Department of Energy (DOE)
Office of Energy Efficiency and Renewable Energy (EERE)

IN PARTNERSHIP WITH

U.S. Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA)

INTEGRATED BIOREFINERY OPTIMIZATION

Funding Opportunity Announcement (FOA) Number: DE-FOA-0001689
FOA Type: Mod 000003
CFDA Number: 81.087

FOA Issue Date:	01/06/2017
Submission Deadline for Concept Papers:	2/06/2017 5:00pm ET
Submission Deadline for Full Applications:	4/05/2017 5:00pm ET
Expected Submission Deadline for Replies to Reviewer Comments:	5/15/2017 5:00pm ET
Expected Date for EERE Selection Notifications:	7/17/2017
Expected Timeframe for Award Negotiations	9/15/2017

- Applicants must submit a Concept Paper by 5:00pm ET the due date listed above to be eligible to submit a Full Application.

- To apply to this FOA, applicants must register with and submit application materials through EERE Exchange at https://eere-Exchange.energy.gov, EERE's online application portal.

- Both EERE and USDA-NIFA will be making awards under this FOA (USDA-NIFA announcements are typically called Requests for Applications, or RFAs; for purposes of this funding opportunity, however, the FOA constitutes a USDA-NIFA announcement). Applicants will submit proposals in response to the FOA, not to a specific agency. This FOA contains the application requirements, to which applicants must be responsive. Additionally, the FOA contains information about specific EERE and USDA-NIFA grant

award terms and conditions. Applicants should carefully review the FOA for the application requirements, award processes, and award terms, and conditions.

- Applicants must designate primary and backup points-of-contact in EERE Exchange with whom EERE and USDA-NIFA will communicate to conduct award negotiations. If an application is selected for award negotiations, it is not a commitment to issue an award. It is imperative that the applicant/selectee be responsive during award negotiations and meet negotiation deadlines. Failure to do so may result in cancelation of further award negotiations and rescission of the Selection.

MODIFICATIONS

All modifications to the Funding Opportunity Announcement are highlighted in yellow in the body of the FOA.

<table>
<tr><th>Mod. No.</th><th>Date</th><th>Description of Modifications</th></tr>
<tr><td>000001</td><td>1/11/2017</td><td>
<h2>Appendix E – Concept Paper Cover Page</h2>
Addition of “Scale and Feedstock Type” table
<table>
<tr><th colspan="4">Scale and Feedstock Type (select one)</th></tr>
<tr><th>Feedstock Type</th><th>Pilot Scale</th><th>Demonstration Scale</th><th>Pioneer/Commercial Scale</th></tr>
<tr><td>Cellulosic</td><td></td><td></td><td></td></tr>
<tr><td>Algae</td><td></td><td></td><td></td></tr>
<tr><td>Biogas</td><td></td><td></td><td></td></tr>
<tr><td>Flue gas +</td><td></td><td></td><td></td></tr>
<tr><td>Waste to Energy (biosolids, separated MSW, Organic-rich waste water, or industrial food and yard waste)</td><td></td><td></td><td></td></tr>
</table>
<h2>Appendix H – Allowable Feedstock Definitions</h2>
This modification adds Appendix H: Allowable Feedstock Definitions and references to Appendix H throughout the document.
<h2>Section I.A – Description/Background</h2>
<u>Additional Feedstock Requirements</u>
</td></tr>
</table>

In order to have a robust and commercially relevant process, applicants must include previous work and future plans to develop a technology that is capable of converting diverse samples representing the potential variability of the selected feedstock (see Appendix H - Allowable Feedstock Definitions). Applicants must identify which feedstock sources have been used, and will be used, to demonstrate the capability of the technology. Examples of representative sources could be (but are not limited to): feedstock from different harvest or production years, different harvest and storage methods, or feedstock produced from different regions of the country.

Section I.B - Topic Areas/Technical Areas of Interest

Topic Area 1

Under Topic Area 1, DOE and USDA-NIFA seek applications to design and develop systems that result in reliable, cost effective, sustainable, robust and continuous feeding of biomass feedstocks into a reactor operating under vacuum or at positive pressures, followed by the removal of residual solids and other waste material from the reactor, and enabling process integration for continuous and reliable operations at commercial scale or design the system to clean-up the non-pristine feedstock before it enters the IBR that will be further reliably fed into a reactor under various operating conditions. A minimum of 1 Dry Metric Tonne per Day (DTPD) flow rate is required and can be achieved with a single train or multiple parallel trains. This equates to an algal process that produces at least 25,000 gallons of intermediate per year.

Topic Area 2

The proposed technologies must have previously achieved successful operations at a minimum of lab scale and will appropriately scale up to a minimum of 1 DTPD for biomass feedstocks, at least 25,000 gallons of intermediate per year for an algal process, or utilization

		of at least 16 mmbtu/day of biogas/industrial flue gas. Applications are required to be at a minimum starting TRL 2 through 4, and will end at TRL 3 through 5 respectively, that is, each application must advance its technology by at least one TRL level. **Topic Area 3** Actual process streams from operations must be used for this topic area. Streams must meet one of the following throughput requirement, further described in Appendix H. A minimum throughput of 1 DTPD throughput of biomass feedstock to the plant, an algal process that produces at least 25,000 gallons of intermediate per year, or a biogas/industrial flue gas that produces at least 16 mmbtu/day must be met during the project. **Topic Area 4** Applicants under Topic Area 4 must work with a real feedstock facility owner and/or feedstock process designer to validate the modeling results. Facilities must have a minimum biomass feedstock throughput of 1 DTPD flow rate which can be achieved with a single train or multiple parallel trains. If an algal process will be used for Topic Area 4, it must produce at least 25,000 gallons of intermediate per year.
000002	3/17/2017	**Section III. B. – Cost Sharing** Removal of text: EERE Cost Share 20% and 50% The cost share must be at least 20% of the total allowable costs (i.e., the sum of the Government share, including FFRDC costs if applicable, and the Recipient share of allowable costs equals the total allowable cost of the project) for research and development projects and 50% of the total allowable costs for demonstration and commercial application projects and must come from non-Federal sources unless otherwise allowed by law. (See 2 CFR 200.306 and 2 CFR 910.130 for the applicable cost sharing requirements.)

000002	3/17/2017	**Section I.B - Topic Areas/Technical Areas of Interest** Topic Area 1 Applications are required to be at a minimum starting TRL of 4 or 5, and will end at TRL 5 or 6 respectively, that is, each application must advance its technology by at least one TRL level. Projects under this Topic Area require cost share be at least 50% of the total allowable costs. Topic Area 2 Applications are required to be at a minimum starting TRL 2 through 4, and will end at TRL 3 through 5 respectively, that is, each application must advance its technology by at least one TRL level. Projects under this Topic Area require cost share be at least 50% of the total allowable costs. Topic Area 3 Applications are required to be at a minimum starting TRL of 4 or 5, and will end at TRL 5 or 6 respectively, that is, each application must advance its technology by at least one TRL level. Projects under this Topic Area require cost share be at least 50% of the total allowable costs. Topic Area 4 Applications are required to be at a minimum starting TRL 2 through 4, and will end at TRL 3 through 5 respectively, that is, each application must advance its technology by at least one TRL level. Projects under this Topic Area require cost share be at least 20% of the total allowable costs.
000003	3/22/2017	Revision of text: **Section I.B - Topic Areas/Technical Areas of Interest** Topic Area 2 Applications are required to be at a minimum starting TRL 2 through 4, and will end at TRL 3 through 5 respectively, that is, each application must advance its technology by at least one TRL level. Projects under this

		Topic Area require cost share be at least 20% of the total allowable costs for task(s) related to R&D activities, and cost share for task(s) related to pilot and demonstation level activities are required to be 50%. Please note that the required front-end throughput is a minimum of 1 DTPD for biomass feedstocks, at least 25,000 gallons of intermediate per year for an algal process, or utilization of at least 16 mmbtu/day of biogas/industrial flue gas and must be achieved by the end of the project period within Topic Area 2. Tasks that will demonstrate this requirement must have a cost-share of 50%. When applicable, applicants may utilize a blended cost share of 20% for R&D tasks and 50% for technology demonstration tasks.
000003	3/22/2017	**Section III. B. – Cost Sharing** Addition of text: EERE Cost Share 20% and 50% The cost share must be at least 20% of the total allowable costs (i.e., the sum of the Government share, including FFRDC costs if applicable, and the Recipient share of allowable costs equals the total allowable cost of the project) for research and development projects and 50% of the total allowable costs for demonstration and commercial application projects and must come from non-Federal sources unless otherwise allowed by law. (See 2 CFR 200.306 and 2 CFR 910.130 for the applicable cost sharing requirements.)
000003	3/22/2017	Submission Deadline for Full Applications extended to 04/05/2017 5:00 pm ET

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I. Funding Opportunity Description

A. Description/Background

The U.S. Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy (EERE), Bioenergy Technologies Office (BETO) and the U.S. Department of Agriculture (USDA), National Institute of Food and Agriculture (NIFA) announce a joint funding opportunity to support Integrated Biorefinery Optimization. DOE has funded biorefinery technology development projects, since 2002, to meet two EERE performance goals: 1) reduce dependence on imported oil, thereby enhancing energy security; and 2) spur the creation of a sustainable domestic bio-industry. USDA-NIFA has funded programs and projects that target vital topical areas related to the development of regional systems for the sustainable production of biofuels, industrial chemicals, biopower, and biobased products; as well as investing in America's scientific corps and developing workforce in bioenergy, bioproducts, and the bioeconomy. Robust scale-up of commercially viable biorefinery technologies will help USDA-NIFA meet two important goals: 1) to enhance energy security through the reduction in the dependence on foreign oil; and 2) to spur the creation of a sustainable domestic bioeconomy. This work supports NIFA's mission to accelerate deployment of energy efficiency and renewable energy technologies to strengthen U.S. energy security, economic vitality, and environmental quality.

Federal support for first-of-a-kind Integrated Biorefineries (IBRs) could significantly reduce the technical and financial risks associated with new technology deployment, thus accelerating the growth of the U.S. bioeconomy, reducing costs to consumers, enabling reductions in environmental pollution in the transportation sector and improving energy security.

There are still unresolved technical and non-technical challenges within the IBRs that need to be addressed in order to achieve reliable and continuous operation that effectively competes with the petroleum refining and petrochemical industries. Many of these challenges are related to:

- Complexity and variability of non-food feedstocks;
- Operational difficulties encountered with handling of solids in the production process;
- Recalcitrance of feedstocks to efficiently convert into products;
- Inhomogeneity of intermediates resulting in non-uniform heat and mass transfer during the manufacturing processes;
- Complex multi-step separation and purification steps;
- Non-monetization of byproducts and residual streams;

- Difficulties in translating bench-scale and pilot-scale learnings to the next step in scale-up such as demonstration-scale or pioneer-scale commercial level;
- Non-competitive cost of bioproducts due to higher capital and operational expenses; and
- Shortage of capital for long-term industrial projects.

As a result of these barriers, there are only a few pioneer-scale commercial IBRs in early stages of commissioning, start-up, and/or production, and a wider deployment of highly-efficient IBR facilities is still a goal to be realized. A number of the challenges result in schedule delays, increased capital (CapEx) and operational (OpEx) expenses, and scale-up complications. BETO has identified, via stakeholder engagements through a Request For Information (RFI) and a Biorefinery Optimization Workshop, areas in which DOE and USDA can effectively support technology development and engineering solutions to economically and sustainably overcome these critical barriers.

The FOA, which will be coordinated with and co-funded by USDA-NIFA, will identify, evaluate, and select applications proposing projects to address challenges encountered with the successful scale-up and reliable continuous operation of IBRs for the manufacture of Advanced or Cellulosic Biofuels (see Definitions) and associated higher value bioproducts. The FOA seeks applications for projects focused on addressing these challenges, reducing risks, and providing resources to accelerate commercialization of biofuels and bioproducts.

The FOA includes four topic areas as follows:

- Topic Area 1: Robust, continuous handling of solid materials (dry and wet feedstocks, biosolids, and/or residual solids remaining in the process) and feeding systems to reactors under various operating conditions;
- Topic Area 2: High value products from waste and/or other under-valued streams in an IBR;
- Topic Area 3: Industrial separations within an IBR; and
- Topic Area 4: Analytical modeling of solid materials (dry and wet feedstocks, and/or residual solids remaining in the process) and reactor feeding systems.

Applicants addressing more than one topic in an application must submit separate applications for each topic. Applicants are expected to detail their strategy for project development, project management, technology verification, funding sources, and risk mitigation. Applicants shall be required to submit a technical and financial datasheet for each application.

BETO, recognizing the significant capital investments that have been made through prior FOAs, encourages innovative reuse and repurposing of capital equipment purchased under prior DOE or USDA programs. The FOA will cover the costs related to the design development, installation, and equipment operation. Any equipment purchased under DOE and USDA-NIFA awards will be subject to the property reporting requirements under 2 CFR 200.311 through 200.315. DOE Awards will also be subject to 2 CFR 910.360 and USDA-NIFA awards to 7 CFR 3430. DOE and USDA-NIFA recommend capital expenditures to not exceed a maximum 35% of the total budgeted costs, based on the best practices to ensure funding availability for operational expenses.

Full applications must submit the life cycle analysis (LCA), and techno-economic analysis (TEA) for the proposed pathway certified by credited expert. Selected applicants must plan to perform ongoing TEA and LCA throughout the project in order to use experimental results to illustrate how improved yields and system processes contribute to lowering the cost of production of biofuels and bioproducts. Applicants must provide information on how their proposed system addresses the aspects of sustainability (water use/recycle, nutrient uptake, etc.), greenhouse gas reduction (CO_2 utilization), and cost effective production towards being competitive with petroleum-based fuels and products by 2030.

A technical and financial data sheet template is included with the FOA, see Appendix F for details. Applicants are required to submit the information requested in the data sheet at the time of application, as it will be reviewed during the merit review. For selected projects, the data provided will be used as the basis for review and discussion during the initial validation and will be refined to establish a baseline. Additional technical data may be requested during the validation period. Please note that if a project is selected for negotiation of award, it is a reporting requirement within the award to update and resubmit this data at least annually.

All applicants must clearly establish that sufficient work at prior scale has been completed to justify that the proposed project meets the appropriate Technology Readiness Level (TRL) for the selected Topic Area. See Appendix G for descriptions of each TRL. Examples of such previous work can include, but is not limited to:

1.The extent to which the process development mimicked the intended commercial application (the mode and type of operation of new process steps and the scalability of equipment used in new process steps);
2. What unit operations of the process were tested in an integrated fashion;
3. The extent of heat integration and recycle streams;

4. The largest scale that each process section/step was tested;
5. Hours of continuous operation runs;
6. How closely the test feedstock mimicked the feedstock intended for commercial operations; and
7. Robustness of the materials of construction, and what tests were performed to evaluate the material of construction?

Additional Feedstock Requirements

In order to have a robust and commercially relevant process, applicants must include previous work and future plans to develop a technology that is capable of converting diverse samples representing the potential variability of the selected feedstock (see Appendix H - Allowable Feedstock Definitions). Applicants must identify which feedstock sources have been used, and will be used, to demonstrate the capability of the technology. Examples of representative sources could be (but are not limited to): feedstock from different harvest or production years, different harvest and storage methods, or feedstock produced from different regions of the country.

Applicants proposing to transition from the feedstock used at prior scale to the feedstock that will be used in the proposed project must discuss the transition strategy in the application. Applications proposing the use only of mock or model feedstocks will be considered non-responsive to all topic areas. Applications must achieve reliable continuous operation with the non-pristine feedstock. Projects may propose the use of a blended feedstock stream, provided the sum of the components meets the minimum throughput requirements of the FOA and are allowable under the selected topic area.

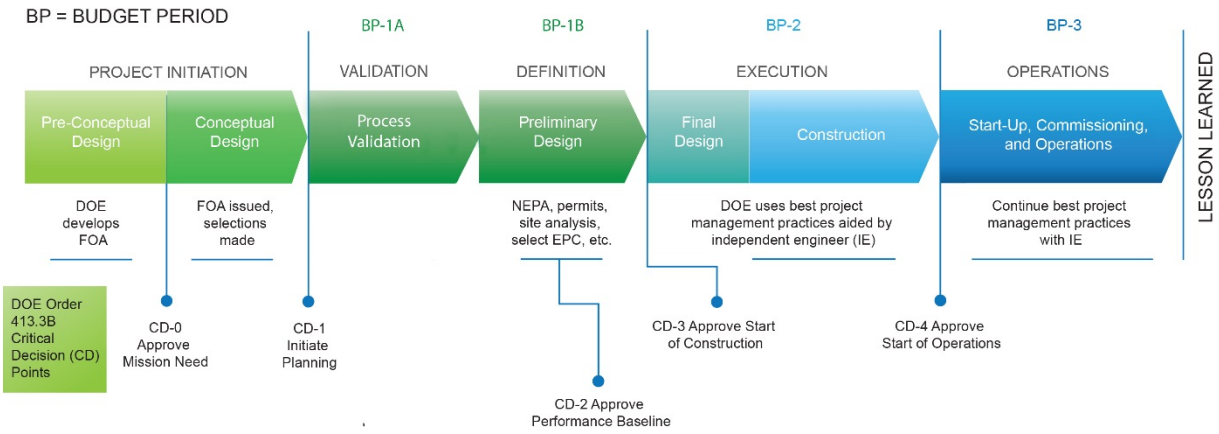
Upon conclusion of the review process, meritorious proposals may be recommended for funding by one of the participating agencies, determined at the option of the agencies, not the proposer. Subsequent award administration procedures will be in accordance with the individual policies of the awarding agency.

USDA-NIFA Award Structure

All awards made under this solicitation by USDA-NIFA will be as standard grants. A standard grant is an award instrument by which the agency agrees to support a specified level of effort for a predetermined project period without the announced intention of providing additional support at a future date.

DOE Project and Award Structure

BETO has established a project management framework with additional management, verification, and oversight procedures to effectively manage its large-scale, capital-intensive IBR activities. Applications submitting for Topic Areas 1, 2 and 3 will be required to go through the three budget period approach described below. The project management framework incorporates DOE standards for management of capital assets as well as industry best practices – including the use of an independent engineer (IE). The framework, shown below, is divided into four main sections that correlate contractual budget periods (BP) to the critical decision (CD) points identified in DOE Order 413.3B[1].



Framework for executing DOE project management for integrated biorefinery projects

DOE Critical Decision Points

CD-0 is an internal DOE activity to appropriate funds, determine the nature of a FOA, and execute the competitive selection process. CD-0 effectively ends once the selections are made.

CD-1 begins with the award negotiation and continues with approval of the performance baseline for project scope, schedule, cost, and risk analysis. This corresponds to stage 1 in Front-End Loading (FEL-1) project management practices.

During the Budget Period BP-1A, the awardees will be required to undergo a design validation process in the time outlined by DOE. A maximum of up to 5% of the total project funding may be used on the validation activities. If the applicant fails to sufficiently address validation issues identified during BP-1A, the project

[1] U.S. Department of Energy, DOE Order 413.3B, Program and Project Management for the Acquisition of Capital Assets, https://www.directives.doe.gov/directives-documents/0413.3-BOrder-b/view

will be terminated and not allowed to proceed to the preliminary design activity during Budget Period BP-1B.

CD-2 occurs when the Project Management Plan (PMP) is put under DOE change control and the project locks down its performance baseline. The PMP forms the more detailed basis for the project scope (Statement of Project Objectives) that becomes the contractual basis for the obligation of BP-1 funds to the award. CD-2 also corresponds to an FEL–2 with a -15%/ +30% cost estimate accuracy for Engineering, Procurement and Construction (EPC).

CD-3 requires completing the project financing, submitting the design for bids to EPC contractors, and meeting -5%/ +15% cost estimate accuracy (FEL-3). Approval of CD-3 releases the federal funds for BP-2, which typically has the highest associated cost of the three budget periods because of the procurement and construction components.

CD-4 is executed when the project has demonstrated readiness to begin operations. For demonstration-scale and pioneer-scale plants, CD-4 is based on meeting design performance objectives and usually occurs after the performance test has been completed. For some pilot-scale plants, the performance test is what sets the baseline performance targets, so CD-4 is sometimes authorized as part of BP-3 during the commissioning/start-up of the plant.

DOE Project Validation

After negotiation and execution of the award, all selected projects will be subject to an initial validation effort to review their baseline and proposed targets. This validation process will be performed by a validation team composed of DOE staff, NREL-Systems Integration staff and possibly a third party independent engineer, and will result in a go/no-go decision.

The validation effort will require that the Recipient conduct a performance test of the process proposed in its FOA application. The performance test will require that the Recipient reproduce data sets commensurate to the prior scale work presented in the application. The prior scale data sets must be available to DOE (which may include delivery to DOE) or its representatives (such as an Independent Engineer) for review in support of the validation effort. The outcome of this performance test will be a primary component of DOE's go/no go decision.

All applicants must include the initial validation task within their proposed scope, schedule, and budget, as Task 1 in Budget Period BP-1A. It must be separated from the rest of the scope of work by a go/no-go decision point, and applicants should estimate three months for the validation effort.

The validation effort includes three steps: pre-validation, on-site validation, and post-validation. All steps are performed in concert with BETO's validation team. The overall process mass and energy balances, including specific operations of interest, as well as basic process operation parameters, and the information requested in the technical/financial datasheet template will be disclosed to non-conflicted DOE National Laboratory (National Renewable Energy Laboratory - NREL - Systems Integration) personnel and/or external third party non-conflicted validators performing the validations (BETO's validation team) as well as non-conflicted third party reviewers potentially participating in the go/no go review process and/or interim review meetings. The objectives of the validation effort are to verify the applicant's technical data/performance metrics/targets as noted in the original application; establish a framework to evaluate and track progress over time; update the technical/financial data to specifically match the project scope; establish benchmark/baseline and associated target values; identify potential major showstoppers; and align project goals with BETO's expectations.

Recipients are expected to share project results such as technical achievements (only non-proprietary and non-business sensistive information) with the public via technical publications in journals or conference proceedings after invention disclosures (e.g., patent applications) are filed.

Applicants will be required to execute the appropriate Conflict of Interest and Non-disclosure Agreements (COI/NDA) with DOE's representatives immediately after negotiation and execution of an award. Failure to execute the COI/NDAs in a reasonable amount of time to enable the validation review will result in a 'no-go' decision.

