

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

**Decarbonization of Water Resource Recovery Facilities  
(D-WRRF)**

**Funding Opportunity Announcement (FOA) Number: DE-FOA-0002855  
FOA Type: **Modification 0002****

<b>FOA Issue Date:</b>	12/16/22
<b>Submission Deadline for Concept Papers:</b>	1/27/23, 5:00pm ET
<b>Submission Deadline for Full Applications:</b>	4/3/23, 5:00pm ET
<b>Expected Submission Deadline for Replies to Reviewer Comments:</b>	5/12/23, 5:00pm ET
<b>Expected Date for EERE Selection Notifications:</b>	6/16/23
<b>Expected Timeframe for Award Negotiations:</b>	Summer-Fall 2023

- 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.
- **Unique Entity Identifier (UEI) and System for Award Management (SAM)** - Each applicant (unless the applicant is excepted from those requirements under 2 CFR 25.110) is required to: (1) Be registered in the SAM at <https://www.sam.gov> before submitting its application; (2) provide a valid UEI 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 UEI 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 will 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.

**NOTE: Due to the high demand of UEI requests and SAM registrations, entity legal business name and address validations are taking longer than expected to process. Entities should start the UEI and SAM registration process as soon as possible. If entities have technical difficulties with the UEI validation or SAM**

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registration process they should utilize the HELP feature on SAM.gov. SAM.gov will work entity service tickets in the order in which they are received and asks that entities not create multiple service tickets for the same request or technical issue. Additional entity validation resources can be found here: [GSAFSD Tier 0 Knowledge Base - Validating your Entity](#).

- 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 the body of the FOA.

Mod. No.	Date	Description of Modification
0001	12/19/2022	Corrected typo in page limit of Diversity Equity and Inclusion Plan in Section IV.D (page 33) and updated formatting throughout document.
0002	3/8/2023	Changes include updates to the following sections: <ol style="list-style-type: none"> <li>1. II.A.i. Estimated Funding</li> <li>2. III.A.iv. Domestic Entities</li> <li>3. III.A.v. Foreign Entities</li> <li>4. Updated file size maximum to 50MB in Sections IV.B and IV.D.i.</li> <li>5. IV.D.i. Full Application Content Requirements</li> <li>6. IV.D.iii. Resumes</li> <li>7. IV.D.xvii. Current and Pending Support</li> <li>8. IV.J.ix. Risk Assessment</li> <li>9. VIII.N Export Control</li> <li>10. Appendix C. Waiver Requests FOR: 1. Foreign Entity Participation; and 2. Foreign Work</li> <li>11. Appendix D. Required Use of American Iron, Steel, Manufactured Products, and Construction Materials</li> <li>12. Added Section IV.D.xviii. Transparency of Foreign Connections</li> <li>13. Added Section IV.D.xix. Potentially Duplicative Funding Notice</li> <li>14. Added Section IV.J.xi. Prohibition Related to Foreign Government-Sponsored Talent Recruitment Programs</li> <li>15. Added Section IV.J.xii. Foreign Collaboration Considerations</li> <li>16. Added Section VI.B.xx. Interim Conflict of Interest Policy for Financial Assistance</li> <li>17. Added Section VI.B.xxii. Fraud, Waste and Abuse</li> <li>18. Added Section VIII.O. Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment</li> <li>19. Added an additional category of applications specifically not of interest in Section I.C.</li> </ol>

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## I. Funding Opportunity Description

### A. Background and Context

#### i. Background and Purpose

This funding opportunity announcement (FOA) is being issued by the U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy (EERE) Industrial Efficiency and Decarbonization Office (IEDO). This FOA will advance the Biden Administration's goals to achieve carbon pollution-free electricity by 2035 and to "deliver an equitable, clean energy future, and put the United States on a path to achieve net-zero emissions, economy-wide, by no later than 2050" to the benefit of all Americans <sup>1</sup>. The research, development, and demonstration (RD&D) activities to be funded under this FOA will support the government-wide approach to the climate crisis by driving the innovation that can lead to the deployment of cost-effective industrial decarbonization technologies, which are critical to an equitable clean energy economy." <sup>2</sup>

