

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

**Project Development for Pilot and Demonstration Scale  
Manufacturing of Biofuels, Bioproducts, and Biopower  
(PD2B3)**

**Funding Opportunity Announcement (FOA) Number: DE-FOA-0001232**

**FOA Type: Mod 000002**

**CFDA Number: 81.087**

<b>FOA Issue Date:</b>	May 6, 2016
<b>Submission Deadline for Concept Papers:</b>	June 6, 2016 5:00pm ET
<b>Submission Deadline for Full Applications:</b>	July 22, 2016 5:00pm ET
<b>Expected Submission Deadline for Replies to Reviewer Comments:</b>	September 9, 2016 5:00pm ET
<b>Expected Date for EERE Selection Notifications:</b>	October 31, 2016
<b>Expected Timeframe for Award Negotiations</b>	January 31, 2017

- Applicants must submit a Concept Paper by 5:00pm ET on 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 Modifications				
000001	5/18/2016	<b>Section I.B - Topic Areas/Technical Areas of Interest</b> <b>and</b> <b>Appendix D – Allowable Feedstock Definitions</b> The throughput requirement for gaseous feedstocks has been modified to align with the energy content of the required cellulosic biomass feedstock throughput for both Topic Area 1 and Topic Area 2.				
		<b>Minimum Throughput Requirements for Each Topic Area:</b>				
				Topic Area 1	Topic Area 2	Topic Area 3
		Biogas	Advanced or Cellulosic Biofuels (Bioproducts, Biopower)	16,000 MBTU/day	800,000 MBTU/day	Not Allowed
		Industrial Flue or Waste Gases (biological conversion mechanisms only)	Advanced or Cellulosic Biofuels (Bioproducts, Biopower)	16,000 MBTU/day	800,000 MBTU/day	Not Allowed
<b>Section II.A – Award Overview</b>  <b>ii. Period of Performance</b> EERE anticipates making Phase 1 awards that will run up to 24 months in length. The initial task in all Phase 1 awards will be a validation of application data. Project continuation after the validation of application data will be contingent upon satisfactory performance and a go/no-go decision review to allow the projects to proceed						

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		<p>with the remaining Phase 1 tasks. At the go/no-go decision point, EERE will evaluate project readiness compared to the baseline presented in the original full application. As a result of this evaluation, EERE will make a determination to continue the project, re-direct the project, or discontinue funding the project.</p> <p><b>Section VII. Questions/Agency Contacts</b></p> <p>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: <a href="mailto:PD2B3@ee.doe.gov">PD2B3@ee.doe.gov</a>. Questions must be submitted not later than 3 business days prior to the application due date and time.</p>															
000002	6/2/2016	<p><b>Section I.B - Topic Areas/Technical Areas of Interest and</b></p> <p><b>Appendix D – Allowable Feedstock Definitions</b></p> <p>The correction in Modification 000001 to modify the throughput requirement for gaseous feedstocks was incorrect. It has been re-modified to align with the energy content of the required cellulosic biomass feedstock throughput for both Topic Area 1 and Topic Area 2.</p> <table><tr><th colspan="5">Minimum Throughput Requirements for Each Topic Area:</th></tr><tr><th></th><th></th><th>Topic Area 1</th><th>Topic Area 2</th><th>Topic Area 3</th></tr><tr><td>Biogas</td><td>Advanced or Cellulosic Biofuels (Bioproducts, Biopower)</td><td>16 MBTU/day</td><td>800 MBTU/day</td><td>Not Allowed</td></tr></table>	Minimum Throughput Requirements for Each Topic Area:							Topic Area 1	Topic Area 2	Topic Area 3	Biogas	Advanced or Cellulosic Biofuels (Bioproducts, Biopower)	16 MBTU/day	800 MBTU/day	Not Allowed
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## Table of Contents

<b>I. Funding Opportunity Description .....</b>	<b>4</b>
A. Description/Background.....	4
B. Topic Areas/Technical Areas of Interest.....	10
C. Applications Specifically Not of Interest.....	17
D. Authorizing Statutes.....	18
<b>II. Award Information .....</b>	<b>18</b>
A. Award Overview .....	18
i. Estimated Funding.....	18
ii. Period of Performance .....	20
iii. New Applications Only .....	20
B. EERE Funding Agreements .....	20
i. Cooperative Agreements.....	21
ii. Funding Agreements with FFRDCs.....	21
<b>III. Eligibility Information .....</b>	<b>21</b>
A. Eligible Applicants .....	21
i. Individuals.....	21
ii. Domestic Entities.....	21
iii. Foreign Entities.....	22
iv. Incorporated Consortia .....	23
v. Unincorporated Consortia .....	23
B. Cost Sharing and Contingency Requirements .....	24
i. Cost Share 50%.....	24
ii. Contingency Requirements .....	26
C. Compliance Criteria .....	27
i. Concept Papers.....	27
ii. Full Applications .....	27
iii. Replies to Reviewer Comments.....	28
D. Responsiveness Criteria.....	28
E. Other Eligibility Requirements .....	28
i. Requirements for DOE/NNSA Federally Funded Research and Development Centers (FFRDC) Listed as the Applicant .....	28
ii. Requirements for DOE/NNSA and non-DOE/NNSA Federally Funded Research and Development Centers Included as a Subrecipient .....	29
F. Limitation on Number of Concept Papers and Full Applications Eligible for Review .....	30
G. Questions Regarding Eligibility.....	30
<b>IV. Application and Submission Information .....</b>	<b>30</b>
A. Application Process .....	30
i. Additional Information on EERE Exchange .....	32
B. Application Forms .....	32
C. Content and Form of the Concept Paper .....	33
i. Concept Paper Content Requirements.....	33
D. Content and Form of the Full Application .....	34
i. Full Application Content Requirements.....	35
ii. Technical Volume .....	36
iii. Statement of Project Objectives.....	40
iv. SF-424: Application for Federal Assistance.....	41
v. Budget Justification Workbook (EERE 335) .....	41
vi. Summary/Abstract for Public Release .....	42

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vii.	Summary Slide .....	42
viii.	Subaward Budget Justification (EERE 335) (if applicable) .....	43
ix.	Budget for DOE/NNSA FFRDC (if applicable) .....	43
x.	Authorization for non-DOE/NNSA or DOE/NNSA FFRDCs (if applicable) .....	43
xi.	SF-LLL: Disclosure of Lobbying Activities .....	43
xii.	Waiver Requests: Foreign Entities and Performance of Work in the United States (if applicable) .....	44
xiii.	U.S. Manufacturing Commitments .....	44
xiv.	Data Management Plan .....	46
xv.	Block Flow Data .....	46
E.	Content and Form of Replies to Reviewer Comments .....	46
F.	Post-Award Information Requests .....	47
G.	Dun and Bradstreet Universal Numbering System Number and System for Award Management .....	47
H.	Submission Dates and Times .....	48
I.	Intergovernmental Review .....	48
J.	Funding Restrictions .....	48
i.	Allowable Costs .....	48
ii.	Pre-Award Costs .....	48
iii.	Performance of Work in the United States .....	50
iv.	Construction .....	50
v.	Foreign Travel .....	51
vi.	Equipment and Supplies .....	51
vii.	Lobbying .....	51
viii.	Risk Assessment .....	52
<b>V.</b>	<b>Application Review Information .....</b>	<b>52</b>
A.	Technical Review Criteria .....	52
i.	Concept Papers .....	52
ii.	Full Applications .....	53
iii.	Criteria for Replies to Reviewer Comments .....	55
B.	Standards for Application Evaluation .....	55
C.	Other Selection Factors .....	55
i.	Program Policy Factors .....	55
D.	Evaluation and Selection Process .....	56
i.	Overview .....	56
ii.	Pre-Selection Interviews .....	56
iii.	Pre-Selection Clarification .....	57
iv.	Recipient Integrity and Performance Matters .....	57
v.	Selection .....	58
E.	Anticipated Notice of Selection and Award Dates .....	58
<b>VI.</b>	<b>Award Administration Information .....</b>	<b>58</b>
A.	Award Notices .....	58
i.	Ineligible Submissions .....	58
ii.	Concept Paper Notifications .....	58
iii.	Full Application Notifications .....	59
iv.	Successful Applicants .....	59
v.	Alternate Selection Determinations .....	59
vi.	Unsuccessful Applicants .....	60
B.	Administrative and National Policy Requirements .....	60
i.	Registration Requirements .....	60
ii.	Award Administrative Requirements .....	61

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iii.	Foreign National Access to DOE Sites .....	61
iv.	Subaward and Executive Reporting.....	62
v.	National Policy Requirements .....	62
vi.	Environmental Review in Accordance with National Environmental Policy Act (NEPA) .....	62
vii.	Applicant Representations and Certifications .....	63
viii.	Statement of Federal Stewardship .....	65
ix.	Statement of Substantial Involvement .....	65
x.	Intellectual Property Management Plan .....	67
xi.	Subject Invention Utilization Reporting.....	67
xii.	Intellectual Property Provisions.....	68
xiii.	Reporting .....	68
xiv.	Go/No-Go Review .....	69
xv.	Conference Spending.....	69
xvi.	Equipment Requirements – For-Profit Entities .....	69
xvii.	Bonding – Construction Contracts.....	71
C.	Program Down-Select.....	71
<b>VII.</b>	<b>Questions/Agency Contacts .....</b>	<b>74</b>
<b>VIII.</b>	<b>Other Information .....</b>	<b>74</b>
A.	FOA Modifications.....	74
B.	Government Right to Reject or Negotiate.....	75
C.	Commitment of Public Funds.....	75
D.	Treatment of Application Information .....	75
E.	Evaluation and Administration by Non-Federal Personnel .....	76
F.	Notice Regarding Eligible/Ineligible Activities .....	76
G.	Notice of Right to Conduct a Review of Financial Capability.....	76
H.	Notice of Potential Disclosure Under Freedom of Information Act (FOIA) .....	77
I.	Requirement for Full and Complete Disclosure .....	77
J.	Retention of Submissions .....	77
K.	Title to Subject Inventions.....	77
L.	Government Rights in Subject Inventions .....	79
i.	Government Use License .....	79
ii.	March-In Rights .....	79
M.	Rights in Technical Data .....	79
N.	Copyright .....	80
O.	Personally Identifiable Information (PII) .....	80
P.	Annual Compliance Audits .....	81
	<b>Appendix A – Cost Share Information .....</b>	<b>82</b>
	<b>Appendix B – Waiver Requests: Foreign Entity Participation as the Prime Recipient and Performance of Work in the United States .....</b>	<b>86</b>
	1. Waiver for Foreign Entity Participation as the Prime Recipient.....	86
	2. Waiver for Performance of Work in the United States .....	87
	<b>Appendix C - Data Management Plan .....</b>	<b>88</b>
	<b>Appendix D – Allowable Feedstock Definitions .....</b>	<b>92</b>
	<b>Appendix E - Concept Paper Cover Page Guidance .....</b>	<b>97</b>
	<b>Appendix F – Block Flow Data .....</b>	<b>100</b>
	<b>Appendix G – Technology Readiness Level Descriptions .....</b>	<b>106</b>
	<b>Appendix H – Definitions .....</b>	<b>108</b>

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## I. Funding Opportunity Description

### A. Description/Background

The Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy (EERE), announces a notice of availability of funding for financial assistance from the Bioenergy Technologies Office (BETO). DOE has funded biorefinery technology development projects since 2002 to meet two EERE performance goals: 1) dramatically reduce dependence on imported oil; and 2) spur the creation of the domestic bio-industry.

This FOA will identify, evaluate, and select applications proposing project development and execution plans for the manufacture of Advanced or Cellulosic Biofuels (“Biofuels”, as defined in the Energy Investment and Security Act of 2007 (EISA 2007) §201), bioproducts, refinery compatible intermediates, or biopower in a domestic pilot or demonstration scale Integrated Biorefinery (IBR). Scale-up and validation of these process technologies is essential to enable the industry to build future pioneer- and commercial-scale facilities. The FOA seeks applications for projects to first design, and then construct and operate IBR facilities. There will be a down-select review between the design phase (Phase 1) and the construction/operation phase (Phase 2). The down-select decision will be made by DOE at the completion of the design phase (see Section VI.C for additional information regarding the down-select process). Project performance in Phase 1, as well as portfolio balance, availability of funds, and other factors will be considered in the down-select decision process. Only projects selected by DOE as a result of the down-select process will receive additional funding and be permitted to proceed into the construction/operation phase (Phase 2).

The FOA will include three topic areas as follows:

- **Topic Area 1:** Pilot scale production of Biofuels from high impact cellulosic, algal, or biogas feedstocks. Minimum feedstock throughput must be 1 dry metric ton (DMT) per day or equivalent throughput of algal biomass or biogas. Bioproducts and biopower are only allowed as co-products from the facility.
- **Topic Area 2:** Demonstration scale production of Biofuels from high impact cellulosic, algal, or biogas feedstocks. Minimum feedstock throughput must be 50 DMT per day or equivalent of algal biomass or biogas. Bioproducts and biopower are only allowed as co-products from the facility.
- **Topic Area 3:** Production of either biopower or Biofuels from biosolids and other allowable Wet Waste Feedstock streams. Bioproducts are also allowed as co-products from the facility. Minimum feedstock throughput must be 1 DMT per day.

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Applications submitted in response to this FOA must address the entire process, from feedstock handling through to biofuel, bio-product, or biopower distribution. Applicants who propose the production of biopower must include a discussion of the costs of combined heat and power or electricity generation in the full application.

All applications must stress articulation of the project's value proposition, target markets, competitors, and distribution channels for proposed technology, along with known or perceived barriers to market penetration, including mitigation strategies. The value proposition should include a discussion of the current and potential market share, and the economic competitiveness of the proposed process.

Applicants who intend to replicate and commercialize the technology through other than scale-up methods, such as through modular deployment or other mechanisms, must present equivalent information to sufficiently describe their envisioned commercialization strategy. Recognizing the significant capital investments that have been made through prior BETO FOAs, BETO also encourages innovative reuse and repurposing of capital equipment purchased under prior DOE programs.

