

**DEPARTMENT OF ENERGY (DOE)
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY (EERE)**

MEGA-BIO: BIOPRODUCTS TO ENABLE BIOFUELS

Funding Opportunity Announcement (FOA) Number: DE-FOA-0001433

FOA Type: 001

CFDA Number: 81.087

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|-----------------------------------------------------------------------|-------------------------|
| FOA Issue Date: | 2/8/2016 |
| Informational Webinar: | 2/16/2016 3:00 PM ET |
| Submission Deadline for Concept Papers: | 2/26/2016 5:00pm ET |
| Submission Deadline for Full Applications: | 4/15/2016 5:00pm ET |
| Expected Submission Deadline for Replies to Reviewer Comments: | 5/27/2016 5:00pm ET |
| Expected Date for EERE Selection Notifications: | August 2016 |
| Expected Timeframe for Award Negotiations | September 2016 |

- 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.
- Applicants must designate primary and backup points-of-contact in EERE Exchange with whom EERE 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.

| Mod. No. | Date | Description of Modification |
|----------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 001 | 2/08/2016 | On page 8, under Section I.c, "Applications specifically not of interest," the following bullet was deleted: "Applications that propose to develop technology that relies on purely heterotrophic algae cultivation." |
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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) announces a notice of availability of funds for financial assistance addressing the development of flexible biomass to hydrocarbon biofuels conversion pathways that can be modified to produce advanced fuels and/or products based on external factors, such as market demand. These pathways could consist of a route to a *platform* chemical that could be converted to products or fuels or a route that *coproduces* chemicals and fuels.

For the purpose of this FOA, please see Appendix E for relevant definitions and acceptable biomass feedstocks.

The mission of EERE's Bioenergy Technologies Office (BETO) is to develop and transform biomass resources into commercially viable, high performance biofuels, bioproducts, and biopower through targeted research, development, demonstration, and deployment supported through public and private partnerships. Under the statutory authority of the Energy Policy Act (EPA) 2005, § 932(c), DOE is encouraged to partner with industry and institutions of higher education to conduct research and development (R&D) in advanced biotechnological processes capable of increasing energy production from lignocellulosic feedstocks, with emphasis on reducing the dependence of industry on imported fossil fuels in U.S. manufacturing facilities, and other advanced processes that will enable the development of cost-effective bioproducts, including advanced biofuels.

BETO has a goal of meeting the 2022 cost target of \$3/gallon gasoline equivalent (gge) for the production of renewable hydrocarbon fuels from lignocellulosic biomass. One approach BETO has taken previously to achieve this goal is to focus on conversion pathways that produce biofuels, with little or no emphasis on coproducing bioproducts. As BETO increasingly focuses on hydrocarbon fuels, it is examining strategies that capitalize on revenue from bioproducts as part of cost-competitive biofuel production.

A variety of technology pathways can be used to produce renewable hydrocarbon biofuels, but many of them require the production of value-added chemicals and products in the near-term to achieve an attractive rate of return on cost-competitive fuels. Value-added chemicals and products can also incentivize the de-risking of "front end" processes (from feedstock logistics through to deconstruction) which are also necessary for fuel production. It is important to note that while bioproducts are seen as a valuable strategy for enabling fuels, the BETO is **not** interested in pursuing R&D solely on bioproducts without a fuels component (See Scenario D in the figure below).

The intent of this FOA, therefore, is to identify R&D projects that develop biomass to hydrocarbon biofuels conversion pathways that can produce variable amounts of fuels and

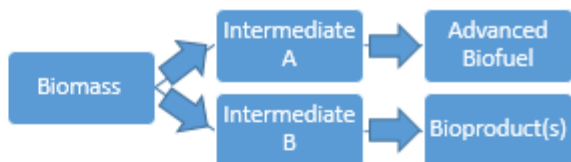
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products based on external factors, such as market demand. These pathways could consist of a route to a platform chemical that could be converted to products or fuels (Scenario A below) or a route that coproduces chemicals and fuels (Scenario B below). Successful applications will include a clear justification for producing the target molecule(s) from biomass, a compelling narrative explaining how the target product(s) will enable biofuels, and supporting techno-economic analysis and life cycle analysis.



A. Conversion pathway from biomass to biofuels and bioproducts via a platform chemical. The platform chemical could be a biomass deconstruction product (like glucose) or it could be a product or products that have been upgraded from an intermediate, like ethylene or benzene, toluene, and xylenes (BTX).



B. Conversion pathway based on co-production of biofuels and bioproducts. Intermediate B could be a waste stream, like lignin.



C. Conversion pathway from biomass to biofuels. Biomass is deconstructed to an intermediate such as a sugar, bio-oil, or syngas. This intermediate is then upgraded to a fuel. In this scenario, the intermediate could be a marketable bioproducts (e.g. methanol in a Methanol to Gasoline pathway).



D. Conversion pathway from biomass to non-fuel bioproducts. Pathways that do not have a fuels component are not of interest.

The proposed pathway must illustrate a realistic approach to producing cost-competitive hydrocarbon biofuels. Proposed pathways can incorporate bioproducts as part of a strategy for realizing cost-competitive biofuels and must explain how that particular product(s) enables the biofuel production pathway (for example, explain the market demand for that product(s) and the revenue that could be generated to offset the cost of biofuels production). Proposed pathways could focus on a platform chemical that could be used to make fuels or products (Scenario A in the figure above) or they could focus on co-producing fuels and products (for example, dividing deconstructed lignocellulosic biomass into sugar and lignin streams and then using the sugar to make fuels and the lignin to make products (Scenario B in the figure above). A pathway that converts a waste stream into a high value product would also fit under Scenario

B). If the proposed pathway does not specify a route to hydrocarbon biofuels, it will not be considered. A successful applicant will propose R&D to optimize one unit operation of the pathway (Topic Area 1) or to integrate several unit operations of the pathway (Topic Area 2) (See Section I.B for further description of Topic Areas). Although the primary focus of a proposed project is not required to be the creation of a biofuel (i.e., the R&D can be on producing a bioproduct), the project *must* specify a route and include a strategy for producing cost-competitive biofuels, and the applicant must demonstrate how the R&D will lower the overall cost of producing a biofuel.

Applicants must provide a baseline discussion of sustainability, life cycle analyses (LCA) and techno-economic analyses (TEA) for the applicant's proposed pathway. Projects proposing systems that are not sustainable (excessive freshwater, unit operations, etc.) and/or are not economical when scaled for commercial operations will not be considered. Applicants must plan for performing ongoing TEA and LCA throughout the project in order to use experimental results to show how the incorporation of bioproducts contribute to improved economics for biofuels production scenarios. Applicants must provide information on how their proposed system addresses sustainability (water use/recycle, etc.), greenhouse gas reduction (CO₂ utilization), and cost effective production towards being competitive with petroleum-based fuels and products by 2022.