The industrial sector is responsible for 30% of all energy-related carbon dioxide emissions <sup>3</sup>. Achieving net-zero emissions across the U.S. economy by 2050 will require an aggressive, multidimensional approach to eliminating industrial emissions. DOE's strategy, outlined in the *Industrial Decarbonization Roadmap* <sup>4</sup>, focuses on accelerating the innovation and adoption of energy efficiency technologies; industrial electrification technologies; low-carbon fuels, feedstocks, and energy sources (LCFFES); and carbon capture, utilization, and storage (CCUS) technologies. DOE's RD&D agenda supports the adoption of these technologies across the entire industrial sector, and within the most energy-and-carbon-intensive sectors with potential for greatest impact.

Specifically, this FOA will advance research and development to decarbonize our nation's water treatment sector. Water Resource Recovery Facilities (WRRFs), which treat wastewater from public water systems, are estimated to be directly and indirectly responsible for over 44 million metric tons (MMT) of greenhouse gas emissions each year <sup>5</sup>. This FOA will address direct and indirect emissions across the entire lifecycle of WRRFs.

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<sup>1</sup> Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad," January 27, 2021

<sup>2</sup> Executive Order 14057, <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/12/08/executive-order-on-catalyzing-clean-energy-industries-and-jobs-through-federal-sustainability/>

<sup>3</sup> "*Annual Energy Outlook 2021 with Projections to 2050.*" U.S. Energy Information Administration, Feb. 3, 2021.

<sup>4</sup> U.S. Department of Energy, "Industrial Decarbonization Roadmap," September 7, 2022

<sup>5</sup> EPA, *Inventories of U.S. Greenhouse Gas Emissions and Sinks: 1990-2020*. 2022, EPA: Washington, DC. p. 841.



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## ii. Technology Space and Strategic Goals

The Environmental Protection Agency (EPA)'s most recent Greenhouse Gas Inventory<sup>6</sup> estimates the total GHG emissions from Water Resource Recovery Facilities (WRRFs), previously known as either Wastewater Treatment Plants (WWTPs) or Publicly-Owned Treatment Works (POTWs), at approximately 44 Mtons CO<sub>2eq</sub>, only slightly less than those from the cement industry. The bulk of these direct emissions are comprised of N<sub>2</sub>O and CH<sub>4</sub>; the EPA estimates do not include other indirect emissions as detailed below. These estimates are widely thought to be low by a factor of two or more on a life cycle basis<sup>7,8,9</sup>, as they only enumerate direct emissions of CH<sub>4</sub> and N<sub>2</sub>O from WRRFs, and do not include:

- Indirect emissions from energy consumption drawn from fossil sources, particularly electricity<sup>10,11</sup>.
- Emissions from sludge disposal, especially CH<sub>4</sub> from landfills, and N<sub>2</sub>O from land application<sup>12,13,14</sup>.
- Diesel fuel consumption for sludge and biosolids transportation, which is growing in importance as land application and landfill regulations become increasingly stringent<sup>15,16,17,18</sup>.

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<sup>6</sup> EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2020*. 2022, EPA: Washington, DC. p. 841.

<sup>7</sup> Willis, J.L., Z.G. Yuan, and S. Murthy, *Wastewater GHG Accounting Protocols as Compared to the State of GHG Science*. Water Environment Research, 2016. **88**(8): p. 704-714

<sup>8</sup> Demir, O. and P. Yapicioglu, *Investigation of GHG emission sources and reducing GHG emissions in a municipal wastewater treatment plant*. Greenhouse Gases-Science and Technology, 2019. **9**(5): p. 948-964.

<sup>9</sup> Li, L.Q., et al., *Carbon neutrality of wastewater treatment-A systematic concept beyond the plant boundary*. Environmental Science and Ecotechnology, 2022. **11**.

