.
- Developing processes that reduce water use
- Streamlining existing systems to produce simpler process flow.

APPENDIX E - NEW FOREST-BASED MATERIALS

The forest products industry is the largest producer of renewable bio-based materials, but these materials are under strong competition from steel, plastic and plastic based composites. The challenge for the forest products industry is to significantly increase the materials flow from sustainable forests while reducing society's need for non-renewable resource to supply material needs.

One means of increasing the output of sustainable forests is to produce useful chemicals and materials from what are currently waste products. One example is to use isolated wood-based sugars to produce biodegradable microbial polyesters. It is estimated that if bio-based products can capture just 10% of the polyester fibers market, it would lead to an annual energy savings of 81 trillion BTU. Alternatively, sugars from forest products could be used to ferment into ethanol. Utilizing 2/3 of the hemicellulose produced in processing forest products could provide 2.4 million gallons of ethanol, which is more than the 1.8 million gallons of fuel ethanol produced in the US in 2001.

Forest productivity can be potentially increased by using alternative feedstock like willow biomass which has an energy multiple (energy input divided by energy content harvested) greater than ten. The high rate of carbon capture per unit of fossil fuel input significantly enhances the overall energy efficiency compared to other feedstock production systems.

Specific goals include but are not limited to:

- Developing novel primary fractionation technology to separate cellulose, hemicellulose, lignin and extractives.
- Developing technology to fractionate (clean/unsulfonated) lignin into multiple molecular structures with emphasis on high molecular weight and relatively unchanged form.
- Developing cost effective hydrolysis of cellulose and hemicellulose to sugars and conversion to products.
- Isolating fibers with preserved nano structure of cellulose and hemicellulose
- Developing cost effective molecular recognition and separation technologies for the small molecules isolated.
- Developing microscale testing methods is desired to allow the screening of the usefulness of isolated components based on quantities that can be obtained from bench scale research.

APPENDIX F - ADDITIONAL QUESTIONS FOR PROPOSAL

Please provide complete yet concise answers to the following questions. The response should be submitted as a separate attachment to the proposal and is limited to five pages.

1. Does the proposed technology address a well-defined industry need or priority?
2. Have any potential customers expressed a willingness to demonstrate the technology if it is a commercial success? If so, is that potential customer part of your project team?
3. Describe the current state of the art technology commercialized in the worldwide market. Also describe any ongoing research (that is known to the author) of competing technologies that could reach the market in the next 5 years. Please describe how the capital and energy costs as well as the environmental impacts of the proposed technology compare with the current state of the art technology and competing technologies under development.
4. Describe the current market condition for selling a new technology to the target industry. Based on this estimate of the target industry, what is the probability that this technology will be implemented in the U.S.? In other words, how will the proposed technology benefit the U.S. chemical and forest products industries, and not its foreign competitors? Will this technology be used for retrofits in existing plants?
5. Describe the current state of patents that can cover the proposed technology. Who owns these patents and can they be licensed? When will the relevant patents expire? Describe how the patents held by other companies will likely affect the commercialization of the proposed technology.

Please provide your best estimate for the following questions regarding the proposed technology.

6. What is the planned start-up year for the proposed technology?
7. What is the maximum production capacity (Million units/year) of the technology under theoretically ideal operation and control?
8. What is the total number of years that the technology will be in place and functional?
9. What is the estimated cost of equipment used directly for manufacturing (i.e., the Inside Battery Limits cost).
10. Please list the cost per unit, and consumption per unit of product for all raw materials, catalysts and consumables, and utilities.
11. Please list the price per unit, and production per unit of product for all by-products.

APPENDIX G – ASERTTI MEMBERSHIP LIST

Members

Advanced Energy Corporation (North Carolina)
California Energy Commission
California Institute for Energy Efficiency
Center for Energy Efficiency & Renewable Energy
Connecticut Office of Policy and Management
Energy Center of Wisconsin
Florida Solar Energy Center
Hawaii Department of Business, Economic Development & Tourism
Iowa Energy Center
Massachusetts Division of Energy Resources
New York State Energy Research & Development Authority
North Carolina Solar Center
Northeast Energy Efficiency Partnerships
Northeast Utilities
Northwest Energy Efficiency Alliance
Pennsylvania Department of Environmental Protection
South Carolina Institute for Energy Studies
Texas A&M University
Washington State University Cooperative Extension Energy Program
University of Illinois at Chicago – Energy Resources Center

Associate Members

Argonne National Laboratory
Bonneville Power Administration
Brookhaven National Laboratory
Consortium for Energy Efficiency
Electric Power Research Institute
Gas Technology Institute
Lawrence Berkeley National Laboratory
National Renewable Energy Laboratory
Oak Ridge National Laboratory
Pacific Northwest National Laboratory

Collaborative Partners

Alliance to Save Energy
American Council for Energy Efficient Economy
Interstate Renewable Energy Council
National Association of State Energy Officials
US Department of Energy
US Environmental Protection Agency

APPENDIX H – ENERGY SAVINGS ESTIMATOR INFORMATION

To use the *Energy Savings Estimator*, users select a product market and enter estimates for market penetration and market growth. Market data (production) and historical growth factors are embedded in the model. Market penetration is calculated using historical market penetration models suitable for various types of technology. Users input the percentage of energy that is saved when the new technology is compared with conventional technology. Typical energy use per pound of product is embedded in the model in the categories of feedstock, heat/steam, and electricity. Energy use numbers are an average for the industry, and do not necessarily represent the state-of-the-art. After market and energy use data are entered, the model returns a summary page of the projected benefits over the next 20 years. These include energy savings and reductions in criteria pollutants associated with fuel combustion. This summary page should be saved as an electronic file (follow instructions on website) and submitted electronically in addition to the main proposal (Adobe PDF file).

There are cases where an individual technology may impact more than one product market. In this case, applicants may submit up to three (3) summary pages for different markets, and results will be viewed as additive when applying energy savings criterion. Please indicate in your discussion any additional product markets that may be impacted, as well as opportunities outside the chemical and forest products industries, and the estimated quantitative benefits (e.g., Btu/year) if available. State all assumptions concerning additional markets.

If you are submitting a chemicals proposal and your technology does not explicitly apply to any of the top fifty chemicals contained in the Energy Savings Estimator, select a chemical product that is most representative of your market, or alternatively, use the Energy Savings Estimator customized product section where certain product data will be needed to be entered by the user (energy per pound, estimated annual production of chemical, etc.). The customized product information you enter can be a composite of multiple products and markets where the developed technology will impact. Include detailed assumption and data used to develop the composite data.

For technical assistance using the *Energy Savings Estimator*, contact Joan Pellegrino, Energetics, Inc., at 410-953-6202 or via email at jpellegrino@energetics.com.