A limited amount of preparatory work to support the design of the proposed pilot scale project will be allowed within the scope of the project. Typically up to 10% of the total Phase 1 project budget (total allowable budget) may be proposed for the preparatory R&D, but the amount is subject to negotiation after notification of selection for negotiation of an award. Preparatory work may include limited research and development (R&D) including expenses for equipment, salaries, and supplies. All project costs, including any preparatory R&D work, will be subject to the 50% cost share requirement, as described in III.B.i.

All applicants must clearly establish that sufficient work at prior scale has been completed to justify that the proposed IBR meets either Technology Readiness Level 6 criteria for pilot scale applications or Technology Readiness Level 7 criteria for demonstration scale applications. See Appendix G for descriptions of each Technology Readiness Level.

#### Clarification on Technologies of Interest and Not of Interest

The production of biogas without further processing into biopower, Biofuels, and/or bioproducts is specifically not of interest for purposes of this FOA. Applicants that propose the production of Biofuels must incorporate the costs of any post-processing steps required to produce a marketable product at a credible level for insertion into the supply chain.

"Biodiesel" or other diesel-equivalent fuel derived from renewable biomass, including vegetable oil and animal fat, is specifically excluded, unless derived from a non-food feedstock. Applicants should note that the technology for producing biodiesel by conventional means is considered an established technology. The intent of this FOA is not to optimize existing

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commercial technologies. Hence, for this FOA, applications that propose biorefineries producing biodiesel via transesterification or other established technologies will be scored lower than applications proposing unique or highly innovative technologies.

In addition, research on improvements in biomass-derived syngas conversion to Fischer-Tropsch products, methanol, and ammonia, isosynthesis or oxosynthesis to aldehydes/alcohols will be scored lower due to the extensive historical industrial and government investment in these conversion technologies. Applications that propose innovative conversion of mixed alcohols or other intermediates into the allowable products for the selected Topic Area are responsive to this FOA. Applications only proposing to produce alcohols or other intermediates without conversion to finished biofuels or other products allowed by the selected Topic Area are not of interest to this FOA.

#### Additional Feedstock Requirements

In order to have a robust and commercially relevant process, applications must include previous work and future plans to develop a technology that is capable of converting diverse samples which represent the potential variability of the selected feedstock. Applicants must identify which feedstock sources have been used, and will be used, to demonstrate the capability of the technology. Examples of representative sources could be: feedstock from different harvest or production years, different harvest and storage methods, or feedstock produced from different regions of the country.

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

#### Project and Award Structure

As noted above, all projects selected from this FOA will be subject to a down-select review and decision between the design phase (Phase 1) and the construction/operation phase (Phase 2). The down-select decision will be made by DOE at the completion of Phase 1. Project performance in Phase 1 as well as portfolio balance, availability of funds, and other factors will be considered in the down-select decision process. Only projects selected by DOE as a result of the down-select process will receive additional funding and be permitted to proceed into the construction/operation phase (Phase 2).

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Phases	Budget Periods	Scope
Phase 1 – Design Phase	Budget Period 1	Validation of baseline data presented in application to DE-FOA-0001232
	Go/No-Go Review	
	Budget Period 2	Preliminary planning and design
Down-select (CD-3) Review		
Phase 2 – Construction/Operation Phase	Budget Period 3	Final Design, Construction
	Go/No-Go (CD-4) Review	
	Budget Period 4	Operations

Awardees are expected to detail their strategy for project development, project management, technology verification, funding sources, and risk mitigation, among other details. Key outcomes to be provided as deliverables to DOE at the end of Phase 1 to inform the down-select review and decision include, but are not limited to:

- A Front-End Loaded – 3 (FEL-3) design (-5%/+15% cost estimate accuracy). This could also be described as CD-3: Approve Start of Construction (CD-3, as described in DOE O 413.3B, Program and Project Management for the Acquisition of Capital Assets<sup>1</sup>);
- A Project Management Plan (PMP) and a Risk Mitigation Plan (RMP) that clearly demonstrate sufficient project controls are in place and that the recipient is ready to execute final design, construction, commissioning, startup, shakedown, and operations of the integrated biorefinery;
- A strategy to qualify for or obtain any necessary regulatory approvals to ensure that the Biofuel(s) and product(s) would be acceptable for sale into commerce, such as but not limited to EPA Title 40 Part 79 registration, including production of sufficient quantities of materials to enable any required testing;
- An updated Life Cycle Analysis (LCA) showing that the Biofuel product(s) will qualify as Advanced or Cellulosic Biofuel(s), such as an EPA Title 40 Part 80 determination, (the primary products for Topic Areas 1 and 2 must be Biofuels);
  - While a similar greenhouse gas (GHG) reduction requirement does not exist for bioproducts or biopower, applicants are encouraged to meet or exceed

<sup>1</sup> DOE O 413.3B, PROGRAM AND PROJECT MANAGEMENT FOR THE ACQUISITION OF CAPITAL ASSETS;  
<https://www.directives.doe.gov/directives-documents/400-series/0413.3-BOrder-b>

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equivalent GHG reductions for their proposed process and must describe how the proposed project presents a significant LCA improvement over competing technologies;

- A business plan that clearly shows the recipient has:
  - secured the rights to practice all necessary intellectual property to construct and operate the proposed integrated biorefinery (IBR) facility;
  - a firm written commitment for the project site, including all applicable permits;
  - the appropriately-skilled team to execute the project to completion;
  - the financial and project management capabilities to complete the project from construction through commissioning, startup, and operations;
  - a scale-up analysis that clearly addresses the scale-up factors and risks associated with each of the process units;
  - feedstock purchase contracts for sufficient quantities of material to execute the proposed project;
  - any necessary utility supply, interconnect, or export agreements indicating sufficient power, water, or similar services will be available to the facility;
  - off-take agreements for any product(s) that will be produced from the facility;
  - market analysis of all major facility inputs and outputs at initial (first facility), transitional, and mature (10 or more facilities) market share points considering any planned transitions in the fuel to products ratio as market share and number of plants increase in the U.S.
- A Techno-Economic Analysis (TEA) that clearly shows how the pioneer (1<sup>st</sup> commercial scale) and follow-on mature commercial facilities, should they become operational, would result in substantive and measurable reductions in the cost of producing drop-in hydrocarbon Biofuels, bioproducts, or biopower;
  - Additional factors to be incorporated into the required TEA include, but not necessarily limited to:
    - Economic competitiveness of proposed solutions compared to existing alternatives, with and without incentives or subsidies
    - Avoided costs when compared to alternative solutions, such as biosolids disposal costs
    - Production of any co-products
- A technical and financial data sheet, supplied by the BETO during Phase 1, which models the target and demonstrated performance (based on previous testing at the next lower Technology Readiness Level [TRL]) that supports the TEA identified above.
- Sufficient cost share and contingency in the form of allowable and readily available resources to complete the remainder of the project.

Note: Contracts or agreements referenced above may include clauses that allow execution to be contingent upon a favorable down-select decision by DOE at the end of Phase 1 of the project.

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### Initial Project Validation

After negotiation and execution of the Phase 1 award all selected projects will be subject to an initial validation effort to review their baseline and proposed targets and will result in a go/no-go decision. The validation effort will require that the Recipient conduct a performance test of the process proposed in the FOA application. The performance test will require that the recipient reproduce data sets to commensurate to the prior scale work presented in the application. The prior scale data sets must be available to DOE, (which may include delivery to DOE), or its representatives (such as an Independent Engineer), for review in support of the validation effort. The outcome of this performance test will be a primary component of the go/no go decision. Applicants should include this task within their proposed scope, schedule, and budget. It is anticipated that the initial validation can take up to three months; applicants must include this task in their schedule as Budget Period 1. Applicants will be required to execute the appropriate Conflict of Interest and Non-disclosure Agreements (COI/NDA) with DOE's representatives immediately after negotiation and execution of an award. Failure to execute the COI/NDAs in a reasonable amount of time to enable the validation review will result in a 'no-go' decision. Selected projects that receive a 'go' decision at the conclusion of the initial validation effort and proceed to Budget Period 2 will also be subject to a final validation review as part of the down-select process prior to Phase 2.

### End of Phase 1 – Down-Select Decision Point

Consistent with the Merit Review Procedure<sup>2</sup> that will be used to evaluate the applications submitted in response to this FOA, DOE will engage an independent panel of subject matter experts to evaluate the Phase 1 deliverables. DOE will consider technical and financial readiness to proceed (including but not limited to the requirements identified above); availability of federal funds; and other selection factors, such as the Program Policy Factors published in the FOA, when making the down-select decision. The requirements for the down-select are discussed in greater detail in Section VI.C.

### National Environmental Policy Act (NEPA) Considerations

All project activities will be subject to NEPA review. Applicants should account for NEPA related efforts in the project scope, schedule, and budget. Phase 1 of each award will be limited in scope, as it will focus only on project development and design activities related to future pilot and demonstration scale integrated biorefineries. Under Phase 1, limited modifications to existing facilities to complete the prior scale data set may be allowed; construction of new facilities will not be allowed.

Any construction activities will be restricted to Phase 2. DOE will complete additional NEPA review for Phase 2 activities. See Sections IV.J.ii.1 and V.B.vi for additional information on NEPA requirements.

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<sup>2</sup> Department of Energy Merit Review Guide For Financial Assistance,  
<http://energy.gov/sites/prod/files/2016/02/f29/Merit%20Review%20Guide%20FINAL%20JULY%202013.pdf>  
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### Additional Financial Requirements

In addition to verifying the technical baseline at the beginning of Phase 1 and demonstrating completion of the key outcomes from Phase 1, Recipients must demonstrate their financial readiness to proceed. This includes demonstrating the ability to provide all required cost share and contingency prior to entering into each Phase of the project. Recipients are required to secure all cost share and contingency prior to proceeding into the next project Phase or budget period. Throughout the award life cycle, DOE will review and monitor the financial capability of the Recipient and other key organizations within the project team, such as parent companies or cost share providers. DOE may also conduct pre-award accounting system audits, financial capability reviews, or reviews of financial or compliance audits.

A contingency reserve is required for all Phase 2 activities. DOE experience and industry best practice show that a minimum of 25% of Total Phase 2 Costs is necessary to allow the project to continue when unexpected expenses are encountered. Recipients must demonstrate that they can meet the financial needs of the project. The continuation application for Phase 2 must also include documentation showing that the Recipient has access to this minimum 25% required contingency. Contingency funds must be: (a) liquid, (b) immediately available, and (c) unrestricted funds dedicated exclusively to the project for the purpose of mitigating project performance baseline risk. The contingency reserve is in addition to Total Project Costs and cannot count towards cost share, until expended. If expended, the contingency will not result in reimbursement by DOE above the total federal share approved in the award. DOE discourages Recipients from reducing scope to comply with the contingency reserve requirement.

## **B. Topic Areas/Technical Areas of Interest**

This FOA has three topic areas related to production of Biofuels, bioproducts, and biopower. Applicants are allowed to submit only one application to the FOA and must self-select the appropriate Topic Area.

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Minimum Requirements for each Topic Area:				
Acceptable Feedstock	Primary Product (Co-products)	Topic Area 1	Topic Area 2	Topic Area 3
Cellulosic Biomass	Advanced or Cellulosic Biofuels (Bioproducts, Biopower)	1 dry metric ton/day	50 dry metric tons/day	Not Allowed
Algal Biomass	Advanced or Cellulosic Biofuels (Bioproducts, Biopower)	25,000 gallons of intermediate per year	5-10x prior scale data (prior scale at least 25,000 gallons of intermediate per year)	Not Allowed
Biogas	Advanced or Cellulosic Biofuels (Bioproducts, Biopower)	16 MBTU/day	800 MBTU/day	Not Allowed
Industrial Flue or Waste Gases (biological conversion mechanisms only)	Advanced or Cellulosic Biofuels (Bioproducts, Biopower)	16 MBTU/day	800 MBTU/day	Not Allowed
Primary, secondary, tertiary, and post-anaerobic digestion sludge (i.e., biosolids) from municipal wastewater treatment systems	Biopower, Advanced or Cellulosic Biofuels (Bioproducts)	Not Allowed	Not allowed	1 dry metric ton/day
Food wastes from industrial, commercial, and residential sources	Biopower, Advanced or Cellulosic Biofuels (Bioproducts)	Not Allowed	Not Allowed	1 dry metric ton/day
Organic-rich wastewaters from industrial and commercial operations	Biopower, Advanced or Cellulosic Biofuels (Bioproducts)	Not Allowed	Not Allowed	1 dry metric ton/day

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**All Topic Area 1 and 2 applications must propose an Advanced or Cellulosic Biofuel (or combination of Advanced or Cellulosic Biofuels) as the Primary Product(s). The Primary Product stream(s) must contain at least 50% of the biogenic carbon leaving the facility as salable product. Applicants to Topic Area 3 must also show how their proposed approach will meet the FOA's objective to produce biopower or Biofuels as the primary product.**

Topic Areas 1 and 2:

For example, a proposed project development plan for a demonstration scale IBR producing liquid transportation Biofuel(s) with a carbon fiber co-product would be considered a competitive application under this FOA subject to the constraint that at least 50% of the biogenic carbon leaving the facility as salable product would be contained within the liquid transportation Biofuel product(s). Multiple Biofuel product streams can be summed to meet this minimum 50% biogenic carbon requirement. Liquid transportation fuels must be a liquid at STP (Standard Temperature and Pressure, 25 °C and 1 atmosphere pressure) conditions and must also be suitable for use as an infrastructure compatible blendstock that could be co-processed or co-distributed with petroleum derived fuels. Biogenic carbon used in the production of exported power must be included in the overall product balance. Waste, emission, or parasitic uses of biogenic carbon would not contribute to the determination of the total biogenic carbon product streams and would also need to be properly accounted for in the financial, technical, environmental, and sustainability targets for the facility. Applicants must also present a rationale supporting how the biofuel product(s) will qualify as Advanced or Cellulosic Biofuels by meeting the required greenhouse gas reductions. Life-cycle analysis (LCA), such as output from Argonne National Laboratory's GREET Model (The Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation Model), or similar, may be used to provide this justification. Applicants may also include tasks related to advanced feedstock supply and logistics, such as feedstock pre-processing or planning for a centralized feedstock depot.