<sup>10</sup> Zib, L., et al., *Operational carbon footprint of the US water and wastewater sector's energy consumption*. Journal of Cleaner Production, 2021. **321**.

<sup>11</sup> Yapicioglu, P. and O. Demir, *Minimizing greenhouse gas emissions of an industrial wastewater treatment plant in terms of water-energy nexus*. Applied Water Science, 2021. **11**(12).

<sup>12</sup> Chen, W.H., et al., *The GHG mitigation opportunity of sludge management in China*. Environmental Research, 2022. **212**.

<sup>13</sup> Liu, B.B., et al., *Life cycle GHG emissions of sewage sludge treatment and disposal options in Tai Lake Watershed, China*. Science of the Total Environment, 2013. **447**: p. 361-369.

<sup>14</sup> Obi-Njoku, O., et al., *Greenhouse gas emissions following biosolids application to farmland: Estimates from the DeNitrification and DeComposition model*. Science of the Total Environment, 2022. **823**.

<sup>15</sup> Woo, D.C.Y., et al., *A techno-economic analysis of sewage sludge valorization for carbon emission reduction*. Biomass Conversion and Biorefinery.

<sup>16</sup> Yoshida, H., J.J. Gable, and J.K. Park, *Evaluation of organic waste diversion alternatives for greenhouse gas reduction*. Resources Conservation and Recycling, 2012. **60**: p. 1-9.

<sup>17</sup> CalRecycle. *California's 75 Percent Initiative: Defining the Future*. 2015 [cited 2015 June 26]; Available from: <http://www.calrecycle.ca.gov/75Percent/>.

<sup>18</sup> NEBRA. *PFAS in Biosolids ("sludge") and Residuals*. 2020 [cited 2021 March 31]; Available from: <https://www.nebiosolids.org/pfas-biosolids>.

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- The portion of direct CO<sub>2</sub> emissions from fossil sources, which can range from 5-15% of total CO<sub>2</sub> releases from WRRFs<sup>19,20,21</sup>.
  - GHG emissions from the production of chemicals and other materials used in large quantities at WRRFs, e.g. Sodium Hydroxide (NaOH).

Inclusion of all these emissions implies that WRRFs represent a significant decarbonization opportunity, similar to the direct emissions from major emitting industries such as steel and food and beverage production. The primary objective of this FOA is to reduce GHG emissions from particular unit processes by at least 50% (Topic Area 1) and plant-wide emissions by a minimum of 25% (Topic Area 2) without increasing overall costs.

There are multiple opportunities to reduce the GHG footprint of WRRFs, including but not limited to:

- Reduction in the mass of sludge or biosolids requiring disposal. This is opportunity to minimize ratepayer pressures for WRRFs, as solids disposal can comprise as much as 40-50% of their operating costs<sup>22,23,24</sup>, and sludge disposal options are becoming more restricted due to increasing regulatory pressures.
- Sludge disposal in landfills also creates methane emissions, and land application may emit N<sub>2</sub>O under some circumstances. Further, transportation of sludge is generally via truck, which creates diesel emissions. This is particularly salient as WRRFs are often located in disadvantaged communities. Reduction in amounts of sludge for disposal would reduce these indirect emissions.

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<sup>19</sup> Law, Y., et al., *Fossil organic carbon in wastewater and its fate in treatment plants*. Water Research, 2013. **47**(14): p. 5270-5281.

<sup>20</sup> Schneider, A.G., A. Townsend-Small, and D. Rosso, *Impact of direct greenhouse gas emissions on the carbon footprint of water reclamation processes employing nitrification-denitrification*. Science of the Total Environment, 2015. **505**: p. 1166-1173.

<sup>21</sup> Tseng, L.Y., et al., *Identification of Preferential Paths of Fossil Carbon within Water Resource Recovery Facilities via Radiocarbon Analysis*. Environmental Science & Technology, 2016. **50**(22): p. 12166-12178.

<sup>22</sup> Seiple, T.E., A.M. Coleman, and R.L. Skaggs, *Municipal wastewater sludge as a sustainable bioresource in the United States*. Journal of Environmental Management, 2017. **197**: p. 673-680.