Selected projects that receive a 'go' decision at the conclusion of the initial validation effort will proceed to Budget Period BP-1B and will also be subject to a final validation review at the conclusion of the project.

During the pre-validation step, BETO's validation team will work closely with the Recipient's project team to discuss the validation process in detail, initiate the review of the technical/financial data and metrics as provided in the original application, and set the date and agenda for the on-site validation. During the on-site meeting, the teams will work together to discuss the goals and performance metrics, ideas for tracking project progress, and alignment with BETO's goals. At the conclusion of the on-site validation, both teams will have the information needed to proceed forward – the Recipient's project team will complete revisions to the technical/financial information previously submitted and resubmit it to DOE, and the validation team will prepare the report-out to the BETO

Demonstration and Market Transformation (DMT) Technology Manager working with the teams. The post-validation step includes the validation team reporting to BETO and the DMT Program personnel will make a determination of the go/no go decision point.

At the conclusion of the validation effort and once a go/no go decision has been made, the DMT Technology Manager will contact the Recipient regarding the go/no go decision and activities will proceed from there (based on the decision). If a "go" decision is reached, the project team and DMT Technology Manager will proceed with the necessary steps to release the remaining scope and associated funding for the project.

Please note: during the validation effort, no experimental or project work may commence within the proposed scope. Only work associated with the validation – typically project management and data gathering activities – are allowed during the validation. The budget associated with the validation effort must correspond only to these types of activities and is typically minimal compared to the remaining project scope and budget.

As previously noted, all applicants must include this task in their scope, schedule and budget. For example, the inclusion of the validation in the scope must include similar to the following:

> 'Task 1. Validation. At the beginning of the project, we shall work with the DOE to further define the technology readiness level of the overall process, including unit operations within the process. Process information and data will be provided to the DOE to support the process claims within the original application. Technical metrics for project progress will be developed including go/no go metrics that will be incorporated into the overall project.
>
> There will be a go/no go associated with Task 1 as follows: Process information and data support the technology readiness level of the overall process, the unit operations within the process, and the original application. Technical metrics are based on preliminary data and represent meaningful project progress toward the final project goals.
>
> Upon successful completion of the data validation effort and go/no go decision point, the project will commence with work on the Priority Areas as discussed.'

All selected projects that receive awards will be required to participate in BETO's Peer Review Process and Comprehensive Project Review. Currently, the Peer Review Process is a biennial process that includes preparation of a presentation

and participation/presentation at the Peer Review Meeting. This activity must be accounted for within each applicant's scope, schedule and budget. The Comprehensive Project Review is conducted on an annual basis and must also be accounted for in the applicant's scope, schedule and the budget.

Upon successful completion of the project, all Recipients would be required to publish a success story to encourage others to approach them and learn about their achievements.

B. Topic Areas/Technical Areas of Interest

This FOA has four topic areas of interest. Applications are sought that address one or more of the following topics. Applicants will be allowed to submit multiple applications to the FOA, however, each application must cover only one topic area.

Topic Area 1: Robust handling of solid materials (dry and wet feedstocks, and/or residual solids remaining in the process) and feeding systems to reactors under various operating conditions

Under Topic Area 1, DOE and USDA-NIFA seek applications to design and develop systems that result in reliable, cost effective, sustainable, robust and continuous feeding of biomass feedstocks into a reactor operating under vacuum or at positive pressures, followed by the removal of residual solids and other waste material from the reactor, and enabling process integration for continuous and reliable operations at commercial scale or design the system to clean-up the non-pristine feedstock before it enters the IBR that will be further reliably fed into a reactor under various operating conditions. A minimum of 1 Dry Metric Tonne per Day (DTPD) flow rate is required and can be achieved with a single train or multiple parallel trains. This equates to an algal process that produces at least 25,000 gallons of intermediate per year.

Successful projects will establish a new or improved design and construction of unit operations for efficient feeding of feedstock or design the system to clean-up the non-pristine feedstock before it enters the IBR that will be further reliably fed into the reactors in continuous operation and discharge of the residual materials under different operating conditions for commercial implementation. Applications may focus on a single or multiple unit operations within the process flow to the reactor throat.

Actual, non-pristine commercial scale relevant feedstock must be used to successfully pass the performance validation. The feedstocks to be tested should include variations in the geographic source, age, moisture content and

harvest/storage methods. Applications considering multiple variability factors in feedstocks will score higher.

Feedstock specifications must be provided in the technical/financial datasheets including particle size distribution, moisture content, yield, and other requested information. Applicants must provide the scale or feed rate associated with prior experiments used to generate benchmark data, as well as the envisioned scale or rate for the planned (proposed) intermediate and the final targets.

Successful projects must increase their overall feed rate within an allowable operating range of +/- 10% of the design capacity while maintaining the design specifications and achieve the robust continuous operation for a minimum of 4 weeks with 24 hours per day of operations.

At the end of project, the applicants must successfully perform the validation test to demonstrate meeting the required operation capability of running reliably, continuously for minimum of 4 weeks 24 hours per day.

Applications must describe plans on how to appropriately scale their design to maintain the feedstock specifications that have been provided by an identified conversion technology partner/existing IBR. It is recommended to limit capital expenditures spending of about 35% of the total project cost.

Applications are required to be at a minimum starting TRL of 4 or 5, and will end at TRL 5 or 6 respectively, that is, each application must advance its technology by at least one TRL level. Projects under this Topic Area require cost share be at least 50% of the total allowable costs.

Topic Area 2: High value products from waste/or other undervalued streams in an integrated biorefinery

Under Topic Area 2, DOE and USDA-NIFA seek applications that develop:

- New analytical and characterization methods to analyze, identify and quantify components present in the waste streams after the primary conversion process and subsequent separations in the integrated biorefineries;
- Sensitivity analyses to address the variability of the waste streams;
- Monetization of components contained in the waste by creating high value co-products to improve the overall profitability of advanced biofuels facility; and

- More efficient production methods for the utilization of residual carbon contained in the waste or undervalued streams by converting into co-products.

For example, the syrup stream produced after the solid/liquid operations in a biochemical cellulosic ethanol facility may be mixed with the solid lignin stream and used as a boiler fuel or disposed of in a landfill. This syrup stream contains valuable carbon and other mineral salts that could effectively be converted to co-products to increase the revenue stream and maximize the profitability of the facility.

Proposed approaches should focus on the characterization and production of higher value products and/or valuable components utilizing waste and/or other under-valued IBR streams.

Successful approaches must establish both the financial (including market potential) as well as the environmental benefits for the production of co-products from the waste stream (for example, production of value added products versus boiler fuel value or a material reduction in environmental pollution).

The applicant must submit the preliminary GHG estimate with the application and the final estimate must be submitted after the selection process. The final estimate must be certified by a relevant accredited organization, or by utilizing the GREET model, or the applicant can perform the analysis with the cooperation of the national laboratories or other certified experts. The final estimate cannot be lower than 10% from the preliminary GHG estimate unless an accredited effort found a much greater reduction in GHG emissions.

To be selected projects must show a favorable techno-economic analysis that includes the sale of the envisioned co-product(s) and results in lowering the overall minimum fuel selling price (MFSP) by at least 10%.

The proposed technologies must have previously achieved successful operations at a minimum of lab scale and will appropriately scale up to a minimum of 1 DTPD for biomass feedstocks, at least 25,000 gallons of intermediate per year for an algal process, or utilization of at least 16 mmbtu/day of biogas/industrial flue gas.

Applications are required to be at a minimum starting TRL 2 through 4, and will end at TRL 3 through 5 respectively, that is, each application must advance its technology by at least one TRL level. Projects under this Topic Area require cost share be at least 20% of the total allowable costs for task(s) related to R&D activities, and cost share for task(s) related to pilot and demonstation level

activities are required to be 50%. Please note that the required front-end throughput is a minimum of 1 DTPD for biomass feedstocks, at least 25,000 gallons of intermediate per year for an algal process, or utilization of at least 16 mmbtu/day of biogas/industrial flue gas and must be achieved by the end of the project period within Topic Area 2. Tasks that will demonstrate this requirement must have a cost-share of 50%. When applicable, applicants may utilize a blended cost share of 20% for R&D tasks and 50% for technology demonstration tasks.

Topic Area 3: Industrial separations within an integrated biorefinery

Biorefineries encounter different operating challenges during the separation of materials within unit operations, which contain varying amounts of solid, liquid and gaseous materials. These streams, including solid/liquid, solid/solid, solid/gas, liquid/liquid, liquid/gas, and gas/gas (gas includes the vapor), may not easily be separated into solid rich, liquid rich and gas rich streams due to several unique characteristics, including but not limited to:

- High molecular weight or high density components and their composition;
- Particle size distribution, shape/geometry; and
- Non-Newtonian fluid behavior.

To address the above challenges, DOE seeks applications under Topic Area 3 that:

- Develop technologies and techniques to increase the efficiency of separations within a cellulosic IBR.

Novel, cost effective, and sustainable separation technologies and techniques are needed to increase the efficiency of separation of these streams. The separation technologies may include dewatering technologies, waste stream separations for value added products to improve the overall profitability of advanced biofuels facility; hydrolysate fractionation, entrained catalyst/product separations, bio-oil and solid or aqueous phase separation, and whole stillage separations.

Actual process streams from operations must be used for this topic area. Streams must meet one of the following throughput requirement, further described in Appendix H. A minimum throughput of 1 DTPD throughput of biomass feedstock to the plant, an algal process that produces at least 25,000 gallons of intermediate per year, or a biogas/industrial flue gas that produces at least 16 mmbtu/day must be met during the project.

Successful projects must show a favorable techno-economic analysis, which lower the overall minimum fuel selling price (MFSP) by at least 10%. Projects must

increase their overall efficiencies at least a minimum of 5% of the design efficiency while maintaining the design specifications. Applications should provide the scale or feed rate associated with the experiment used to generate benchmark data for the intermediate and final targets envisioned scale or rate. Applicants must describe plans on how to appropriately scale their design to maintain the specifications.

Applications are required to be at a minimum starting TRL of 4 or 5, and will end at TRL 5 or 6 respectively, that is, each application must advance its technology by at least one TRL level. Projects under this Topic Area require cost share be at least 50% of the total allowable costs.

Topic Area 4: Analytical modeling of solid materials (dry and wet feedstocks, and/or residual solids remaining in the process) and feeding systems to reactors

Under Topic Area 4, DOE and USDA-NIFA seek applications focusing on the development of dynamic, novel, real-time analytical models that would contribute to the design of reliable, cost effective, continuous feeding of biomass feedstocks (assuming the feedstock is already available within the plant boundary) into the reactor.

Modeling efforts should focus primarily on feedstock characterization, particle size distribution, flow behavior and rheological properties within the feedstock handling unit operations and how the solid material will flow within the reactor unit operations. Modeling efforts must account for the effect of temperature and pressure on feedstock handling.

Applicants under Topic Area 4 must work with a real feedstock facility owner and/or feedstock process designer to validate the modeling results. Facilities must have a minimum biomass feedstock throughput of 1 DTPD flow rate which can be achieved with a single train or multiple parallel trains. If an algal process will be used for Topic Area 4, it must produce at least 25,000 gallons of intermediate per year.

Applications are required to be at a minimum starting TRL 2 through 4, and will end at TRL 3 through 5 respectively, that is, each application must advance its technology by at least one TRL level. Projects under this Topic Area require cost share be at least 20% of the total allowable costs.

All work under EERE funding agreements must be performed in the United States. See Section IV.J.3 and Appendix C.

International activities for USDA-NIFA funded projects:

Applicants may submit proposals that support USDA's strategic objective (3.1) to "ensure U.S. agricultural resources contribute to enhanced global food security" (see USDA Strategic Plan 6 FY2014-2018). Any such activity proposed under NIFA's Agriculture and Food Research Initiative (AFRI) (e.g., partnerships, exchanges, training, and/or travel), must first and foremost support AFRI's domestic program goals. Applicants must clearly describe and demonstrate how international activities proposed in applications submitted to AFRI will contribute to and support advances in U.S. agriculture.

If international activities are proposed, applicants must describe the metrics that will be used for reporting beneficial outputs and outcomes. Such metrics should reflect how the proposed international collaboration adds value to achieving the AFRI program's objectives by introducing innovative technologies/approaches, promoting synergistic science, addressing issues of mutual concern, or other means.

Additional guidance on including international activities in AFRI applications is provided on NIFA's Center for International Programs website (https://nifa.usda.gov/office/center-international-programs) that includes Frequently Asked Questions, descriptions of existing MOUs and other resources to assist applicants interested in enhancing the potential for global engagement.

C. Applications Specifically Not of Interest

The following types of applications will be deemed non-responsive and will not be reviewed or considered (See Section III.D of the FOA):

- Applications that fall outside the technical parameters specified in Section I.B of the FOA.
- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).
- Applications that propose mock, model, synthetic, or simulated feedstocks are specifically not of interest to this FOA.
- No plant based material that is generally intended for use as food or animal feed can be employed as a feedstock in any Topic Area of this FOA.
- "Biodiesel" or other diesel-equivalent fuel derived from non-renewable biomass, including vegetable oil and animal fat, is specifically excluded, unless derived from a non-food renewable cellulosic feedstock.

- Applications that do not include any direct linkage to the biofuel production as opposed only to bioproducts production.

D. Authorizing Statutes

The programmatic authorizing statutes are:

- EPAct 2005, § 932
- Energy Independence and Security Act of 2007, §201, §207
- Competitive, Special, and Facilities Research Grants, 7 U.S.C. 450i(a)

Awards made by DOE under this announcement will fall under the purview of 2 CFR Part 200 as amended by 2 CFR Part 910. Awards made by USDA-NIFA under this announcement will fall under the purview of 2 CFR 200, 2 CFR 400, 2 CFR 415, and 2 CFR 416.

II. Award Information

A. Award Overview

i. Estimated Funding

EERE expects to make approximately $19,800,000 of Federal funding available for new awards under this FOA, subject to the availability of appropriated funds. USDA-NIFA expects to make approximately $2,900,000 of Federal Funding available for new awards under this FOA, subject to the availability of appropriated funds. EERE anticipates making approximately five awards under this FOA. EERE may issue one, multiple, or no awards under any Topic Area. Individual awards may vary between $1,000,000 and $10,000,000. NIFA anticipates making 1-3 awards ranging in size from $900,000 to $2,900,000.

NIFA anticpates funding awards in topic areas 1, 2, and 4. EERE may issue awards in one, multiple, or none of the following topic areas:

Topic Area 1: Robust, continuous handling of solid materials (dry and wet feedstocks, biosolids, and/or residual solids remaining in the process) and feeding systems to reactors. EERE may issue approximately 1-2 awards in this topic area with an anticipated estimated maximum per award amount up to $10,000,000.

Topic Area 2: High value products from waste and/or other under-valued streams in an IBR. EERE may issue approximately 1-2 awards in this topic

area with an anticipated estimated maximum award amount up to $3,000,000.

Topic Area 3: Industrial separations within an IBR. EERE may issue approximately 1-2 awards in this topic area with an anticipated estimated maximum award amount up to $5,000,000.

Topic Area 4: Analytical modeling of solid materials (dry and wet feedstocks, and/or residual solids remaining in the process) and reactor feeding systems. EERE may issue approximately 1-2 awards in this topic area with an anticipated estimated maximum award amount up to $1,800,000.

EERE may establish more than one budget period for each award and fund only the initial budget period(s). Funding for all budget periods, including the initial budget period, is not guaranteed. Before the expiration of the initial budget period(s), EERE reserves the right to perform a down-select among different Recipients and provide additional funding only to a subset of Recipients.

ii. Period of Performance

EERE and USDA-NIFA anticipate making awards that will run up to 36 months in length, comprised of one or more budget periods. USDA-NIFA funded awards have the potential for no cost extensions but USDA-NIFA will not offer continuation awards. DOE project continuation will be contingent upon satisfactory performance and go/no-go decision review. At the go/no-go decision points, EERE will evaluate project performance, project schedule adherence, meeting milestone objectives, compliance with reporting requirements, and overall contribution to the program goals and objectives. As a result of this evaluation, EERE will make a determination to continue the project, re-direct the project, or discontinue funding the project.

iii. New Applications Only

EERE and USDA-NIFA will accept only new applications under this FOA. EERE and USDA-NIFA will not consider applications for renewals of existing EERE-or USDA-NIFA-funded awards through this FOA.

B. EERE Funding Agreements

Through Cooperative Agreements and other similar agreements, EERE provides financial and other support to projects that have the potential to realize the FOA objectives. EERE does not use such agreements to acquire property or services for the direct benefit or use of the United States Government.

i. Cooperative Agreements

EERE generally uses Cooperative Agreements to provide financial and other support to Prime Recipients.

Through Cooperative Agreements, EERE provides financial or other support to accomplish a public purpose of support or stimulation authorized by Federal statute. Under Cooperative Agreements, the Government and Prime Recipients share responsibility for the direction of projects.

EERE has substantial involvement in all projects funded via Cooperative Agreement. See Section VI.B.9 of the FOA for more information on what substantial involvement may involve.

ii. Funding Agreements with FFRDCs

In most cases, Federally Funded Research and Development Centers (FFRDC) are funded independently of the remainder of the Project Team. The FFRDC then executes an agreement with any non-FFRDC Project Team members to arrange work structure, project execution, and any other matters. Regardless of these arrangements, the entity that applied as the Prime Recipient for the project will remain the Prime Recipient for the project.

iii. Technology Investment Agreements

In rare cases and if determined appropriate, EERE will consider awarding a Technology Investment Agreement (TIA) to a non-FFRDC applicant. TIAs, governed by 10 CFR Part 603, are assistance instruments used to increase the involvement of commercial entities in the Department's research, development, and demonstration programs. A TIA may be either a type of cooperative agreement or an assistance transaction other than a cooperative agreement, depending on the intellectual property provisions. In both cases, TIAs are not necessarily subject to all of the requirements of 2 CFR Part 200 as amended by 2 CFR Part 910.

In a TIA, EERE may modify the standard Government terms and conditions, including but not limited to:

- Intellectual Property Provisions: EERE may negotiate special arrangements with Recipients to avoid the encumbrance of existing intellectual property rights or to facilitate the commercial deployment of inventions conceived or first actually reduced to practice under the EERE funding agreement.

- Accounting Provisions: EERE may authorize the use of generally accepted accounting principles (GAAP) where Recipients do not have accounting systems that comply with Government recordkeeping and reporting requirements.

EERE will be more amenable to awarding a TIA in support of an application from a consortium or a team arrangement that includes cost sharing with the private sector, as opposed to an application from a single organization. Such a consortium or teaming arrangement could include a FFRDC. If a DOE/NNSA FFRDC is a part of the consortium or teaming arrangement, the value of, and funding for the DOE/NNSA FFRDC portion of the work will be authorized and funded under the DOE field work authorization system and performed under the laboratory's Management and Operating contract. Funding for a non-DOE/NNSA FFRDC would be through an interagency agreement under the Economy Act or other statutory authority. Other appropriate contractual accommodations, such as those involving intellectual property, may be made through a "funds in" agreement to facilitate the FFRDCs participation in the consortium or teaming arrangement. If a TIA is awarded, certain types of information described in 10 CFR 603.420(b) are exempt from disclosure under the Freedom of Information Act for five years after DOE receives the information.

An applicant may request a TIA if it believes that using a TIA could benefit the RD&D objectives of the program (see section 603.225) and can document these benefits. If an applicant is seeking to negotiate a TIA, the applicant must include an explicit request in its Full Application. After an applicant is selected for award negotiation, the Contracting Officer will determine if awarding a TIA would benefit the RD&D objectives of the program in ways that likely would not happen if another type of assistance agreement (e.g., cooperative agreement subject to the requirements of 2 CFR Part 200 as amended by 2 CFR Part 910). The Contracting Officer will use the criteria in 10 CFR 603, Subpart B, to make this determination.

C. Funding Agreements with USDA NIFA

All awards made under this solicitation by NIFA will be as standard grants. A standard grant is an award instrument by which the agency agrees to support a specified level of effort for a predetermined project period without the announced intention of providing additional support at a future date.

III. Eligibility Information

To be considered for substantive evaluation, an applicant's submission must meet the criteria set forth below. If the application does not meet these initial requirements, it will be considered non-responsive, removed from further evaluation, and ineligible for any award.

A. Eligible Applicants

i. EERE awards

a. Individuals

U.S. citizens and lawful permanent residents are eligible to apply for funding as a Prime Recipient or Subrecipient.

b. Domestic Entities

For-profit entities, educational institutions, and nonprofits that are incorporated (or otherwise formed) under the laws of a particular State or territory of the United States are eligible to apply for funding as a Prime Recipient or Subrecipient. Nonprofit organizations described in section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995, are not eligible to apply for funding.

State, local, and tribal government entities are eligible to apply for funding as a Prime Recipient or Subrecipient.

DOE/NNSA Federally Funded Research and Development Centers (FFRDCs) are eligible to apply for funding as a Prime Recipient or Subrecipient.

Non-DOE/NNSA FFRDCs are eligible to apply for funding as a Subrecipient, but are not eligible to apply as a Prime Recipient.

Federal agencies and instrumentalities (other than DOE) are eligible to apply for funding as a Subrecipient, but are not eligible to apply as a Prime Recipient.

c. Foreign Entities

Foreign entities, whether for-profit or otherwise, are eligible to apply for funding under this FOA. Other than as provided in the "Individuals" or "Domestic Entities" sections above, all Prime Recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. If a foreign entity applies for funding as a Prime Recipient, it must designate in the Full Application a subsidiary or

affiliate incorporated (or otherwise formed) under the laws of a State or territory of the United States to be the Prime Recipient. The Full Application must state the nature of the corporate relationship between the foreign entity and domestic subsidiary or affiliate.

Foreign entities may request a waiver of the requirement to designate a subsidiary in the United States as the Prime Recipient in the Full Application (i.e., a foreign entity may request that it remains the Prime Recipient on an award). To do so, the Applicant must submit an explicit written waiver request in the Full Application. Appendix C lists the necessary information that must be included in a request to waive this requirement. The applicant does not have the right to appeal EERE's decision concerning a waiver request.