Applications may also address strategies using biogas, algal biomass, or cellulosic biomass to produce an intermediate that would further be upgraded to fuels and products in an existing petroleum refinery. Applications would need to address how at least 50% of the biogenic carbon would be converted to a Biofuel and how this would be measured. The biofuel intermediate must proceed through a process to a hydrocarbon biofuel and possibly co-product(s), volumes of which must correspond to the intermediate production requirements. Applicants are required to show how the renewable fraction would be distributed across the refinery's product suite and continue to meet all applicable regulatory requirements both during production and also through distribution and use.

The techno-economic performance of these processes will be validated at scale in support of the BETO goal of a mature modeled price of \$3/gallon gasoline equivalent (gge) of Advanced

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Biofuel (as defined in EISA 2007, § 201). Applicants will also be asked to perform a sensitivity analysis on their Techno-Economic Analysis (TEA) considering recent fossil energy prices over the estimated term of any debt servicing that may be required for their envisioned facility.

The following feedstocks are allowable under only Topic Areas 1 and 2:

- Cellulosic biomass – Applicants proposing to use a cellulosic biomass feedstock for the production of drop-in hydrocarbon Biofuels and bioproducts must meet a minimum throughput of at least 1 DMT per day of a high impact cellulosic feedstock (or combination of feedstocks) for a pilot scale IBR, or a minimum throughput of 50 DMT per day of a high impact cellulosic feedstock (or combination) for demonstration scale IBR facilities.

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

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

**No plant based material that is generally intended for use as food or animal feed may be employed as a feedstock. The determining factor will be the typical use of the material in commerce.**

- Algal biomass – Applicants proposing to use an algal feedstock for the production of drop-in hydrocarbon biofuels and bioproducts must meet the following: both pilot and demonstration activities must occur in commercially relevant outdoor production environments; pilot scale biofuel intermediate production is expected to be on the order of 25,000 to 50,000 gallons per year; demonstration scale biofuel intermediate production is expected to be on the order of 5 to 10 times the applicant's existing pilot scale production (existing pilot scale production must be at a minimum of 25,000 to

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50,000 gallons of biofuel intermediate per year). Applications that propose to develop and/or utilize artificial lighting-based cultivation of algae are not of interest to this FOA.

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

Mixotrophic cultivation systems are eligible under this FOA; however, only renewable biomass-derived sugars such as cellulosic sugars or carbon-containing waste effluent may be utilized and are considered allowable within this FOA. Food- and grain-based sugars are not allowed. For the purpose of this FOA, mixotrophic algal biomass is grown photosynthetically with CO<sub>2</sub> as the main carbon source (photoautotrophic growth) and at some point in the cultivation process, cellulosic carbon from renewable biomass or carbon-containing waste effluent is fed as a supplemental carbon source. Heterotrophic cultivation systems are not eligible under the 'algal biomass' definition and requirements. See the discussion on cellulosic feedstocks above for additional information on heterotrophic systems.

For the purpose of this FOA, algal biofuel intermediates are defined as the end result of cultivation, harvesting, concentration (dewatering), and preprocessing (extraction or process-specific analog) of the resultant algal biomass into a feedstock suitable for processing to biofuels. Applicants are required to fully characterize their algal intermediates to show how they are suitable feedstocks for the selected downstream biofuel production technology. If an Applicant for demonstration scale does not have data at the minimum pilot scale, it will be deemed non-responsive for the demonstration scale requirement. In addition, although the production requirements for scale are based on the production of a biofuel intermediate, this FOA requires the production of a hydrocarbon biofuel with an allowance for co-product(s). Under this FOA, the proposed process may not end at production of the biofuel intermediate. Applicants must present prior scale data as well as future plans to demonstrate how the biofuel intermediate will be processed into a hydrocarbon biofuel and possibly co-product(s), volumes of which must correspond to the intermediate production requirements.

- High energy content waste gases:
  - Biogas (including landfill gas and sewage waste treatment gas) produced through the conversion of organic matter from renewable biomass.
  - Industrial flue waste gas, when converted to fuels and products via a biological mechanism.

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### Topic Area 3:

EERE is focused on achieving aggressive and well-defined mid-to-long term clean energy goals for the United States of America. In service of this goal, BETO targets the cost-effective and energy-efficient conversion of biogenic feedstocks to Biofuels, bioproducts, and biopower.<sup>3</sup> Wet organic waste streams can provide a biogenic source of carbon that has the potential to replace imported petroleum in a wide variety of applications.

Biosolids from municipal wastewater treatment processes (including primary, secondary, tertiary, and post-anaerobic digestion sludges) have traditionally been beneficially applied as fertilizer, utilized as daily cover in landfills, or incinerated. All three of these options are increasingly constrained by regulation, landfill consolidation, and public acceptance. Alternative solutions that simultaneously minimize the amount of biosolids requiring disposal and energy consumption are needed. Some of these efforts could potentially produce electricity or biofuel or bioproduct precursors, offering the opportunity to generate revenue from what is currently considered a waste treatment expense. Other possibilities include technologies that simultaneously enhance the energy production from anaerobic digestion and deliver Class A biosolids, which are suitable for a broader array of land applications.

While some relevant technologies have seen commercial success in Europe, deployment to date in the U.S. has been minimal. This Topic Area requests applications for deployments of energy-efficient biosolids processing technology with throughputs of at least one dry metric ton per day in order to validate the proposed technology to produce biopower, Biofuels, and/or bioproducts using allowable Wet Waste Feedstock(s), as defined below. Applicants must utilize only the three wet organic waste streams described below for the proposed project and future commercialization efforts.

For purposes of this FOA, DOE has defined the following three allowable Wet Waste Feedstocks:

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

Both pre-treatments that substantially enhance the performance of anaerobic digestion, and post-treatments that further reduce solids volume and/or recover additional energy and other valuable resources are eligible, as are processes that operate independently of anaerobic

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<sup>3</sup> DOE, *Bioenergy Technologies Office Multi-Year Program Plan*. 2015, Department of Energy: Washington, DC. p. 244.

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digestion. Projects proposing conversion of biosolids to a biogas or other intermediate through only an anaerobic digestion process will be considered non-responsive to this Topic Area.

Novel and innovative technologies are encouraged, as are solutions that minimize the amount of biosolids requiring disposal. Actual waste streams or waste stream blends must be used for all portions of the project including any preparatory research and development (R&D). “Mock” or “model” waste streams are specifically not of interest to this FOA. “Mock” or “model” waste streams are defined as feedstock(s) that are meant to replicate the composition and characteristics of a feedstock(s) but are not derived from the sources described above. For instance, chemical mixtures intending to simulate biosolids or food wastes are specifically not of interest for this FOA.

Additionally, commercial technologies such as incineration or traditional anaerobic digestion are not eligible. For purposes of this Topic Area, “commercial” is defined as more than three installations of the underlying technology in a comparable or larger scale operation in North America for at least one year. So, although traditional anaerobic digestion is not of interest, alternative reactor designs such as anaerobic membrane bioreactors or alternative forms of anaerobic digestion that otherwise meet the requirements will merit consideration.

Applications to Topic Area 3 must include solids handling as part of the proposed project. Projects addressing only collection and conversion of biogas to final products will be considered non-responsive to this Topic Area.

Blends of the above waste streams are permitted. Only actual streams from live operations will be considered; model or simulated mixtures are not of interest.

### Exclusions

The following types of feedstocks are specifically not of interest for Topic Area 3. Some items in the following list may be eligible for Topic Areas 1 and 2. Refer to Appendix D for a more detailed discussion. Any applications that rely on these resources will be deemed non-responsive and will not be reviewed or considered:

- Edible foodstuffs
- Manure slurries from animal husbandry operations.
- Aquatic plants, including but not limited to, water hyacinth, duckweed, and eelgrass.
- Yard waste
- Construction waste
- Commonly recycled paper
- Biogases, including but not limited to landfill gases, and gases produced from the anaerobic digestion of organic waste streams.
- Forest or crop residues

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- Purpose-grown energy crops
- Algal biomass

Topic Area 3 Applicants must provide a basis and justification showing that a majority of the allowable Wet Waste feedstock will be directed to production of biopower or Biofuels from the facility. Realizing that there are multiple technology pathways that could be utilized for the production of power, Applicants must show how their proposed approach will meet the FOA's objective to produce biopower or Biofuels as a primary product from the identified Wet Waste streams. Bioproducts are allowable as part of the overall value proposition, and should be incorporated as part of the business case. Proposals that include only bioproducts in the absence of biopower and/or Biofuels will be rejected as non-responsive.

**Note: All work under EERE funding agreements, under all Topic Areas, must be performed in the United States. See Section IV.J.3 and Appendix B.**

### **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 that fall outside the technical parameters specified in Section I.B of the FOA, including but not limited to:
  - Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).
  - Mock, model, synthetic, or simulated feedstocks are specifically not of interest to this FOA.
  - No plant based material that is generally intended for use as food or animal feed can be employed as a feedstock in any Topic Area of this FOA.
  - Applications only proposing to produce alcohols or other intermediates without conversion to finished biofuels or other products allowed by the selected Topic Area are not of interest to this FOA.
  - Applications that propose to develop and/or utilize artificial lighting-based cultivation of algae are not of interest to this FOA.
  - Traditional anaerobic digestion is a commercial technology, and is therefore not of interest. However, alternative reactor designs such as anaerobic membrane bioreactors or other novel configurations that are not commercial, and otherwise meet the requirements, may merit consideration.
  - The production of biogas without further processing into biopower, Biofuels, and/or bioproducts is specifically not of interest for purposes of this FOA.

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- “Biodiesel” or other diesel-equivalent fuel derived from renewable biomass, including vegetable oil and animal fat, is specifically excluded, unless derived from a non-food feedstock.

## D. Authorizing Statutes

The programmatic authorizing statutes are:

- EPCA 2005, § 932
- Energy Independence and Security Act of 2007, §201, §207
- 160 Cong. Rec. H9307 – Explanatory Statement Submitted by Mr. Rogers of Kentucky, Chairman of the House Committee on Appropriations Regarding the House Amendment to the Senate Amendment on H.R. 83

Awards made under FOA are subject to 2 CFR Part 200 as amended by 2 CFR Part 910.

## II. Award Information

### A. Award Overview

#### i. Estimated Funding

EERE expects to make approximately \$90,000,000 (\$38,000,000 for Phase 1 and the remaining \$52,000,000 for Phase 2) of Federal funding available for new awards under this FOA, subject to the availability of appropriated funds. No Phase 2 funds are being awarded at this time. All Phase 2 funding will only be awarded through the down-select review process at the completion of Phase 1. BETO anticipates an additional \$128,000,000 may be available for Phase 2 awards, however, these are out-year funds and are subject to future Congressional appropriations. EERE anticipates making approximately 4-11 awards under Phase 1 of this FOA; however, EERE may issue one, multiple, or no awards from this FOA.

For Phase 1, individual awards may vary between \$1,000,000 and \$2,000,000 for Topic Areas 1 and 3. Phase 1 awards may vary between \$1,000,000 and \$4,000,000 for Topic Area 2. For Phase 2, individual awards for Topic Areas 1 and 3 may be up to \$15,000,000. It is anticipated that approximately 2-6 projects will be selected to receive Phase 2 funding, which may be up to \$45,000,000 per project, subject to congressional appropriations.

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EERE may issue awards in one, multiple, or none of the following topic areas for Phase 1:

Topic Area 1: Development and preliminary planning of pilot scale facilities that will produce Advanced or Cellulosic Biofuels using cellulosic biomass, algal biomass, biogas, or biologically converted industrial flue or waste gases as a feedstock. EERE may issue approximately 5-10 awards in this topic area, with an average award amount of \$2,000,000.

Topic Area 2: Development and preliminary planning of demonstration scale facilities that will produce Advanced or Cellulosic Biofuels using cellulosic biomass, algal biomass, biogas, or biologically converted industrial flue or waste gases as a feedstock. EERE may issue approximately 2-4 awards in this topic area, with an average award amount of \$4,000,000.

Topic Area 3 : Development and preliminary planning of waste to energy facilities that will produce biopower or Biofuels using biosolids or other allowable wet waste streams as a feedstock. EERE may issue approximately 1-2 awards in this topic area, with an average award amount of \$2,000,000.

Applicants receiving a Phase 1 award will be eligible to compete for Phase 2 funding through a down-select review process. EERE may issue awards in one, multiple, or none of the following topic areas for Phase 2:

Topic Area 1: Construction and operations of pilot scale facilities that will produce Advanced or Cellulosic Biofuels using cellulosic biomass, algal biomass, biogas, or biologically converted industrial flue or waste gases as a feedstock. EERE may issue approximately 2-5 awards in this topic area, with a maximum award amount of \$15,000,000.

Topic Area 2: Construction and operations of demonstration scale facilities that will produce Advanced or Cellulosic Biofuels using cellulosic biomass, algal biomass, biogas, or biologically converted industrial flue or waste gases as a feedstock. EERE may issue approximately 1-2 awards in this topic area, with a maximum award amount of \$45,000,000.

Topic Area 3: Construction and operations of waste to energy facilities that will produce biopower or Biofuels using biosolids or other allowable wet waste streams as a feedstock. EERE may issue approximately 1 award in this topic area, with a maximum award amount of \$15,000,000.

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EERE will establish more than one budget period for each Phase of each award and fund only the initial Phase. Funding for all budget periods, including the initial budget period, is not guaranteed. Before the expiration of Phase 1, EERE will perform a down-select review on all Phase 1 recipients. EERE will provide Phase 2 funding only to recipients selected to continue to Phase 2.