Applications submitted under either Topic Area must demonstrate a strong and convincing technology development strategy, including a feasible pathway to transition the program results to the next logical stage of R&D and/or directly into commercial development and deployment. Applications must meet this requirement by providing a baseline for their current state of technology by providing the information set forth in the applicable Technical and Economic Tables Template, found in Appendix F, as well as intermediate and final technical and economic target metrics to be met with the proposed Workplan.

The Technical and Economic Tables Template was designed to guide applicants in providing information to assess the technical and financial status of the feedstock, process configuration, and conversion process. Applicants will need to adapt the tables and key performance parameters to fit the circumstances of their specific process; however, applicants must use them in a manner consistent with the assessment purposes described above.

The Technical and Economic Tables Template is included with the FOA with requested information highlighted in yellow. 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. 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 for the intermediate and final validations.

If selected for award, applicants must execute any necessary nondisclosure agreements with independent third parties that assist DOE with the validation process so that validations may be conducted as expeditiously as possible.

All selected projects will be subject to an initial validation effort by BETO and/or its designee to review their baseline performance and proposed targets. The validation effort will conclude with a go/no go decision to be made by DOE based on congruence of baseline performance with that claimed in the application. Applicants must include this task within their scope, schedule, and budget. Additional information relative to addressing this validation within the scope, schedule, and budget, as well as more information on what the validation entails, is provided below.

The initial validation period, including on-site observation of experiments and report creation, can take up to three months. Applicants must include this time in their schedule. Selected projects that receive a 'go' decision at the conclusion of the initial validation effort will be subject to both an interim and a final 'validation' review. The interim review will also conclude with a 'go/no-go' decision to be made by DOE and will be based on the project's progress toward interim project goals and the likelihood of meeting the overall project goals by the conclusion of the project. A 'no-go' decision may result in termination of the project or re-direction of scope. It is anticipated that the interim and final reviews will include the applicant (now awardee) presenting the project progress toward the targets established during the initial validation. Both the interim and final validations should be noted and accounted for within the scope, schedule, and budget so that if a project is selected and receives a 'go' decision at the conclusion of the initial validation effort, the schedule and budget will already account for the interim and final validations.

Validation Task

All applicants must include the initial validation task within their scope as Task 1. It must be separated from the rest of the scope of work by a 'go/no-go' decision point, and applicants should estimate a three-month duration for the validation effort. This task, Task 1, will also be within a separate budget period, Budget Period 1 (BP1), from the remainder of the project.

The objectives of the validation effort are to verify the applicant's technical data/performance metrics/targets as described in the original application; establish a framework to evaluate and track progress over time; update the data in the Technical and Economic Tables Template 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.

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 and the project management 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

and Economic Tables Template will be disclosed to non-conflicted DOE National Laboratory (National Renewable Energy Laboratory Systems Integration – NREL-SI) 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. It is expected that developments and advancements in technical performance made during the course of the project will be shared with the public via technical publications in journals or conference proceedings. It is also anticipated that the initial validation may, of necessity, involve pre-existing intellectual property of which DOE will not require publication. Data access, deliverables and dissemination requirements will be negotiated and set forth in the Statement of Project Objectives and will be consistent with Section VIII N. of this FOA. DOE and those working on DOE’s behalf, such as support service contractors, National Laboratory personnel, validators, and reviewers, must be able to have sufficient access to these data to assess the baseline performance of the technology – subject to appropriate non-disclosure agreements or other protections.

During the pre-validation step, the validation team will work closely with the project team to discuss the effort in detail, initiate the review of the data from the Technical and Economic Tables Template and metrics as provided in the original application, and set the date for the on-site meeting. This is an iterative process between the two teams and establishes the agenda for the on-site meeting. During the on-site validation meeting, the validation team will observe key experiments performed by the project team in order to replicate benchmark/baseline data provided in the application as described in the Technical and Economic Tables Template. In addition, the two 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 meeting, both teams will have the information needed to proceed forward – the project team will complete revisions to the Technical and Economic Tables Template previously submitted and resubmit it to DOE, and the validation team will prepare the report-out to the Technology Manager working with the teams. The post-validation step includes the validation team reporting to the Program personnel and the Conversion Program personnel working through the ‘go/no-go’ decision point.

At the conclusion of the validation effort and once a ‘go/no-go’ decision has been made, the DOE 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 DOE 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 additional experimental or project work, beyond that associated with the validation, 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 should 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. By way of example, the inclusion of the validation in the scope could include something like the following:

‘Task 1. Validation. At the beginning of the project, we will work with 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 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. Experiments will be conducted at the on-site validation visit to replicate the benchmark data provided in the application as described in the Technical and Economic Tables Template.

There will be a ‘go/no-go’ associated with Task 1.1 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 also be required to participate in DOE’s Peer Review Process. Currently this is a bi-annual 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.

Indicators of Successful Projects

Biofuels and bioproducts have the potential to significantly increase the availability of domestically produced renewable liquid transportation fuels. It is anticipated that successful projects from this FOA will include:

- A biofuel production pathway that can produce both fuels and bioproducts
- A bioproduct(s) that can improve the economic viability of a biofuel production pathway in a quantifiable manner (i.e. technoeconomic analysis)
- A compelling case for why pursuit of the proposed bioproduct(s) is well-suited to be derived from biomass
- A bioproduct(s) that can be produced with lower greenhouse gas (GHG) emissions than its petroleum-derived counterpart (i.e. life cycle analysis)

These applied research and development applications should seek to lower the financial, technical, environmental, and market risks inherent in the development of new technologies. To this end, ongoing techno-economic analyses based on experimental results are required

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project deliverables. Successful applications will also provide supporting analyses for better assessment of likely commercial production scale-up scenarios.

B. TOPIC AREAS/TECHNICAL AREAS OF INTEREST

Topic Area 1. Early TRL (TRL 2-3) R&D to optimize **one** unit operation of the proposed conversion pathway.

Topic Area 2. Middle TRL (TRL 4-5) R&D optimize and integrate **multiple** unit operations of the proposed conversion pathway.