In the waiver request, the applicant must demonstrate to the satisfaction of EERE that it would further the purposes of this FOA and is otherwise in the economic interests of the United States to have a foreign entity serve as the Prime Recipient. EERE may require additional information before considering the waiver request.

A foreign entity may receive funding as a Subrecipient.

d. Incorporated Consortia

Incorporated consortia, which may include domestic and/or foreign entities, are eligible to apply for funding as a Prime Recipient or Subrecipient. For consortia incorporated (or otherwise formed) under the laws of a State or territory of the United States, please refer to "Domestic Entities" above. For consortia incorporated in foreign countries, please refer to the requirements in "Foreign Entities" above.

Each incorporated consortium must have an internal governance structure and a written set of internal rules. Upon request, the consortium must provide a written description of its internal governance structure and its internal rules to the EERE Contracting Officer.

e. Unincorporated Consortia

Unincorporated Consortia, which may include domestic and foreign entities, must designate one member of the consortium to serve as the Prime Recipient/consortium representative. The Prime Recipient/consortium representative must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. The eligibility of the consortium will

be determined by the eligibility of the Prime Recipient/consortium representative under Section III.A of the FOA.

Upon request, unincorporated consortia must provide the EERE Contracting Officer with a collaboration agreement, commonly referred to as the articles of collaboration, which sets out the rights and responsibilities of each consortium member. This agreement binds the individual consortium members together and should discuss, among other things, the consortium's:

- Management structure;
- Method of making payments to consortium members;
- Means of ensuring and overseeing members' efforts on the project;
- Provisions for members' cost sharing contributions; and
- Provisions for ownership and rights in intellectual property developed previously or under the agreement.

ii. USDA-NIFA awards

Eligible applicants include: (1) State agricultural experiment stations; (2) colleges and universities (including junior colleges offering associate degrees or higher); (3) university research foundations; (4) other research institutions and organizations; (5) Federal agencies, (6) national laboratories; (7) private organizations or corporations; (8) individuals who are U.S. citizens, nationals, or permanent residents; and (9) any group consisting of 2 or more entities identified in (1) through (8). Eligible institutions do not include foreign and international organizations.

B. Cost Sharing

EERE Cost Share 20%, Cost Share Waiver Utilized

- *Cost Sharing Generally*

  The cost share must be at least 20% of the total allowable costs for research and development projects (i.e., the sum of the Government share, including FFRDC costs if applicable, and the Recipient share of allowable costs equals the total allowable cost of the project) and must come from non-Federal sources unless otherwise allowed by law. (See 2 CFR 200.306 and 2 CFR 910.130 for the applicable cost sharing requirements.)

- *Special Cost Share Waiver for Domestic Institutions of Higher Education, Domestic Nonprofit Entities, FFRDCs, or U.S. State, Local, or Tribal Government Entity*

  The Assistant Secretary for the Office of Energy Efficiency and Renewable Energy has issued a Cost Share Reduction determination pursuant to Section

988(b)(3) of the Energy Policy Act of 2005 that is applicable to certain entities applying under this FOA. Specifically, Recipient cost share requirement for applied research and development activities projects is reduced from 20% to 10% where:

1. The Prime Recipient is a domestic institution of higher education; domestic nonprofit entity; FFRDC; or U.S. State, local, or tribal government entity; and
2. The Prime Recipient performs more than 50% of the project work, as measured by the Total Project Cost.

Applicants who believe their project qualifies for the reduced Recipient cost share must be able to provide verification that the above requirements are satisfied.

EERE Cost Share 20% and 50%
The cost share must be at least 20% of the total allowable costs (i.e., the sum of the Government share, including FFRDC costs if applicable, and the Recipient share of allowable costs equals the total allowable cost of the project) for research and development projects and 50% of the total allowable costs for demonstration and commercial application projects and must come from non-Federal sources unless otherwise allowed by law. (See 2 CFR 200.306 and 2 CFR 910.130 for the applicable cost sharing requirements.)

EERE Cost Share 50%
The cost share must be at least 50% of the total allowable costs for demonstration projects (i.e., the sum of the Government share, including FFRDC costs if applicable, and the Recipient share of allowable costs equals the total allowable cost of the project) and must come from non-Federal sources unless otherwise allowed by law. (See 2 CFR 200.306 and 2 CFR 910.130 for the applicable cost sharing requirements.)

To assist applicants in calculating proper cost share amounts, EERE has included a cost share information sheet and sample cost share calculation as Appendices B and C to this FOA.

Cost Sharing – USDA-NIFA Funds
If a project with an applied research component, is commodity-specific and not of national scope, the grant recipient is required to match the USDA funds awarded on a dollar-for-dollar basis from non-Federal sources with cash and/or in-kind contributions.

When a grant provides a particular benefit to a specific agricultural commodity, the grant recipient must match awarded USDA funds with cash and in-kind contributions on a dollar-for-dollar basis from non-federal sources. USDA-NIFA may waive the matching funds requirement for a grant if it determines that:
(a) The results of the project, while of particular benefit to a specific agricultural commodity, are likely to be applicable to agricultural commodities generally; or
(b) The project involves a minor commodity, the project deals with scientifically important research, and the grant recipient is unable to satisfy the matching funds requirement.

i. Legal Responsibility

Although the cost share requirement applies to the project as a whole, including work performed by members of the project team other than the Prime Recipient, the Prime Recipient is legally responsible for paying the entire cost share. The Prime Recipient's cost share obligation is expressed in the Assistance Agreement as a static amount in U.S. dollars (cost share amount) and as a percentage of the Total Project Cost (cost share percentage). If the funding agreement is terminated prior to the end of the project period, the Prime Recipient is required to contribute at least the cost share percentage of total expenditures incurred through the date of termination.

The Prime Recipient is solely responsible for managing cost share contributions by the Project Team and enforcing cost share obligation assumed by Project Team members in subawards or related agreements.

ii. ccCost Share Allocation

Each Project Team is free to determine how best to allocate the cost share requirement among the team members. The amount contributed by individual Project Team members may vary, as long as the cost share requirement for the project as a whole is met.

iii. Cost Share Types and Allowability

Every cost share contribution must be allowable under the applicable Federal cost principles, as described in Section IV.J.1 of the FOA. In addition, cost share must be verifiable upon submission of the Full Application.

Project Teams may provide cost share in the form of cash or in-kind contributions. Cash contributions may be provided by the Prime Recipient or Subrecipients. Allowable in-kind contributions include, but are not limited to:

rental value of buildings or equipment, the value of a donated service or resource, or third party in-kind contribution.

Project teams may use funding or property received from state or local governments to meet the cost share requirement, so long as the funding was not provided to the state or local government by the Federal Government.

The Prime Recipient may not use the following sources to meet its cost share obligations including, but not limited to:

- Revenues or royalties from the prospective operation of an activity beyond the project period;
- Proceeds from the prospective sale of an asset of an activity;
- Federal funding or property (e.g., Federal grants, equipment owned by the Federal Government); or
- Expenditures that were reimbursed under a separate Federal Program.

Project Teams may not use the same cash or in-kind contributions to meet cost share requirements for more than one project or program.

Cost share contributions must be specified in the project budget, verifiable from the Prime Recipient's records, and necessary and reasonable for proper and efficient accomplishment of the project. As all sources of cost share are considered part of total project cost, the cost share dollars will be scrutinized under the same Federal regulations as Federal dollars to the project. Every cost share contribution must be reviewed and approved in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred.

Applicants are encouraged to refer to 2 CFR 200.306 as amended by 2 CFR 910.130 & 10 CFR 603.525-555 for additional guidance on cost sharing.

iv. Cost Share Contributions by FFRDCs

Because FFRDCs are funded by the Federal Government, costs incurred by FFRDCs generally may not be used to meet the cost share requirement. FFRDCs may contribute cost share only if the contributions are paid directly from the contractor's Management Fee or another non-Federal source.

v. Cost Share Verification

Applicants are required to provide written assurance of their proposed cost share contributions in their Full Applications.

Upon selection for award negotiations, applicants are required to provide additional information and documentation regarding their cost share contributions. Please refer to Appendix A of the FOA.

vi. Cost Share Payment

EERE requires Prime Recipients to contribute the cost share amount incrementally over the life of the award. Specifically, the Prime Recipient's cost share for each billing period must always reflect the overall cost share ratio negotiated by the parties (i.e., the total amount of cost sharing on each invoice when considered cumulatively with previous invoices must reflect, at a minimum, the cost sharing percentage negotiated).

In limited circumstances, and where it is in the government's interest, the EERE Contracting Officer may approve a request by the Prime Recipient to meet its cost share requirements on a less frequent basis, such as monthly or quarterly. Regardless of the interval requested, the Prime Recipient must be up-to-date on cost share at each interval. Such requests must be sent to the Contracting Officer during award negotiations and include the following information: (1) a detailed justification for the request; (2) a proposed schedule of payments, including amounts and dates; (3) a written commitment to meet that schedule; and (4) such evidence as necessary to demonstrate that the Prime Recipient has complied with its cost share obligations to date. The Contracting Officer must approve all such requests before they go into effect.

C. Compliance Criteria

Concept Papers and Full Applications must meet all Compliance criteria listed below or they will be considered noncompliant. EERE will not review or consider noncompliant submissions, including Concept Papers, Full Applications, and Replies to Reviewer Comments that were: submitted through means other than EERE Exchange; submitted after the applicable deadline; and/or submitted incomplete. EERE will not extend the submission deadline for applicants that fail to submit required information due to server/connection congestion.

i. Compliance Criteria

1. Concept Papers

Concept Papers are deemed compliant if:

- The Concept Paper complies with the content and form requirements in Section IV.C of the FOA; and
- The applicant successfully uploaded all required documents and clicked the "Submit" button in EERE Exchange by the deadline stated in this FOA.

2. **Full Applications**
   Full Applications are deemed compliant if:

   - The applicant submitted a compliant Concept Paper;
   - The Full Application complies with the content and form requirements in Section IV.D of the FOA; and
   - The applicant successfully uploaded all required documents and clicked the "Submit" button in EERE Exchange by the deadline stated in the FOA.

3. **Replies to Reviewer Comments**
   Replies to Reviewer Comments are deemed compliant if:

   - The Reply to Reviewer Comments complies with the content and form requirements in Section IV.E of the FOA; and
   - The applicant successfully uploaded all required documents to EERE Exchange by the deadline stated in the FOA.

D. Responsiveness Criteria

All "Applications Specifically Not of Interest," as described in Section I.C of the FOA, are deemed non-responsive and are not reviewed or considered.

E. Other Eligibility Requirements

i. Requirements for DOE/NNSA Federally Funded Research and Development Centers (FFRDC) Listed as the Applicant

A DOE/NNSA FFRDC is eligible to apply for funding under this FOA if its cognizant Contracting Officer provides written authorization and this authorization is submitted with the application. If a DOE/NNSA FFRDC is selected for award negotiation, the proposed work will be authorized under the DOE work authorization process and performed under the laboratory's Management and Operating (M&O) contract.

The following wording is acceptable for the authorization:

Authorization is granted for the [Enter Laboratory Name] Laboratory to participate in the proposed project. The work proposed for the laboratory is consistent with or complementary to the missions of the laboratory, and will not adversely impact execution of the DOE assigned programs at the laboratory.

ii. Requirements for DOE/NNSA and non-DOE/NNSA Federally Funded Research and Development Centers Included as a Subrecipient

DOE/NNSA and non-DOE/NNSA FFRDCs may be proposed as a Subrecipient on another entity's application subject to the following guidelines:

1. **Authorization for non-DOE/NNSA FFRDCs**
   The Federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with its authority under its award.

2. **Authorization for DOE/NNSA FFRDCs**
   The cognizant Contracting Officer for the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The following wording is acceptable for this authorization:

   Authorization is granted for the [Enter Laboratory Name] Laboratory to participate in the proposed project. The work proposed for the laboratory is consistent with or complementary to the missions of the laboratory, and will not adversely impact execution of the DOE assigned programs at the laboratory.

3. **Value/Funding**
   The value of and funding for the FFRDC portion of the work will not normally be included in the award to a successful applicant. Usually, DOE will fund a DOE/NNSA FFRDC contractor through the DOE field work proposal system and non-DOE/NNSA FFRDC through an interagency agreement with the sponsoring agency.

4. **Cost Share**
   Although the FFRDC portion of the work is usually excluded from the award to a successful applicant, the applicant's cost share requirement

will be based on the total cost of the project, including the applicant's and the FFRDC's portions of the project.

5. **Responsibility**
   The Prime Recipient will be the responsible authority regarding the settlement and satisfaction of all contractual and administrative issues including, but not limited to disputes and claims arising out of any agreement between the Prime Recipient and the FFRDC contractor.

6. **Limit on FFRDC Effort**
   The scope of work to be performed by the FFRDC may not be more significant than the scope of work to be performed by the applicant.

F. Limitation on Number of Concept Papers and Full Applications Eligible for Review

Applicants may submit more than one Full Application to this FOA, provided that each application describes a unique, scientifically distinct project. Each Full Application must be submitted to only one topic area of this FOA and may not span multiple topic areas.

G. Questions Regarding Eligibility

EERE and USDA-NIFA will not make eligibility determinations for potential applicants prior to the date on which applications to this FOA must be submitted. The decision whether to submit an application in response to this FOA lies solely with the applicant.

IV. Application and Submission Information

A. Application Process

The application process will include two phases: a Concept Paper phase and a Full Application phase. Both phases will be led by DOE and follow DOE procedures as specified in this FOA. **Only applicants who have submitted an eligible Concept Paper will be eligible to submit a Full Application**. At each phase, EERE performs an initial eligibility review of the applicant submissions to determine whether they meet the eligibility requirements of Section III of the FOA. EERE will not review or consider submissions that do not meet the eligibility requirements of Section III. All submissions must conform to the following form and content requirements, including maximum page lengths (described below) and must be submitted via EERE Exchange at https://eere-exchange.energy.gov/, unless specifically stated otherwise. **EERE will not review or consider submissions submitted through**

means other than EERE Exchange, submissions submitted after the applicable deadline, and incomplete submissions. EERE will not extend deadlines for applicants who fail to submit required information and documents due to server/connection congestion. A control number will be issued when an applicant begins the Exchange application process. This control number must be included with all Application documents, as described below.

The Concept Paper, Full Application, and Reply to Reviewer Comments must conform to the following requirements:

- Each must be submitted in Adobe PDF format unless stated otherwise.
- Each must be written in English.
- All pages must be formatted to fit on 8.5 x 11 inch paper with margins not less than one inch on every side. Use Times New Roman typeface, a black font color, and a font size of 12 point or larger (except in figures or tables, which may be 10 point font). A symbol font may be used to insert Greek letters or special characters, but the font size requirement still applies. References must be included as footnotes or endnotes in a font size of 10 or larger. Footnotes and endnotes are counted toward the maximum page requirement.
- The Control Number must be prominently displayed on the upper right corner of the header of every page. Page numbers must be included in the footer of every page.
- Each submission must not exceed the specified maximum page limit, including cover page, charts, graphs, maps, and photographs when printed using the formatting requirements set forth above and single spaced. If applicants exceed the maximum page lengths indicated below, EERE will review only the authorized number of pages and disregard any additional pages.

Applicants are responsible for meeting each submission deadline. **Applicants are strongly encouraged to submit their Concept Papers and Full Applications at least 48 hours in advance of the submission deadline**. Under normal conditions (i.e., at least 48 hours in advance of the submission deadline), applicants should allow at least 1 hour to submit a Concept Paper, Full Application, or Reply to Reviewer Comments. Once the Concept Paper, Full Application, or Reply to Reviewer Comments is submitted in EERE Exchange, applicants may revise or update that submission until the expiration of the applicable deadline. If changes are made, the applicant must resubmit the Concept Paper, Full Application, or Reply to Reviewer Comments before the applicable deadline.

EERE and USDA-NIFA urge applicants to carefully review their Concept Papers, and Full Applications and to allow sufficient time for the submission of required information and documents. All Full Applications that pass the initial eligibility review will undergo comprehensive technical merit review according to the criteria identified in Section V.A.2 of the FOA.

i. Additional Information on EERE Exchange

EERE Exchange is designed to enforce the deadlines specified in this FOA. The "Apply" and "Submit" buttons will automatically disable at the defined submission deadlines. Should applicants experience problems with Exchange, the following information may be helpful.

Applicants that experience issues with submission PRIOR to the FOA deadline: In the event that an applicant experiences technical difficulties with a submission, the Application should contact the Exchange helpdesk for assistance (EERE-ExchangeSupport@hq.doe.gov). The Exchange helpdesk and/or the EERE Exchange system administrators will assist Applicants in resolving issues.

Applicants that experience issue with submissions that result in late submissions: In the event that an applicant experiences technical difficulties so severe that they are unable to submit their application by the deadline, the applicant should contact the Exchange helpdesk for assistance (EERE-ExchangeSupport@hq.doe.gov). The Exchange helpdesk and/or the EERE Exchange system administrators will assist the applicant in resolving all issues (including finalizing submission on behalf of and with the applicant's concurrence). PLEASE NOTE, however, those applicants who are unable to submit their application on time due to their waiting until the last minute when network traffic is at its heaviest to submit their materials will not be able to use this process.

B. Application Forms

The application forms and instructions are available on EERE Exchange. To access these materials, go to https://eere-Exchange.energy.gov and select the appropriate funding opportunity number.

Note: The maximum file size that can be uploaded to the EERE Exchange website is 10MB. Files in excess of 10MB cannot be uploaded, and hence cannot be submitted for review. If a file exceeds 10MB but is still within the maximum page limit specified in the FOA, it must be broken into parts and denoted to that effect. For example:

ControlNumber_LeadOrganization_Project_Part_1
ControlNumber_LeadOrganization_Project_Part_2, etc.

C. Content and Form of the Concept Paper

To be eligible to submit a Full Application, applicants must submit a Concept Paper by the specified due date and time.

i. Concept Paper Content Requirements

EERE and USDA-NIFA will not review or consider ineligible Concept Papers (see Section III of the FOA).

Each Concept Paper must be limited to a single concept or technology. Unrelated concepts and technologies should not be consolidated into a single Concept Paper.

The Concept Paper must conform to the following content requirements:

Section	Page Limit	Description
Cover Page	2 pages maximum	The cover page should include the project title, the specific FOA Topic Area being addressed (if applicable), both the technical and business points of contact, names of all team member organizations, and any statements regarding confidentiality.
Technology Description	3 pages maximum	Applicants are required to describe succinctly: • The proposed technology, including its basic operating principles and how it is unique and innovative; • The proposed technology's target level of performance (applicants should provide technical data or other support to show how the proposed target could be met); • The current state-of-the-art in the relevant field and application, including key shortcomings, limitations, and challenges; • How the proposed technology will overcome the shortcomings, limitations, and challenges in the relevant field and application; • The potential impact that the proposed project would have on the relevant field and application; • The key technical risks/issues associated with the proposed technology development plan; and

		• The impact that EERE funding would have on the proposed project.
Addendum	1 page maximum	Applicants are required to describe succinctly the qualifications, experience, and capabilities of the proposed Project Team, including: • Whether the Principal Investigator (PI) and Project Team have the skill and expertise needed to successfully execute the project plan; • Whether the applicant has prior experience which demonstrates an ability to perform tasks of similar risk and complexity; • Whether the applicant has worked together with its teaming partners on prior projects or programs; and • Whether the applicant has adequate access to equipment and facilities necessary to accomplish the effort and/or clearly explain how it intends to obtain access to the necessary equipment and facilities. Applicants may provide graphs, charts, or other data to supplement their Technology Description.

EERE makes an independent assessment of each Concept Paper based on the criteria in Section V.A.i of the FOA. EERE will encourage a subset of applicants to submit Full Applications. Other applicants will be discouraged from submitting a Full Application. An applicant who receives a "discouraged" notification may still submit a Full Application. EERE will review all eligible Full Applications. However, by discouraging the submission of a Full Application, EERE intends to convey its lack of programmatic interest in the proposed project in an effort to save the applicant the time and expense of preparing an application that is unlikely to be selected for award negotiations.

EERE may include general comments provided from reviewers on an applicant's Concept Paper in the encourage/discourage notification sent to applicants at the close of that phase.

D. Content and Form of the Full Application

Applicants must submit a Full Application by the specified due date and time to be considered for funding under this FOA. Applicants must complete the following application forms found on the EERE Exchange website at https://eere-Exchange.energy.gov/, in accordance with the instructions.

Applicants will have approximately 30 days from receipt of the Concept Paper Encourage/Discourage notification to prepare and submit a Full Application.

Regardless of the date the applicant receives the Encourage/Discourage notification, the submission deadline for the Full Application remains the date and time stated on the FOA cover page.

All Full Application documents must be marked with the Control Number issued to the applicant. Applicants will receive a control number upon submission of their Concept Paper, and should include that control number in the file name of their Full Application submission (i.e., Control number_Applicant Name_Full Application).

i. Full Application Content Requirements

EERE and USDA-NIFA will not review or consider ineligible Full Applications (see Section III of the FOA).

Each Full Application shall be limited to a single concept or technology. Unrelated concepts and technologies shall not be consolidated in a single Full Application.

Full Applications must conform to the following requirements:

Submission	Components	File Name
Full Application (PDF, unless stated otherwise)	Technical Volume (See Chart in Section IV.D.2)	ControlNumber_LeadOrganization_Technical Volume
	Technical and Economic Datasheet (See Appendix F)	ControlNumber_LeadOrganization_TechFin Datasheet
	Research Data package (10 page limit)	ControlNumber_LeadOrganization_Research Data
	Statement of Project Objectives (Microsoft Word format) (5 page limit)	ControlNumber_LeadOrganization_SOPO
	SF-424	ControlNumber_LeadOrganization_App424
	Budget Justification (EERE 335) (Microsoft Excel format. Applicants must use the template available in EERE Exchange)	ControlNumber_LeadOrganization_Budget_Justification
	Summary for Public Release (1 page limit)	ControlNumber_LeadOrganization_Summary
	Summary Slide (1 page limit, Microsoft PowerPoint format)	ControlNumber_LeadOrganization_Slide
	Subaward Budget Justification, if applicable (EERE 335) (Microsoft Excel format. Applicants must use the template available in EERE Exchange)	ControlNumber_LeadOrganization_Subawardee_Budget_Justification
	Budget for FFRDC, if applicable	ControlNumber_LeadOrganization_FWP
	Authorization from cognizant Contracting Officer for FFRDC, if applicable	ControlNumber_LeadOrganization_FFRDCAuth

	SF-LLL Disclosure of Lobbying Activities	ControlNumber_LeadOrganization_SF-LLL
	Foreign Entity and Performance of Work in the United States waiver requests, if applicable	ControlNumber_LeadOrganization_Waiver
	U.S. Manufacturing Plan	ControlNumber_LeadOrganization_USMP
	Data Management Plan	ControlNumber_LeadOrganization_DMP

Note: The maximum file size that can be uploaded to the EERE Exchange website is 10MB. Files in excess of 10MB cannot be uploaded, and hence cannot be submitted for review. If a file exceeds 10MB but is still within the maximum page limit specified in the FOA it must be broken into parts and denoted to that effect. For example:

ControlNumber_LeadOrganization_TechnicalVolume_Part_1
ControlNumber_LeadOrganization_TechnicalVolume_Part_2, etc.