**ii. Period of Performance**

EERE anticipates making Phase 1 awards that will run up to 24 months in length. The initial task in all Phase 1 awards will be a validation of application data. Project continuation after the validation of application data will be contingent upon satisfactory performance and a go/no-go decision review to allow the projects to proceed with the remaining Phase 1 tasks. At the go/no-go decision point, EERE will evaluate project readiness compared to the baseline presented in the original full application. As a result of this evaluation, EERE will make a determination to continue the project, re-direct the project, or discontinue funding the project.

Projects that complete Phase 1 will be expected to prepare a continuation application to inform a down-select review that will advance a reduced number of projects to Phase 2. At the down-select review, EERE will evaluate project readiness to proceed, project performance, project schedule adherence, meeting milestone objectives, compliance with reporting requirements, and overall contribution to the program goals and objectives. The down-select review will be completed within the 24-month Phase 1 period of performance. The period of performance for Phase 2 is anticipated to be up to 36 months in length. Only projects selected and awarded under Phase 1 will be allowed to participate in the down-select review prior to Phase 2.

**iii. 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

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objectives. EERE does not use such agreements to acquire property or services for the direct benefit or use of the United States Government.

**i. Cooperative Agreements**

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

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

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

**ii. Funding Agreements with FFRDCs**

In most cases, Federally Funded Research and Development Centers (FFRDC) are funded independently of the remainder of the Project Team. The FFRDC then executes an agreement with any non-FFRDC Project Team members to arrange work structure, project execution, and any other matters.

Regardless of these arrangements, the entity that applied as the Prime Recipient for the project will remain the Prime Recipient for the project.

### **III. Eligibility Information**

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

#### **A. Eligible Applicants**

**i. Individuals**

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

**ii. Domestic Entities**

For-profit entities, educational institutions, and nonprofits that are incorporated (or otherwise formed) under the laws of a particular State or

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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.

### **iii. Foreign Entities**

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

Foreign entities may request a waiver of the requirement to designate a subsidiary in the United States as the Prime Recipient in the Full Application (i.e., a foreign entity may request that it remains the Prime Recipient on an award). To do so, the Applicant must submit an explicit written waiver request in the Full Application. [Appendix B 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

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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.

#### **iv. 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.

#### **v. 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.

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## B. Cost Sharing and Contingency Requirements

### i. Cost Share 50%

The cost share must be at least 50% of the total allowable costs for demonstration projects (i.e., the sum of the Government share, including FFRDC costs if applicable, and the recipient share of allowable costs equals the total allowable cost of the project) and must come from non-Federal sources unless otherwise allowed by law. The 50% cost share requirement applies to all project costs, including demonstration, R&D, or other activities, for all Topic Areas under this FOA. (See 2 CFR 200.306 and 2 CFR 910.130 for the applicable cost sharing requirements.)

To assist applicants in calculating proper cost share amounts, EERE has included a cost share information sheet and sample cost share calculation in Appendix A 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 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.

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### 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.i of the FOA. In addition, cost share must be verifiable upon submission of the Full Application.

Project Teams may provide cost share in the form of cash or in-kind contributions. Cash contributions may be provided by the Prime Recipient or Subrecipients. Allowable in-kind contributions include, but are not limited to: rental value of buildings or equipment, the value of a donated service or resource, or third party in-kind contribution.

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

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

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

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

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

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

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#### **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 cumulative cost share must always meet or exceed 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.

### **ii. Contingency Requirements**

A contingency reserve is required for all Phase 2 activities. DOE experience and industry best practice show that a minimum of 25% of Total Phase 2 Project Costs is necessary to allow the project to continue when unexpected expenses are encountered. Awardees must demonstrate that they can meet the financial needs of the project. The continuation application for Phase 2 must also include

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documentation showing that the Awardee has access to this minimum 25% required contingency. Contingency funds must be: (a) liquid, (b) immediately available, and (c) unrestricted funds dedicated exclusively to the project for the purpose of mitigating project performance baseline risk. The contingency reserve is in addition to Total Project Costs and cannot count towards cost share, until expended. If expended, the contingency will not, result in reimbursement by DOE above the total federal share approved in the award. DOE discourages Awardees from reducing scope to comply with the contingency reserve requirement.

## C. Compliance Criteria

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

### i. Concept Papers

Concept Papers are deemed compliant if:

- The Concept Paper complies with the content and form requirements in Section IV.C and Appendix E 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.

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### 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
- The applicant successfully uploaded all required documents to EERE Exchange. The expected submission deadline is on the cover page of this FOA; however, it is the applicant's responsibility to monitor email in the event that the expected date changes.

## 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

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

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

The following wording is acceptable for the authorization:

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

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

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

### **1. Authorization for non-DOE/NNSA FFRDCs**

The Federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with its authority under its award.

### **2. Authorization for DOE/NNSA FFRDCs**

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

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

### **3. Value/Funding**

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

### **4. Cost Share**

Although the FFRDC portion of the work is usually excluded from the award to a successful applicant, the applicant's cost share requirement will be based on the total cost of the project, including the applicant's and the FFRDC's portions of the project.

### **5. Responsibility**

The Prime Recipient will be the responsible authority regarding the settlement and satisfaction of all contractual and administrative issues

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including, but not limited to disputes and claims arising out of any agreement between the Prime Recipient and the FFRDC contractor.

#### **6. Limit on FFRDC Effort**

The scope of work to be performed by an FFRDC as a subrecipient may not be more significant than the scope of work to be performed by the applicant.

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

Applicants may only submit one Concept Paper and one Full Application for consideration under this FOA. The Concept Paper and Full Application must address no more than one of the three (3) topic areas identified in Section I.B of the FOA. If an applicant submits more than one Concept Paper or Full Application, EERE will only consider the last timely submission for evaluation. Any other submissions received listing the same applicant will be considered noncompliant and not eligible for further consideration. This limitation does not prohibit an applicant from collaborating on other applications (e.g., as a potential Subrecipient or partner) so long as the entity is only listed as the prime applicant on one Concept Paper and Full Application submitted under this FOA.

### **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**

### **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**

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

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

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

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

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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.

#### **i. Additional Information on EERE Exchange**

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

Applicants that experience issues with submission PRIOR to the FOA deadline: In the event that an applicant experiences technical difficulties with a submission, the applicant should contact the Exchange helpdesk for assistance ([EERE-ExchangeSupport@hq.doe.gov](mailto: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](mailto: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.

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For example:

**ControlNumber\_LeadOrganization\_Project\_Part\_1**

**ControlNumber\_LeadOrganization\_Project\_Part\_2**, etc.

## C. Content and Form of the Concept Paper

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

### i. Concept Paper Content Requirements

EERE 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
<b>Cover Page</b>	2 pages maximum	Applicants are required to provide the information in the attached Cover Page guidance (Appendix E). This format is encouraged but not required. At a minimum, the cover page must include the project title, the specific FOA Topic Area being addressed, both the technical and business points of contact, and names of all team member organizations or key individuals. The cover page should also include any statements regarding confidentiality.
<b>Technology Description</b>	3 pages maximum	Applicants are required to describe succinctly: <ul style="list-style-type: none"> <li>• The proposed technology, including its basic operating principles and how it is unique and innovative;</li> <li>• 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);</li> <li>• The current state-of-the-art in the relevant field and application, including key shortcomings, limitations, and challenges;</li> <li>• How the proposed technology will overcome the shortcomings, limitations, and challenges in the relevant field and application;</li> <li>• The potential impact that the proposed project would have on the relevant field and application;</li> </ul>

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		<ul style="list-style-type: none"> <li>The key technical risks/issues associated with the proposed technology development plan; and</li> <li>The impact that EERE funding would have on the proposed project.</li> </ul>
<b>Addendum</b>	2 pages maximum	<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"> <li>Whether the Principal Investigator (PI) and Project Team have the skill and expertise needed to successfully execute the project plan;</li> <li>Whether the applicant has prior experience which demonstrates an ability to perform tasks of similar risk and complexity;</li> <li>Whether the applicant has worked together with its teaming partners on prior projects or programs; and</li> <li>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.</li> </ul> <p>Applicants may provide graphs, charts, or other data to supplement their Technology Description.</p>

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

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

## D. Content and Form of the Full Application

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

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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 must include that control number in the file name of their Full Application submission (i.e., *Control number\_Applicant Name\_Full Application*).

**i. Full Application Content Requirements**

EERE 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
<b>Full Application - PHASE 1 ONLY</b> <b>(PDF, unless stated otherwise)</b>	Technical Volume – Phase 1 ONLY (See Chart in Section IV.D.ii)	ControlNumber_LeadOrganization_TechnicalVolume
	Statement of Project Objectives – Phase 1 ONLY (Microsoft Word format) (5 page limit)	ControlNumber_LeadOrganization_SOPO
	SF-424 – Phase 1 ONLY	ControlNumber_LeadOrganization_App424
	Budget Justification – Phase 1 ONLY (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_Subaward_Budget_Justification
	Budget for FFRDC, if applicable	ControlNumber_LeadOrganization_FWP

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	Authorization from cognizant Contracting Officer for FFRDC, if applicable	ControlNumber_LeadOrganization_FFRDC uth
	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
	Block Flow Data (See Appendix F for suggested format)	ControlNumber_LeadOrganization_BFD

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

**ControlNumber\_LeadOrganization\_TechnicalVolume\_Part\_1**  
**ControlNumber\_LeadOrganization\_TechnicalVolume\_Part\_2**, etc.

**EERE will not accept late submissions that resulted from technical difficulties due to uploading files that exceed 10MB.**

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

## ii. Technical Volume

The Technical Volume must be submitted in Adobe PDF format. The Technical Volume must conform to the following content and form requirements, including maximum page lengths. If applicants exceed the maximum page lengths indicated below, EERE 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.ii 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 60 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.ii of the FOA) when preparing the Technical Volume.

SECTION/PAGE LIMIT	DESCRIPTION
	The cover page should 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.
<b>Project Overview</b> (This section should constitute approximately 10% of the Technical Volume)	<p>The Project Overview should contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Background:</b> The applicant should discuss the background of their organization, including the history, successes, and current research and development status (i.e., the technical baseline) relevant to the technical topic being addressed in the Full Application.</li> <li>• <b>Project Goal:</b> The applicant should explicitly identify the targeted improvements to the baseline technology and the critical success factors in achieving that goal.</li> <li>• <b>DOE Impact:</b> The applicant should discuss the impact that DOE funding would have on the proposed project. Applicants should 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.</li> </ul>
<b>Technical Description, Innovation, and Impact</b> (This section should constitute approximately 30% of the Technical Volume)	<p>The Technical Description should contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Relevance and Outcomes:</b> The applicant should provide a detailed description of the technology, including the scientific and other principles and objectives that will be pursued during the project. This section should describe the relevance of the proposed project to the goals and objectives of the FOA, including the potential to meet specific DOE technical targets or other relevant performance targets. The applicant should clearly specify the expected outcomes of the project.</li> <li>• <b>Feasibility:</b> The applicant should demonstrate the technical feasibility of the proposed technology and capability of achieving the anticipated performance targets, including a description of previous work done and prior results.</li> <li>• <b>Innovation and Impacts:</b> The applicant should describe the current state of the art in the applicable field, the specific innovation of the proposed technology, the advantages of proposed technology over current and emerging technologies, and the overall impact on advancing the state of the art/technical baseline if the project is successful.</li> </ul>

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<b>Workplan and Market Transformation Plan</b> (This section should constitute approximately 40% of the Technical Volume)	<p>The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure, Milestones, Go/No-Go Decision Points, and Project Schedule. A detailed Statement of Project Objectives (SOPO) is separately requested. The Workplan should contain the following information:</p> <ul style="list-style-type: none"><li>• <b>Project Objectives:</b> The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes.</li><li>• <b>Technical Scope Summary:</b> The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete, approximately annual decision points (see below for more information on go/no-go decision points). The applicant should describe the specific expected end result of each performance period.</li><li>• <b>Work Breakdown Structure (WBS) and Task Description Summary:</b> The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard work breakdown structure (WBS) for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as “we will then complete a proprietary process” is unacceptable). It is the applicant’s responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this FOA. The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks.</li><li>• <b>Milestone Summary:</b> The applicant should 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 <b>S</b>pecific, <b>M</b>easurable, <b>A</b>chievable, <b>R</b>elevant, and <b>T</b>imely. 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 should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO.</li></ul>
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	<ul style="list-style-type: none"> <li>• <b>Go/No-Go Decision Points:</b> The applicant should provide a summary of project-wide go/no-go decision points at appropriate points in the Workplan. A go/no-go decision point is a risk management tool and a project management best practice to ensure that, for the current phase or period of performance, technical success is definitively achieved and potential for success in future phases or periods of performance is evaluated, prior to actually beginning the execution of future phases. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one project-wide go/no-go decision point for each budget period (12 to 18-month period) of the project. The Applicant should also provide the specific technical criteria to be used to make the go/no-go decision. The summary provided should be consistent with the SOPO.</li> <li>• <b>Project Schedule (Gantt Chart or similar):</b> The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and go/no-go decision points.</li> <li>• <b>Project Management:</b> The applicant should discuss the team's proposed management plan, including the following: <ul style="list-style-type: none"> <li>○ The overall approach to and organization for managing the work</li> <li>○ The roles of each Project Team member</li> <li>○ Any critical handoffs/interdependencies among Project Team members</li> <li>○ The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices</li> <li>○ The approach to project risk management</li> <li>○ A description of how project changes will be handled</li> <li>○ If applicable, the approach to Quality Assurance/Control</li> <li>○ How communications will be maintained among Project Team members</li> </ul> </li> <li>• <b>Market Transformation Plan:</b> The applicant should provide a market transformation plan, including the following: <ul style="list-style-type: none"> <li>○ Identification of target market, competitors, and distribution channels for proposed technology along with known or perceived barriers to market penetration, including a mitigation plan</li> <li>○ 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.</li> </ul> </li> </ul>
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<p><b>Technical Qualifications and Resources</b> (Approximately 20% of the Technical Volume)</p>	<p>The Technical Qualifications and Resources should contain the following information:</p> <ul style="list-style-type: none"> <li>• Describe the Project Team’s unique qualifications and expertise, including those of key Subrecipients.</li> <li>• 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.</li> <li>• This section should also include relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives.</li> <li>• Describe the time commitment of the key team members to support the project.</li> <li>• 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.</li> <li>• Describe the technical services to be provided by DOE/NNSA FFRDCs, if applicable.</li> <li>• Attach letters of commitment from all Subrecipient/third party cost share providers as an appendix. Letters of commitment do not count towards the page limit.</li> <li>• 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.</li> <li>• For multi-organizational or multi-investigator projects, describe succinctly: <ul style="list-style-type: none"> <li>○ The roles and the work to be performed by each PI and Key Participant;</li> <li>○ Business agreements between the applicant and each PI and Key Participant;</li> <li>○ How the various efforts will be integrated and managed;</li> <li>○ Process for making decisions on scientific/technical direction;</li> <li>○ Publication arrangements;</li> <li>○ Intellectual Property issues; and</li> <li>○ Communication plans</li> </ul> </li> <li>• <b>FFRDC applicants must also describe how leading the proposed project aligns with the core capabilities of the applying FFRDC.</b></li> </ul>
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### iii. Statement of Project Objectives

Applicants are required to complete a Statement of Project Objectives (SOPO) for Phase 1 of the project (no SOPO is required at this time for Phase 2). A SOPO template is available on EERE Exchange at <https://eere-Exchange.energy.gov/>. The SOPO, including the Milestone Table, must not exceed five (5) pages when printed using standard 8.5 x 11 paper with 1”

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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".