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

C. APPLICATIONS SPECIFICALLY NOT OF INTEREST

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

- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).
- Applications that fall outside the technical parameters specified in Sections I.A and I.B of the FOA, including but not limited to
 - Applications that propose R&D on a biomass conversion pathway that does not include a strategy for producing cost-competitive biofuels;
 - Applications that propose systems that are not sustainable and/or are not economical (excessive freshwater, unit operations, etc.) when scaled for commercial operation.
 - Applications that do not explain how the proposed R&D will lower the overall cost of producing a biofuel.
- Applications that do not use an acceptable feedstock as defined in Appendix E.
- Applications that use food or feed carbohydrates, lipids, or proteins (e.g. maize or wheat dextrose, beet sucrose, sugar cane or grain sorghum syrup, soybean oil or meal), and/or derivatives (e.g. amino acids from maize dextrose, glycerol from the transesterification of soybean oil).
- Applications that propose the production of biodiesel produced from transesterification or hydrotreating or hydrocracking of agronomic, natural plant oils (e.g., soybeans, palm, coconut, safflower, castor).
- Applications that propose the production of alcohols or biogas as a final fuel product. *Note that while ethanol and biogas are unacceptable final products, they will be accepted as process intermediates for upgrading to other advanced biofuels and products, if derived from applicable biomass sources.*

- Applications that propose mixotrophic algae cultivation strategies that utilize food-based sugars (i.e., derived from food-based crops including but not limited to corn, beets, sorghum, and sugar cane).
- Applications that propose to develop technology for the artificial lighting-based cultivation of algae for energy products (other than as an enabling tool for high throughput laboratory-based screening).
- Applications that propose the use of pure sugar feeds and/or ‘model’ intermediate feeds such as avicel, cane and starch sugar or model lignin compounds and mixtures. *Note, it is expected that the baseline validation, stage gate and final validations will be performed on cellulosic derived intermediates.*
- Applications that fail to include the appropriate data as outlined in the Technical and Economic Tables Template (Appendix F).

D. AUTHORIZING STATUTES

The programmatic authorizing statute is the Energy Policy Act (EPAct) of 2005, § 932(c).

Awards made under this announcement will fall under the purview of 2 CFR Part 200 as amended by 2 CFR Part 910.

II. AWARD INFORMATION

A. AWARD OVERVIEW

1. ESTIMATED FUNDING

EERE expects to make approximately \$11.3 million of Federal funding available for new awards under this FOA, subject to the availability of appropriated funds. EERE anticipates making approximately 1 - 10 awards under this FOA. EERE may issue one, multiple, or no awards.

Individual awards may vary between \$1 and \$8 million.

EERE may issue awards in one, multiple, or none of the following topic areas:

Topic Area 1. Early TRL (TRL 2-3) R&D to optimize **one** unit operation of the proposed conversion pathway. Awards will range \$1M - \$2M.

Topic Area 2. Middle TRL (TRL 4-5) R&D optimize and integrate **multiple** unit operations of the proposed conversion pathway. Projects are capped at \$8M.

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.

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2. PERIOD OF PERFORMANCE

EERE anticipates making awards that will run up to 36 months in length. 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.

3. NEW APPLICATIONS ONLY

EERE will accept only new applications under this FOA. EERE will not consider applications for renewals of existing EERE-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.

1. 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.

2. 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. 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

1. INDIVIDUALS

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

2. 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.

3. 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.

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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.

4. 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.

5. 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.

B. COST SHARING

Cost Share 20%, Cost Share Waiver Utilized

i. 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.)

ii. 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. The cost share waiver only applies to FY16 funds. If an award is selected from this FOA using FY17 funds, non-federal cost share of 20% is required, unless the waiver is extended. 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.

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.

1. 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

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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.

2. COST 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.

3. 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: personnel costs, indirect costs, facilities and administrative costs, rental value of buildings or equipment, and the value of a service, other 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.

4. 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.

5. 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.

6. 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.

1. COMPLIANCE CRITERIA

i. 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.

ii. 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.

iii. 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

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- 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 nonresponsive and are not reviewed or considered.

E. OTHER ELIGIBILITY REQUIREMENTS

1. 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 _____ 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.

2. 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:

i. 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.

ii. 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:

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Authorization is granted for the _____ 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.

iii. 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.

iv. 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.

v. 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.

vi. Limit on FFRDC Effort

The FFRDC effort, in aggregate, shall not exceed 50% of the total estimated cost of the project, including the applicant's and the FFRDC's portions of the effort.

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.

G. QUESTIONS REGARDING ELIGIBILITY

EERE 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

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A. APPLICATION PROCESS

The application process will include two phases: a Concept Paper phase and a Full Application phase. **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

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applicant must resubmit the Concept Paper, Full Application, or Reply to Reviewer Comments before the applicable deadline.

EERE urges 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.

1. 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.

1. CONCEPT PAPER CONTENT REQUIREMENTS

EERE 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 | 1 page maximum | The cover page should include the project title, 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: <ul style="list-style-type: none"> • Project Goal: The Applicant must explicitly identify: <ul style="list-style-type: none"> ○ A target molecule(s) ○ The current market for the target molecule(s) (or, if the applicant is proposing a target molecule that is not currently on the market, a projection of what the market might look like, including appropriate citations) ○ How the target molecule(s) are currently produced (or, if the applicant is proposing a target molecule that is not currently in production, an explanation of how similar products are produced) ○ A proposed route to produce the molecule from cellulosic biomass including any relevant preliminary results ○ How the target molecule(s) can be produced from cellulosic biomass with an improved greenhouse gas profile over the conventional route (i.e. Life Cycle Analysis, LCA) ○ Why the Applicant has chosen this target molecule(s) |

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|------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <ul style="list-style-type: none"> ○ The proposed technology, including its basic operating principles and how it is unique and innovative; ○ How producing the target molecule(s) will enable the production of biofuels, specifically explaining how the value of the proposed product is worth more than producing power from the feedstock, and ideally could be sold for more than the fuel. ● Block Flow Diagram: The Applicant must include a block flow diagram that illustrates the process of converting biomass to biofuel and how any related products will be produced. If the applicant is proposing to work on just one element of the process, the Applicant must highlight this with a red box. ● 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 key technical risks/issues associated with the proposed technology development plan; ● The impact that EERE funding would have on the proposed project. |
| <p>Addendum</p> | <p>1 pages maximum</p> | <p>Applicants may provide graphs, charts, or other data to supplement their Technology Description.</p> <p>Applicants are required to describe succinctly the qualifications, experience, and capabilities of the proposed Project Team, including:</p> <ul style="list-style-type: none"> ● 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. |

EERE makes an independent assessment of each Concept Paper based on the criteria in Section V.A.1 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*).

1. FULL APPLICATION CONTENT REQUIREMENTS

EERE 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 |
| | Statement of Project Objectives (Microsoft Word format) (5 page limit) | ControlNumber_LeadOrganization_SOPO |
| | SF-424 | ControlNumber_LeadOrganization_App424 |

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| | |
|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| 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 (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 Plans | ControlNumber_LeadOrganization_USMP |
| Data Management Plan | ControlNumber_LeadOrganization_DMP |
| Technical and Economic Tables Template | ControlNumber_LeadOrganization_Tables |
| Validation Participation Acknowledgement | ControlNumber_LeadOrganization_Validation |

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ControlNumber_LeadOrganization_TechnicalVolume_Part_1
ControlNumber_LeadOrganization_TechnicalVolume_Part_2, etc.