EERE and USDA-NIFA will not accept late submissions that resulted from technical difficulties due to uploading files that exceed 10MB.

EERE provides detailed guidance on the content and form of each component below.

ii. Technical Volume

The Technical Volume must be submitted in Adobe PDF format. The Technical Volume must conform to the following content and form requirements, including maximum page lengths. If applicants exceed the maximum page lengths indicated below, EERE and USDA-NIFA will review only the authorized number of pages and disregard any additional pages. This volume must address the Merit Review Criteria as discussed in Section V.A.2 of the FOA. Save the Technical Volume in a single PDF file using the following convention for the title:
"ControlNumber_LeadOrganization_TechnicalVolume".

Applicants must provide sufficient citations and references to the primary research literature to justify the claims and approaches made in the Technical Volume. However, EERE, USDA-NIFA and reviewers are under no obligation to review cited sources.

The Technical Volume to the Full Application may not be more than 30 pages, including the cover page, table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all of the information in

the table below. The applicant should consider the weighting of each of the evaluation criteria (see Section V.A.2 of the FOA) when preparing the Technical Volume.

SECTION/PAGE LIMIT	DESCRIPTION
Cover Page	The cover page should include the project title, the specific FOA Topic Area being addressed (if applicable), both the technical and business points of contact, names of all team member organizations, and any statements regarding confidentiality.
Project Overview (This section should constitute approximately 10% of the Technical Volume)	The Project Overview should contain the following information: • Background: The applicant should discuss the background of their organization, including the history, successes, and current research and development status (i.e., the technical baseline) relevant to the technical topic being addressed in the Full Application. • Project Goal: The applicant should explicitly identify the targeted improvements to the baseline technology and the critical success factors in achieving that goal. • DOE and/or USDA-NIFA Impact: The applicant should discuss the impact that funding would have on the proposed project. Applicants should specifically explain how funding, relative to prior, current, or anticipated funding from other public and private sources, is necessary to achieve the project objectives.
Technical Description, Innovation, and Impact (This section should constitute approximately 40% of the Technical Volume)	The Technical Description should contain the following information: • Relevance and Outcomes: The applicant should provide a detailed description of the technology, including the scientific and other principles and objectives that will be pursued during the project. This section should describe the relevance of the proposed project to the goals and objectives of the FOA, including the potential to meet specific DOE technical targets or other relevant performance targets. The applicant should clearly specify the expected outcomes of the project. • Feasibility: The applicant should demonstrate the technical feasibility of the proposed technology and capability of achieving the anticipated performance targets, including a description of previous work done and prior results. • Innovation and Impacts: The applicant should describe the current state of the art in the applicable field, the specific innovation of the proposed technology, the advantages of proposed technology over current and emerging technologies, and the overall impact on advancing the state of the art/technical baseline if the project is successful. • Environmental Impact: The Applicant must include a life cycle analysis (LCA) or compelling narrative that demonstrates that

	the proposed technology will have an improved environmental profile over conventional production. Applicant must include explanations of assumptions and appropriate references. • Economic Impact: The Applicant must include a techno-economic analysis (TEA) or compelling narrative that demonstrates that the proposed route will enable the cost-competitive production of biofuels. Applicant must include explanations of assumptions and appropriate references.
Workplan and Market Transformation Plan (This section should constitute approximately 35% of the Technical Volume)	The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure, Milestones, Go/No-Go Decision Points, and Project Schedule. A detailed Statement of Project Objectives (SOPO) is separately requested. The Workplan should contain the following information: • Project Objectives: The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes. • Technical Scope Summary: The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete, approximately annual decision points (see below for more information on go/no-go decision points). The applicant should describe the specific expected end result of each performance period. • Work Breakdown Structure (WBS) and Task Description Summary: The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard work breakdown structure (WBS) for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as "we will then complete a proprietary process" is unacceptable). It is the applicant's responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this FOA. The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks. • Milestone Summary: The applicant should provide a summary of appropriate milestones throughout the project to demonstrate success. A milestone may be either a progress measure (which can be activity based) or a SMART technical milestone. SMART milestones should be **S**pecific, **M**easurable, **A**chievable, **R**elevant, and **T**imely, and must demonstrate a technical achievement rather than simply completing a task. Unless otherwise specified in the

	FOA, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project with at least one SMART technical milestone per year (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The applicant should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO. • Go/No-Go Decision Points: The applicant should provide a summary of project-wide go/no-go decision points at appropriate points in the Workplan. A go/no-go decision point is a risk management tool and a project management best practice to ensure that, for the current phase or period of performance, technical success is definitively achieved and potential for success in future phases or periods of performance is evaluated, prior to actually beginning the execution of future phases. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one project-wide go/no-go decision point for each budget period (12 to 18-month period) of the project. The Applicant should also provide the specific technical criteria to be used to make the go/no-go decision. The summary provided should be consistent with the SOPO. Go/no-go decision points are considered "SMART" and can fulfill the requirement for an annual SMART milestone. • End of Project Goal: The applicant should provide a summary of the end of project goal(s). Unless otherwise specified in the FOA, the minimum requirement is that each project must have one SMART end of project goal. The summary provided should be consistent with the SOPO. • Project Schedule (Gantt Chart or similar): The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and go/no-go decision points. • Project Management: The applicant should discuss the team's proposed management plan, including the following: o The overall approach to and organization for managing the work o The roles of each Project Team member o Any critical handoffs/interdependencies among Project Team members o The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices o The approach to project risk management o A description of how project changes will be handled o If applicable, the approach to Quality Assurance/Control o How communications will be maintained among Project Team members

	• Market Transformation Plan: The applicant should provide a market transformation plan, including the following: o Identification of target market, competitors, and distribution channels for proposed technology along with known or perceived barriers to market penetration, including a mitigation plan o Identification of a product development and/or service plan, commercialization timeline, financing, product marketing, legal/regulatory considerations including intellectual property, infrastructure requirements, data dissemination, U.S. manufacturing plan etc., and product distribution. o Upon successful completion of the project, all Recipients would be required to publish a success story to encourage others to approach them and learn about their achievements.
Technical Qualifications and Resources (Approximately 15% of the Technical Volume)	The Technical Qualifications and Resources should contain the following information: • Describe the Project Team's unique qualifications and expertise, including those of key Subrecipients. • Describe the Project Team's existing equipment and facilities that will facilitate the successful completion of the proposed project; include a justification of any new equipment or facilities requested as part of the project. • This section should also include relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives. • Describe the time commitment of the key team members to support the project. • Attach one-page resumes for key participating team members as an appendix. Resumes do not count towards the page limit. Multi-page resumes are not allowed. • Describe the technical services to be provided by DOE/NNSA FFRDCs, if applicable. • Attach letters of commitment from all Subrecipient/third party cost share providers as an appendix. Letters of commitment do not count towards the page limit. • Attach any letters of support from partners/end users as an appendix (1 page maximum per letter). Letters of support do not count towards the page limit. • For multi-organizational or multi-investigator projects, describe succinctly: o The roles and the work to be performed by each PI and Key Participant; o Business agreements between the applicant and each PI and Key Participant;

	o How the various efforts will be integrated and managed; o Process for making decisions on scientific/technical direction; o Publication arrangements; o Intellectual Property issues; and o Communication plans

iii. Statement of Project Objectives

Applicants are required to complete a Statement of Project Objectives (SOPO). A SOPO template is available on EERE Exchange at https://eere-Exchange.energy.gov/. The SOPO, including the Milestone Table, must not exceed 5 pages when printed using standard 8.5 x 11 paper with 1" margins (top, bottom, left, and right) with font not smaller than 12 point. Save the SOPO in a single Microsoft Word file using the following convention for the title "ControlNumber_LeadOrganization_SOPO".

iv. SF-424: Application for Federal Assistance

Complete all required fields in accordance with the instructions on the form. The list of certifications and assurances in Field 21 can be found at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms, under Certifications and Assurances. Note: The dates and dollar amounts on the SF-424 are for the complete project period and not just the first project year, first phase or other subset of the project period. Save the SF-424 in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_App424".

v. Budget Justification Workbook (EERE 335)

Applicants are required to complete the Budget Justification Workbook. This form is available on EERE Exchange at https://eere-Exchange.energy.gov/. Prime Recipients must complete each tab of the Budget Justification Workbook for the project as a whole, including all work to be performed by the Prime Recipient and its Subrecipients and Contractors, and provide all requested documentation (e.g., a Federally-approved rate agreement, vendor quotes). Applicants should include costs associated with required annual audits and incurred cost proposals in their proposed budget documents. The "Instructions and Summary" included with the Budget Justification Workbook will auto-populate as the applicant enters information into the Workbook. Applicants must carefully read the "Instructions and Summary" tab provided within the Budget Justification

Workbook. Save the Budget Justification Workbook in a single Microsoft Excel file using the following convention for the title "ControlNumber_LeadOrganization_Budget_Justification".

vi. Summary/Abstract for Public Release

Applicants are required to submit a one-page summary/abstract of their project. The project summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the project director/principal investigator(s), the project title, the objectives of the project, a description of the project, including methods to be employed, the potential impact of the project (e.g., benefits, outcomes), and major participants (for collaborative projects). This document must not include any proprietary or sensitive business information as DOE may make it available to the public after selections are made. The project summary must not exceed 1 page when printed using standard 8.5 x 11 paper with 1" margins (top, bottom, left, and right) with font not smaller than 12 point. Save the Summary for Public Release in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_Summary".

vii. Summary Slide

Applicants are required to provide a single PowerPoint slide summarizing the proposed project. The slide must be submitted in Microsoft PowerPoint format. This slide is used during the evaluation process. Save the Summary Slide in a single file using the following convention for the title "ControlNumber_LeadOrganization_Slide".

The Summary Slide template requires the following information:

- A technology Summary;
- A description of the technology's impact;
- Proposed project goals;
- Any key graphics (illustrations, charts and/or tables);
- The project's key idea/takeaway;
- Project title, Prime Recipient, Principal Investigator, and Key Participant information; and
- Requested funds and proposed applicant cost share.

viii. Subaward Budget Justification (EERE 335) (if applicable)

Applicants must provide a separate budget justification, EERE 335 (i.e., budget justification for each budget year and a cumulative budget) for each subawardee that is expected to perform work estimated to be more than

$250,000 or 25 percent of the total work effort (whichever is less). The budget justification must include the same justification information described in the "Budget Justification" section above. Save each subaward budget justification in a Microsoft Excel file using the following convention for the title "ControlNumber_LeadOrganization_Subawardee_Budget_Justification".

ix. Budget for DOE/NNSA FFRDC (if applicable)

If a DOE/NNSA FFRDC contractor is to perform a portion of the work, the applicant must provide a DOE Field Work Proposal (FWP) in accordance with the requirements in DOE Order 412.1, Work Authorization System. DOE Order 412.1 and DOE O 412.1 (Field Work Proposal form) area available at the following link, under "DOE Budget Forms": https://www.directives.doe.gov/directives/0412.1-BOrder-a/view. Save the FWP in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_FWP".

x. Authorization for non-DOE/NNSA or DOE/NNSA FFRDCs (if applicable)

The Federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with the contractor's authority under its award. Save the Authorization in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_FFRDCAuth".

xi. SF-LLL: Disclosure of Lobbying Activities

Prime Recipients and Subrecipients may not use any Federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Prime Recipients and Subrecipients are required to complete and submit SF-LLL, "Disclosure of Lobbying Activities" (http://www.whitehouse.gov/sites/default/files/omb/grants/sflllin.pdf) if any non-Federal funds have been paid or will be paid to any person for influencing or attempting to influence any of the following in connection with your application:

- An officer or employee of any Federal agency;
- A Member of Congress;
- An officer or employee of Congress; or

- An employee of a Member of Congress.

Save the SF-LLL in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_SF-LLL".

xii. Waiver Requests: Foreign Entities and Performance of Work in the United States (if applicable)

1. **Foreign Entity Participation***:*
   As set forth in Section III.A.3, all Prime Recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application. Appendix C lists the necessary information that must be included in a request to waive this requirement.

2. **Performance of Work in the United States**
   As set forth in Section IV.K.iii, all work under EERE funding agreements must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment, so a waiver is not required for foreign purchases of these items. However, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. Appendix C lists the necessary information that must be included in a request to waive the Performance of Work in the United States requirement.

xiii. U.S. Manufacturing Commitments

As part of the application, applicants are required to submit a U.S. Manufacturing Plan. The U.S. Manufacturing Plan represents the applicant's measurable commitment to support U.S. manufacturing as a result of its award.

The weight given to the U.S. Manufacturing Plans during the review and selection process varies based on the particular FOA. Applicants should review Section V.A.2 of this FOA to determine the weight given to the U.S. Manufacturing Plans under this FOA.

A U.S. Manufacturing Plan should contain the following or similar preamble: "If selected for funding, the applicant agrees to the following commitments as a condition of that funding:" and, after the preamble, the plan should

include one or more specific and measureable commitments. For example, an applicant may commit particular types of products to be manufactured in the U.S. In addition to or instead of making a commitment tied to a particular product, the applicant may make other types of commitments still beneficial to U.S. manufacturing. An applicant may commit to a particular investment in a new or existing U.S. manufacturing facility, keep certain activities based in the U.S. (i.e., final assembly) or support a certain number of jobs in the U.S. related to the technology and manufacturing. For an applicant which is likely to license the technology to others, especially universities for which licensing may be the exclusive means of commercialization the technology, the U.S. manufacturing plan may indicate the applicant's plan and commitment to use a licensing strategy that would likely support U.S. manufacturing.

When an applicant that is a domestic small business, domestic educational institution, or nonprofit organization is selected for an award, the U.S. Manufacturing Plan submitted by the applicant becomes part of the terms and conditions of the award. The applicant/awardee may request a waiver or modification of the U.S. Manufacturing Plan from DOE upon a showing that the original U.S. Manufacturing Plan is no longer economically feasible.

When an applicant that is a domestic large business is selected for an award, a class patent waiver applies as set forth in Section VIII. L. Under this class patent waiver, domestic large businesses may elect title to their subject inventions similar to the right provided to the domestic small businesses, educational institutions, and nonprofits by law. In order to avail itself of the class patent waiver, a domestic large business must agree that any products embodying or produced through the use of an invention conceived or first actually reduced to practice under the award will be substantially manufactured in the United States, unless DOE agrees that the commitments proposed in the U.S. Manufacturing Plan are sufficient.
For other entity types that are selected for award, please see Section VIII.L regarding U.S. manufacturing commitments.

xiv. Data Management Plan

Applicants are required to submit a Data Management Plan with their Full Application. The Data Management Plan is a document that outlines the proposed plan for data sharing or preservation. Submission of a Data Management Plan with the Full Application is required; failure to submit a complete Data Management Plan may result in a determination of non-compliance for your Full Application. Guidance for preparing a Data Management Plan is included in Appendix D of the FOA.

xv. Technical and Economic Data Tables

Applicants are required to submit the Block Flow Diagram, Technical and economic data tables and supporting data as outlined in the "Technical and Economic Data Tables." [See Appendix F]. Applicants must describe the proposed process by providing the requested information and following the instructions in the appendix. [See Appendix F] The Technical and Economic Data Table attachment cannot exceed 20 pages.

Save the Block Flow Diagram in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_TechFinDatasheet".

E. Content and Form of Replies to Reviewer Comments

EERE will provide applicants with reviewer comments following evaluation of all eligible Full Applications. Applicants will have a brief opportunity to review the comments and to prepare a short Reply to Reviewer Comments responding to comments however they desire or supplementing their Full Application. The Reply to Reviewer Comments is an optional submission; applicants are not required to submit a Reply to Reviewer Comments. EERE will notify applicants via email when the Reviewer Comments are available for reply. The expected submission deadline is on the cover page of the FOA; however, it is the applicant's responsibility to monitor email in the event that the expected date changes. The deadline will not be extended for applicants who are unable to timely submit their reply due to failure to check email or relying on the expected date alone. Applicants should anticipate having approximately three (3) business days to submit Replies to Reviewer Comments.

EERE will not review or consider ineligible Replies to Reviewer Comments (see Section III of the FOA). EERE will review and consider each eligible Full Application, even if no Reply is submitted or if the Reply is found to be ineligible.

Replies to Reviewer Comments must conform to the following content and form requirements, including maximum page lengths, described below. If a Reply to Reviewer Comments is more than three pages in length, EERE will review only the first three (3) pages and disregard any additional pages.

SECTION	PAGE LIMIT	DESCRIPTION
Text	2 pages max	Applicants may respond to one or more reviewer comments or supplement their Full Application.

Optional	1 page max	Applicants may use this page however they wish; text, graphs, charts, or other data to respond to reviewer comments or supplement their Full Application are acceptable.

F. Post-Award Information Requests

If selected for award, EERE and or/USDA-NIFA reserve the right to request additional or clarifying information for any reason deemed necessary, including but not limited to:

- Indirect cost information
- Other budget information
- Commitment Letters from Third Parties Contributing to Cost Share, if applicable
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5)
- Representation of Limited Rights Data and Restricted Software, if applicable
- Environmental Questionnaire
- Lifecycle Analysis

G. Dun and Bradstreet Universal Numbering System Number and System for Award Management

Each applicant (unless the applicant is an individual or Federal awarding agency that is excepted from those requirements under 2 CFR §25.110(b) or (c), or has an exception approved by the Federal awarding agency under 2 CFR §25.110(d)) is required to: (1) Be registered in the System for Award Management (SAM) at https://www.sam.gov before submitting its application; (2) provide a valid Dun and Bradstreet Universal Numbering System (DUNS) number in its application; and (3) continue to maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency. DOE may not make a Federal award to an applicant until the applicant has complied with all applicable DUNS and SAM requirements and, if an applicant has not fully complied with the requirements by the time DOE is ready to make a Federal award, the DOE may determine that the applicant is not qualified to receive a Federal award and use that determination as a basis for making a Federal award to another applicant.

H. Submission Dates and Times

Concept Papers, Full Applications, and Replies to Reviewer Comments must be submitted in EERE Exchange no later than 5 p.m. Eastern on the dates provided on the cover page of this FOA.

I. Intergovernmental Review

This FOA is not subject to Executive Order 12372 – Intergovernmental Review of Federal Programs.

J. Funding Restrictions

i. Allowable Costs

All expenditures must be allowable, allocable, and reasonable in accordance with the applicable Federal cost principles.

Refer to the following applicable Federal cost principles for more information:

- FAR Part 31 for For-Profit entities; and
- 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.

ii. Pre-Award Costs

USDA-NIFA selectees are authorized to incur pre-award costs 90 calendar days prior to award (or more than 90 calendar days with the prior approval of the Federal awarding agency). Preaward expenditures prior to funding of an increment within a multiple-year project, including any optional years, are not subject to this limitation or approval requirement. All costs are incurred at the recipient's risk (i.e., the Federal awarding agency is under no obligation to reimburse such costs if for any reason the recipient does not receive an award or if the award is less than anticipated and inadequate to cover such costs).

EERE selectees must request prior written approval to charge pre-award costs. Pre-award costs are those incurred prior to the effective date of the Federal award directly pursuant to the negotiation and in anticipation of the Federal award where such costs are necessary for efficient and timely performance of the scope of work. Such costs are allowable only to the extent that they would have been allowable if incurred after the date of the Federal award and **only** with the written approval of the Federal awarding agency, through the Contracting Officer assigned to the award.

Pre-award costs cannot be incurred prior to the Selection Official signing the Selection Statement and Analysis. Pre-award costs can only be incurred if such costs would be reimbursable under the agreement if incurred after award.

Pre-Award expenditures are made at the Selectee's risk; EERE is not obligated to reimburse costs: (1) in the absence of appropriations; (2) if an

award is not made; or (3) if an award is made for a lesser amount than the Selectee anticipated.

1. **Pre-Award Costs Related to National Environmental Policy Act (NEPA) Requirements**
   EERE's decision whether and how to distribute Federal funds under this FOA is subject to NEPA. Applicants should carefully consider and should seek legal counsel or other expert advice before taking any action related to the proposed project that would have an adverse effect on the environment or limit the choice of reasonable alternatives prior to EERE completing the NEPA review process.

   EERE does not guarantee or assume any obligation to reimburse costs where the Prime Recipient incurred the costs prior to receiving written authorization from the Contracting Officer. If the applicant elects to undertake activities that may have an adverse effect on the environment or limit the choice of reasonable alternatives prior to receiving such written authorization from the Contracting Officer, the applicant is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share. Likewise, if a project is selected for negotiation of award, and the Prime Recipient elects to undertake activities that are not authorized for Federal funding by the Contracting Officer in advance of EERE completing a NEPA review, the Prime Recipient is doing so at risk of not receiving Federal Funding and such costs may not be recognized as allowable cost share. Nothing contained in the pre-award cost reimbursement regulations or any pre-award costs approval letter from the Contracting Officer override these NEPA requirements to obtain the written authorization from the Contracting Officer prior to taking any action that may have an adverse effect on the environment or limit the choice of reasonable alternatives.

iii. EERE Awards: Performance of Work in the United States

1. **Requirement**
   All work performed under EERE Awards must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment; however, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. The Prime Recipient must flow down this requirement to its Subrecipients.