<sup>23</sup> Zhao, G., et al., *Greenhouse Gas Emission Mitigation of Large-Scale Wastewater Treatment Plants (WWTPs): Optimization of Sludge Treatment and Disposal*. Polish Journal of Environmental Studies, 2021. **30**(1): p. 955-964.

<sup>24</sup> Wei, L.L., et al., *Development, current state and future trends of sludge management in China: Based on exploratory data and CO<sub>2</sub>-equivalent emissions analysis*. Environment International, 2020. **144**.

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- Reduction or elimination of aeration in the wastewater treatment process, as aeration can comprise as much as 80% of the electricity demand in WRRFs<sup>25,26,27</sup>. There are two key unit processes where this is relevant:
  - Secondary treatment (activated sludge)
  - Conventional nitrification/denitrification (biological nitrogen removal).These two processes can also be key sources of direct GHG emissions, particularly N<sub>2</sub>O. Replacing them with innovative alternatives presents a significant opportunity to reduce carbon emissions, as well as costs, as electricity consumption from aeration can be as high as 0.7 kWh/m<sup>3</sup> in older systems<sup>28</sup>.
- Energy recovery from wastewaters is also an important opportunity to reduce net carbon emissions. Conventional anaerobic digestion does not capture all the latent energy in wastewater, is economically challenging at smaller scales, and may miss possibilities for minimization of the overall net GHG impact of WRRFs.
- Opportunities also exist to produce higher-value products than biogas from wastewater that have the potential to supplant fossil fuel-derived products, and thus contribute to decarbonization goals<sup>29,30</sup>.
- Cost-effective recovery of nutrients, particularly Nitrogen (N) and Phosphorous (P), while not directly related to WRRF emissions, is of interest due to the possibility of displacing fossil-fuel-based methods for fertilizer production and application<sup>31,32</sup>.

Example of possible solution spaces include, but are no means limited to:

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<sup>25</sup> Contreras, J.A., E.I. Valenzuela, and G. Quijano, *Nitrate/nitrite-dependent anaerobic oxidation of methane (NAOM) as a technology platform for greenhouse gas abatement in wastewater treatment plants: State-of-the-art and challenges*. *Journal of Environmental Management*, 2022. **319**.

<sup>26</sup> Bao, Z.Y., S.C. Sun, and D.Z. Sun, *Assessment of greenhouse gas emission from A/O and SBR wastewater treatment plants in Beijing, China*. *International Biodeterioration & Biodegradation*, 2016. **108**: p. 108-114.

<sup>27</sup> Tomczak, W. and M. Gryta, *Energy-Efficient AnMBRs Technology for Treatment of Wastewaters: A Review*. *Energies*, 2022. **15**(14).

<sup>28</sup> Drewnowski, J., et al., *Aeration Process in Bioreactors as the Main Energy Consumer in a Wastewater Treatment Plant. Review of Solutions and Methods of Process Optimization*. *Processes*, 2019. **7**(5).

<sup>29</sup> Li, S.Y., et al., *Techno-economic uncertainty analysis of wet waste-to-biocrude via hydrothermal liquefaction*. *Applied Energy*, 2021. **283**.

<sup>30</sup> Skaggs, R.L., et al., *Waste-to-Energy biofuel production potential for selected feedstocks in the conterminous United States*. *Renewable & Sustainable Energy Reviews*, 2018. **82**: p. 2640-2651.

<sup>31</sup> Puyol, D., et al., *Resource Recovery from Wastewater by Biological Technologies: Opportunities, Challenges, and Prospects*. *Frontiers in Microbiology*, 2017. **7**.

<sup>32</sup> Nancharaiyah, Y.V., S.V. Mohan, and P.N.L. Lens, *Recent advances in nutrient removal and recovery in biological and bioelectrochemical systems*. *Bioresource Technology*, 2016. **215**: p. 173-185.