EERE 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.

2. 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 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 and reviewers are under no obligation to review cited sources.

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The Technical Volume to the Full Application may not be more than 25 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 |
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| Cover Page | The cover page must include the project title, the specific FOA Topic Area being addressed, both the technical and business points of contact, names of all team member organizations, and any statements regarding confidentiality. |
| Project Overview (Approximately 20% of the Technical Volume) | <p>The Project Overview must contain the following information:</p> <ul style="list-style-type: none"> • Project Goal: The Applicant must explicitly identify: <ul style="list-style-type: none"> ○ A target molecule(s) ○ The current market for the target molecule(s) (or, if the applicant is proposing a target molecule that is not currently on the market, a projection of what the market might look like, including appropriate citations) ○ How the target molecule(s) are currently produced (or, if the applicant is proposing a target molecule that is not currently in production, an explanation of how similar products are produced) ○ A proposed route to produce the molecule from cellulosic biomass ○ The key technical risks associated with the proposed technology development plan and a risk mitigation plan; and ○ 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) ○ How the target molecule(s) can be produced from cellulosic biomass with an improved greenhouse gas profile over the conventional route (i.e. Life Cycle Analysis, LCA) ○ Why the Applicant has chosen this target molecule(s) ○ How producing the target molecule(s) will enable the production of biofuels, specifically explaining how the value of the proposed product is worth more than producing power from the feedstock, and ideally could be sold for more than the fuel. • Block Flow Diagram: The Applicant must include a block flow diagram that illustrates the process of converting biomass to biofuel and how any related products will be produced. If the applicant is proposing to |

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| | <p>work on just one element of the process, the Applicant must highlight this with a red box.</p> |
| <p>Background (Approximately 10% of the Technical Volume)</p> | <ul style="list-style-type: none"> • Background: The Applicant must discuss the current research and development status (i.e., the technical baseline) relevant to the technical topic being addressed in the Full Application. • State of Technology: The Applicant must provide an assessment of the state of the art and background information on other similar research efforts. The applicant must provide an adequately cited comparison of the proposed technology and the state of the art. The state of the art must be relevant to the proposed technology. For example, if the Applicant is proposing a hydrothermal liquefaction technology, comparing it to an enzymatic cellulosic ethanol process is not acceptable. |
| <p>Impact (Approximately 15% of the Technical Volume)</p> | <ul style="list-style-type: none"> • DOE Impact: The Applicant must discuss the impact that DOE funding would have on the proposed project. Applicants must specifically explain how DOE funding, relative to prior, current, or anticipated funding from other public and private sources, is necessary to achieve the project objectives; • Environmental Impact: The Applicant must include a life cycle analysis (LCA) or compelling narrative that demonstrates that the proposed molecule(s) and fuel(s) can be produced from cellulosic biomass with an improved greenhouse gas 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. |

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| <p>Technical Description and Innovation (Approximately 15% of the Technical Volume)</p> | <p>The Technical Description must contain the following information:</p> <ul style="list-style-type: none"> • Proposed Strategy: The Applicant must provide a detailed description of the technology, including the scientific and other principles and objectives that will be pursued during the project. The Applicant must clearly specify the expected outcomes of the project and how technical risks have been significantly reduced. • Feasibility: The Applicant must discuss 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. |
| <p>Workplan and Market Transformation Plan (Approximately 30% of the Technical Volume)</p> | <p>The Workplan section in the application must 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 requested separately. The Workplan must contain the following information:</p> <ul style="list-style-type: none"> • Project Objectives: The Applicant must 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 must 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 must describe the specific expected end result of each performance period. • Work Breakdown Structure (WBS) and Task Description Summary: The Workplan must 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 detailed description of the specific activities to be conducted over the life of the project. "Detailed" is defined as 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 must be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks. |

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| | <ul style="list-style-type: none"> • Milestone Summary: The Applicant must provide a summary of appropriate milestones throughout the project to demonstrate success, where success is defined as technical achievement rather than simply completing a task. To ensure that milestones are relevant, Applicants should follow the SMART rule of thumb, which is that all milestones should be Specific, Measurable, Achievable, Relevant, and Timely. 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 (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The Applicant must also specify the means and metrics by which the milestone will be verified. • Go/No-Go Decision Point Summary: The Applicant must 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 year or for each budget period, with the budget period typically every 12-18 months. The Applicant must also provide the specific technical criteria to be used to make the go/no-go decision. • Project Schedule (Gantt Chart or similar): The Applicant must provide a detailed schedule for the entire project, including task and subtask durations, milestones, and go/no-go decision points. • Project Management: The Applicant must discuss the team's proposed management plan and structure, including the following: <ul style="list-style-type: none"> ▪ The overall approach to and organization for managing the work ▪ The roles of each Project Team member ▪ Any critical handoffs/interdependencies among Project Team members ▪ The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices ▪ The approach to project risk management ▪ A description of how project changes will be handled ▪ If applicable, the approach to Quality Assurance/Control |
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| | <ul style="list-style-type: none"> ▪ How communications will be maintained among Project Team members <p>Market Transformation Plan: The Applicant must provide a market transformation plan, including the following:</p> <ul style="list-style-type: none"> • Identification of U.S. target market, competitors, and distribution channels for proposed technology along with known or perceived barriers to market penetration, including a mitigation plan • 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. |
| <p>Technical Qualifications and Resources (Approximately 10% of the Technical Volume)</p> | <p>The Technical Qualifications and Resources must contain the following information:</p> <ul style="list-style-type: none"> • 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 and GOGOs, if applicable. • 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: <ul style="list-style-type: none"> ○ The roles and the work to be performed by each PI and Key Participant; ○ Business agreements between the Applicant and each PI and Key Participant; ○ How the various efforts will be integrated and managed; ○ Process for making decisions on scientific/technical direction; ○ Publication arrangements; ○ Intellectual Property issues; and |

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| | o Communication plans |
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3. 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".

4. 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".

5. 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".

6. 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".

7. 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 EERE funds and proposed applicant cost share.

8. SUBAWARD BUDGET JUSTIFICATION (EERE 335)

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".

9. 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".

10. AUTHORIZATION FOR NON-DOE/NNSA OR DOE/NNSA FFRDCs (IF APPLICABLE)

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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".

11. 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".

12. WAIVER REQUESTS: FOREIGN ENTITIES AND PERFORMANCE OF WORK IN THE UNITED STATES

i. 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.

ii. 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. Appendix C lists the necessary information that must be included in a request to waive the Performance of Work in the United States requirement.