2. **Failure to Comply**
   If the Prime Recipient fails to comply with the Performance of Work in the United States requirement, EERE may deny reimbursement for the

work conducted outside the United States and such costs may not be recognized as allowable Recipient cost share. The Prime Recipient is responsible should any work under this Award be performed outside the United States, absent a waiver, regardless of if the work is performed by the Prime Recipient, Subrecipients, contractors or other project partners.

3. **Waiver**

There may be limited circumstances where it is in the interest of the project to perform a portion of the work outside the United States. To seek a waiver of the Performance of Work in the United States requirement, the applicant must submit a written waiver request to EERE. Appendix C lists the necessary information that must be included in a request to waive the Performance of Work in the United States requirement.

The applicant must demonstrate to the satisfaction of EERE that a waiver would further the purposes of the FOA and is in the economic interests of the United States. EERE may require additional information before considering a waiver request. Save the waiver request(s) in a single PDF file titled "ControlNumber_PerformanceofWork_Waiver". The applicant does not have the right to appeal EERE's decision concerning a waiver request.

iv. Construction

EERE recipients are required to obtain written authorization from the Contracting Officer before incurring any major construction costs. USDA-NIFA funds may not be used for the construction of a new building or facility or the acquisition, expansion, remodeling, or alteration of an existing building or facility (including site grading and improvement, and architect fees).

v. EERE Awards: Foreign Travel

If international travel is proposed for your project, please note that your organization must comply with the International Air Transportation Fair Competitive Practices Act of 1974 (49 USC 40118), commonly referred to as the "Fly America Act," and implementing regulations at 41 CFR 301-10.131 through 301-10.143. The law and regulations require air transport of people or property to, from, between, or within a country other than the United States, the cost of which is supported under this award, to be performed by or under a cost-sharing arrangement with a U.S. flag carrier, if service is available. Foreign travel costs are allowable only with the written prior approval of the Contracting Officer assigned to the award.

vi. Equipment and Supplies

To the greatest extent practicable, all equipment and products purchased with funds made available under this FOA should be American-made. This requirement does not apply to used or leased equipment.

Property disposition will be required at the end of a project if the current fair market value of property exceeds $5,000. The rules for property disposition are set forth in 2 CFR 200.310 – 200.316 as adopted by DOE and USDA. Property disposition requirements for DOE awards are further governed by 2 CFR 910.360.

vii. Lobbying

Recipients and Subrecipients may not use any Federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Recipients and Subrecipients are required to complete and submit SF-LLL, "Disclosure of Lobbying Activities" (http://www.whitehouse.gov/sites/default/files/omb/grants/sflllin.pdf) if any non-Federal funds have been paid or will be paid to any person for influencing or attempting to influence any of the following in connection with your application:

- An officer or employee of any Federal agency;
- A Member of Congress;
- An officer or employee of Congress; or
- An employee of a Member of Congress.

viii. EERE Awards: Risk Assessment

Prior to making a Federal award, the DOE is required by 31 U.S.C. 3321 and 41 U.S.C. 2313 to review information available through any OMB-designated repositories of government-wide eligibility qualification or financial integrity information, such as SAM Exclusions and "Do Not Pay."

In addition, DOE evaluates the risk(s) posed by applicants before they receive Federal awards. This evaluation may consider: results of the evaluation of the applicant's eligibility; the quality of the application; financial stability; quality of management systems and ability to meet the management standards prescribed in this part; history of performance; reports and findings from audits; and the applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-Federal entities.

In addition to this review, DOE must comply with the guidelines on government-wide suspension and debarment in 2 CFR 180, and must require non-Federal entities to comply with these provisions. These provisions restrict Federal awards, subawards and contracts with certain parties that are debarred, suspended or otherwise excluded from or ineligible for participation in Federal programs or activities.

ix. Invoice Review and Approval

DOE selected applicants. DOE employs a risk-based approach to determine the level of supporting documentation required for approving invoice payments. Recipients may be required to provide some or all of the following items with their requests for reimbursement:

- Summary of costs by cost categories
- Timesheets or personnel hours report
- Invoices/receipts for all travel, equipment, supplies, contractual, and other costs
- UCC filing proof for equipment acquired with project funds by for-profit Recipients and subrecipients
- Explanation of cost share for invoicing period
- Analogous information for some subrecipients
- Other items as required by DOE

USDA-NIFA selected applicants. The awards are made as a standard grant and cost reimbursements are made through the Automated Standard Applications for Payment System (ASAP), operated by the Department of Treasury's Bureau of the Fiscal Service, is the designated payment system for awards from NIFA resulting from this joint-solicitation. For more information see: https://www.fiscal.treasury.gov/fsservices/gov/pmt/asap/asap_home.htm

x. Indirect Cost (F&A) Limitations:

For awards made by USDA-NIFA: Section 713 of the Consolidated Appropriations Act, 2016 (Pub. L. 114-113) limits indirect costs to 30 percent of the total Federal funds provided (or 42.857 percent of total direct costs) under each award. Similar language may be included in the FY 2017 appropriation, therefore, when preparing budgets, you should limit your request for the recovery of indirect costs to the lesser of your institution's official negotiated indirect cost rate or the equivalent of 30 percent of total Federal funds awarded. Further indirect cost information is available in Part

V section 7.9 of the NIFA Grants.gov Application Guide and at http://nifa.usda.gov/indirect-costs

V. Application Review Information

A. Technical Review Criteria

i. Concept Papers

Concept Papers are evaluated based on consideration the following factors. All sub-criteria are of equal weight.

Concept Paper Criterion: Overall FOA Responsiveness and Viability of the Project (Weight: 100%)

- The applicant clearly describes the proposed technology, describes how the technology is unique and innovative, and how the technology will advance the current state-of-the-art;
- The applicant has identified risks and challenges, including possible mitigation strategies, and has shown the impact that EERE funding and the proposed project would have on the relevant field and application;
- The applicant has the qualifications, experience, capabilities and other resources necessary to complete the proposed project; and
- The proposed work, if successfully accomplished, would clearly meet the objectives as stated in the FOA.

ii. Full Applications

Applications will be evaluated against the merit review criteria shown below. All sub-criteria are of equal weight.

Criterion 1: Technical Merit, Innovation, and Impact (50%)

Technical Merit and Innovation

- Extent to which the proposed technology or process is innovative;
- Degree to which the current state of the technology and the proposed advancement are clearly described;
- Extent to which the application specifically and convincingly demonstrates how the applicant will move the state of the art to the proposed advancement; and

- Sufficiency of technical detail in the application to assess whether the proposed work is scientifically meritorious and revolutionary, including relevant data, calculations and discussion of prior work in the literature with analyses (techno-economic, life-cycle analysis) that support the viability of the proposed work.

Impact of Technology Advancement

- How the project supports the topic area objectives and target specifications and metrics; and
- The potential impact of the project on advancing the state-of-the-art.

Criterion 2: Project Research and Market Transformation Plan (30%)

Research Approach, Workplan and SOPO

- Degree to which the approach and critical path have been clearly described and thoughtfully considered; and
- Degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan and SOPO will succeed in meeting the project goals.

Identification of Technical Risks

- Discussion and demonstrated understanding of the key technical risk areas involved in the proposed work and the quality of the mitigation strategies to address them.

Baseline, Metrics, and Deliverables

- The level of clarity in the definition of the baseline, metrics, and milestones; and
- Relative to a clearly defined experimental baseline, the strength of the quantifiable metrics, milestones, and a mid-point deliverables defined in the application, such that meaningful interim progress will be made.

Market Transformation Plan

- Identification of target market, competitors, and distribution channels for proposed technology along with known or perceived barriers to market penetration, including mitigation plan; and
- Comprehensiveness of market transformation plan including but not limited to product development and/or service plan, commercialization timeline, financing, product marketing, legal/regulatory considerations including intellectual property,

infrastructure requirements, Data Management Plan, U.S. manufacturing plan etc., and product distribution.

Criterion 3: Team and Resources (20%)

- The capability of the Principal Investigator(s) and the proposed team to address all aspects of the proposed work with a high probability of success. The qualifications, relevant expertise, and time commitment of the individuals on the team;
- The sufficiency of the facilities to support the work;
- The degree to which the proposed consortia/team demonstrates the ability to facilitate and expedite further development and commercial deployment of the proposed technologies;
- The level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan; and
- The reasonableness of the budget and spend plan for the proposed project and objectives.

iii. Criteria for Replies to Reviewer Comments

EERE and USDA-NIFA have not established separate criteria to evaluate Replies to Reviewer Comments. Instead, Replies to Reviewer Comments are attached to the original applications and evaluated as an extension of the Full Application.

B. Standards for Application Evaluation

Applications that are determined to be eligible will be evaluated in accordance with this FOA, by the standards set forth in EERE's Notice of Objective Merit Review Procedure (76 Fed. Reg. 17846, March 31, 2011) and the guidance provided in the "Department of Energy Merit Review Guide for Financial Assistance," which is available at: http://energy.gov/management/downloads/merit-review-guide-financial-assistance.

C. Other Selection Factors

i. Program Policy Factors

In addition to the above criteria, the Selection Officials for DOE projects may consider the following program policy factors in determining which Full Applications to select for award negotiations:

- The degree to which the proposed project exhibits technological diversity when compared to the existing DOE project portfolio and other projects selected from the subject FOA;
- The degree to which the proposed project, including proposed cost share, optimizes the use of available EERE funding to achieve programmatic objectives;
- The level of industry involvement and demonstrated ability to accelerate commercialization and overcome key market barriers;
- The degree to which the proposed project is likely to lead to increased employment and manufacturing in the United States;
- The degree to which the proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty; and
- Whether the applicant is a Climate Action Champion designated under DOE's Request for Applications DE-FOA-0001189 (FA) or the applicant has a letter of support from a Climate Action Champion designated under the above referenced RFA.

For applications selected for award by USDA-NIFA, additional program policy factors will include:

- Encourage the integration of disciplines and application of the best technical resources;
- Diversity of funded feedstocks and conversion technologies;
- Geographic diversity of research and/or development projects, as well as demonstration projects; and
- Involve a consortium of experts from multiple institutions

D. Evaluation and Selection Process

i. Overview

The evaluation process consists of multiple phases; each includes an initial eligibility review and a thorough technical review. Rigorous technical reviews of eligible submissions are conducted by reviewers that are experts in the subject matter of the FOA. Ultimately, the Selection Official considers the recommendations of the reviewers, along with other considerations such as program policy factors, in determining which applications to select. DOE will conduct the review with the assistance of a NIFA National Program Leader to manage and conduct the review. DOE and USDA-NIFA will work together through post panel discussions and each agency may select projects to fund based on merit and other relevant factors. DOE will have a priority selection

over the applications. Projects would be individually funded by each agency, though both agencies would share results and data from the selected projects without any constraints.

ii. EERE Awards: Pre-Selection Interviews

As part of the evaluation and selection process, EERE may invite one or more applicants to participate in Pre-Selection Interviews. Pre-Selection Interviews are distinct from and more formal than pre-selection clarifications (See Section V.D.3 of the FOA). The invited applicant(s) will meet with EERE representatives to provide clarification on the contents of the Full Applications and to provide EERE an opportunity to ask questions regarding the proposed project. The information provided by applicants to EERE through Pre-Selection Interviews contributes to EERE's selection decisions.

EERE will arrange to meet with the invited applicants in person at EERE's offices or a mutually agreed upon location. EERE may also arrange site visits at certain applicants' facilities. In the alternative, EERE may invite certain applicants to participate in a one-on-one conference with EERE via webinar, videoconference, or conference call.

EERE will not reimburse applicants for travel and other expenses relating to the Pre-Selection Interviews, nor will these costs be eligible for reimbursement as pre-award costs.

EERE may obtain additional information through Pre-Selection Interviews that will be used to make a final selection determination. EERE may select applications for funding and make awards without Pre-Selection Interviews. Participation in Pre-Selection Interviews with EERE does not signify that applicants have been selected for award negotiations.

iii. EERE Awards: Pre-Selection Clarification

EERE may determine that pre-selection clarifications are necessary from one or more applicants. Pre-selection clarifications are distinct from and less formal than pre-selection interviews. These pre-selection clarifications will solely be for the purposes of clarifying the application, and will be limited to information already provided in the application documentation. The pre-selection clarifications may occur before, during or after the merit review evaluation process. Information provided by an applicant that is not necessary to address the pre-selection clarification question will not be reviewed or considered. Typically, a pre-selection clarification will be carried out through either written responses to EERE's written clarification questions or video or conference calls with EERE representatives.

The information provided by applicants to EERE through pre-selection clarifications is incorporated in their applications and contributes to the merit review evaluation and EERE's selection decisions. If EERE contacts an applicant for pre-selection clarification purposes, it does not signify that the applicant has been selected for negotiation of award or that the applicant is among the top ranked applications.

EERE will not reimburse applicants for expenses relating to the pre-selection clarifications, nor will these costs be eligible for reimbursement as pre-award costs.

iv. Recipient Integrity and Performance Matters

DOE and USDA-NIFA, prior to making a Federal award with a total amount of Federal share greater than the simplified acquisition threshold, are required to review and consider any information about the applicant that is in the designated integrity and performance system accessible through SAM (currently FAPIIS) (see 41 U.S.C. 2313).

The applicant, at its option, may review information in the designated integrity and performance systems accessible through SAM and comment on any information about itself that a Federal awarding agency previously entered and is currently in the designated integrity and performance system accessible through SAM.

DOE and USDA-NIFA will consider any written comments by the applicant, in addition to the other information in the designated integrity and performance system, in making a judgment about the applicant's integrity, business ethics, and record of performance under Federal awards when completing the review of risk posed by applicants as described in 2 C.F.R. § 200.205.

v. Selection

The Selection Official may consider the technical merit, the Federal Consensus Board's recommendations, program policy factors, and the amount of funds available in arriving at selections for this FOA.

E. Anticipated Notice of Selection and Award Dates

EERE anticipates notifying applicants selected for negotiation of award by July 2017 and making awards by September 2017.

F. USDA-NIFA Award Administration and Conditions:

Within the limit of funds available for such purpose, the USDA-NIFA awarding official shall make grants to those responsible, eligible applicants whose applications are judged most meritorious under the procedures set forth in this solicitation. The date specified by the USDA-NIFA awarding official as the effective date of the grant shall be no later than September 30 of the federal fiscal year in which the project is approved for support and funds are appropriated for such purpose, unless otherwise permitted by law. The project need not be initiated on the grant effective date, but as soon thereafter as practical so that project goals may be attained within the funded project period. All funds granted by NIFA under this FOA may be used only for the purpose for which they are granted in accordance with the approved application and budget, regulations, terms and conditions of the award, applicable federal cost principles, USDA assistance regulations, and NIFA General Awards Administration Provisions at 7 CFR part 3430, subparts A through E.

VI. Award Administration Information

A. Award Notices

i. Ineligible Submissions

Ineligible Concept Papers and Full Applications will not be further reviewed or considered for award. The Contracting Officer will send a notification letter by email to the technical and administrative points of contact designated by the applicant in EERE Exchange. The notification letter will state the basis upon which the Concept Paper or the Full Application is ineligible and not considered for further review.

ii. Concept Paper Notifications

EERE will notify applicants of its determination to encourage or discourage the submission of a Full Application. EERE will send a notification letter by email to the technical and administrative points of contact designated by the applicant in EERE Exchange.

Applicants may submit a Full Application even if they receive a notification discouraging them from doing so. By discouraging the submission of a Full Application, EERE intends to convey its lack of programmatic interest in the proposed project. Such assessments do not necessarily reflect judgments on the merits of the proposed project. The purpose of the Concept Paper phase

is to save applicants the considerable time and expense of preparing a Full Application that is unlikely to be selected for award negotiations.

A notification letter encouraging the submission of a Full Application does not authorize the applicant to commence performance of the project. Please refer to Section IV.J.2 of the FOA for guidance on pre-award costs.

iii. Full Application Notifications

EERE will notify applicants of its determination via a notification letter by email to the technical and administrative points of contact designated by the applicant in EERE Exchange. The notification letter will inform the applicant whether or not its Full Application was selected for award negotiations. Alternatively, EERE may notify one or more applicants that a final selection determination on particular Full Applications will be made at a later date, subject to the availability of funds or other factors.

iv. Successful Applicants

Upon conclusion of the review process, meritorious research proposals may be recommended for funding by one of the participating agencies, determined at the option of the agencies, not the proposer.

DOE Selected Applicants: Receipt of a notification letter selecting a Full Application for award negotiations does not authorize the applicant to commence performance of the project. If an application is selected for award negotiations, it is not a commitment by EERE to issue an award. Applicants do not receive an award until award negotiations are complete and the Contracting Officer executes the funding agreement, accessible by the Prime Recipient in FedConnect.

The award negotiation process will take approximately 60 days. Applicants must designate a primary and a backup point-of-contact in EERE Exchange with whom EERE will communicate to conduct award negotiations. The applicant must be responsive during award negotiations (i.e., provide requested documentation) and meet the negotiation deadlines. If the applicant fails to do so or if award negotiations are otherwise unsuccessful, EERE will cancel the award negotiations and rescind the Selection. EERE reserves the right to terminate award negotiations at any time for any reason.

Please refer to Section IV.J.2 of the FOA for guidance on pre-award costs.

USDA Selected Applicants. Applications selected for funding by USDA-NIFA will be processed in accordance with USDA-NIFA procedures. The award document will provide pertinent instructions and information including, at a minimum, the following:

- Legal name and address of performing organization or institution to whom the Director has issued an award under the terms of this request for applications;
- Title of project;
- Name(s) and institution(s) of Project Directors chosen to direct and control approved activities;
- Identifying award number assigned by the Department;
- Project period, specifying the amount of time the Department intends to support the project without requiring recompetition for funds;
- Total amount of Departmental financial assistance approved by the Director during the project period;
- Legal authority(ies) under which the award is issued;
- Appropriate Catalog of Federal Domestic Assistance (CFDA) number;
- Applicable award terms and conditions (see See http://www.nifa.usda.gov/business/awards/awardterms.html to view current NIFA award terms and conditions.
- Approved budget plan for categorizing allocable project funds to accomplish the stated purpose of the award; and
- The output and reporting requirements are included in the award terms and conditions. If there are any program or award-specific award terms, those, if any, will be identified in the Notice of Award.

v. EERE Awards: Alternate Selection Determinations

In some instances, an applicant may receive a notification that its application was not selected for award and EERE designated the application to be an alternate. As an alternate, EERE may consider the Full Application for Federal funding in the future. A notification letter stating the Full Application is designated as an alternate does not authorize the applicant to commence performance of the project. EERE may ultimately determine to select or not select the Full Application for award negotiations.

vi. Unsuccessful Applicants

EERE shall promptly notify in writing each applicant whose application has not been selected for award or whose application cannot be funded because of the unavailability of appropriated funds.

B. Administrative and National Policy Requirements

i. Registration Requirements

There are several one-time actions before submitting an application in response to this FOA, and it is vital that applicants address these items as soon as possible. Some may take several weeks, and failure to complete them could interfere with an applicant's ability to apply to this FOA, or to meet the negotiation deadlines and receive an award if the application is selected. These requirements are as follows:

1. **EERE Exchange**
   Register and create an account on EERE Exchange at https://eere-Exchange.energy.gov.
   This account will then allow the user to register for any open EERE FOAs that are currently in EERE Exchange. It is recommended that each organization or business unit, whether acting as a team or a single entity, use only one account as the contact point for each submission. Applicants should also designate backup points of contact so they may be easily contacted if deemed necessary. **This step is required to apply to this FOA.**

   The EERE Exchange registration does not have a delay; however, **the remaining registration requirements below could take several weeks to process and are necessary for a potential applicant to receive an award under this FOA**.

2. **DUNS Number**
   Obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number (including the plus 4 extension, if applicable) at http://fedgov.dnb.com/webform.

3. **System for Award Management**
   Register with the System for Award Management (SAM) at https://www.sam.gov. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in SAM registration. Please update your SAM registration annually.

4. **FedConnect**
   Register in FedConnect at https://www.fedconnect.net. To create an organization account, your organization's SAM MPIN is required. For

more information about the SAM MPIN or other registration requirements, review the FedConnect Ready, Set, Go! Guide at http://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf.

5. **Grants.gov**
   Register in Grants.gov (http://www.grants.gov) to receive automatic updates when Amendments to this FOA are posted. However, please note that Concept Papers, and Full Applications will not be accepted through Grants.gov.

6. **Electronic Authorization of Applications and Award Documents**
   Submission of an application and supplemental information under this FOA through electronic systems used by the Department of Energy, including EERE Exchange and FedConnect.net, constitutes the authorized representative's approval and electronic signature.

ii. Award Administrative Requirements

The administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR Part 200 as amended by 2 CFR Part 910.

There are several federal statutes and regulations applicable to USDA-NIFA grant applications considered for review and to project grants awarded under this program. These include, but are not limited to the ones listed below.

2 CFR Part 200 – Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards.

2 CFR Part 400—USDA implementation of 2 CFR Part 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards.

2 CFR Part 415 – USDA General Program Administrative Regulations.

7 CFR Part 1, subpart A—USDA implementation of the Freedom of Information Act.

7 CFR Part 3—USDA implementation of OMB Circular No. A-129 regarding debt collection.

7 CFR Part 15, subpart A—USDA implementation of Title VI of the Civil Rights Act of 1964, as amended.

2 CFR Part 180 and Part 417--OMB Guidelines to Agencies on Government-Wide Debarment and Suspension (Non-procurement) and USDA Non-procurement Debarment and Suspension.

7 CFR Part 331 and 9 CFR Part 121—USDA implementation of the Agricultural Bioterrorism Protection Act of 2002.

2 CFR Part 416—USDA General Program Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments.

2 CFR Part 418—USDA implementation of Restrictions on Lobbying. Imposes prohibitions and requirements for disclosure and certification related to lobbying on Recipients of federal contracts, grants, cooperative agreements, and loans.

7 CFR Part 3407—USDA procedures to implement the National Environmental Policy Act of 1969, as amended.

7 CFR 3430—Competitive and Noncompetitive Non-formula Financial Assistance Programs--General Award Administrative Provisions.