The first task in Phase 1 of the project will be a validation of application data. Applicants should include the following language in their SOPO to represent this task:

**Budget Period 1: Sub Task 1.1 – Process and Data 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 and demonstrated 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. 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 move into BP2 with work commencing on Task 2.

**iv. SF-424: Application for Federal Assistance**

Complete all required fields in accordance with the instructions on the form. The list of certifications and assurances in Field 21 can be found at <http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms>, under Certifications and Assurances. Note: The dates and dollar amounts on the SF-424 are for the complete project period and not just the first project year, first phase or other subset of the project period. Save the SF-424 in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_App424".

**v. Budget Justification Workbook (EERE 335)**

Applicants are required to complete the Budget Justification Workbook. This form is available on EERE Exchange at <https://eere-Exchange.energy.gov/>. Prime Recipients must complete each tab of the Budget Justification Workbook for the project as a whole, including all work to be performed by the Prime Recipient and its Subrecipients and Contractors, and provide all

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requested documentation (e.g., a Federally-approved rate agreement, vendor quotes). Applicants should include costs associated with required annual audits and incurred cost proposals in their proposed budget documents. The “Instructions and Summary” included with the Budget Justification Workbook will auto-populate as the applicant enters information into the Workbook. Applicants must carefully read the “Instructions and Summary” tab provided within the Budget Justification Workbook. Save the Budget Justification Workbook in a single Microsoft Excel file using the following convention for the title “ControlNumber\_LeadOrganization\_Budget\_Justification”.

**vi. Summary/Abstract for Public Release**

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

**vii. Summary Slide**

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

The Summary Slide template requires the following information:

- A technology Summary;
- A description of the technology’s impact;
- Proposed project goals;
- Any key graphics (illustrations, charts and/or tables);
- The project’s key idea/takeaway;

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- Project title, Prime Recipient, Principal Investigator, and Key Participant information; and
- Requested EERE funds and proposed applicant cost share.

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

Applicants must provide a separate budget justification, EERE 335 (i.e., budget justification for each budget year and a cumulative budget) for each subawardee that is expected to perform work estimated to be more than \$250,000 or 25 percent of the total work effort (whichever is less). The budget justification must include the same justification information described in the “Budget Justification” section above. Save each subaward budget justification in a Microsoft Excel file using the following convention for the title  
“ControlNumber\_LeadOrganization\_Subawardee\_Budget\_Justification”.

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

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

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

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

**xi. SF-LLL: Disclosure of Lobbying Activities**

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

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Prime Recipients and Subrecipients are required to complete and submit SF-LLL, "Disclosure of Lobbying Activities"

(<http://www.whitehouse.gov/sites/default/files/omb/grants/sflllin.pdf>) if any non-Federal funds have been paid or will be paid to any person for influencing or attempting to influence any of the following in connection with your application:

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

Save the SF-LLL in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_SF-LLL".

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

**1. Foreign Entity Participation:**

As set forth in Section III.A.iii, 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 B lists the necessary information that must be included in a request to waive this requirement.

**2. Performance of Work in the United States**

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

**xiii. U.S. Manufacturing Commitments**

As part of the application, applicants are required to submit a U.S. Manufacturing Plan. The U.S. Manufacturing Plan represents the applicant's

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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.ii of this FOA to determine the weight given to the U.S. Manufacturing Plans under this FOA.

A U.S. Manufacturing Plan should contain the following or similar preamble: “If selected for funding, the applicant agrees to the following commitments as a condition of that funding:” and, after the preamble, the plan should include one or more specific and measureable commitments. For example, an applicant may commit particular types of products to be manufactured in the U.S. In addition to or instead of making a commitment tied to a particular product, the applicant may make other types of commitments still beneficial to U.S. manufacturing. An applicant may commit to a particular investment in a new or existing U.S. manufacturing facility, keep certain activities based in the U.S. (i.e., final assembly) or support a certain number of jobs in the U.S. related to the technology and manufacturing. For an applicant which is likely to license the technology to others, especially universities for which licensing may be the exclusive means of commercialization the technology, the U.S. manufacturing plan may indicate the applicant’s plan and commitment to use a licensing strategy that would likely support U.S. manufacturing.

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

When an applicant that is a domestic large business is selected for an award, a class patent waiver applies as set forth in Section VIII.K. 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

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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.K regarding U.S. manufacturing commitments.

#### **xiv. Data Management Plan**

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

#### **xv. Block Flow Data**

A Block Flow Diagram and Supporting Data discussion must be included in the Technical Volume. Applicants must describe the proposed process by providing the requested information and following the instructions in the Block Flow Data Guidance appendix attachment to the FOA. [See Appendix F] The Block Flow Data attachment cannot exceed 40 pages.

Save the Block Flow Diagram in a single PDF file using the following convention for the title “ControlNumber\_LeadOrganization\_BFD”.

### **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 only relying on the expected date posted on the cover page of the FOA.

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Applicants should anticipate having approximately five (5) 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
<b>Text</b>	3 pages max	Applicants may respond to one or more reviewer comments or supplement their Full Application.
<b>Optional</b>	2 pages 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

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

Each applicant (unless the applicant is an individual or Federal awarding agency that is excepted from those requirements under 2 CFR §25.110(b) or (c), or has an exception approved by the Federal awarding agency under 2 CFR §25.110(d)) is required to: (1) Be registered in the System for Award Management (SAM) at <https://www.sam.gov> before submitting its application; (2) provide a valid Dun

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and Bradstreet Universal Numbering System (DUNS) number in its application; and (3) continue to maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency. DOE may not make a Federal award to an applicant until the applicant has complied with all applicable DUNS and SAM requirements and, if an applicant has not fully complied with the requirements by the time DOE is ready to make a Federal award, the DOE may determine that the applicant is not qualified to receive a Federal award and use that determination as a basis for making a Federal award to another applicant.

## **H. Submission Dates and Times**

Concept Papers, Full Applications, and Replies to Reviewer Comments must be submitted in EERE Exchange no later than 5 p.m. Eastern on the dates provided on the cover page of this FOA. It is the applicant's responsibility to monitor email in the event that the expected dates change.

## **I. Intergovernmental Review**

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

## **J. Funding Restrictions**

### **i. Allowable Costs**

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

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

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

### **ii. Pre-Award Costs**

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

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the Federal award and **only** with the written approval of the Federal awarding agency, through the Contracting Officer assigned to the award.

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

Pre-Award expenditures are made at the Selectee's risk; EERE is not obligated to reimburse costs: (1) in the absence of appropriations; (2) if an award is not made; or (3) if an award is made for a lesser amount than the Selectee anticipated.

### **1. Pre-Award Costs Related to National Environmental Policy Act (NEPA) Requirements**

EERE's decision whether and how to distribute Federal funds under this FOA is subject to NEPA. Applicants should carefully consider and should seek legal counsel or other expert advice before taking any action related to the proposed project that would have an adverse effect on the environment or limit the choice of reasonable alternatives prior to EERE completing the NEPA review process.

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

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### iii. Performance of Work in the United States

#### 1. Requirement

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

#### 2. Failure to Comply

If the Prime Recipient fails to comply with the Performance of Work in the United States requirement, EERE may deny reimbursement for the work conducted outside the United States and such costs may not be recognized as allowable recipient cost share. The Prime Recipient is responsible should any work under this Award be performed outside the United States, absent a waiver, regardless of if the work is performed by the Prime Recipient, Subrecipients, contractors or other project partners.

#### 3. Waiver

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

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

### iv. Construction

Recipients are required to obtain written authorization from the Contracting Officer before incurring any major construction costs.

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**v. Foreign Travel**

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

**vi. Equipment and Supplies**

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

Property disposition will be required at the end of a project if the current fair market value of property exceeds \$5,000. The rules for property disposition are set forth in 2 CFR 200.310 – 200.316 as amended by 2 CFR 910.360.

**vii. Lobbying**

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

Recipients and Subrecipients are required to complete and submit SF-LLL, “Disclosure of Lobbying Activities”

(<http://www.whitehouse.gov/sites/default/files/omb/grants/sflllin.pdf>) if any non-Federal funds have been paid or will be paid to any person for influencing or attempting to influence any of the following in connection with your application:

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

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**viii. 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

**i. Concept Papers**

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

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

- The applicant clearly describes the proposed technology, describes how the technology is unique and innovative, and how the technology will advance the current state-of-the-art;
- The applicant has identified risks and challenges, including possible mitigation strategies, and has shown the impact that EERE funding and the proposed project would have on the relevant field and application;

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- The applicant has the qualifications, experience, capabilities and other resources necessary to complete the proposed project; and
- The proposed work, if successfully accomplished, would clearly meet the objectives as stated in the FOA.

## ii. **Full Applications**

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

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

#### Technical Merit and Innovation

- Extent to which the proposed technology or process is innovative and has the potential to advance the state of the art;
- Degree to which the current state of the technology and the proposed advancement are clearly described;
- Extent to which the application specifically and convincingly demonstrates how the applicant will move the state of the art to the proposed advancement; and
- Sufficiency of technical detail in the application to assess whether the proposed work is scientifically meritorious and revolutionary, including relevant data, calculations and discussion of prior work in the literature with analyses that support the viability of the proposed work.

#### Impact of Technology Advancement

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

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

#### Research Approach, Workplan and SOPO

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

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Identification of Technical Risks

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

Baseline, Metrics, and Deliverables

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

Market Transformation Plan

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

**Criterion 3: Team and Resources (20%)**

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

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### iii. Criteria for Replies to Reviewer Comments

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/management/downloads/merit-review-guide-financial-assistance>.

## C. Other Selection Factors

### i. 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 applicant is a Climate Action Champion<sup>4</sup> designated

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<sup>4</sup> In 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

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under DOE's Request for Applications DE-FOA-0001189 (RFA) or the applicant has a letter of support from a Climate Action Champion designated under the above referenced RFA.

## D. Evaluation and Selection Process

### i. Overview

The evaluation process consists of multiple phases; each includes an initial eligibility review and a thorough technical review. Rigorous technical reviews of eligible submissions are conducted by reviewers that are experts in the subject matter of the FOA. Ultimately, the Selection Official considers the recommendations of the reviewers, along with other considerations such as program policy factors, in determining which applications to select.

### ii. 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.

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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-class-climate-action-champions>

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Participation in Pre-Selection Interviews with EERE does not signify that applicants have been selected for award negotiations.

### **iii. Pre-Selection Clarification**

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

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

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

### **iv. Recipient Integrity and Performance Matters**

DOE, 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.

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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.

**v. Selection**

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

**E. Anticipated Notice of Selection and Award Dates**

EERE anticipates notifying applicants selected for negotiation of award by October, 2016 and making awards by January, 2017.

**VI. Award Administration Information**

**A. Award Notices**

**i. Ineligible Submissions**

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

**ii. Concept Paper Notifications**

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

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

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Application that is non-responsive or otherwise 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.ii of the FOA for guidance on pre-award costs.

### **iii. Full Application Notifications**

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

### **iv. Successful Applicants**

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.ii of the FOA for guidance on pre-award costs.

### **v. 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

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designated as an alternate does not authorize the applicant to commence performance of the project. EERE may ultimately determine to select or not select the Full Application for award negotiations.

#### vi. **Unsuccessful Applicants**

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

## **B. Administrative and National Policy Requirements**

### i. **Registration Requirements**

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

#### **1. EERE Exchange**

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

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

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

#### **2. DUNS Number**

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

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**3. System for Award Management**

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

**4. FedConnect**

Register in FedConnect at <https://www.fedconnect.net>. To create an organization account, your organization's SAM MPIN is required. For more information about the SAM MPIN or other registration requirements, review the FedConnect Ready, Set, Go! Guide at [http://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect\\_Ready\\_Set\\_Go.pdf](http://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf).

**5. Grants.gov**

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

**6. Electronic Authorization of Applications and Award Documents**

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

**ii. Award Administrative Requirements**

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

**iii. 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

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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.