13. 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 measurable 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.

14. DATA MANAGEMENT PLAN

Applicants whose Full Applications are selected for award negotiations will be required to submit a Data Management Plan during the award negotiations phase. The Data Management Plan is a document that outlines the proposed plan for data sharing or preservation. Submission of this plan is required, and failure to submit the plan may result in the termination of award negotiations. As a courtesy, guidance for preparing a Data Management Plan is provided in Appendix D of the FOA.

15. ADDITIONAL REQUIREMENTS

Technical and Economic Data Tables. The application must include the applicable data described in the Technical and Economic Tables Template provided in Appendix F of this FOA. Applicants may use the tables as presented or adapt them to fit the specific circumstances of their proposed process(es); however, applicants must use them in a manner consistent with the assessment purposes described in Section I.A. above.

Acknowledgement. The application must include the applicant's acknowledgement to participate in the independent third party validations required under this FOA.

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 reserves 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
- Data as described in the Technical and Economic Tables Template in Appendix F

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: (i) Be registered in the System for Award Management (SAM) at <https://www.sam.gov> before submitting its application; (ii) provide a valid Dun and Bradstreet Universal Numbering System (DUNS) number in its application; and (iii) 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

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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

1. 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.

2. PRE-AWARD COSTS

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.

i. 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

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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.

3. PERFORMANCE OF WORK IN THE UNITED STATES

a. 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.

b. 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.

c. 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.

4. CONSTRUCTION

No major construction activities (i.e., construction of new buildings, major renovations, or additions to existing buildings) can be undertaken as part of this FOA. Applicants are expected to bring together both the human and physical capital necessary to achieve the objectives of the FOA. Modifications to existing experimental infrastructure at one or more of the partnering facilities is allowable. Such modifications may not exceed 20% of the total project cost. Capital expenditure for analytical tools and instrumentation to enhance existing infrastructure is allowable.

5. 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.

6. 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 amended by 2 CFR 910.360.

7. 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.

8. 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.

V. APPLICATION REVIEW INFORMATION

A. TECHNICAL REVIEW CRITERIA

1. 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%)

This criteria involves consideration of the following factors:

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- 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 clearly describes the current market or market potential for the proposed target(s).
- The applicant clearly describes in a quantitative manner how the proposed technology will enable biofuels production.
- 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.
- The proposed work, if successfully accomplished, would clearly meet the objectives as stated in the FOA.

2. 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

Weight: 60%

Project Overview

- Extent to which the applicant clearly identifies the target molecule(s);
- The extent to which the applicant clearly and accurately describes the current (or proposed) market for the target molecule, including the appropriateness of citations;
- The level of clarity and accuracy in the applicant's description of how the target molecule(s) (or similar products) are currently produced;
- The level of clarity, appropriateness and reasonableness in the applicant's logic for pursuing the chosen molecule(s), with consideration given to the following factors:
 - Extent to which the proposed molecule(s) capitalize on the highly oxygenated nature of biomass, (i.e. final product contains oxygen from the biomass starting material);
 - If the proposed molecule(s) does not contain oxygen, the extent to which the applicant makes a compelling argument for why the molecule should be derived from biomass;
 - The appropriateness of the proposed conversion process and/or feedstock for synthesizing the chosen target molecule(s);

- The likelihood that, if the proposed research is successful, that the proposed molecule(s) could be produced with lower GHG emissions than how the molecule(s) is currently produced;
- The level of clarity and reasonableness in the applicant's proposed route to target molecule(s) and fuels;
- Clarity of the applicant's block flow diagram, including illustrating the pathway for producing the target bioproduct(s) and biofuel(s);
- Extent to which the proposed target molecule(s) will be useful for enabling biofuels production in a quantifiable manner and reducing the risk of biofuels production, with consideration given to the following factors:
 - The likelihood that the proposed pathway could produce cost competitive biofuels;
 - The likelihood that the proposed target molecule(s) could produce significant revenue (at a minimum, sold for at least 2x the cost of power generated from the biomass feedstock);
 - If the target molecule(s) will not generate significant revenue, the extent to which the applicant makes a compelling argument for how the target molecule(s) could enable the production of biofuels in an integrated biorefinery setting e.g. via waste reduction;
 - The size of the market for the target molecule(s) and the anticipated impact(s) of that size on enabling 1 billion gallons of advanced or cellulosic biofuels;
 - If the market of the target molecule(s) will not likely grow as the size of the biofuel market increases to 1 billion gallons of advanced or cellulosic biofuels, the extent to which the applicant describes a transition strategy to produce additional products at scale;?

Background

- Degree to which the applicant fully and accurately describes the state of the art, including a comparison of the applicant's technology to relevant technologies and the extent to which the applicant includes appropriate citations to defend his/her view of the state of the art;
- 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 analysis that supports the viability of the proposed work.

Impact of Technology Advancement

- The level of impact that DOE funding will have on the proposed project;
- The degree to which the applicant defined successful project outcomes;
- The degree to which the project supports the topic area objectives and target specifications and metrics;

- The potential impact of the project on advancing the state of the art;
- If the applicant is successful, the degree to which their success would impact the industry and other researchers; and
- The extent to which the applicant provides a compelling LCA or narrative explaining of how the proposed molecule(s) and fuel(s) will be produced from cellulosic biomass with an improved greenhouse gas profile (environmental impact);
- The extent to which the applicant justifies assumptions made in describing the proposed LCA/environmental impact and appropriateness of the associated references;
- The extent to which the applicant provides a compelling TEA or narrative explaining how the proposed route will enable the production of cost-competitive biofuels (economic impact); and
- The degree to which the assumptions in the TEA are based on verifiable and referenceable data.

Technical Description and Innovation

- Degree to which the research approach is clearly outlined and explained;
- Degree to which the applicant makes a compelling case for technical feasibility; and
- Degree to which the applicant provides previously acquired data where appropriate (if available).

Criterion 2: Project Research and Market Transformation Plan

**Weight:
30%**

Research Approach and Workplan

- Degree to which the approach and critical path have been clearly described and thoughtfully considered;
- Degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan will succeed in meeting the project goals;
- Level of clarity and reasonableness of the WBS;
- Level of clarity and reasonableness of the Gantt chart; and
- Reasonableness of schedule.

Identification of Technical Risks

- Discussion and demonstrated understanding of the key technical risk areas and barriers 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, milestones, and go/no-go decision points; and

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

Market Transformation Plan

- Extent to which the application specifically and convincingly assesses the current market and future markets when the product is produced at significant scale for the proposed bioproduct(s) with the most up-to-date and appropriate market information;
- Appropriateness of the market for the proposed bioproduct(s) and corresponding pathway;
- Adequacy of assessment of unique market risks associated with the proposed bioproduct and pathway;
- 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 commercialization 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 dissemination, U.S. manufacturing plan etc., and product distribution.