29 U.S.C. 794 (section 504, Rehabilitation Act of 1973) and 7 CFR Part 15b (USDA implementation of statute)—prohibiting discrimination based upon physical or mental handicap in federally-assisted programs.

35 U.S.C. 200 et seq. —Bayh Dole Act, controlling allocation of rights to inventions made by employees of small business firms and domestic nonprofit organizations, including universities, in federally-assisted programs (implementing regulations are contained in 37 CFR Part 401).

44 U.S.C. 3541 et seq. (Pub. L. 107-347) - Federal Information System Security Management Act of 2002 (FISMA), to improve computer and network security within the Federal Government. Applies to awardees if it will collect, store, process, transmit, or use information on behalf of NIFA.

iii. Other USDA-NIFA Requirements

Responsible and Ethical Conduct of Research

In accordance with sections 2, 3, and 8 of 2 CFR Part 422, institutions that conduct USDA-funded extramural research must foster an atmosphere conducive to research integrity, bear primary responsibility for prevention and detection of research misconduct, and maintain and effectively communicate and train their staff regarding policies and procedures. In the event an application to NIFA results in an award, the Authorized Representative (AR) assures, through acceptance of the award that the institution will comply with the above requirements. Award recipients shall, upon request, make available to NIFA the policies, procedures, and documentation to support the conduct of the training. See http://nifa.usda.gov/responsible-and-ethical-conduct-research for more information.

Felony Convictions or Tax Delinquent Status

If selected for funding, the applicants will be required to file the mandatory Felony Convictions or Tax Delinquent Status. This form and other required forms can be accessed at:
https://nifa.usda.gov/resource/application-support-templates

In addition, specific management information relating to an applicant shall be submitted on a one-time basis, with updates on an as-needed basis. This requirement is part of the responsibility determination prior to the award of a grant identified under this Request for Applications (RFA), if such information has not been provided previously under this or another NIFA program. Copies of forms recommended for use in fulfilling these requirements will be provided to applicants as part of the pre-award process. Although an applicant may be eligible based on its status as one of these entities, there are factors that may exclude an applicant from receiving federal financial and non-financial assistance and benefits under this program (e.g., debarment or suspension of an individual involved or a determination that an applicant is not responsible based on submitted organizational management information).

The NIFA Federal Assistance Policy Guide, a compendium of basic NIFA policies and procedures that apply to all NIFA awards, unless there are statutory, regulatory, or award-specific requirements to the contrary, is available at http://nifa.usda.gov/policy-guide. Please note the NIFA Policy

Guide is being updated in FY17 to include Uniform Guidance and the 2014 Farm Bill.

iv. Foreign National Access to DOE Sites

All applicants that ultimately enter into an award resulting from this FOA will be subject to the following requirement concerning foreign national involvement. Upon DOE's request, Prime Recipients must provide information to facilitate DOE's responsibilities associated with foreign national access to DOE sites, information, technologies, and equipment. A foreign national is defined as any person who was born outside the jurisdiction of the United States, is a citizen of a foreign government, and has not been naturalized under U.S. law. If the Prime Recipient or Subrecipients, contractors or vendors under the award, anticipate utilizing a foreign national person in the performance of an award, the Prime Recipient is responsible for providing to the Contracting Officer specific information of the foreign national(s) to satisfy compliance with all of the requirements for access approval.

v. Subaward and Executive Reporting

Additional administrative requirements necessary for DOE and USDA-NIFA grants and cooperative agreements to comply with the Federal Funding and Transparency Act of 2006 (FFATA) are contained in 2 CFR Part 170. Prime Recipients must register with the new FFATA Subaward Reporting System database and report the required data on their first tier Subrecipients. Prime Recipients must report the executive compensation for their own executives as part of their registration profile in SAM.

vi. National Policy Requirements

The DOE National Policy Assurances that are incorporated as a term and condition of award are located at: http://www.nsf.gov/awards/managing/rtc.jsp.

USDA NIFA awardees will be subject to the terms and conditions identified in the award.
See http://www.nifa.usda.gov/business/awards/awardterms.html for information about NIFA award terms.

vii. Environmental Review in Accordance with National Environmental Policy Act (NEPA)

EERE's decision whether and how to distribute federal funds under this FOA is subject to the National Environmental Policy Act (42 USC 4321, *et seq.*). NEPA requires Federal agencies to integrate environmental values into their decision-making processes by considering the potential environmental impacts of their proposed actions. For additional background on NEPA, please see DOE's NEPA website, at http://nepa.energy.gov/.

While NEPA compliance is a Federal agency responsibility and the ultimate decisions remain with the Federal agency, all Recipients selected for an award will be required to assist in the timely and effective completion of the NEPA process in the manner most pertinent to their proposed project. If DOE determines certain records must be prepared to complete the NEPA review process (e.g., biological evaluations or environmental assessments), the costs to prepare the necessary records may be included as part of the project costs.

viii. Applicant Representations and Certifications

1. Lobbying Restrictions

By accepting funds under this award, the Prime Recipient agrees that none of the funds obligated on the award shall be expended, directly or indirectly, to influence Congressional action on any legislation or appropriation matters pending before Congress, other than to communicate to Members of Congress as described in 18 U.S.C. §1913. This restriction is in addition to those prescribed elsewhere in statute and regulation.

2. Corporate Felony Conviction and Federal Tax Liability Representations

In submitting an application in response to this FOA, the applicant represents that:

a. It is **not** a corporation that has been convicted of a felony criminal violation under any Federal law within the preceding 24 months, and
b. It is **not** a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

For purposes of these representations the following definitions apply:

A Corporation includes any entity that has filed articles of incorporation in any of the 50 states, the District of Columbia, or the various territories of the United States [but not foreign corporations]. It includes both for-profit and non-profit organizations.

3. Nondisclosure and Confidentiality Agreements Representations
In submitting an application in response to this FOA the applicant represents that:

a. It **does not and will not** require its employees or contractors to sign internal nondisclosure or confidentiality agreements or statements prohibiting or otherwise restricting its employees or contactors from lawfully reporting waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.

b. It **does not and will not** use any Federal funds to implement or enforce any nondisclosure and/or confidentiality policy, form, or agreement it uses unless it contains the following provisions:

(1) *''These provisions are consistent with and do not supersede, conflict with, or otherwise alter the employee obligations, rights, or liabilities created by existing statute or Executive order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive orders and statutory provisions are incorporated into this agreement and are controlling.''*

(2) The limitation above shall not contravene requirements applicable to Standard Form 312, Form 4414, or any other form issued by a Federal department or agency governing the nondisclosure of classified information.

(3) Notwithstanding the provision listed in paragraph (a), a nondisclosure or confidentiality policy form or agreement that is to be executed by a person connected with the conduct of an intelligence or intelligence-related activity, other than an employee or officer of the United States Government, may contain provisions appropriate to the particular activity for which such document is to be used. Such form or agreement shall, at a minimum, require that the person will not disclose any classified information received in the course of such activity unless specifically authorized to do so by the United States Government. Such nondisclosure or confidentiality forms shall also make it clear that they do not bar disclosures to Congress, or to an authorized official of an executive agency or the Department of Justice, that are essential to reporting a substantial violation of law.

ix. Statement of Federal Stewardship

EERE and USDA-NIFA will exercise normal Federal stewardship in overseeing the project activities performed under EERE and USDA-NIFA Awards. Stewardship Activities include, but are not limited to, conducting site visits; reviewing performance and financial reports, providing assistance and/or temporary intervention in usual circumstances to correct deficiencies that develop during the project; assuring compliance with terms and conditions; and reviewing technical performance after project completion to ensure that the project objectives have been accomplished.

x. Statement of Substantial Involvement

EERE has substantial involvement in work performed under DOE Awards made as a result of this FOA. EERE does not limit its involvement to the administrative requirements of the Award. Instead, EERE has substantial involvement in the direction and redirection of the technical aspects of the project as a whole. Substantial involvement includes, but is not limited to, the following:

1. EERE shares responsibility with the Recipient for the management, control, direction, and performance of the Project.

2. EERE may intervene in the conduct or performance of work under this Award for programmatic reasons. Intervention includes the interruption or modification of the conduct or performance of project activities.

3. EERE may redirect or discontinue funding the Project based on the outcome of EERE's evaluation of the Project at that the Go/No Go decision point(s).

4. EERE participates in major project decision-making processes.

USDA-NIFA will not have substantial involvement under Awards made as a result of this FOA as its awards are issued as standard grants.

xi. Subject Invention Utilization Reporting

In order to ensure that Prime Recipients and Subrecipients holding title to subject inventions are taking the appropriate steps to commercialize subject inventions, EERE may require that each Prime Recipient holding title to a subject invention submit annual reports for 10 years from the date the subject invention was disclosed to EERE on the utilization of the subject invention and efforts made by Prime Recipient or their licensees or assignees to stimulate such utilization. The reports must include information regarding the status of development, date of first commercial sale or use, gross royalties received by the Prime Recipient, and such other data and information as EERE may specify.

xii. Intellectual Property Provisions

The standard DOE financial assistance intellectual property provisions applicable to the various types of Recipients are located at http://www1.eere.energy.gov/financing/resources.html.

xiii. Reporting

DOE Selected Applicants. Reporting requirements are identified on the Federal Assistance Reporting Checklist, attached to the award agreement. Other reports that will be required from projects awarded under this FOA will include annual updates to the Project Management Plan, and a technical and financial data sheet which will be updated at the go/no-go decision points. The checklist can be accessed at http://www1.eere.energy.gov/financing/resources.html.

Understanding that investments in bioenergy applied R&D often do not immediately translate into impactful commercial products and processes, BETO is interested in evaluating both the short-term progress and the long-term impact of its investments. Thus, a letter of commitment from proposers agreeing to report beyond the end of the period of performance will be required as part of the application. Similar language will be incorporated into the substantial involvement clause of the resulting awards. Recipients will be required to furnish brief commercialization status updates to BETO for a period of 5 years after the end of the period of performance, no more frequently than annually and consisting of no more than 600 words per report. This information could include, but is not limited to whether the company has sales from new bioenergy products or technologies, whether new jobs were created in the prior year, whether new manufacturing facilities have been financed or established, and/or whether it has been acquired by another company.

USDA Selected Applicants. Grantees are to use REEport, NIFA's electronic, web-based inventory system to submit an initial project initiation which documents expected products and outcomes of the project. Additionally, annual progress report documenting realized project outcomes must be submitted to the electronic system. The web-based system facilitates an electronic workflow between grantees and NIFA for project accomplishments to be easily searchable and allows for public access to information on Federally-funded projects. The details of these reporting requirements, including those specific to the annual and final technical reports, are included in the award terms and conditions.

xiv. Go/No-Go Review

DOE Selected Applicants. Each project selected under this FOA will be subject to a periodic project evaluation referred to as a Go/No-Go Review. Federal funding beyond the Go/No Go decision point (continuation funding), is contingent on (1) the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority; (2) meeting the objectives, milestones, deliverables, and decision point criteria of Recipient's approved project and obtaining approval from EERE to continue work on the project; and (3) the submittal of required reports in accordance with the Statement of Project Objectives.

As a result of the Go/No Go Review, DOE may, at its discretion, authorize the following actions: (1) continue to fund the project, contingent upon the

availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority; (2) recommend redirection of work under the project; (3) place a hold on federal funding for the project, pending further supporting data or funding; or (4) discontinue funding the project because of insufficient progress, change in strategic direction, or lack of funding.

The Go/No-Go decision is distinct from a non-compliance determination. In the event a Recipient fails to comply with the requirements of an award, EERE may take appropriate action, including but not limited to, redirecting, suspending or terminating the award.

xv. Conference Spending

The Recipient shall not expend **any** funds on a conference not directly and programmatically related to the purpose for which the grant or cooperative agreement was awarded that would defray the cost to the United States Government of a conference held by any Executive branch department, agency, board, commission, or office for which the cost to the United States Government would otherwise exceed $20,000, thereby circumventing the required notification by the head of any such Executive Branch department, agency, board, commission, or office to the Inspector General (or senior ethics official for any entity without an Inspector General), of the date, location, and number of employees attending such conference.

xvi. UCC Financing Statements

DOE Selected Applicants. Per 2 CFR 910.360 (Real Property and Equipment) when a piece of equipment is purchased by a for-profit Recipient or subrecipient with Federal Funds, and when the Federal share of the financial assistance agreement is more than $1,000,000, the Recipient or subrecipient must:

Properly record, and consent to the Department's ability to properly record if the Recipient fails to do so, UCC financing statement(s) for all equipment in excess of $5,000 purchased with project funds. These financing statement(s) must be approved in writing by the contracting officer prior to the recording, and they shall provide notice that the Recipient's title to all equipment (not real property) purchased with Federal funds under the financial assistance agreement is conditional pursuant to the terms of this section, and that the Government retains an undivided reversionary interest in the equipment. The UCC financing statement(s) must be filed before the Contracting Officer may reimburse the Recipient for the Federal share of the equipment unless

otherwise provided for in the relevant financial assistance agreement. The Recipient shall further make any amendments to the financing statements or additional recordings, including appropriate continuation statements, as necessary or as the contracting officer may direct.

VII. Questions/Agency Contacts

Upon the issuance of a FOA, EERE personnel are prohibited from communicating (in writing or otherwise) with applicants regarding the FOA except through the established question and answer process as described below. Specifically, questions regarding the content of this FOA must be submitted to: IBR_Optimization@ee.doe.gov. Questions must be submitted not later than 3 business days prior to the application due date and time.

All questions and answers related to this FOA will be posted on EERE Exchange at: https://eere-exchange.energy.gov. **Please note that you must first select this specific FOA Number in order to view the questions and answers specific to this FOA**. EERE will attempt to respond to a question within 3 business days, unless a similar question and answer has already been posted on the website.

Questions related to the registration process and use of the EERE Exchange website should be submitted to: EERE-ExchangeSupport@hq.doe.gov.

VIII. Other Information

A. FOA Modifications

Amendments to this FOA will be posted on the EERE Exchange website and the Grants.gov system. However, you will only receive an email when an amendment or a FOA is posted on these sites if you register for email notifications for this FOA in Grants.gov. EERE recommends that you register as soon after the release of the FOA as possible to ensure you receive timely notice of any amendments or other FOAs.

B. Government Right to Reject or Negotiate

EERE and USDA-NIFA reserve the right, without qualification, to reject any or all applications received in response to this FOA and to select any application, in whole or in part, as a basis for negotiation and/or award.

C. Commitment of Public Funds

DOE Selected Applicants. The Contracting Officer is the only individual who can make awards or commit the Government to the expenditure of public funds. A commitment by anyone other than the Contracting Officer, either express or implied, is invalid.

USDA-NIFA Selected Applicants. The Authorized Departmental Officer (ADO) is the individual responsible for executing, modifying, and administering awards on behalf of the U.S. Department of Agriculture. (7 CFR 3430.2).

D. Treatment of Application Information

In general, EERE will only use data and other information contained in applications for evaluation purposes, unless such information is generally available to the public or is already the property of the Government.

Applicants should not include trade secrets or commercial or financial information that is privileged or confidential in their application unless such information is necessary to convey an understanding of the proposed project or to comply with a requirement in the FOA.

The use of protective markings such as "Do Not Publicly Release – Trade Secret" or "Do Not Publicly Release – Confidential Business Information" is encouraged. However, applicants should be aware that the use of protective markings is not dispositive as to whether information will be publicly released pursuant to the Freedom of Information Act, 5 U.S.C. §552, et. seq., as amended by the OPEN Government Act of 2007, Pub. L. No. 110-175. (See Section I of this document, "Notice of Potential Disclosure Under the Freedom of Information Act (FOIA)" for additional information regarding the public release of information under the Freedom of Information Act.

Applicants are encouraged to employ protective markings in the following manner:

The cover sheet of the application must be marked as follows and identify the specific pages containing trade secrets or commercial or financial information that is privileged or confidential:

> Notice of Restriction on Disclosure and Use of Data:
> Pages [list applicable pages] of this document may contain trade secrets or commercial or financial information that is privileged or confidential, and is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial assistance or loan agreement between the submitter and the Government. The Government may use or disclose any information that

is not appropriately marked or otherwise restricted, regardless of source. [End of Notice]

The header and footer of every page that contains trade secrets or commercial or financial information that is privileged must be marked as follows: "May contain trade secrets or commercial or financial information that is privileged or confidential and exempt from public disclosure."

In addition, each line or paragraph containing trade secrets or commercial or financial information that is privileged or confidential must be enclosed in brackets.

E. Evaluation and Administration by Non-Federal Personnel

In conducting the merit review evaluation, the Go/No-Go Review and Peer Review, the Government may seek the advice of qualified non Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The applicant, by submitting its application, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing an application. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

F. Notice Regarding Eligible/Ineligible Activities

Eligible activities under this FOA include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.

G. Notice of Right to Conduct a Review of Financial Capability

EERE reserves the right to conduct an independent third party review of financial capability for applicants that are selected for negotiation of award (including personal credit information of principal(s) of a small business if there is insufficient information to determine financial capability of the organization).

H. Notice of Potential Disclosure Under Freedom of Information Act (FOIA)

Under the Freedom of Information Act, (FOIA), 5 U.S.C. §552, et. seq., as amended by the OPEN Government Act of 2007, Pub. L. No. 110-175, any information received from the Applicant is considered to be an agency record, and as such,

subject to public release under FOIA. The purpose of the FOIA is to afford the public the right to request and receive agency records unless those agency records are protected from disclosure under one or more of the nine FOIA exemptions. Decisions to disclose or withhold information received from the Applicant are based upon the applicability of one or more of the nine FOIA exemptions, not on the existence or nonexistence of protective markings or designations. Only the agency's designated FOIA Officer may determine if information received from the Applicant may be withheld pursuant to one of the nine FOIA exemptions. All FOIA requests received by DOE are processed in accordance with 10 C.F.R. Part 1004.

I. Requirement for Full and Complete Disclosure

Applicants are required to make a full and complete disclosure of all information requested. Any failure to make a full and complete disclosure of the requested information may result in:

- The termination of award negotiations;
- The modification, suspension, and/or termination of a funding agreement;
- The initiation of debarment proceedings, debarment, and/or a declaration of ineligibility for receipt of Federal contracts, subcontracts, and financial assistance and benefits; and
- Civil and/or criminal penalties.

J. Retention of Submissions

EERE expects to retain copies of all Concept Papers, Full Applications, Replies to Reviewer Comments, and other submissions. No submissions will be returned. By applying to EERE for funding, applicants consent to EERE's retention of their submissions.

K. Title to Subject Inventions

DOE Selected Applicants. Ownership of subject inventions is governed pursuant to the authorities listed below.

- Domestic Small Businesses, Educational Institutions, and Nonprofits: Under the Bayh-Dole Act (35 U.S.C. § 200 et seq.), domestic small businesses, educational institutions, and nonprofits may elect to retain title to their subject inventions.
- All other parties: The Federal Non-Nuclear Energy Act of 1974, 42. U.S.C. 5908, provides that the Government obtains title to new inventions unless a waiver is granted (see below).
- Class Patent Waiver:

DOE has issued a class waiver that applies to this FOA. Under this class waiver, domestic large businesses may elect title to their subject inventions similar to the right provided to the domestic small businesses, educational institutions, and nonprofits by law. In order to avail itself of the class waiver, a domestic large business must agree that any products embodying or produced through the use of a subject invention first created or reduced to practice under this program will be substantially manufactured in the United States, unless DOE agrees that the commitments proposed in the U.S. Manufacturing Plan are sufficient.

- Advance and Identified Waivers: Applicants may request a patent waiver that will cover subject inventions that may be invented under the award, in advance of or within 30 days after the effective date of the award. Even if an advance waiver is not requested or the request is denied, the Recipient will have a continuing right under the award to request a waiver for identified inventions, i.e., individual subject inventions that are disclosed to EERE within the timeframes set forth in the award's intellectual property terms and conditions. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.
- Determination of Exceptional Circumstances (DEC): Each applicant is required to submit a U.S. Manufacturing Plan as part of its application. If selected, the U.S. Manufacturing Plan shall be incorporated into the award terms and conditions for domestic small businesses and nonprofit organizations. DOE has determined that exceptional circumstances exist that warrants the modification of the standard patent rights clause for small businesses and non-profit awardees under Bayh-Dole to the extent necessary to implement and enforce the U.S. Manufacturing Plan. For example, the commitments and enforcement of a U.S. Manufacturing Plan may be tied to subject inventions. Any Bayh-Dole entity (domestic small business or nonprofit organization) affected by this DEC has the right to appeal it.

USDA Selected Applicants. Allocation of rights of patents, inventions and copyrights must be in accordance with 2 CFR 200.315 and 2 CFR 200.448. In accordance with 37 CFR 401.14, each subject invention must be disclosed to the USDA awarding agency within two months after the inventor discloses it in writing to the contactor responsible for patent matters.

L. Government Rights in Subject Inventions

Where Prime Recipients and Subrecipients retain title to subject inventions, the U.S. Government retains certain rights.

i. Government Use License

The U.S. Government retains a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States any subject invention throughout the world. This license extends to contractors doing work on behalf of the Government.

ii. March-In Rights

The U.S. Government retains march-in rights with respect to all subject inventions. Through "march-in rights," the Government may require a Prime Recipient or Subrecipient who has elected to retain title to a subject invention (or their assignees or exclusive licensees), to grant a license for use of the invention to a third party. In addition, the Government may grant licenses for use of the subject invention when a Prime Recipient, Subrecipient, or their assignees and exclusive licensees refuse to do so.

DOE may exercise its march-in rights only if it determines that such action is necessary under any of the four following conditions:

- The owner or licensee has not taken or is not expected to take effective steps to achieve practical application of the invention within a reasonable time;
- The owner or licensee has not taken action to alleviate health or safety needs in a reasonably satisfied manner;
- The owner has not met public use requirements specified by Federal statutes in a reasonably satisfied manner; or
- The U.S. Manufacturing requirement has not been met.

Any determination that march-in rights are warranted must follow a fact-finding process in which the Recipient has certain rights to present evidence and witnesses, confront witnesses and appear with counsel and appeal any adverse decision. To date, DOE has never exercised its march-in rights to any subject inventions.

M. Rights in Technical Data

Data rights differ based on whether data is first produced under an award or instead was developed at private expense outside the award.