**iv. 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.

**v. 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/rtr.jsp>.

**vi. 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.

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**vii. Applicant Representations and Certifications****1. Lobbying Restrictions**

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

**2. Corporate Felony Conviction and Federal Tax Liability Representations**

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

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

For purposes of these representations the following definitions apply:

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

**3. Nondisclosure and Confidentiality Agreements Representations**

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

- a. It **does not and will not** require its employees or contractors to sign internal nondisclosure or confidentiality agreements or statements prohibiting or otherwise restricting its employees or 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.

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- b. It **does not and will not** use any Federal funds to implement or enforce any nondisclosure and/or confidentiality policy, form, or agreement it uses unless it contains the following provisions:
- (1) *“These provisions are consistent with and do not supersede, conflict with, or otherwise alter the employee obligations, rights, or liabilities created by existing statute or Executive order relating to: (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive orders and statutory provisions are incorporated into this agreement and are controlling.”*
  - (2) The limitation above shall not contravene requirements applicable to Standard Form 312, Form 4414, or any other form issued by a Federal department or agency governing the nondisclosure of classified information.
  - (3) Notwithstanding the provision listed in paragraph (a), a nondisclosure or confidentiality policy form or agreement that is to be executed by a person connected with the conduct of an intelligence or intelligence-related activity, other than an employee or officer of the United States Government, may contain provisions appropriate to the particular activity for which such document is to be used. Such form or agreement shall, at a minimum, require that the person will not disclose any classified information received in the course of such activity unless specifically authorized to do so by the United States Government. Such nondisclosure or confidentiality forms shall also make it clear that they do not bar disclosures to Congress, or to an authorized official of an executive agency or the Department of Justice, that are essential to reporting a substantial violation of law.

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**viii. 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.

**ix. 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:

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 the Go/No Go decision point(s).
4. EERE participates in major project decision-making processes.

As part of its substantial involvement, DOE will engage a private, independent engineering (IE) firm, or other consultants, to assist with project monitoring and oversight. 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 by DOE include attendance at Recipient meetings, reviews and tests, as well as adequate and timely access for DOE's consultants to perform independent evaluations of Recipient's plans and processes. Recipient shall notify the DOE Project Officer of meetings, reviews, and tests in sufficient time to permit DOE participation, and provide all appropriate documentation for DOE review. DOE, and its

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consultants, may also require access to and delivery of data generated outside of the project in order to complete the review and validation tasks. Failure to provide sufficient access to data to assess project readiness may result in a no-go decision or termination.

Specific activities to be conducted by DOE:

- Risk Evaluation – DOE will review the Recipient’s initial Risk Mitigation Plan (RMP) for quality and completeness. DOE will also monitor updates to the RMP and actions taken by the Recipient during the performance of its award to mitigate risks and improve the probability of successful execution of the integrated biorefinery project. At DOE’s discretion, additional independent risk analyses of the project by DOE consultants may be requested.
- Independent Engineering Assessments – DOE will engage a private, independent engineering (IE) firm to assist in assessing the progress of the project and provide timely and accurate reports to DOE. The Recipient will ensure that the IE has access to any and all relevant documentation sufficient to allow the IE to provide independent evaluations to DOE on the progress of the project. Such documentation includes but is not limited to the following:
  - Drawings and specifications
  - Construction and Execution plans
  - Resource loaded schedules
  - Design functions and requirements for the site final design review
  - Risk management plans
  - Value management and engineering studies and/or plans
  - Acquisition strategies
  - Project execution plans
  - Project controls including earned value management systems
  - Qualifications of the integrated project team.
  - Financial strategy for funding the construction project
  - Updated marketing and business plan
  - Invoices submitted to DOE

DOE will evaluate the quality and completeness of information and documentation provided by the Recipient to DOE and its consultants in order to allow DOE to provide technical direction and/or redirection to the Recipient about how best to achieve the purposes of the award. Consultants to DOE may not provide technical direction and/or redirection to the Recipient.

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**x. Intellectual Property Management Plan**

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

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.K-VIII.N 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.

**xi. Subject Invention Utilization Reporting**

In order to ensure that Prime Recipients and Subrecipients holding title to subject inventions are taking the appropriate steps to commercialize subject inventions, EERE may require that each Prime Recipient holding title to a subject invention submit annual reports for 10 years from the date the

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subject invention was disclosed to EERE on the utilization of the subject invention and efforts made by Prime Recipient or their licensees or assignees to stimulate such utilization. The reports must include information regarding the status of development, date of first commercial sale or use, gross royalties received by the Prime Recipient, and such other data and information as EERE may specify.

## **xii. Intellectual Property Provisions**

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

## **xiii. Reporting**

Reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F 4600.2, attached to the award agreement. Other reports that will be required from projects awarded under this FOA will include monthly technical and financial updates, annual updates to the Project Management Plan, and a technical and financial data sheet which will be updated at the go/no-go and down-select decision points. The checklist can be accessed at <http://energy.gov/management/downloads/federal-assistance-reporting-checklist-and-instructions-projects>.

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

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**xiv. 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.

**xv. Conference Spending**

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

**xvi. Equipment Requirements – For-Profit Entities**

For-profit organizations are subject to 2 CFR 910.360 – Real Property and Equipment. Per 2 CFR 910.360 (b)(4) for-profit recipients may purchase real property or equipment with an acquisition cost per unit of \$5,000 or more in

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whole or in part with Federal funds only with the prior written approval of the contracting officer or in accordance with express award terms. Subject to the requirements of 2 CFR 910.360 (b)(4), the non-Federal entity must properly record UCC financing statement(s) for all equipment purchased with Federal funds. These financing statement(s) must be approved in writing by the contracting officer prior to the recording, and they shall provide notice that the recipient's title to all equipment (not real property) purchased with Federal funds under the financial assistance agreement is conditional pursuant to the terms of this section, and that the Government retains an undivided reversionary interest in the equipment. The UCC financing statement(s) must be filed before the contracting officer may reimburse the recipient for the Federal share of the equipment unless otherwise provided for in the relevant financial assistance agreement. The recipient shall further make any amendments to the financing statements or additional recordings, including appropriate continuation statements, as necessary or as the contracting officer may direct.

Per 2 CFR 910.360 (f)(2) after Federal funding for the project ceases, or if, as may be determined by the contracting officer, the real property or equipment is no longer needed for the purposes of the project, or if the recipient suspends work on the project, the recipient may use the real property or equipment for other projects, if:

- (i) There are Federally sponsored projects for which the real property or equipment may be used;
- (ii) The recipient obtains written approval from the contracting officer to do so. The contracting officer must ensure that there is a formal change of accountability for the real property or equipment to a currently funded Federal award; and
- (iii) The recipient's use of the real property or equipment for other projects is in the same order of priority as described in paragraph (e)(1) of this section.
- (iv) If the only use for the real property or equipment is for projects that have no Federal sponsorship, the recipient must proceed with disposition of the real property or equipment in accordance with paragraph (g) of this section.

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**xvii. Bonding – Construction Contracts**

Recipients are subject to 2 CFR 200.325 – Bonding requirements. For construction or facility improvement contracts or subcontracts exceeding the Simplified Acquisition Threshold, the Federal awarding agency or pass-through entity may accept the bonding policy and requirements of the non-Federal entity provided that the Federal awarding agency or pass-through entity has made a determination that the Federal interest is adequately protected. If such a determination has not been made, the minimum requirements must be as follows:

A bid guarantee from each bidder equivalent to five percent of the bid price. The “bid guarantee” must consist of a firm commitment such as a bid bond, certified check, or other negotiable instrument accompanying a bid as assurance that the bidder will, upon acceptance of the bid, execute such contractual documents as may be required within the time specified.

A performance bond on the part of the contractor for 100 percent of the contract price. A “performance bond” is one executed in connection with a contract to secure fulfillment of all the contractor's obligations under such contract.

A payment bond on the part of the contractor for 100 percent of the contract price. A “payment bond” is one executed in connection with a contract to assure payment as required by law of all persons supplying labor and material in the execution of the work provided for in the contract.

**C. Program Down-Select**

In addition to the Go/No Go Reviews required for each project, EERE intends to conduct a competitive project review (down-selection process) upon the completion of Phase 1. Recipients will present their projects to EERE individually (not to other recipients). Subject matter experts from academia, national laboratories, and industry may be used as reviewers, subject to conflict of interest and non-disclosure considerations.

During Phase 1, recipients must prepare the following deliverables:

- A Front-End Loaded – 3 (FEL-3) design (-5%/+15% cost estimate accuracy). This could also be described as CD-3: Approve Start of Construction (CD-3, as described in DOE O 413.3B, Program and Project Management for the Acquisition of Capital Assets<sup>5</sup>);

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<sup>5</sup> DOE O 413.3B, PROGRAM AND PROJECT MANAGEMENT FOR THE ACQUISITION OF CAPITAL ASSETS;  
<https://www.directives.doe.gov/directives-documents/400-series/0413.3-BOrder-b>

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- A Project Management Plan (PMP) and a Risk Mitigation Plan (RMP) that clearly demonstrate sufficient project controls are in place and that the recipient is ready to execute final design, construction, commissioning, startup, shakedown, and operations of the integrated biorefinery;
- A strategy to qualify for or obtain any necessary regulatory approvals to ensure that the Biofuel(s) and product(s) would be acceptable for sale into commerce, such as but not limited to EPA Title 40 Part 79 registration, including production of sufficient quantities of materials to enable any required testing;
- An updated Life Cycle Analysis (LCA) showing that the Biofuel product(s) will qualify as Advanced or Cellulosic Biofuel(s), such as an EPA Title 40 Part 80 determination, (the primary products for Topic Areas 1 and 2 must be Biofuels);
  - While a similar greenhouse gas (GHG) reduction requirement does not exist for bioproducts or biopower, applicants are encouraged to meet or exceed equivalent GHG reductions for their proposed process and must describe how the proposed project presents a significant LCA improvement over competing technologies;
- A business plan that clearly shows the recipient has:
  - secured the rights to practice all necessary intellectual property to construct and operate the proposed integrated biorefinery (IBR) facility;
  - a firm written commitment for the project site;
  - the appropriately-skilled team to execute the project to completion;
  - the financial and project management capabilities to complete the project from construction through commissioning, startup, and operations;
  - a scale-up analysis that clearly addresses the scale-up factors and risks associated with each of the process units;
  - feedstock purchase contracts for sufficient quantities of material to execute the proposed project;
  - any necessary utility supply and interconnect agreements indicating sufficient power, water, or similar will be available to the facility;
  - off-take agreements for any product(s) intended for sale or distribution that will be produced from the facility;
  - market analysis of all major facility inputs and outputs at initial (first facility), transitional, and mature (10 or more facilities) market share points considering any planned transitions in the fuel to products ratio as market share and number of plants increase in the U.S.
- A Techno-Economic Analysis (TEA) that clearly shows how the pioneer (1<sup>st</sup> commercial scale) and follow-on mature commercial facilities, should they become operational, would result in substantive, measurable reductions in the cost of producing drop-in hydrocarbon biofuels, bioproducts, or biopower;

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- Additional factors to be incorporated into the required TEA include, but are not necessarily limited to:
  - Economic competitiveness of proposed solutions compared to existing alternatives, with and without incentives or subsidies
  - Avoided costs when compared to alternative solutions, such as biosolids disposal costs
  - Production of any co-products
- A technical and financial data sheet, supplied by BETO during Phase 1, which models the target and demonstrated performance (based on previous testing at the next lower Technology Readiness Level [TRL]) that supports the TEA identified above.
- Sufficient cost share and contingency in the form of allowable and readily available resources to complete the remainder of the project.
- A continuation application for the proposed Phase 2 project, which will include:
  - Application for Federal Assistance, SF-424
  - Commitment Letters from Third Parties Contributing to Cost Share
  - Statement of Project Objectives (SOPO, EERE 303) and Milestone Summary Table
  - Environmental Questionnaire, EQ-1
  - Budget Justification form, EERE 335
    - This must also be completed each sub-recipient/subcontractor who is expected to perform work estimated to be more than \$250,000, or 25 percent of the total work effort, whichever is less.

Templates for above documents can be found at:

<http://www1.eere.energy.gov/financing/resources.html>

To ensure rapid execution of Phase 2, the readiness of all projects will be evaluated at the down-select review. Within the availability of DOE funding, only the projects demonstrating the most mature project execution plans prepared in Phase 1 will be considered to proceed to Phase 2. All Project Phase 1 deliverables will be evaluated based on the following criteria:

- The degree to which the Phase 1 deliverables present a comprehensive and complete description of the scope, schedule, and budget that will be required to successfully execute Phase 2
- Demonstration that all prior-scale data which will be necessary to rapidly execute Phase 2 has been obtained and incorporated into the project plans.
- The degree to which sufficient cost share, contingency, and other financial resources have been secured to enable rapid execution of Phase 2.

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- The degree to which all other project resources, such as, but not limited to: site access, required permitting and regulatory approvals, stakeholder and sponsor support, and any licensing agreements have been secured.

Upon completion of the competitive project review (down-selection process), EERE will select which projects will receive Federal funding beyond Phase 1. Due to the availability of funding and program considerations, only a portion of the recipients will be selected to receive funding for project continuation. As a result of this down-select process, certain projects will not receive Federal funding beyond Phase 1, even if the project is meeting the pre-defined metrics.

## 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: [PD2B3@ee.doe.gov](mailto:PD2B3@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](mailto: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.

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## **B. 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.