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- 
- Applications that propose replacing aeration in secondary treatment with anaerobic or other processes.
  - Alternatives to traditional nitrification/denitrification that reduce any or all direct GHG emissions, especially N<sub>2</sub>O, the electricity requirements for aeration, or the need for external carbon sources.
  - Projects that propose dramatic reductions in sludge production by replacing traditional sludge handling methods such as dewatering, drying, stabilization, and anaerobic digestion with novel processes or treatment trains.

Applications that propose other credible methods to reduce GHG emissions from WRRFs will also be entertained, provided that they meet the metrics stipulated in Section I.B below.

### iii. **Diversity, Equity, and Inclusion**

It is the policy of the Biden Administration that:

[T]he Federal Government should pursue a comprehensive approach to advancing equity<sup>33</sup> for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. Affirmatively advancing equity, civil rights, racial justice, and equal opportunity is the responsibility of the whole of our Government. Because advancing equity requires a systematic approach to embedding fairness in decision-making processes, executive departments and agencies (agencies) must recognize and work to redress inequities in their policies and programs that serve as barriers to equal opportunity.

By advancing equity across the Federal Government, we can create opportunities for the improvement of communities that have been historically underserved, which benefits everyone.<sup>34</sup>

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<sup>33</sup> The term “equity” means the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality.

<sup>34</sup> Executive Order 13985, “Advancing Racial Equity and Support for Underserved Communities Through the Federal Government” (Jan. 20, 2021).

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As part of this whole of government approach, this FOA seeks to encourage the participation of underserved communities<sup>35</sup> and underrepresented groups. Applicants are highly encouraged to include individuals from groups historically underrepresented<sup>36,37</sup> in STEM on their project teams. As part of the application, applicants are required to describe how diversity, equity, and inclusion objectives will be incorporated in the project. Specifically, applicants are required to submit a Diversity, Equity, and Inclusion (DEI) Plan that describes the actions the applicant will take to foster a welcoming and inclusive environment, support people from underrepresented groups in STEM, advance equity, and encourage the inclusion of individuals from these groups in the project; and the extent the project activities will be located in or benefit underserved communities. The plan should include at least one SMART (Specific, Measurable, Assignable, Realistic and Time-Related) milestone per budget period supported by metrics to measure the success of the proposed actions. This plan will be evaluated as part of the technical review process and incorporated into the award if selected.

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<sup>35</sup> The term “underserved communities” refers to populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life, as exemplified by the list of in the definition of “equity.” E.O. 13985. For purposes of this FOA, as applicable to geographic communities, applicants can refer to economically distressed communities identified by the Internal Revenue Service as Qualified Opportunity Zones; communities identified as disadvantaged or underserved communities by their respective States; communities identified on the Index of Deep Disadvantage referenced at <https://news.umich.edu/new-index-ranks-americas-100-most-disadvantaged-communities/>, and communities that otherwise meet the definition of “underserved communities” stated above.

<sup>36</sup> According to the National Science Foundation’s 2019 report titled, “Women, Minorities and Persons with Disabilities in Science and Engineering”, women, persons with disabilities, and underrepresented minority groups—blacks or African Americans, Hispanics or Latinos, and American Indians or Alaska Natives—are vastly underrepresented in the STEM (science, technology, engineering and math) fields that drive the energy sector. That is, their representation in STEM education and STEM employment is smaller than their representation in the U.S. population. <https://nces.nsf.gov/pubs/nsf19304/digest/about-this-report> For example, in the U.S., Hispanics, African Americans and American Indians or Alaska Natives make up 24 percent of the overall workforce, yet only account for 9 percent of the country’s science and engineering workforce. DOE seeks to inspire underrepresented Americans to pursue careers in energy and support their advancement into leadership positions. <https://www.energy.gov/articles/introducing-minorities-energy-initiative>

<sup>37</sup> See also. Note that Congress recognized in section 305 of the American Innovation and Competitiveness Act of 2017, Public Law 114-329:

(1) [I]t is critical to our Nation’s economic leadership and global competitiveness that the United States educate, train, and retain more scientists, engineers, and computer scientists; (2) there is currently a disconnect between the availability of and growing demand for STEM-skilled workers; (3) historically, underrepresented populations are the largest untapped STEM talent pools in the United States; and (4) given the shifting demographic landscape, the United States should encourage full participation of individuals from underrepresented populations in STEM fields.