"Limited Rights Data": The U.S. Government will not normally require delivery of confidential or trade secret-type technical data developed solely at private expense prior to issuance of an award, except as necessary to monitor technical

progress and evaluate the potential of proposed technologies to reach specific technical and cost metrics.

Government rights in Technical Data Produced Under Awards: The U.S. Government normally retains unlimited rights in technical data produced under Government financial assistance awards, including the right to distribute to the public. However, pursuant to special statutory authority, certain categories of data generated under EERE awards may be protected from public disclosure for up to five years after the data is generated ("Protected Data"). For awards permitting Protected Data, the protected data must be marked as set forth in the awards intellectual property terms and conditions and a listing of unlimited rights data (i.e., non-protected data) must be inserted into the data clause in the award. In addition, invention disclosures may be protected from public disclosure for a reasonable time in order to allow for filing a patent application.

N. Copyright

The Prime Recipient and Subrecipients of DOE awards may assert copyright in copyrightable works, such as software, first produced under the award without EERE approval. When copyright is asserted, the Government retains a paid-up nonexclusive, irrevocable worldwide license to reproduce, prepare derivative works, distribute copies to the public, and to perform publicly and display publicly the copyrighted work. This license extends to contractors and others doing work on behalf of the Government. The Prime Recipient and Subrecipients of USDA-NIFA awards must allocate the rights of copyrights in accordance with 2 CFR 200.315 and 2 CFR 200.448.

O. Personally Identifiable Information (PII)

All information provided by the Applicant must to the greatest extent possible exclude Personally Identifiable Information (PII). The term "personally identifiable information" refers to information which can be used to distinguish or trace an individual's identity, such as their name, social security number, biometric records, etc. alone, or when combined with other personal or identifying information which is linked or linkable to a specific individual, such as date and place of birth, mother's maiden name, etc. (See OMB Memorandum M-07-16 dated May 22, 2007, found at: https://www.whitehouse.gov/sites/default/files/omb/memoranda/fy2007/m07-16.pdf

By way of example, Applicants must screen resumes to ensure that they do not contain PII such as personal addresses, phone/cell numbers, personal emails

and/or SSNs. In short, if the PII is not essential to the application, it should not be in the application.

P. Annual Compliance Audits

DOE Selected Applicants. If a for-profit entity is a Prime Recipient and has expended $750,000 or more of DOE funds during the entity's fiscal year, an annual compliance audit performed by an independent auditor is be required. For additional information, please refer to 2 C.F.R. § 910.501 and Subpart F.

If an educational institution, non-profit organization, or state/local government is a Prime Recipient or Subrecipient and has expended $750,000 or more of Federal funds during the non-Federal entity's fiscal year, then a single or program-specific audit is required. For additional information, please refer to 2 C.F.R. § 200.501 and Subpart F.

Applicants and subrecipients (if applicable) should propose sufficient costs in the project budget to cover the costs associated with the audit. EERE will share in the cost of the audit at its applicable cost share ratio.

USDA-NIFA Selected Applicants. Non Federal Entities (NFEs) are responsible for obtaining audits in accordance with the audit requirements of 2 CFR 200.500 through 200.521. In addition, NFEs are subject to the audit requirements found in the Single Audit Act Amendments of 1996, (31 U.S.C. 7501-7507).
A NFE that expends $750,000 or more in a fiscal year in Federal awards must have a single or program-specific audit conducted for that year.
A NFE that expends less than $750,000 during their fiscal year in Federal awards is exempt from Federal audit and requirements for that year, **except** as noted in 2 CFR 200.503 Relation to other audit requirements, but records must be available for review or audit by appropriate USDA officials, pass-through entity, and Government Accountability Office (GAO). The audit report must be completed and the Data Collection Form (Form SF-SAC) and reporting package must be submitted within 30 calendar days after receipt of the auditor's report(s), or nine months after the end of the audit period. All auditees are to submit their audit reports directly to the Federal Audit Clearinghouse (FAC). The SF-SAC and reporting package MUSTbe submitted electronically to FAC:
http://harvester.census.gov/sac/. Any future updates to the location of the FAC may be found at the OMB web site.

Appendix A – Cost Share Information

Cost Sharing or Cost Matching

The terms "cost sharing" and "cost matching" are often used synonymously. Even the DOE Financial Assistance Regulations, 2 CFR 200.306, use both of the terms in the titles specific to regulations applicable to cost sharing. EERE almost always uses the term "cost sharing," as it conveys the concept that non-federal share is calculated as a percentage of the Total Project Cost. An exception is the State Energy Program Regulation, 10 CFR 420.12, State Matching Contribution. Here "cost matching" for the non-federal share is calculated as a percentage of the Federal funds only, rather than the Total Project Cost.

How Cost Sharing Is Calculated

As stated above, cost sharing is calculated as a percentage of the Total Project Cost. FFRDC costs must be included in Total Project Costs. Following is an example of how to calculate cost sharing amounts for a project with $1,000,000 in federal funds with a minimum 20% non-federal cost sharing requirement:

- Formula: Federal share ($) divided by Federal share (%) = Total Project Cost
  Example: $1,000,000 divided by 80% = $1,250,000

- Formula: Total Project Cost ($) minus Federal share ($) = Non-federal share ($)
  Example: $1,250,000 minus $1,000,000 = $250,000

- Formula: Non-federal share ($) divided by Total Project Cost ($) = Non-federal share (%)
  Example: $250,000 divided by $1,250,000 = 20%

What Qualifies For Cost Sharing

While it is not possible to explain what specifically qualifies for cost sharing in one or even a couple of sentences, in general, if a cost is allowable under the cost principles applicable to the organization incurring the cost and is eligible for reimbursement under an EERE grant or cooperative agreement, then it is allowable as cost share. Conversely, if the cost is not allowable under the cost principles and not eligible for reimbursement, then it is not allowable as cost share. In addition, costs may not be counted as cost share if they are paid by the Federal Government under another award unless authorized by Federal statute to be used for cost sharing.

The rules associated with what is allowable as cost share are specific to the type of organization that is receiving funds under the grant or cooperative agreement, though are generally the same for all types of entities. The specific rules applicable to:

- FAR Part 31 for For-Profit entities, (48 CFR Part 31); and
- 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.

In addition to the regulations referenced above, other factors may also come into play such as timing of donations and length of the project period. For example, the value of ten years of donated maintenance on a project that has a project period of five years would not be fully allowable as cost share. Only the value for the five years of donated maintenance that corresponds to the project period is allowable and may be counted as cost share.

Additionally, EERE generally does not allow pre-award costs for either cost share or reimbursement when these costs precede the signing of the appropriation bill that funds the award. In the case of a competitive award, EERE generally does not allow pre-award costs prior to the signing of the Selection Statement by the EERE Selection Official.

DOE Financial Assistance Rules 2 CFR Part 200 as amended by 2 CFR Part 910

As stated above, the rules associated with what is allowable cost share are generally the same for all types of organizations. Following are the rules found to be common, but again, the specifics are contained in the regulations and cost principles specific to the type of entity:

(A) Acceptable contributions. All contributions, including cash contributions and third party in-kind contributions, must be accepted as part of the Prime Recipient's cost sharing if such contributions meet all of the following criteria:

(1) They are verifiable from the recipient's records.

(2) They are not included as contributions for any other federally-assisted project or program.

(3) They are necessary and reasonable for the proper and efficient accomplishment of project or program objectives.

(4) They are allowable under the cost principles applicable to the type of entity incurring the cost as follows:

a. For-profit organizations. Allowability of costs incurred by for-profit organizations and those nonprofit organizations listed in Attachment C to OMB Circular A–122 is determined in accordance with the for-profit cost principles in 48 CFR Part 31

in the Federal Acquisition Regulation, except that patent prosecution costs are not allowable unless specifically authorized in the award document. (v) Commercial Organizations. FAR Subpart 31.2—Contracts with Commercial Organizations

b. Other types of organizations. For all other non-federal entities, allowability of costs is determined in accordance with 2 CFR Part 200 Subpart E.

(5) They are not paid by the Federal Government under another award unless authorized by Federal statute to be used for cost sharing or matching.

(6) They are provided for in the approved budget.

(B) Valuing and documenting contributions

(1) Valuing recipient's property or services of recipient's employees. Values are established in accordance with the applicable cost principles, which mean that amounts chargeable to the project are determined on the basis of costs incurred. For real property or equipment used on the project, the cost principles authorize depreciation or use charges. The full value of the item may be applied when the item will be consumed in the performance of the award or fully depreciated by the end of the award. In cases where the full value of a donated capital asset is to be applied as cost sharing or matching, that full value must be the lesser or the following:

a. The certified value of the remaining life of the property recorded in the recipient's accounting records at the time of donation; or
b. The current fair market value. If there is sufficient justification, the Contracting Officer may approve the use of the current fair market value of the donated property, even if it exceeds the certified value at the time of donation to the project. The Contracting Officer may accept the use of any reasonable basis for determining the fair market value of the property.

(2) Valuing services of others' employees. If an employer other than the recipient furnishes the services of an employee, those services are valued at the employee's regular rate of pay, provided these services are for the same skill level for which the employee is normally paid.

(3) Valuing volunteer services. Volunteer services furnished by professional and technical personnel, consultants, and other skilled and unskilled labor may be counted as cost sharing or matching if the service is an integral and necessary part of an approved project or program. Rates for volunteer services must be consistent with those paid for similar work in the recipient's organization. In those markets in

which the required skills are not found in the recipient organization, rates must be consistent with those paid for similar work in the labor market in which the recipient competes for the kind of services involved. In either case, paid fringe benefits that are reasonable, allowable, and allocable may be included in the valuation.

(4) Valuing property donated by third parties.

a. Donated supplies may include such items as office supplies or laboratory supplies. Value assessed to donated supplies included in the cost sharing or matching share must be reasonable and must not exceed the fair market value of the property at the time of the donation.

b. Normally only depreciation or use charges for equipment and buildings may be applied. However, the fair rental charges for land and the full value of equipment or other capital assets may be allowed, when they will be consumed in the performance of the award or fully depreciated by the end of the award, provided that the Contracting Officer has approved the charges. When use charges are applied, values must be determined in accordance with the usual accounting policies of the recipient, with the following qualifications:

i. The value of donated space must not exceed the fair rental value of comparable space as established by an independent appraisal of comparable space and facilities in a privately-owned building in the same locality.
ii. The value of loaned equipment must not exceed its fair rental value.

(5) Documentation. The following requirements pertain to the recipient's supporting records for in-kind contributions from third parties:

a. Volunteer services must be documented and, to the extent feasible, supported by the same methods used by the recipient for its own employees.

b. The basis for determining the valuation for personal services and property must be documented.

Appendix B – Sample Cost Share Calculation for Blended Cost Share Percentage

The following example shows the math for calculating required cost share for a project with $2,000,000 in Federal funds with four tasks requiring different Non-federal cost share percentages:

Task	Proposed Federal Share	Federal Share %	Recipient Share %
Task 1 (R&D)	$1,000,000	80%	20%
Task 2 (R&D)	$500,000	80%	20%
Task 3 (Demonstration)	$400,000	50%	50%
Task 4 (Outreach)	$100,000	100%	0%

Federal share ($) divided by Federal share (%) = Task Cost

Each task must be calculated individually as follows:

Task 1
$1,000,000 divided by 80% = $1,250,000 (Task 1 Cost)
Task 1 Cost minus federal share = Non-federal share
$1,250,000 - $1,000,000 = $250,000 (Non-federal share)

Task 2
$500,000 divided 80% = $625,000 (Task 2 Cost)
Task 2 Cost minus federal share = Non-federal share
$625,000 - $500,000 = $125,000 (Non-federal share)

Task 3
$400,000 / 50% = $800,000 (Task 3 Cost)
Task 3 Cost minus federal share = Non-federal share
$800,000 - $400,000 = $400,000 (Non-federal share)

Task 4
Federal share = $100,000
Non-federal cost share is not mandated for outreach = $0 (Non-federal share)

The calculation may then be completed as follows:

Tasks	$ Federal Share	% Federal Share	$ Non-Federal Share	% Non-Federal Share	Total Project Cost
Task 1	$1,000,000	80%	$250,000	20%	$1,250,000
Task 2	$500,000	80%	$125,000	20%	$625,000
Task 3	$400,000	50%	$400,000	50%	$800,000
Task 4	$100,000	100%	$0	0%	$100,000
Totals	$2,000,000		$775,000		$2,775,000

Blended Cost Share %
Non-federal share ($775,000) divided by Total Project Cost ($2,775,000) = 27.9% (Non-federal)
Federal share ($2,000,000) divided by Total Project Cost ($2,775,000) = 72.1% (Federal)

Appendix C – DOE Waiver Requests: Foreign Entity Participation as the Prime Recipient and Performance of Work in the United States

1. Waiver for Foreign Entity Participation as the Prime Recipient

As set forth in Section III.A.3, all Prime Recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. To request a waiver of this requirement, an applicant must submit an explicit waiver request in the Full Application.

Overall, the applicant must demonstrate to the satisfaction of EERE that it would further the purposes of this FOA and is otherwise in the economic interests of the United States to have a foreign entity serve as the Prime Recipient. A request to waive the *Foreign Entity Participation as the Prime Recipient* requirement must include the following:

- Entity name;
- The rationale for proposing a foreign entity to serve as the Prime Recipient;
- Country of incorporation;
- A description of the project's anticipated contributions to the US economy;
    - How the project will benefit U.S. research, development and manufacturing, including contributions to employment in the U.S. and growth in new markets and jobs in the U.S.;
    - How the project will promote domestic American manufacturing of products and/or services;
- A description of how the foreign entity's participation as the Prime Recipient is essential to the project;
- A description of the likelihood of Intellectual Property (IP) being created from the work and the treatment of any such IP;
- Countries where the work will be performed (Note: if any work is proposed to be conducted outside the U.S., the applicant must also complete a separate request for waiver of the Performance of Work in the United States requirement).

EERE may require additional information before considering the waiver request.

The applicant does not have the right to appeal EERE's decision concerning a waiver request.

2. Waiver for Performance of Work in the United States

As set forth in Section IV.J.3, all work under EERE funding agreements must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment, so a

waiver is not required for foreign purchases of these items. However, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. There may be limited circumstances where it is in the interest of the project to perform a portion of the work outside the United States. To seek a waiver of the Performance of Work in the United States requirement, the applicant must submit an explicit waiver request in the Full Application. A separate waiver request must be submitted for each entity proposing performance of work outside of the United States.

Overall, a waiver request must demonstrate to the satisfaction of EERE that it would further the purposes of this FOA and is otherwise in the economic interests of the United States to perform work outside of the United States. A request to waive the *Performance of Work in the United States* requirement must include the following:

- The rationale for performing the work outside the U.S. ("foreign work");
- A description of the work proposed to be performed outside the U.S.;
- An explanation as to how the foreign work is essential to the project;
- A description of the anticipated benefits to be realized by the proposed foreign work and the anticipated contributions to the US economy;
    - The associated benefits to be realized and the contribution to the project from the foreign work;
    - How the foreign work will benefit U.S. research, development and manufacturing, including contributions to employment in the U.S. and growth in new markets and jobs in the U.S.;
    - How the foreign work will promote domestic American manufacturing of products and/or services;
- A description of the likelihood of Intellectual Property (IP) being created from the foreign work and the treatment of any such IP;
- The total estimated cost (DOE and Recipient cost share) of the proposed foreign work;
- The countries in which the foreign work is proposed to be performed; and
- The name of the entity that would perform the foreign work.

EERE may require additional information before considering the waiver request.

The applicant does not have the right to appeal EERE's decision concerning a waiver request.

Appendix D - Data Management Plan

DOE Selected Projects

A data management plan ("DMP") explains how data generated in the course of the work performed under an EERE award will be shared and preserved or, when justified, explains why data sharing or preservation is not possible or scientifically appropriate.

DMP Requirements

In order for a DMP to be considered acceptable, the DMP must address the following:

At a minimum, the DMP must describe how data sharing and preservation will enable validation of the results from the proposed work, or how results could be validated if data are not shared or preserved.

The DMP must provide a plan for making all research data displayed in publications resulting from the proposed work digitally accessible at the time of publication. This includes data that are displayed in charts, figures, images, etc. In addition, the underlying digital research data used to generate the displayed data should be made as accessible as possible in accordance with the principles stated above. This requirement could be met by including the data as supplementary information to the published article, or through other means. The published article should indicate how these data can be accessed.

The DMP should consult and reference available information about data management resources to be used in the course of the proposed work. In particular, a DMP that explicitly or implicitly commits data management resources at a facility beyond what is conventionally made available to approved users should be accompanied by written approval from that facility. In determining the resources available for data management at DOE User Facilities, researchers should consult the published description of data management resources and practices at that facility and reference it in the DMP. Information about other DOE facilities can be found in the additional guidance from the sponsoring program.

The DMP must protect confidentiality, personal privacy, Personally Identifiable Information, and U.S. national, homeland, and economic security; recognize proprietary interests, business confidential information, and intellectual property rights; avoid significant negative impact on innovation, and U.S. competitiveness; and otherwise be consistent with all laws (i.e., export control laws), and DOE regulations, orders, and policies.

Data Determination for a DMP

The Principal Investigator should determine which data should be the subject of the DMP and, in the DMP, propose which data should be shared and/or preserved in accordance with the DMP Requirements noted above.

For data that will be generated through the course of the proposed work, the Principal Investigator should indicate what types of data should be protected from immediate public disclosure by DOE (referred to as "protected data") and what types of data that DOE should be able to release immediately. Similarly, for data developed outside of the proposed work at private expense that will be used in the course of the proposed work, the Principal Investigator should indicate whether that type of data will be subject to public release or kept confidential (referred to as "limited rights data"). Any use of limited rights data or labeling of data as "protected data" must be consistent with the DMP Requirements noted above.

Suggested Elements for a DMP

The following list of elements for a DMP provides suggestions regarding the data management planning process and the structure of the DMP:

Data Types and Sources: A brief, high-level description of the data to be generated or used through the course of the proposed work and which of these are considered digital research data necessary to validate the research findings or results.

Content and Format: A statement of plans for data and metadata content and format including, where applicable, a description of documentation plans, annotation of relevant software, and the rationale for the selection of appropriate standards. Existing, accepted community standards should be used where possible. Where community standards are missing or inadequate, the DMP could propose alternate strategies for facilitating sharing, and should advise the sponsoring program of any need to develop or generalize standards.

Sharing and Preservation: A description of the plans for data sharing and preservation. This should include, when appropriate: the anticipated means for sharing and the rationale for any restrictions on who may access the data and under what conditions; a timeline for sharing and preservation that addresses both the minimum length of time the data will be available and any anticipated delay to data access after research findings are published; any special requirements for data sharing, for example, proprietary software needed to access or interpret data, applicable policies, provisions, and licenses for re-use and re-distribution, and for the production of derivatives, including guidance for how data and

data products should be cited; any resources and capabilities (equipment, connections, systems, software, expertise, etc.) requested in the research proposal that are needed to meet the stated goals for sharing and preservation (this could reference the relevant section of the associated research proposal and budget request); and whether/where the data will be preserved after direct project funding ends and any plans for the transfer of responsibilities for sharing and preservation.

Protection: A statement of plans, where appropriate and necessary, to protect confidentiality, personal privacy, Personally Identifiable Information, and U.S. national, homeland, and economic security; recognize proprietary interests, business confidential information, and intellectual property rights; and avoid significant negative impact on innovation, and U.S. competitiveness.

Rationale: A discussion of the rationale or justification for the proposed data management plan including, for example, the potential impact of the data within the immediate field and in other fields, and any broader societal impact.

DOE Additional Guidance

In determining which data should be shared and preserved, researchers must consider the data needed to validate research findings as described in the Requirements, and are encouraged to consider the potential benefits of their data to their own fields of research, fields other than their own, and society at large.

DMPs should reflect relevant standards and community best practices and make use of community accepted repositories whenever practicable.

Costs associated with the scope of work and resources articulated in a DMP may be included in the proposed research budget as permitted by the applicable cost principles.

To improve the discoverability of and attribution for datasets created and used in the course of research, EERE encourages the citation of publicly available datasets within the reference section of publications, and the identification of datasets with persistent identifiers such as Digital Object Identifiers (DOIs). In most cases, EERE can provide DOIs free of charge for data resulting from DOE-funded research through its Office of Scientific and Technical Information (OSTI) DataID Service.

EERE's Digital Data Management principles can be found at: EERE Digital Data Management | Department of Energy.

USDA-NIFA selected Projects

For USDA-NIFA funded projects, the awarded project will receive guidance from the NIFA program staff. For example, the project will be expected to coordinate (harmonize) data parameters and sustainability indicators with other NIFA projects. During the course of the project, primary data from agricultural and industrial operations for performance assessment of USDA-NIFA funded projects is expected to be submitted online to the National Agricultural Library's (NAL) Life-Cycle Assessments (LCA) Digital Commons, http://www.lcacommons.gov/. This data can include material and energy flows, impacts, and costs of agricultural and industrial processes related to bioenergy and material production. Data management plans include guidelines and tools for preparing data and meta-data in the EcoSpold format.

Definitions

Data Preservation: Data preservation means providing for the usability of data beyond the lifetime of the research activity that generated them.
Data Sharing: Data sharing means making data available to people other than those who have generated them. Examples of data sharing range from bilateral communications with colleagues, to providing free, unrestricted access to anyone through, for example, a web-based platform.

Digital Research Data: The term digital data encompasses a wide variety of information stored in digital form including: experimental, observational, and simulation data; codes, software and algorithms; text; numeric information; images; video; audio; and associated metadata. It also encompasses information in a variety of different forms including raw, processed, and analyzed data, published and archived data.

Research Data: The recorded factual material commonly accepted in the scientific community as necessary to validate research findings, but not any of the following: preliminary analyses, drafts of scientific papers, plans for future research, peer reviews, or communications with colleagues. This 'recorded' material excludes physical objects (e.g., laboratory samples). Research data also do not include:

> (A) Trade secrets, commercial information, materials necessary to be held confidential by a researcher until they are published, or similar information which is protected under law; and
>
> (B) Personnel and medical information and similar information the disclosure of which would constitute a clearly unwarranted invasion of personal privacy, such as information that could be used to identify a particular person in a research study."