Criterion 3: Team and Resources

**Weight:
10%**

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

3. CRITERIA FOR REPLIES TO REVIEWER COMMENTS

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Problems with EERE Exchange? Email EERE- EERE-ExchangeSupport@hq.doe.gov Include FOA name and number in subject line.

EERE has 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/sites/prod/files/meritrev.pdf>.

C. OTHER SELECTION FACTORS

1. PROGRAM POLICY FACTORS

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

- 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 commercialize energy or related technologies;
- Technical, market, organizational, and environmental risks associated with the project;
- Whether the proposed project is likely to lead to increased employment and manufacturing in the United States;
- Whether 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 proposed project will advance the goals of the Climate Action Champion initiative, as committed to by the designated Champion pursuant to its designation agreement. The Climate Action Champion initiative goals include improving climate resilience and reducing greenhouse gas emissions.

Note: The Climate Action Champion initiative program policy factor is only applicable to (1) projects proposed by Climate Action Champions¹ as designated under DOE's Request for Applications DE-FOA-0001189; (2) projects proposed by a member of a regional collaboration or consortium designated as a Champion; and (3) projects proposed in a Climate Action Champion community where the applicant submits a letter from the Champion confirming the proposed project would further the Champion's goals under the Climate Action Champion initiative. If an applicant is seeking to receive consideration under (3), the applicant must contact the applicable Champion to obtain a letter of support.

¹In recognition of the importance of the dual policy goals of reducing greenhouse gas emissions and enhancing

climate resilience, the U.S. Department of Energy (DOE) – in close collaboration with other Federal agencies – launched the Climate Action Champion initiative to identify and showcase U.S. local and tribal governments that have proven to be climate leaders through pursuing opportunities to advance both of these goals in their communities. Recently, DOE selected sixteen (16) U.S. local governments and tribal governments – or regional collaborations or consortia thereof – that demonstrated a strong and ongoing commitment to implementing strategies that both reduce greenhouse gas emissions and enhance climate resilience, with a particular emphasis on strategies that further both goals. <http://www.whitehouse.gov/blog/2014/12/03/announcing-first-classclimate-action-champions>

D. EVALUATION AND SELECTION PROCESS

1. 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.

2. 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.

3. PRE-SELECTION CLARIFICATION

Questions about this FOA? Email BETOMegabioFOA@ee.doe.gov

Problems with EERE Exchange? Email EERE- EERE-ExchangeSupport@hq.doe.gov Include FOA name and number in subject line.

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.

4. RECIPIENT INTEGRITY AND PERFORMANCE MATTERS

DOE, prior to making a Federal award with a total amount of Federal share greater than the simplified acquisition threshold, is 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 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.

5. 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

Questions about this FOA? Email BETOMegabioFOA@ee.doe.gov

Problems with EERE Exchange? Email EERE- EERE-ExchangeSupport@hq.doe.gov Include FOA name and number in subject line.

EERE anticipates notifying applicants selected for negotiation of award by August 2016 and making awards by Fall 2016.

VI. AWARD ADMINISTRATION INFORMATION

A. AWARD NOTICES

1. *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.

2. *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.

3. *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.

4. *SUCCESSFUL APPLICANTS*

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Problems with EERE Exchange? Email EERE- EERE-ExchangeSupport@hq.doe.gov Include FOA name and number in subject line.

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.

5. 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.

6. 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

1. 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:

i. EERE Exchange

Register and create an account on EERE Exchange at <https://eere-Exchange.energy.gov>.

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Problems with EERE Exchange? Email EERE- EERE-ExchangeSupport@hq.doe.gov Include FOA name and number in subject line.

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.**

ii. 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>.

iii. 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.

iv. 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.

v. 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.

vi. 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.

2. 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.

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Problems with EERE Exchange? Email EERE- EERE-ExchangeSupport@hq.doe.gov Include FOA name and number in subject line.

3. 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.

4. SUBAWARD AND EXECUTIVE REPORTING

Additional administrative requirements necessary for DOE 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.

5. NATIONAL POLICY REQUIREMENTS

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

6. 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.

Questions about this FOA? Email BETOMegabioFOA@ee.doe.gov

Problems with EERE Exchange? Email EERE- EERE-ExchangeSupport@hq.doe.gov Include FOA name and number in subject line.

7. APPLICANT REPRESENTATIONS AND CERTIFICATIONS

i. 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.

ii. Corporate Felony Conviction and Federal Tax Liability Representations

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

(1) It is **not** a corporation that has been convicted of a felony criminal violation under any Federal law within the preceding 24 months, and

(2) 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.

iii. Nondisclosure and Confidentiality Agreements Representations

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

(1) 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 contractors 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.

(2) 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:

a. *“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.”

- b. 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.
- c. 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.

8. STATEMENT OF FEDERAL STEWARDSHIP

EERE will exercise normal Federal stewardship in overseeing the project activities performed under EERE 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.

9. STATEMENT OF SUBSTANTIAL INVOLVEMENT

EERE has substantial involvement in work performed under 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:

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Problems with EERE Exchange? Email EERE- EERE-ExchangeSupport@hq.doe.gov Include FOA name and number in subject line.

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.
5. In order to adequately monitor project progress and provide technical direction and/or redirection to the Recipient, DOE must be provided an adequate level of insight into various Recipient activities. Government insight activities include but are not limited to access for DOE's consultants to perform independent evaluations of Recipient's plans and processes. (Consultants to DOE may not provide technical direction and/or redirection to the Recipient.)
6. DOE will be actively involved with the Recipient in verifying the current technology readiness level of the project (and specific unit operations) as well as establishing the project technology baseline and interim and concluding performance metrics. This includes working with the Recipient to generate the baseline technical and financial data sheet that will then be updated periodically throughout the project.

10. INTELLECTUAL PROPERTY MANAGEMENT PLAN

Within 30 days of selection, applicants must submit an executed IP Management Plan between the members of the consortia or team if required by the Contracting Officer.

The award will set forth the treatment of and obligations related to intellectual property rights between EERE and the individual members. The IP Management Plan should describe how the members will handle intellectual property rights and issues between themselves while ensuring compliance with Federal IP laws, regulations, and policies (see Sections VIII.L-VIII.O of this FOA for more details on applicable Federal IP laws and regulations). Guidance regarding the contents of IP Management Plans is available from EERE upon request.