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Further, Minority Serving Institutions<sup>38</sup>, Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Veteran Owned Businesses, or entities located in an underserved community that meet the eligibility requirements (See Section III.) are encouraged to apply as the prime applicant or participate on an application as a proposed partner to the prime applicant. The Selection Official may consider the inclusion of these types of entities as part of the selection decision

Integrating some or all of the following recommendations will ensure a strong DEI plan:

1. The DEI plan should reflect the funded project's activities, rather than the applicant's organizational policies. Statements that primarily restate a partner organization's high-level corporate policies related to justice, diversity, inclusion, and equity will not be considered sufficient.
2. The plan should provide employment and/or educational opportunities for underrepresented students or groups. The project partners might include collaborations with researchers, students, and staff at Minority Serving Institutions (MSIs) such as Historically Black Colleges and Universities, Hispanic Serving Institutions, Tribal Colleges and Universities, Asian American and Native American Pacific Islander Institutions.
3. The plan should incorporate early stakeholder engagement, and including engagement of local, remote, and disadvantaged communities. A strong DEI plan will describe actions to date and future plans to incorporate representatives of communities from which the proposed work/project may have a direct influence in the planning, scoping, and consideration of needs. Applicants may also provide letters of support from representative organizations reflecting substantive engagement and feedback on applicant's approach to community benefits.
4. Long-term goals stated in the DEI Plan should be project-specific, not generalizable impacts of the study at large. For instance, statements should not rely on logic such as "climate change disproportionately impacts disadvantaged communities, therefore research that can help mitigate climate change is a DEI impact".
5. The DEI plan should assess how the technologies being developed might impact communities and groups. The plan should state how the team will assess and map the benefits or harms of the project, particularly for projects that are characterizing energy, data, or other resources. Projects that involve technology

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<sup>38</sup> Minority Serving Institutions (MSIs), including Historically Black Colleges and Universities/Other Minority Institutions as educational entities recognized by the Office of Civil Rights (OCR), U.S. Department of Education, and identified on the OCR's Department of Education U.S. accredited postsecondary minorities' institution list. See <https://www2.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>.

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development should assess the impact of these technologies on local communities, and strategies to mitigate those impacts.

6. The applicant and significant project partners should make commitments to non-discrimination, diversity and inclusion, and pay equity within their organizational structure.

## B. Topic Areas

### i. Topic Areas

This FOA includes two topic areas, the first focused on early-stage R&D at the unit process level, and the second on late-stage pilots of more comprehensive solutions.

Topic Area	Topic Area Title	Focus	Minimum Scale	Required Cost Share
1	Decarbonization of WRRF Unit Processes	Required GHG reductions of 50% minimum assessed at the unit process level	5 liters/day (L/D) throughput (assuming liquids feedstock with varying solids percentages)	20%
2	Reducing overall GHG emissions from WRRFs	Required GHG reductions of 25% minimum assessed at the overall plant level	50 L/D throughput (assuming liquid feedstocks with varying solids percentages)	50%

Applications under both topic areas should meet the following requirements:

- Applicants must propose to perform techno-economic analysis (TEA) and life cycle assessment (LCA) of their potential projects. These analyses must also include a comparison of the current, commercially available state-of-the-art technology with the proposed unit process(es) or treatment train, including comparisons of functionality. The comparison should include an initial TEA and an initial LCA that considers: 1) current, commercially available state-of-the-art technology; 2) relevant preliminary data that demonstrates the current developmental stage of the proposed system, whether experimental, literature-based, or both); and 3) the proposed system’s targets that will be

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achieved by end of project. The preliminary TEA and LCA of the three scenarios, which must be included in the technical volume of the application, should be conducted using credible methodologies and assumptions and will need to be updated throughout the life of selected projects. Technologies that are not able to demonstrate economic and decarbonization feasibility will not be considered. See Appendix H for more information.