## **C. 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.

## **D. Treatment of Application Information**

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

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

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

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

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

Notice of Restriction on Disclosure and Use of Data:

Pages [list applicable pages] of this document may contain trade secrets or commercial or financial information that is privileged or confidential,

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and is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial assistance or loan agreement between the submitter and the Government. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source.  
[End of Notice]

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

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

## **E. Evaluation and Administration by Non-Federal Personnel**

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

## **F. Notice Regarding Eligible/Ineligible Activities**

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

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

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

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

Under the Freedom of Information Act, (FOIA), 5 U.S.C. §552, et. seq., as amended by the OPEN Government Act of 2007, Pub. L. No. 110-175, any information received from the Applicant is considered to be an agency record, and as such, subject to public release under FOIA. The purpose of the FOIA is to afford the public the right to request and receive agency records unless those agency records are protected from disclosure under one or more of the nine FOIA exemptions. Decisions to disclose or withhold information received from the Applicant are based upon the applicability of one or more of the nine FOIA exemptions, not on the existence or nonexistence of protective markings or designations. Only the agency's designated FOIA Officer may determine if information received from the Applicant may be withheld pursuant to one of the nine FOIA exemptions. All FOIA requests received by DOE are processed in accordance with 10 C.F.R. Part 1004.

## I. Requirement for Full and Complete Disclosure

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

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

## J. Retention of Submissions

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

## K. Title to Subject Inventions

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,

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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.

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## **L. Government Rights in Subject Inventions**

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

### **i. Government Use License**

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

### **ii. March-In Rights**

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

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

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

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

## **M. Rights in Technical Data**

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

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“Limited Rights Data”: The U.S. Government may 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 to further the objectives of this FOA

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

## **N. Copyright**

The Prime Recipient and Subrecipients 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.

## **O. Personally Identifiable Information (PII)**

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

<https://www.whitehouse.gov/sites/default/files/omb/memoranda/fy2007/m07-16.pdf>

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By way of example, Applicants must screen resumes to ensure that they do not contain PII such as personal addresses, phone/cell numbers, personal emails and/or SSNs. In short, if the PII is not essential to the application, it should not be in the application.

## **P. Annual Compliance Audits**

If a for-profit entity is a Prime Recipient and has expended \$750,000 or more of DOE funds during the entity's fiscal year, an annual compliance audit performed by an independent auditor is 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.

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## 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 50% non-federal cost sharing requirement:

- Formula: Federal share (\$) divided by Federal share (%) = Total Project Cost  
Example: \$1,000,000 divided by 50% = \$2,000,000
- Formula: Total Project Cost (\$) minus Federal share (\$) = Non-federal share (\$)  
Example: \$2,000,000 minus \$1,000,000 = \$1,000,000
- Formula: Non-federal share (\$) divided by Total Project Cost (\$) = Non-federal share (%)  
Example: \$1,000,000 divided by \$2,000,000 = 50%

### 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.

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

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

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

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

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

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

- (A) Acceptable contributions. All contributions, including cash contributions and third party in-kind contributions, must be accepted as part of the Prime Recipient's cost sharing if such contributions meet all of the following criteria:
- (1) They are verifiable from the recipient's records.
  - (2) They are not included as contributions for any other federally-assisted project or program.
  - (3) They are necessary and reasonable for the proper and efficient accomplishment of project or program objectives.
  - (4) They are allowable under the cost principles applicable to the type of entity incurring the cost as follows:
    - a. For-profit organizations. Allowability of costs incurred by for-profit organizations and those nonprofit organizations listed in Attachment C to OMB Circular A-122

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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

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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.

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## Appendix B – 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.iii, 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.

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## 2. Waiver for Performance of Work in the United States

As set forth in Section IV.J.iii, all work under EERE funding agreements must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment, so a waiver is not required for foreign purchases of these items. However, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. 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.

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## Appendix C - 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.

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## 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,

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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.

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## 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.

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## Appendix D – Allowable Feedstock Definitions



### Requirements for All Topic Areas:

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

Minimum Throughput Requirements for Each Topic Area:			
	Topic Area 1	Topic Area 2	Topic Area 3
Cellulosic Biomass	1 dry metric ton/day	50 dry metric tons/day	Not Allowed
Algal Biomass	25,000 gallons of intermediate per year	5-10 x10x prior scale data (prior scale at least 25,000 gallons of intermediate per year)	Not Allowed
Biogas	16 MBTU/day	800 MBTU/day	Not Allowed
Industrial Flue or Waste Gasses (biological conversion mechanisms only)	16 MBTU/day	800 MBTU/day	Not Allowed
Primary, secondary, tertiary, and post-anaerobic digestion sludge (i.e., biosolids) from municipal wastewater treatment systems	Not Allowed	Not allowed	1 dry metric ton/day
Food wastes from industrial, commercial, and residential sources	Not Allowed	Not Allowed	1 dry metric ton/day
Organic-rich wastewaters from industrial and commercial operations	Not Allowed	Not Allowed	1 dry metric ton/day

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## Topic Areas 1 and 2

**All Topic Area 1 and 2 applications must propose an Advanced or Cellulosic Biofuel (or combination of Advanced or Cellulosic Biofuels) as the Primary Product(s). The Primary Product stream(s) must contain at least 50% of the biogenic carbon leaving the facility as salable product.**

### **Allowable Cellulosic, Algal, and Gaseous Feedstocks:**

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

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

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

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

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

Municipal Solid Waste (MSW) is not an acceptable feedstock. However, biomass as defined in EPCA 2005 (Public Law 109-58) Section 932(a)(1-2) that is segregated from the MSW as a separate stream, could be employed as a feedstock with appropriate considerations for the costs of such segregation, collection, processing, and transportation. Hence, post-sorted MSW, where all recyclables and non-biomass components have been removed, would qualify, but only the remaining dry material that meets the above requirements would qualify as a feedstock for purposes of this FOA. Allowable costs include processing (such as, chipping or

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grinding) the feedstock into a form that can be fed into the reactor. Processing costs for MSW are restricted to post-sorted materials.

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

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

Mixotrophic cultivation systems are eligible; however, only renewable biomass-derived sugars such as cellulosic sugars or carbon-containing waste effluent may be utilized and are considered allowable within this FOA. Food- and grain-based sugars are not allowed. For the purpose of this FOA, mixotrophic algal biomass is grown photosynthetically with CO<sub>2</sub> as the main carbon source (photoautotrophic growth) and at some point in the cultivation process, cellulosic carbon from renewable biomass or carbon-containing waste effluent is fed as a supplemental carbon source. Heterotrophic cultivation systems are not eligible under the 'algal biomass' definition and requirements. Refer to the discussion on cellulosic feedstocks for the requirements for heterotrophic systems.

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

Using the definitions of “renewable biomass” as stated in the Energy Policy Act of 2005 (EPAct 2005), the Energy Independence and Security Act of 2007 (EISA 2007), and the Food, Conservation, and Energy Act of 2008, Title IX, Sec. 9001, as guidance, for the purpose of this FOA, the acceptable feedstocks will be those listed below:

- (A) materials, pre-commercial thinnings, or invasive species from National Forest System land and public lands (as defined in section 103 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1702)) that –

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- (i) are byproducts of preventive treatments that are removed –
    - (I) to reduce hazardous fuels;
    - (II) to reduce or contain disease or insect infestation; or
    - (III) to restore ecosystem health;
  - (ii) would not otherwise be used for higher-value products; and
  - (iii) are harvested in accordance with –
    - (I) applicable law and land management plans; and
    - (II) the requirements for
      - i. old-growth maintenance, restoration, and management direction of paragraphs (2), (3), and (4) of subsection (e) of section 102 of the Healthy Forests Restoration Act of 2003 (16 U.S.C. 6512); and
      - ii. large-tree retention of subsection (f) of that section; or
- (B) organic matter that is available on a renewable or recurring basis from non-Federal land or land belonging to an Indian or Indian tribe that is held in trust by the United States or subject to a restriction against alienation imposed by the United States, including –
- (i) renewable plant material, including –
    - (I) organic material grown for the purposes of being converted to energy; and
    - (II) algae ('algae' refers to microalgae, macroalgae, and cyanobacteria; aquatic plants such as water hyacinth, duckweed, and eelgrass are not algae); and
  - (ii) waste material, including –
    - (I) crop residue (including cobs, stover, bagasse and other residues);
    - (II) other vegetative waste material (including wood waste and wood residues);
    - (III) food waste and yard waste;
    - (IV) biogas (including landfill gas and sewage waste treatment gas) produced through the conversion of organic matter from renewable biomass.

### Topic Area 3

#### Allowable Wet Waste Feedstocks:

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

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## Appendix E - Concept Paper Cover Page Guidance

NOTE: This Concept Paper Cover Page template is provided as a convenient method of documenting the information required to review and respond to the concept papers submitted to this FOA. The use of the Concept Paper Cover Page template is not required, but the data elements within the Concept Paper Cover Page template are required.

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### CONCEPT PAPER COVER PAGE

U.S. Department of Energy – Energy Efficiency and Renewable Energy

Bioenergy Technologies Office

Demonstration and Market Transformation

Project Development for Pilot and Demonstration Scale Manufacturing of Biofuels, Bioproducts,  
and Biopower (PD2B3)

Funding Opportunity Announcement Number: DE-FOA-0001232

CFDA Number: 81.087 Renewable Energy Research and Development

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

Topic Area and Feedstock Type (select one)		
Feedstock Type	Pilot Scale	Demonstration Scale
Cellulosic Biomass	<input type="radio"/>	<input type="radio"/>
Algae	<input type="radio"/>	<input type="radio"/>
Biosolids/Waste-to-Energy	<input type="radio"/>	<input type="radio"/>
Biogas	<input type="radio"/>	<input type="radio"/>
Flue gas + Microbial Conversion	<input type="radio"/>	<input type="radio"/>

Details
Specific Feedstock(s):
Primary Product (one) include percentage of carbon utilized for primary product:
Co-Products (other products) include percentage of carbon utilized for co-product(s):
•
•
Location(s) of Prior Scale's Facility and Proposed Pilot or Demonstration Facility:
Prior:
Proposed:

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<b>Throughput of Proposed Facility</b> (dry metric tons of cellulosic feedstock or biosolids; per day or gallons per acre per year for Algal technologies, scf/day for gaseous feedstocks):		
<b>Technology Types:</b>	<b>Currently Achieved TRL per :</b>	<b>Short Description:</b>
Feed System		
Deconstruction/ Fractionation		
Synthesis/Upgrading		
Algal Cultivation		
Algae Harvest & Dewatering		
Algal Downstream Processing		
Biogas or Flue Gas Collection		
Biogas or Flue Gas Clean-up		
Biogas or Flue Gas Synthesis/Upgrading		
Other (Describe)		
Other (Describe)		

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## Appendix F – Block Flow Data

NOTE: This Block Flow Data template is provided as a convenient method of documenting the information required to assess the projects proposed in response to this FOA. The use of the Block Flow Data template is not required, but the data elements within the Block Flow Data template are required.

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**Instructions and Overview:**

The purpose of this section is to assess the merits of the selected technology and the status of the process technology in order to gain an understanding of project risks and the potential viability of the proposed project. Please answer all questions as thoroughly as possible based on current knowledge.

It is expected that applicants have collected data from some **(a) existing facility** that is used to design the **(b) proposed facility** which in turn will be used to gain process information to build a **(c) commercial facility** in the future. Please pay particular attention to the proposed pilot or demonstration scale facility when reading and answering the questions. The attached BFD should relate to the proposed project.

**Unit Operation Step:** Unit operation steps are defined as the areas in the plant where a change occurs, such as reactions, physical changes to materials including materials handling, or chemical conversions. (A physical step physically alters material, and a chemical conversion step involves changes in the molecular form of a material.) Some examples of items to be included as unit operation steps appear below.

Examples of block steps:

Reactors	Shredder
Distillation	Mixers
Drying	Aerators
Separations	Filters
Ion exchange	Gas absorption

Use a unique number for each unit operation in the BFD. Show recycle loops and waste streams as well. The characteristics of each output should directly tie to input of the respective unit operation in the process. If additional processing is required before the output of one unit can be used as the input to another, an additional unit operation should be included to describe how the stream is altered. It is particularly important to focus on the heat and material balance of each block step. The description of the process should begin with the first manipulation of the feedstock in its as-received condition, such as de-stringing of baled corn stover or any initial sizing/moisture reduction of wood chips. Applicants are encouraged to summarize the process using ten blocks or less for an estimated level of detail.

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*Provide the following information for the process shown in the BFD*

1. How and why was the proposed process chosen? Discuss technical and business risks, benefits and opportunities associated with the process.
2. Describe the history of research and development performed by the applicant for the proposed process including scale, duration of runs, type of data collected, etc.

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*Answer the following questions for each Unit Operation shown in the BFD*

**Unit Operation # – {title}**

1. Name or title (as shown in the BFD).
2. Description of the unit operation.
  - 1) Capacity and throughput.
  - 2) Provide the heat and material balance (H&MB). Specifically including, but not limited to, energy and carbon balance information.
  - 3) Provide the processing conditions for the unit operation, including temperature, pressure, and residence time.
  - 4) Provide designed and actual yield, conversion and efficiency data for each unit operation detailing the products, byproducts, and waste streams.
  - 5) Provide the materials of construction and the basis for their selection for each critical piece of equipment.
  - 6) Provide the expected service life including expected maintenance cycles.
  - 7) Describe any known causes and the effects and impacts thereof for system upset and contaminants (including the source(s) of the contaminants).

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- 8) Provide a description, including physical and chemical composition, phase, temperature and pressure of all input and output streams.
  - 9) Describe the mode of operation, i.e. batch, plug or continuous flow.
  - 10) For all waste streams leaving the process describe the physical and chemical composition, phase, temperature and pressure, and the proposed method of treatment, storage and/or disposal.
  - 11) Provide the estimated capital cost of each unit operation and the basis for those costs.
  - 12) Describe the instrumentation and controls that will be incorporated into this unit. This should complement the instrumentation and controls discussion in the Project Narrative.
3. Describe the state of technology for the unit operation.
- 1) If the technology is commercially available, is the proposed design and use within the manufacturer's normal operating parameters?
  - 2) At what scale(s) has the technology been designed and tested? What is the scale-up factor for the proposed unit operation or integration step? (Scale up = proposed facility unit capacity divided by previous scale capacity.) That is, provide specific explanation and justification for the basis of assumed success in achieving the designed scale up.