The following is a non-exhaustive list of examples of items that the IP Management Plan may cover:

- The treatment of confidential information between members (i.e., the use of non-disclosure agreements);

- The treatment of background IP (e.g., any requirements for identifying it or making it available);
- The treatment of inventions made under the project (e.g., any requirements for disclosing to the other members, filing patent applications, paying for patent prosecution, and cross-licensing or other licensing arrangements between the members);
- The treatment of data produced, including software, under the project (e.g., any publication process or other dissemination strategies, copyrighting strategy or arrangement between members);
- Any technology transfer and commercialization requirements or arrangements between the members;
- The treatment of any intellectual property issues that may arise due to a change in membership of the consortia or team; and
- The handling of disputes related to intellectual property between the members.

11. 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.

12. INTELLECTUAL PROPERTY PROVISIONS

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at <http://energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards>.

13. REPORTING

Reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F 4600.2, attached to the award agreement. The checklist can be accessed at http://energy.gov/sites/prod/files/2013/05/f0/Attch_FA_RepReqChecklist_COMBINED_FINAL_4-23-13%20%283%29_0.pdf.

The information requested in the Technical and Economic Tables Template at the time of application as well as during the validation task for selected and awarded projects, must be updated during the intermediate and final validations and at go/no go decision points throughout the project.

A Project Management Plan will be due for selected and awarded projects thirty days after award and must be updated annually at a minimum.

As a steward of taxpayer funds, BETO recognizes the importance of tracking, documenting and analyzing the outcomes of Federally funded awards. 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. If a project is selected for award negotiations, a letter of commitment from selectees to reporting beyond the end of the period of performance for at least five years will be required. Receipt of the required information during award negotiations enables BETO to improve future funding opportunities to achieve better outcomes for the high-risk, high-reward technologies it seeks to support.

Therefore, Prime Recipients must agree to provide annual updates (consisting of no more than 600 words) for at least five years following the conclusion of the award, describing technical and economic updates to the technology developed under the BETO award. This may include but is not limited to the following: how the results from the project have been leveraged and have led to commercialization efforts; creation of jobs; subsequent awards; formation of new partnerships; building of new facilities; testing at increased scales; patents and licenses awarded; purchase of technologies and/or companies; and if the awardee sells technologies or the company itself.

14. Go/No-Go REVIEW

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.

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15. 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.

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: BETOMegabioFOA@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. INFORMATIONAL WEBINAR

EERE will conduct one informational webinar during the FOA process. It will be held after the initial FOA release but before the due date for Concept Papers.

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Attendance is not mandatory and will not positively or negatively impact the overall review of any applicant submissions. As the webinar will be open to all applicants who wish to participate, applicants should refrain from asking questions or communicating information that would reveal confidential and/or proprietary information specific to their project. Specific dates for the webinar can be found on the cover page of the FOA.

C. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE

EERE reserves 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.

D. COMMITMENT OF PUBLIC FUNDS

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.

E. 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. Applications containing trade secrets or commercial or financial information that is privileged or confidential, which the applicant does not want disclosed to the public or used by the Government for any purpose other than application evaluation, must be marked as described in this section.

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.

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[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.

The above markings enable EERE to follow the provisions of 10 CFR 1004.11(d) in the event a Freedom of Information Act (FOIA) request is received for information submitted with an application. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under a FOIA request or otherwise. The U.S. Government is not liable for the disclosure or use of unmarked information, and may use or disclose such information for any purpose.

Subject to the specific FOIA exemptions identified in 5 U.S.C. 552(b), all information submitted to EERE by a FOA applicant is subject to public release under the Freedom of Information Act, 5 U.S.C. §552, as amended by the OPEN Government Act of 2007, Pub. L. No. 110-175. It is the applicant’s responsibility to review FOIA and its exemptions to understand (1) what information may be subject to public disclosure and (2) what information applicants submit to the Government that are protected by law. In some cases, DOE may be unable to make an independent determination regarding which information submitted by an applicant is releasable and which is protected by an exemption. In such cases, DOE will consult with the applicant, in accordance with 10 C.F.R. §1004.11, to solicit the applicant’s views on how the information should be treated.

F. 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.

G. 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.

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H. 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).

I. NOTICE OF POTENTIAL DISCLOSURE UNDER FREEDOM OF INFORMATION ACT

Applicants should be advised that identifying information regarding all applicants, including applicant names and/or points of contact, may be subject to public disclosure under the Freedom of Information Act, whether or not such applicants are selected for negotiation of award.

J. 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.

K. RETENTION OF SUBMISSIONS

EERE expects to retain copies of all [Letters of Intent](#), 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.

L. TITLE TO SUBJECT INVENTIONS

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.

M. GOVERNMENT RIGHTS IN SUBJECT INVENTIONS

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

1. 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.

2. 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.

N. 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.

O. COPYRIGHT

The Prime Recipient and Subrecipients 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.

P. PROTECTED PERSONALLY IDENTIFIABLE INFORMATION

In responding to this FOA, applicants must ensure that Protected Personally Identifiable Information (PII) is not included in the application documents. These documents will be used by the Merit Review Committee in the review process to evaluate each application. PII is defined by the Office of Management and Budget (OMB) and EERE as:

Any information about an individual maintained by an agency, including but not limited to, education, financial transactions, medical history, and criminal or employment history and information that can be used to distinguish or trace an individual's identity, such as their name, social security number, date and place of birth, mother's maiden name, biometric records, etc., including any other personal information that is linked or linkable to an individual.

This definition of PII can be further defined as: (1) Public PII and (2) Protected PII.

Public PII: PII found in public sources such as telephone books, public websites, business cards, university listing, etc. Public PII includes first and last name, address, work telephone number, email address, home telephone number, and general education credentials.

Protected PII: PII that requires enhanced protection. This information includes data that if compromised could cause harm to an individual such as identity theft.

Listed below are examples of Protected PII that applicants must not include in the files listed above to be evaluated by the Merit Review Committee. This list is not all inclusive.

- Social Security Numbers in any form
- Place of Birth associated with an individual
- Date of Birth associated with an individual
- Mother's maiden name associated with an individual
- Biometric record associated with an individual

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- Fingerprint
- Iris scan
- DNA
- Medical history information associated with an individual
- Medical conditions, including history of disease
- Metric information, e.g. weight, height, blood pressure
- Criminal history associated with an individual
- Employment history and other employment information associated with an individual
- Ratings
- Disciplinary actions
- Performance elements and standards (or work expectations) are PII when they are so intertwined with performance appraisals that their disclosure would reveal an individual's performance appraisal
- Financial information associated with an individual
- Credit card numbers
- Bank account numbers
- Security clearance history or related information (not including actual clearances held)

Q. ANNUAL COMPLIANCE AUDITS

If a for-profit entity is a Prime Recipient or Subrecipient 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 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 sub-recipients (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.

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:

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- 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 – 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

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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

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.

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.

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.