Validate: In the context of DMPs, validate means to support, corroborate, verify, or otherwise determine the legitimacy of the research findings. Validation of research findings could be accomplished by reproducing the original experiment or analyses; comparing and contrasting the results against those of a new experiment or analyses; or by some other means.

Biofuels: As defined in the Energy Investment and Security Act of 2007 (EISA 2007) §201
"ADVANCED BIOFUEL.– in general, the term 'advanced biofuel' means renewable fuel, other than ethanol derived from corn starch, that has lifecycle greenhouse gas emissions, as determined by the Administrator, after notice and opportunity for comment, that are at least 50 percent less than baseline lifecycle greenhouse gas emissions

INCLUSIONS. – The types of fuels eligible for consideration as 'advanced biofuel' may include any of the following:

(I) Ethanol derived from cellulose, hemicellulose, or lignin.
(II) Ethanol derived from sugar or starch (other than corn starch).
(III) Ethanol derived from waste material, including crop residue, other vegetative waste material, animal waste, and food waste and yard waste.
(IV) Biomass-based diesel.
(V) Biogas (including landfill gas and sewage waste treatment gas) produced through the conversion of organic matter from renewable biomass.
(VI) Butanol or other alcohols produced through the conversion of organic matter from renewable biomass.
(VII) Other fuel derived from cellulosic biomass."

"CELLULOSIC BIOFUEL.—The term 'cellulosic biofuel' means renewable fuel derived from any cellulose, hemicellulose, or lignin that is derived from renewable biomass and that has lifecycle greenhouse gas emissions, as determined by the Administrator, that are at least 60 percent less than the baseline lifecycle greenhouse gas emissions."

Appendix E – Concept Paper Cover Page Guidance

DOE provides the following format guidance for preparing the Concept Paper cover page. If the applicant chooses not to use the provided format, it must nonetheless provide the information identified in it.

CONCEPT PAPER COVER PAGE

U.S. Department of Energy – Energy Efficiency and Renewable Energy
Bioenergy Technologies Office
Demonstration and Market Transformation
Project Definition for Biorefinery Optimization
Funding Opportunity Announcement Number: DE-FOA-0001689
CFDA Number: 81.087 Renewable Energy Research and Development

Applicant Information	
Applicant Name:	Applicant Name:
Project Title:	Project Title:
Topic Area:	Topic Area:
Major Project Subcontractors:	Major Project Subcontractors:
Major Project Vendors:	Major Project Vendors:
Key Individuals:	Key Individuals:

Topic Area and Feedstock Type (select one)			
Feedstock Type	**Pilot Scale**	**Demonstration Scale**	**Pioneer/Commercial Scale**
Cellulosic Biomass			
Algae			
Biogas			
Flue gas + Microbial			
Waste to Energy (biosolids, separated MSW, Organic-rich waste water, or industrial food and yard waste)			

Details
Specific Feedstock(s):
Primary Product (one) include percentage of carbon utilized for primary product:
Co-Products (other products) include percentage of carbon utilized for co-product(s):

• •		
Location(s) of Prior Scale's Facility and Proposed Facility:		
Prior: **Proposed:**		
Throughput of Proposed Facility **(dry tonnes of lignocellulosic feedstock or biosolids; per day or gallons per acre per year for Algal technologies, scf/day for gaseous feedstocks):**		
Technology Types:	**Currently Achieved TRL per :**	**Short Description:**
Feed System		
Deconstruction/ Fractionation		
Synthesis/Upgrading		
Algal Cultivation		
Algae Harvest & Dewatering		
Algal Downstream Processing		
Biogas or Flue Gas Collection		
Biogas or Flue Gas Clean-up		
Biogas or Flue Gas Synthesis/Upgrading		
Other (Describe)		
Other (Describe)		

Appendix F – Technical and Economics Tables Template

The Technical and Economic Tables Template is available in an Excel format as an attachment to the FOA. The tables in the template are intended to be utilized to demonstrate performance target metrics as well as the estimated production cost impacts of the proposed project.

Applications submitted without the appropriate technical and economic data as defined in the template tables provided will be excluded from review under this FOA. Complete these or similar tables as they apply to the proposed project. It is expected that all relevant data will be provided where possible and appropriate. If the applicant chooses to use the format provided in the Excel spreadsheet, please use the following instructions. If the applicant chooses to represent this data in a different format, please use the Technical and Economic Tables Template as a guide to the types of data that must be included in the application, as the figures and tables are examples.

Tab Definitions and Instructions

BFD (Block Flow Diagram) (Should be completed by applicant) – On the "BFD" tab, the applicant is expected to insert a block flow diagram (BFD) of their process. The BFD is intended to be high-level, but should include the ***entire process from feedstock to all products including fuel***. It should represent the conceptual design and show the relationship (including recycle loops affected by the project) between the major unit operations. It should not include any minor equipment, piping materials of construction, or piping sizes. The applicant should ***clearly highlight which portion of this process is being explored in the application***. For the highlighted unit operations in the BFD (the focus of the application), a set of three columns (Benchmark, Intermediate, and Final) must be completed on the "Validation Table" tab. Examples of a Topic Area 1 (Feestock Handling) and Topic Areas 2 & 3 (High Valued Products & Separations) have been provided in respective spreadsheet tabs.

Validation Table (Should be completed by applicant) – This tab contains the majority of the key technical performance metrics that should be completed by applicant to represent the current benchmark, as well as intermediate and final targets (described below). The intent of the Validation Table is to capture the data that is critical for measuring the current state of technology as well provide a template to measure the success of a project. The validation parameters and values for each project will be finalized after selection, during the negotiation phase. There are three main sections to this tab:

- **General Information**: This part of the table is intended to capture the general aspects of your project. This information is critical; however, if there are other parameters that the applicant believes are necessary for understanding the project, they are free to add or subtract rows.

- **Insert Other Key Performance Parameters (KPPs):** This section is meant to determine the most important performance parameters that will be reviewed during the on site validation. If the provided KPPs are applicable to your process, it is expected that these will be populated. If they are not, they can be deleted. The section labeled, "Insert additional key performance parameters tailored for the proposed scope of work" provides the applicant with additional rows to include metrics that are specific to their project. It is expected that each application will add additional KPPs tailored to the application. When adding KPPs it is important to include benchmark, intermediate, and final target data to evaluate the current state-of-technology and establish the framework to evaluate progress throughout the project. The "KPP example" tab (described below) provides some suggestions for metrics that are representative of the types of metrics expected to show up in this section - these are only suggestions/examples and the applicant can add any relevant KPP. **Please note that this is a very important section to complete.**
- **Unit Operation Material Streams In/Out:** This section is intended to capture the mass compositions of the various materials that are feeding in and out of each unit operation. Please complete as appropriate for your process. If they do not apply, please delete.

TechnoEconomics (Should be completed by applicant) – On this tab, the applicant is expected to fill out the appropriate line items ***for an envisioned commercial-scale project that includes their technology(s)*** to the best of their ability. Values entered into the "TechnoEconomics" tab should reflect the unit operations included in the applicant's BFD. The TEA tab is a summary of the TEA and LCA information that should be included as part of the Technical Volume, this tab is not a substitute. At a minimum the applicant should understand the margin between the value of the products and the cost of the feedstock and other process inputs. ***The "TechnoEconomics" table is designed to evaluate the economic improvements to a commercial process that would be realized if the technical targets established in the project's scope were achieved***. The "TechnoEconomics" table is not designed to capture improvements to economics resulting from economies of scale or process improvements outside the scope of work for the project. Therefore, economic parameters (i.e. capital costs, operating expenses) for unit operations outside the scope of work for the project should remain the same across the Benchmark, Intermediate, and Final Target columns.

The "TechnoEconomics" tab should be filled out at an appropriate level for the project's TRL. For example, some of the potential capital and operating expenses should be understood and reported, however, BETO recognizes these are lower TRL projects and there is a large number of unknowns. A detailed economic analysis may not be feasible or appropriate at this stage. If the application is selected for award negotiations, the initial validation will including populating the rest of the table, walking through the table to understand the assumptions that went into

completing it, and may involve supplementing the data with additional, process specifc information.
There are a number of design cases that can be leveraged to fill in portions of the table that are not being addressed by the application. Those design cases can be found here:

Process Design and Economics for the Conversion of Lignocellulosic Biomass to Hydrocarbons: Dilute-Acid and Enzymatic Deconstruction of Biomass to Sugars and Biological Conversion of Sugars to Hydrocarbons
http://www.nrel.gov/docs/fy14osti/60223.pdf

Process Design and Economics for the Conversion of Lignocellulosic Biomass to Hydrocarbons: Dilute-Acid and Enzymatic Deconstruction of Biomass to Sugars and Catalytic Conversion of Sugars to Hydrocarbons
http://www.nrel.gov/docs/fy15osti/62498.pdf

Process Design and Economics for the Conversion of Lignocellulosic Biomass to Hydrocarbon Fuels: Fast Pyrolysis and Hydrotreating Bio-oil Pathway
http://www.nrel.gov/docs/fy14osti/61178.pdf

Process Design and Econmics for the Conversion of Algal Biomass to Biofuels: Algal Biomass Fractionation to Lipid- and Carbohydrate-Derived Fuel Products
http://www.nrel.gov/docs/fy14osti/62368.pdf

Process Design and Economics for the the Conversion of Lignocellulosic Biomass to Hydrocarbons via Indirect Liquefaction: Thermochemical Research Pathway to High-Octane Gasoline Blendstock through Methanol/Dimethyl Ether Intermediates
http://www.nrel.gov/docs/fy15osti/62402.pdf

Process Design and Economics for the Conversion of Lignocellulosic Biomass to Hydrocarbon Fuels: Thermochemical Research Pathways with In Situ and Ex Situ Upgrading of Fast Pyrolysis Vapors
http://www.nrel.gov/docs/fy15osti/62455.pdf

KPP Examples – This tab is intended to provide examples of Key Performance Parameters that can be used to populate the "Validation" to help define the performance of each unit operation in the proposed process. It is important to note that these metrics or parameters should only show up in the Validation table if they are applicable to your process. If there are parameters that are not included in this tab, but relevant to your process, please fill them out in the Validation table as appropriate. These are only to be used as a reference for the Validation Table. This tab is not to be filled out by the applicant.

Column Definitions

Benchmark/Current Process: The data provided should reflect the best current status of the process being proposed under the application. Should the application be selected for negotiation of an award, **the benchmark data must be reproducible** and will be verified during the initial project validation. There are some key points to be aware of when completing the benchmark column:

- Please provide the most representative data available, even if that means your baseline is zero.
- If your project is developing a new technology and no baseline data is available for that particular technology, an option is to use literature values as the current state of art (please include relevant citations).

Intermediate Targets: These targets should reflect the technical achievements that are being proposed within the first 2/3rds of the project. The achievement of these targets will be verified during the second or stage gate validation and will be utilized during a stage gate review upon completion of the validation.

Final Targets: These targets are to reflect the overall technical achievements being proposed within the application. The achievement of these targets will be verified during the final validation at the completion of the project.

Appendix G – Technical Readiness Levels

Technology Readiness Levels (TRLs): Identify the readiness level of the technology associated with the project as well as the planned progression during the course of project execution. A detailed explanation of the rationale for the estimated technology readiness level should be provided. Specific entry criteria for the next higher technology readiness level should be identified. The following definitions apply:

1. **TRL-1**. Basic principles observed and reported: Scientific problem or phenomenon identified. Essential characteristics and behaviors of systems and architectures are identified using mathematical formulations or algorithms. The observation of basic scientific principles or phenomena has been validated through peer-reviewed research. Technology is ready to transition from scientific research to applied research.

2. **TRL-2**. Technology concept and/or application formulated: Applied research activity. Theory and scientific principles are focused on specific application areas to define the concept. Characteristics of the application are described. Analytical tools are developed for simulation or analysis of the application.

3. **TRL-3**. Analytical and experimental critical function and/or characteristic proof of concept: Proof of concept validation has been achieved at this level. Experimental research and development is initiated with analytical and laboratory studies. System/integrated process requirements for the overall system application are well known. Demonstration of technical feasibility using immature prototype implementations are exercised with representative interface inputs to include electrical, mechanical, or controlling elements to validate predictions.

4. **TRL-4**. Component and/or process validation in laboratory environment- Alpha prototype (component) Standalone prototyping implementation and testing in laboratory environment demonstrates the concept. Integration and testing of component technology elements are sufficient to validate feasibility.

5. **TRL-5**. Component and/or process validation in relevant environment- Beta prototype (component): Thorough prototype testing of the component/process in relevant environment to the end user is performed. Basic technology elements are integrated with reasonably realistic supporting elements based on available technologies. Prototyping implementations conform to the target environment and interfaces.

6. **TRL-6**. System/process model or prototype demonstration in a relevant environment- Beta prototype (system): Prototyping implementations are partially integrated with

existing systems. Engineering feasibility fully demonstrated in actual or high fidelity system applications in an environment relevant to the end user.

7. **TRL-7**. System/process prototype demonstration in an operational environment- Integrated pilot (system): System prototyping demonstration in operational environment. System is at or near full scale (pilot or engineering scale) of the operational system, with most functions available for demonstration and test. The system, component, or process is integrated with collateral and ancillary systems in a near production quality prototype.

8. **TRL-8**. Actual system/process completed and qualified through test and demonstration- Pre-commercial demonstration: End of system development. Full-scale system is fully integrated into operational environment with fully operational hardware and software systems. All functionality is tested in simulated and operational scenarios with demonstrated achievement of end-user specifications. Technology is ready to move from development to commercialization.

APPENDIX H – ALLOWABLE FEEDSTOCK DEFINITIONS

Requirements for All Topic Areas:

- Projects proposing use of mock or model feedstocks will be considered non-responsive to all topic areas.
- Projects may propose the use of a blended feedstock stream, provided the sum of the components are allowable to the selected topic area.

Minimum Throughput Requirements for Each Topic Area:				
	Topic Area 1	Topic Area 2	Topic Area 3	Topic Area 4
Cellulosic Biomass	1 dry metric tonne/day	1 dry metric tonne/day	1 dry metric tonne/day	1 dry metric tonne/day
Algal Biomass	25,000 gallons of intermediate per year	25,000 gallons of intermediate per year	25,000 gallons of intermediate per year	25,000 gallons of intermediate per year
Biogas	Not Allowed	16 mmbtu/day	16 mmbtu/day	Not Allowed
Industrial Flue or Waste Gasses (biological conversion mechanisms only)	Not Allowed	16 mmbtu/day	16 mmbtu/day	Not Allowed
Primary, secondary, tertiary, and post-anaerobic digestion sludge (i.e., biosolids) from municipal wastewater treatment systems	1 dry metric tonne/day	1 dry metric tonne/day	1 dry metric tonne/day	1 dry metric tonne/day
Food and yard wastes from industrial, commercial, and residential sources	1 dry metric tonne/day	1 dry metric tonne/day	1 dry metric tonne/day	1 dry metric tonne/day
Organic-rich wastewaters from industrial and commercial operations	1 dry metric tonne/day	1 dry metric tonne/day	1 dry metric tonne/day	1 dry metric tonne/day
Separated Municipal Solid Waste (MSW)	1 dry metric tonne/day	1 dry metric tonne/day	1 dry metric tonne/day	1 dry metric tonne/day

Topic Areas 1 and 4

For Topic Areas 1 and 4 applications must propose an Advanced or Cellulosic Biofuel (or combination of Advanced or Cellulosic Biofuels) as the Primary Product(s). Please note gaseous feedstocks are not allowable under Topics Areas 1 and 4.

Allowable Cellulosic and Algal Feedstocks:
Acceptable feedstocks must be domestically available and compliant with the definitions provided in this section. The acceptable feedstocks proposed in response to this FOA must be shown to be domestically available in sufficient quantities to contribute meaningfully to the RFS goal of 21 billion gallons of advanced biofuels by 2022.

Cellulosic feedstocks must also be "High Impact Feedstocks". For the purpose of this FOA, High Impact Feedstocks are defined as:

> A feedstock that is domestically available and has the agronomically and ecologically sustainable ultimate availability potential of at least 50 million dry metric tons of cellulosic biomass per year. Multiple feedstocks may be combined to satisfy this requirement if the proposed conversion technology is shown to be capable of converting each of the feedstocks that constitute the 50 million dry metric tons per year. Alternately, the feedstock must be domestically available and have the agronomically and ecologically sustainable ultimate availability potential to produce at least 1 billion gallons per year of an acceptable biofuel.

Heterotrophic algae are allowed to be used in conversion processes, provided that the minimum throughput requirements are met based on the process carbon source. The carbon source could be cellulosic sugars, biomass hydrolysates, glycerol, or any other non-food derived source. Sugars from food sources are not acceptable for growing heterotrophic algae under this FOA.

Separated Municipal Solid Waste (MSW) is an acceptable feedstock. Biomass as defined in EPAct 2005 (Public Law 109-58) Section 932(a)(1-2) that is segregated from the MSW as a separate stream, could be employed as a feedstock with appropriate considerations for the costs of such segregation, collection, processing, and transportation. Hence, separated MSW, where recyclable paper, cardboard, plastics, rubber, textiles, metals, and glass that can be recycled are separated and removed from the municipal solid waste stream to the extent reasonably practicable according to a plan submitted to and approved by U.S. EPA under the

registration procedures specified in §80.1450(b)(1)(viii); and the fuel producer has evidence of all contracts relating to the disposition of paper, cardboard, plastics, rubber, textiles, metals, and glass that are recycled and that meets the above requirements would qualify as an allowable feedstock for purposes of this FOA. Allowable costs include processing (such as, chipping or grinding) the feedstock into a form that can be fed into the reactor. Processing costs for MSW are restricted to post-sorted materials.

Algal biomass – Applicants proposing to use an algal feedstock for the production of drop-in hydrocarbon biofuels and bioproducts must meet the following: pilot and demonstration activities must occur in commercially relevant outdoor production environments; pilot scale biofuel intermediate production is expected to be on the order of 25,000 to 50,000 gallons per year; demonstration scale biofuel intermediate production is expected to be on the order of 5 to 10 times the applicant's existing pilot scale production (existing pilot scale production must be at a minimum of 25,000 to 50,000 gallons of biofuel intermediate per year). Applications that propose to develop and utilize technology based on artificial lighting-based cultivation of algae are not of interest to this FOA.

For the purpose of this FOA, 'algal' refers to microalgae, macroalgae, and cyanobacteria; aquatic plants such as water hyacinth, duckweed, and eelgrass are not algae.

Mixotrophic cultivation systems are eligible; however, only renewable biomass-derived sugars such as cellulosic sugars or carbon-containing waste effluent may be utilized and are considered allowable within this FOA. Food- and grain-based sugars are not allowed. For the purpose of this FOA, mixotrophic algal biomass is grown photosynthetically with CO_2 as the main carbon source (photoautotrophic growth) and at some point in the cultivation process, cellulosic carbon from renewable biomass or carbon-containing waste effluent is fed as a supplemental carbon source. Heterotrophic cultivation systems are not eligible under the 'algal biomass' definition and requirements. Refer to the discussion on cellulosic feedstocks for the requirements for heterotrophic systems.

No plant based material that is generally intended for use as food or animal feed can be employed as a feedstock in any Topic Area of this FOA. Hence, sugars derived from sugarcane or beets and oils derived from soy, canola, sunflower, peanut, etc. normally recovered using conventional food processing methods will be excluded from eligibility for this FOA. The determining factor will be the typical use of the material in commerce. Use of excess oil production of food-grade oil also does not constitute an acceptable feedstock. Distillers Dried Grains with Soluble (DDGS) is also excluded.

Using the definitions of “renewable biomass” as stated in the Energy Policy Act of 2005 (EPAct 2005), the Energy Independence and Security Act of 2007 (EISA 2007), and the Food,

Conservation, and Energy Act of 2008, Title IX, Sec. 9001, as guidance, for the purpose of this FOA, the acceptable feedstocks will be those listed below:

(A) materials, pre-commercial thinnings, or invasive species from National Forest System land and public lands (as defined in section 103 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1702)) that –
  (i) are byproducts of preventive treatments that are removed –
    (I) to reduce hazardous fuels;
    (II) to reduce or contain disease or insect infestation; or
    (III) to restore ecosystem health;
  (ii) would not otherwise be used for higher-value products; and
  (iii) are harvested in accordance with –
    (I) applicable law and land management plans; and
    (II) the requirements for
      i. old-growth maintenance, restoration, and management direction of paragraphs (2), (3), and (4) of subsection (e) of section 102 of the Healthy Forests Restoration Act of 2003 (16 U.S.C. 6512); and
      ii. large-tree retention of subsection (f) of that section; or

(B) organic matter that is available on a renewable or recurring basis from non-Federal land or land belonging to an Indian or Indian tribe that is held in trust by the United States or subject to a restriction against alienation imposed by the United States, including –
  (i) renewable plant material, including –
    (I) organic material grown for the purposes of being converted to energy; and
    (II) algae ('algae' refers to microalgae, macroalgae, and cyanobacteria; aquatic plants such as water hyacinth, duckweed, and eelgrass are not algae); and
  (ii) waste material, including –
    (I) crop residue (including cobs, stover, bagasse and other residues);
    (II) other vegetative waste material (including wood waste and wood residues);
    (III) food waste and yard waste;

Allowable Wet Waste Feedstocks:

- Primary, secondary, tertiary, and post-anaerobic digestion sludge (i.e., biosolids) from municipal wastewater treatment systems.
- Food wastes from industrial, commercial, and residential sources
- Organic-rich wastewaters from industrial and commercial operations

Topic Areas 2 and 3

For Topic Areas 2 and 3 applications must propose an Advanced or Cellulosic Biofuel (or combination of Advanced or Cellulosic Biofuels) as the Primary Product(s). Please note that the allowable feedstocks for Topic Areas 2 and 3 are identical to Topic Areas 1 and 4 other than the inclusion of gaseous feedstocks.

Additionally Allowable Gaseous Feedstocks:

Industrial flue gas or similar non-biogas emissions are also allowable feedstocks for technologies proposing **a biological conversion mechanism**. Inorganic or chemical conversion of non-biogas feedstocks is not allowable under this FOA.

Under "Renewable Biomass" definition section B.ii.IV: Biogas (including landfill gas and sewage waste treatment gas) produced through the conversion of organic matter from renewable biomass.