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3) How many runs were made at the stated scale, and for how many continuous hours/days? When (approximately) was the most recent test run?

4) If R&D is the basis for the state of technology, describe the original goals and objectives of the R&D. If not discussed in #3, above, summarize the results of the R&D and discuss how the original goals and objectives were met or not met. Describe the quality and replicability of the results. (If data quality objectives were used to set minimum data quality standards, briefly describe them.)

Is further R&D is needed? Describe the goal and summarize the work needed to obtain the needed information. In lieu of including the information here, if the work is planned to be conducted as part of the project within the scope of this proposal, reference the activity (preferably by task or WBS number(s)).

5) Calculate the following sustainability metrics for each unit operation commenting on both the values observed to date as well as targets for the envisioned commercial-scale facility:

- 1) GHGs (g CO<sub>2</sub>-e/MJ fuel) – (emissions)
- 2) Fossil Energy Consumption (MJ fossil energy/MJ fuel product)
- 3) Total Fuel Yield (gal/dry ton wood; GGE/dry ton wood)
- 4) Carbon-to-Fuel Efficiency (C in fuel/C in biomass)
- 5) Water Consumption (m<sup>3</sup>/day; gal/GGE)
- 6) Wastewater Generation (m<sup>3</sup>/day; gal/GGE)

6) Discuss the current state of any offtake agreements and regulatory approval for any products intended to be sold. Include a discussion of any remaining regulatory approval requirements and how the proposed facility will contribute to advancing the market acceptance of the products.

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## Appendix G – Technology Readiness Level Descriptions

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

1. **TRL-1.** Basic principles observed and reported: Scientific problem or phenomenon identified. Essential characteristics and behaviors of systems and architectures are identified using mathematical formulations or algorithms. The observation of basic scientific principles or phenomena has been validated through peer-reviewed research. Technology is ready to transition from scientific research to applied research.
2. **TRL-2.** Technology concept and/or application formulated: Applied research activity. Theory and scientific principles are focused on specific application areas to define the concept. Characteristics of the application are described. Analytical tools are developed for simulation or analysis of the application.
3. **TRL-3.** Analytical and experimental critical function and/or characteristic proof of concept: Proof of concept validation has been achieved at this level. Experimental research and development is initiated with analytical and laboratory studies. System/integrated process requirements for the overall system application are well known. Demonstration of technical feasibility using immature prototype implementations are exercised with representative interface inputs to include electrical, mechanical, or controlling elements to validate predictions.
4. **TRL-4.** Component and/or process validation in laboratory environment- Alpha prototype (component) Standalone prototyping implementation and testing in laboratory environment demonstrates the concept. Integration and testing of component technology elements are sufficient to validate feasibility.
5. **TRL-5.** Component and/or process validation in relevant environment- Beta prototype (component): Thorough prototype testing of the component/process in relevant environment to the end user is performed. Basic technology elements are integrated with reasonably realistic supporting elements based on available technologies. Prototyping implementations conform to the target environment and interfaces.
6. **TRL-6.** System/process model or prototype demonstration in a relevant environment- Beta prototype (system): Prototyping implementations are partially integrated with

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

7. **TRL-7.** System/process prototype demonstration in an operational environment- Integrated pilot (system): System prototyping demonstration in operational environment. System is at or near full scale (pilot or engineering scale) of the operational system, with most functions available for demonstration and test. The system, component, or process is integrated with collateral and ancillary systems in a near production quality prototype.
8. **TRL-8.** Actual system/process completed and qualified through test and demonstration- Pre-commercial demonstration: End of system development. Full-scale system is fully integrated into operational environment with fully operational hardware and software systems. All functionality is tested in simulated and operational scenarios with demonstrated achievement of end-user specifications. Technology is ready to move from development to commercialization.

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## Appendix H – Definitions

**“Acceptable Algal Types”** for the purpose of this FOA are cyanobacteria, microalgae, and macroalgae. Mixotrophic cultivation systems are eligible; however, only renewable biomass-derived sugars such as cellulosic sugars or carbon-containing waste effluent may be utilized and are considered allowable within this FOA. Food- and grain-based sugars are not allowed. Heterotrophic algae are allowed, provided that the minimum throughput requirements are met based on the process carbon source. The carbon source could be cellulosic sugars, biomass hydrolysates, glycerol, or any other non-food derived source. Sugars from food sources are not acceptable for growing heterotrophic algae under this FOA.

**“Acceptable Biofuel”** for the purpose of this FOA must meet the definitions for either Advanced or Cellulosic Biofuels (“Biofuels”, as defined in the Energy Investment and Security Act of 2007 (EISA 2007) §201). Additionally, “Acceptable Biofuels” must be produced from an “Acceptable Feedstock” and also be a liquid at STP (Standard Temperature and Pressure, 25 °C and 1 atmosphere pressure).

**“Acceptable feedstock”** for the purpose of this FOA are discussed in Section I.B. Topic Areas/Technical Areas of Interest as well as Appendix D – Allowable Feedstock Definitions.

**“Amendment”** means a revision to a Funding Opportunity Announcement

**“Applicant”** means the legal entity or individual signing the Application. This entity or individual may be one organization or a single entity representing a group of organizations (such as a Consortium) that has chosen to submit a single Application in response to a Funding Opportunity Announcement.

**“Application (or Full Application)”** means the documentation submitted in response to a Funding Opportunity Announcement.

**“Award”** means the written documentation executed by a DOE Contracting Officer, after an Application is approved, which contains the negotiated terms and conditions for providing Financial Assistance to the Recipient. Financial Assistance Awards resulting from this FOA will be Cooperative Agreements.

**“Biodiesel”** for the purpose of this FOA means a fuel derived from trans-esterification of renewable biomass, including but not limited to, vegetable oil and animal fat.

**“Bioproduct”** for the purpose of this FOA, means any cost-effective, high-value biobased chemical or substitute for a petroleum-based feedstock or product.

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**“Budget”** means the cost expenditure plan submitted in the Application, including both the DOE contribution and the Applicant Cost Share.

**“Competitive Advantage”** means the favorable position that occurs when a firm delivers the same services as its competitors but at a lower cost. It may also result from a firm’s delivering greater services for the same price as its competitors.

**“Consortium (plural: Consortia)”** means the group of organizations or individuals that have chosen to submit a single Application in response to a Funding Opportunity Announcement.

**“Contingency”** for the purpose of this FOA is defined as additional financial resources that must be readily available to the project to complete the approved scope in the event of cost overruns or other unforeseen events.

**“Contracting Officer”** means the DOE official authorized to execute Awards on behalf of DOE and who is responsible for the business management and non-program aspects of the Financial Assistance process.

**“Cooperative Agreement”** means a Financial Assistance instrument used by DOE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and Substantial Involvement (see definition below) is anticipated between DOE and the Applicant during the performance of the contemplated activity.

**“Cost Share”** for the purpose of this FOA, means the respective share of Total Project Costs to be contributed by the Applicant and by DOE. The percentage of Applicant Cost Share is to be applied to the Total Project Cost (i.e., the sum of Applicant plus DOE Cost Shares) rather than to the DOE contribution alone.

**“Data Universal Numbering System (DUNS) Number”** is a unique nine-character identification number issued by Dun and Bradstreet (D&B). Call 1-866-705-5711 to receive one free of charge. [http://www.grants.gov/applicants/request\\_duns\\_number.jsp](http://www.grants.gov/applicants/request_duns_number.jsp)

**“Demonstration scale”** for the purpose of this FOA is defined as a facility with throughput of no less than fifty (50) dry metric tons of feedstock per day, or equivalent of algal biomass or biogas. Equivalent feedstock throughput is discussed in Section I.B as well as Appendix D.

**“E-Find”** is a Grants.gov webpage where you can search for Federal Funding Opportunities in FedGrants. <http://www.grants.gov/search/searchHome.do>

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**“EERE Exchange”** is the Department of Energy, Energy Efficiency and Renewable Energy’s web system for posting Federal Funding Opportunity Announcements, receiving applications, and answering questions. EERE eXCHANGE website: <https://eere-exchange.energy.gov/>

**“FedConnect”** is where federal agencies post opportunities and make awards via the web. Any Applicant can view public postings without registering. However, registered users have numerous added benefits including the ability to electronically submit Applications / Responses to the government directly through this site. <https://www.fedconnect.net/FedConnect/>

**“Federally Funded Research and Development Center (FFRDC)”** means a research laboratory as defined by Federal Acquisition Regulation 35.017.

**“Financial Assistance”** for the purpose of this FOA, means the transfer of money or property to a Recipient to accomplish a public purpose of support authorized by Federal statute through Grants or Cooperative Agreements and sub-awards. For DOE, it does not include direct loans, loan guarantees, price guarantees, purchase agreements, Cooperative Research and Development Agreements (CRADAs), or any other type of financial incentive instrument.

**“Funding Opportunity Announcement (FOA)”** is a publicly available document by which a Federal agency makes known its intentions to award cooperative agreements, usually as a result of competition for funds. Funding opportunity announcements may be known as program announcements, notices of funding availability, solicitations, or other names depending on the agency and type of program.

**“Grants.gov”** is the “storefront” web portal which allows organizations to electronically find and apply for competitive financial assistance opportunities from all Federal grant-making agencies. Grants.gov is THE single access point for over 900 grant programs offered by the 26 Federal grant-making agencies. <http://www.grants.gov>

**“High Impact Feedstock”** is a feedstock that is domestically available and has the agronomically and ecologically sustainable ultimate availability potential of at least 50 million dry metric tons of cellulosic biomass per year.

**“Indian Tribe”** means any Indian tribe, band, nation, or other organized group or community, including Alaska Native village or regional or village corporation, as defined in or established pursuant to the Alaska Native Claims Settlement Act (85 Stat. 688)[43 U.S.C. § 1601 et seq.], which are recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.

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**“Integrated Biorefinery (IBR)”** for the purpose of this FOA, is a facility that uses an acceptable feedstock meeting the requirements described in this FOA that produces an acceptable biofuel (all Topic Areas) or biopower (Topic Area 3 only) as the primary product. Additional biofuels, bioproducts, biopower, or heat may be produced as co-products.

**“Key Personnel”** means the individuals who will have significant roles in planning and implementing the proposed Project on the part of the Applicant and Participants, including FFRDCs.

**“Participant”** for purposes of this Funding Opportunity Announcement only, means any entity, except the Applicant substantially involved in a Consortium, or other business arrangement (including all parties to the Application at any tier), responding to the Funding Opportunity Announcement.

**“Personally Identifiable Information (PII)”** 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. Additional information is located in Section VIII.O – Protected Personally Identifiable Information.

**“Pilot Scale”** for the purpose of this FOA is defined as a facility with a throughput of no less than one (1) dry ton of feedstock per day, or equivalent of algal biomass or biogas. Equivalent feedstock throughput is discussed in Section I.B as well as Appendix D.

**“Primary Product”** is the commodity to be offered for sale resulting from the operation of the integrated biorefinery containing highest total biogenic carbon output. The total biogenic carbon output output is not based on the carbon output per unit of product but rather the production rate of the product multiplied by its carbon output per unit. For the purpose of the FOA, any application proposing a biofuel as the primary product must produce a fuel that is liquid at standard temperature and pressure. Although a proposed technology may potentially produce multiple fuels and products, only the amount of biofuel (all Topic Areas) or biopower (Topic Area 3 only) derived directly from a feedstock that is acceptable under the topic area to which the application is submitted will be considered for the purposes of determining the primary product.

**“Principal Investigator (PI)”** refers to the technical point of contact/Project Manager for a specific project award.

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**“Project”** means the set of activities described in an Application that is approved by DOE for Financial Assistance (whether such Financial Assistance represents all or only a portion of the support necessary to carry out those activities).

**“Recipient”** means the organization, individual, or other entity that receives a Financial Assistance Award from DOE, is financially accountable for the use of any DOE funds or property provided for the performance of the Project, and is legally responsible for carrying out the terms and condition of the award. Also known as “Awardee”.

**“Renewable Diesel”** means a diesel fuel that is processed from renewable biomass by [hydrocracking](#) or [hydrogenation](#).

**“System for Award Management (SAM)”** is the Official U.S. Government system that consolidated the capabilities of CCR/FedReg, ORCA, and EPLS. There is NO fee to register for this site. Entities may register at no cost directly from this page.

<https://www.sam.gov/portal/SAM/#1>

**“Selectee”** means an Applicant who has been selected for negotiation of an award by the DOE Selection Official but has not yet been received a Financial Assistance award.

**“Selection”** means the determination by the DOE Selection Official that negotiations take place for certain Projects with the intent of awarding a Financial Assistance instrument.

**“Selection Official”** means the DOE official designated to select Applications for negotiation of an Award under a subject Funding Opportunity Announcement.

**“Substantial Involvement”** means involvement on the part of the Government. DOE's involvement may include shared responsibility for the performance of the Project; providing technical assistance or guidance which the Applicant is to follow; and the right to intervene in the conduct or performance of the Project. Such involvement will be negotiated with each Applicant prior to signing any agreement.

**“Total Project Cost”** means all the funds to complete the effort proposed by the Applicant, including DOE funds (including direct funding of any FFRDC) plus all other funds that will be committed by the Applicant as Cost Sharing. Note that in this FOA, it is used interchangeably with Total Allowable Cost and Total Project Budget. Note that, as used in this FOA, none of these terms allow contingency or management reserve funds to be included as allowable costs.

**“Tribal Energy Resource Development Organization or Group”** means an “organization” of two or more entities, at least one of which is an Indian Tribe (see “Indian Tribe” above) that has the

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written consent of the governing bodies of all Indian Tribes participating in the organization to apply for financial assistance or a loan, or other assistance under 25 U.S.C. § 3503.

**“Value Proposition”** means the unique added value an organization offers customers through its operations, and it refers to the benefits that stakeholders are assured of receiving as a result of their relationship with the organization. It also relates to a business's promise to deliver the expected experience with their product or service, and why a consumer should buy a business's product or service.