APPENDIX E – DEFINITIONS AND ACCEPTABLE BIOMASS

FEEDSTOCKS

“Advanced Biofuels” For purposes of this FOA, the term 'advanced biofuels' means renewable fuel, other than sugar, starch and lignocellulosic based alcohols, that has lifecycle greenhouse gas emissions that are at least 50 percent less than baseline lifecycle greenhouse gas emissions. The targeted fuels must be either currently approved hydrocarbon fuels or likely to be approved in the future. “Biodiesel” or other diesel-equivalent fuel derived from transesterification of renewable biomass, including vegetable oil and animal fat, is specifically excluded.

“Biomass intermediates” for the purposes of this FOA, ‘biomass intermediates’ are biologically derived materials such as mixed, dilute sugars, oligomeric sugars, acids, alcohols, biogases, biosolids, and lignin. Further conversion of these intermediates leads to liquid transportation fuels or other bioproducts.

“Biogas” (including landfill gas and sewage waste treatment gas) for the purposes of this FOA, is produced through the conversion of organic matter from renewable biomass. This DOES NOT include syngas from the gasification of biomass.

Acceptable Biomass Feedstocks

Both lignocellulosic and algal feedstocks are of interest. Applicants must identify their target, high-impact feedstock, which is defined as a feedstock that has the potential to ultimately produce 50 million dry tons of biomass per year. Alternatively, the proposed technology must be shown to have the ability to convert a variety of biomass feedstocks that together represent a total sustainable potential of at least 50 million dry tons of biomass per year. The lignocellulosic biomass sources include agricultural residues such as corn stover, other grain straws, bagasse, soybean matter and wood residues as defined in EPA Act 2005 Section 932(a)(1)&(2) and cited below. No plant based material that is generally intended for use as food may be used as a feedstock under this FOA. Hence, sugars derived from sugarcane, sweet sorghum, or beets and oils derived from soy, canola, sunflower, peanut, and other such food sources normally recovered using conventional food processing methods are not eligible as feedstocks under this FOA. **To be clear, applications proposing to process fiber from wet and dry-grind corn refineries, distillers dried grains and solubles, or other food related biomass will be considered non-responsive and will NOT be considered for funding under this FOA.**

Algal biomass includes micro- and macro-algae, as well as cyanobacteria. Algal biofuel and bioproduct intermediates include extracted lipids, products derived from sugars or proteins (alcohol or hydrocarbon fuels), secreted metabolites (alcohols or others), or bio-crude resulting from hydrothermal liquefaction. If experimental plans rely on genetically modified organism (GMO) technology, a discussion of U.S. regulatory landscape – e.g., Toxic Substance Control Act (TSCA), the Animal and Plant Health Inspection Service (APHIS) – and the impacts of regulations on the project objectives, scope, and schedule are required. Biology and cultivation

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experimental plans must consider scaling explicitly in experimental design and objectives as shown by but not limited to: primary use of robust production organisms (instead of model organisms, e.g. *Chlamydomonas reinhardtii*); diurnal cycles, solar-strength irradiance, and fluctuating temperatures for growth experiments; and outdoor culture performance verification.

Sec. 932. BIOENERGY PROGRAM.

(a) DEFINITIONS.—In this section:

(1) BIOMASS.—The term “biomass” means—

- (A) any organic material grown for the purpose of being converted to energy;
- (B) any organic byproduct of agriculture (including wastes from food production and processing) that can be converted into energy; or
- (C) any waste material that can be converted to energy, is segregated from other waste materials, and is derived from—
 - (i) any of the following forest-related resources: mill residues, precommercial thinnings, slash, brush, or otherwise non-merchantable material; or
 - (ii) wood waste materials, including waste pallets, crates, dunnage, manufacturing and construction wood wastes (other than pressure-treated, chemically-treated, or painted wood wastes), and landscape or right-of-way tree trimmings, but not including municipal solid waste, gas derived from the biodegradation of municipal solid waste or paper that is commonly recycled.

(2) LIGNOCELLULOSIC FEEDSTOCK.—The term “lignocellulosic feedstock” means any portion of a plant or coproduct from conversion, including crops, trees, forest residues, and agricultural residues *not specifically grown for food*, [emphasis added] including from barley grain, grape seed, rice bran, rice hulls, rice straw, soybean matter, and sugarcane bagasse.

(b) PROGRAM.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for bioenergy, including—

- (1) biopower energy systems;
- (2) biofuels;
- (3) bioproducts;
- (4) integrated biorefineries that may produce biopower, biofuels, and bioproducts;
- (5) cross-cutting research and development in feedstocks; and
- (6) economic analysis

(c) BIOFUELS AND BIOPRODUCTS.—The goals of the biofuels and bioproducts programs shall be to develop, in partnership with industry and institutions of higher education—

- (1) advanced biochemical and thermochemical conversion technologies capable of making fuels from lignocellulosic feedstocks that are price-competitive with gasoline or diesel in either internal combustion engines or fuel cell-powered vehicles;

(2) advanced biotechnology processes capable of making biofuels and bioproducts with emphasis on development of biorefinery technologies using enzyme-based processing systems;

(3) advanced biotechnology processes capable of increasing energy production from lignocellulosic feedstocks, with emphasis on reducing the dependence of industry on fossil fuels in manufacturing facilities; and

(4) other advanced processes that will enable the development of cost-effective bioproducts, including biofuels.

APPENDIX F – TECHNICAL AND ECONOMIC 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.

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. It is understood that the proposed project may be in the very early stages of research and the BFD may change throughout the project as the applicant better understands how the project would fit into a commercial biofuels plant. 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 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 each unit operation that is highlighted in the BFD (and is 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 (single unit operation) and Topic Area 2 (multiple unit operations) 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. 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 (feedstock, technology readiness level, products, scale and basis for benchmark data provided). 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:** This section has only five metrics that are prescribed (net product yield, % theoretical yield, temperature, pressure, and residence time). If these 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 Key Performance Parameters tailored to the application. When adding Key Performance Parameters (KPP) 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.

Topic Area 1 – Topic Area 1 is limited to improvements in one unit operation and thus applicants will only be expected to complete the benchmark, intermediate and final targets for that single unit operation (columns D-F).

Topic Area 2 - Topic Area 2 applicants are proposing improvements to multiple unit operations and thus will be expected to complete the benchmark, intermediate and final targets for each of the unit operations being addressed in the proposal(columns D-F, H-J, etc.).

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. While it is understood that these projects may have lower technology readiness levels (TRLs), there are a number of TechnoEconomic Analysis (TEA) inputs that each applicant should know before moving forward with research and development. 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 and walking through the table to understand the assumptions that went into completing it.

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 Economics 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>

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.**

Topic Area 1 and 2 Examples – Examples of the type of information and tables that are expected from applicants. **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.