- In all cases, letters of commitment from partner organizations, particularly in the case of existing collaborations, and especially those that pledge cost share, will make for stronger applications.
- For both topic areas, applicants must include a process flow diagram (PFD) of the proposed advances. The PFD should clearly depict how the proposed unit processes or treatment trains would fit into an existing wastewater treatment ecosystem, from collection to discharge. Influent and effluent characteristics should be detailed, and the diagram also needs to include rough estimates of energy inputs and outputs, with energy and mass balances clearly indicated, as well as GHG emissions. Note that the process flow diagram will not count towards the Technical Volume page limits in Section IV.D.
- Applications must quantify how their advanced resource recovery system could, if successful, reduce net GHG emissions and/or operating costs. Applicants must explain their R&D approach in detail, including the process improvements required for their systems to move to the next step in commercialization.
- The role of modeling and simulations, experimentation, lab, bench, and pilot-scale testing should be explained. Anticipated technical barriers should be described, along with a planned approach to overcome them. Applicants should explain the underlying research to date, including any literature review or experimental data to support the proposed R&D approach and justify the R&D needs.
- The cost share for Topic Area 1 must be at least 20% of the total allowable costs (i.e., the sum of the government share, including FFRDC costs if applicable, and the recipient share of allowable costs equals the total allowable cost of the project). For Topic Area 2, the cost share must be at least 50% of total allowable costs.
- All applications must also define credible and measurable baselines for both metrics, supported by prior data from literature and/or experimentation, preferably both. The quality and scientific depth of these proposed baselines and metrics will be an important element of the technical evaluation of applications.

Recognizing that not all applicants may have prior experience with TEA and LCA at the appropriate level of sophistication, the DOE has developed relevant tools that are optionally available to projects selected for negotiation. These tools are

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called Water Data and Analysis Management System (Water DAMS) and the Water Techno-economic Assessment Pipe Parity Platform (Water-TAP). Water-TAP in particular could be useful in conducting TEAs and LCAs, along with other DOE-developed tools such as the Greenhouse gases, Regulated Emissions, and Energy use in Technologies model (GREET) developed by the Argonne National Laboratory<sup>39</sup>. As part of this FOA, the DOE may be able to offer technical support from relevant national laboratories in the application of these tools to awarded projects. *Applicants interested in further engaging with the DOE's national laboratories in this regard should so indicate in their applications and are encouraged to include an open-source software distribution plan for any software to be developed (see Section IV.D.xv and Appendix I for more information on these plans).* See Section IV.D.xxi for more information on Water-TAP and Water DAMS.

ii. **Eligibility Considerations**

This FOA is explicitly targeted at the widespread adoption and deployment of GHG reduction solutions at WRRFs, in the full understanding that costs will be a key element in such adoption. The vast majority of these deployments would take place at Water Resource Recovery Facilities (WRRFs). Thus, participation from WRRFs (and optionally engineering firms that tend to design and build actual installations) is essential. Accordingly, this FOA includes restricted eligibility requirements. The specific requirements vary slightly by topic area. Please see Section III, "Eligibility Information" for the FOA eligibility requirements.

**Further, piloting or demonstration activities must occur at a WRRF utilizing real waste streams.**

iii. **Topic Area 1: Decarbonization of WRRF Unit Processes**

This topic seeks projects that meet or exceed the GHG emissions and/or cost reductions enumerated above for a specific unit process within WRRFs, with a strong emphasis on GHG reductions while maintaining or decreasing operating costs. As noted above, applications must specify which processes they propose to replace in their PFD and in the text, and provide justifications for why these processes were chosen, and articulate feasible technical paths to meet the specified metrics. **For this topic, the metrics will be applied at the unit process level, i.e. proposed projects must achieve a 50% reduction in emissions without increasing total WRRF operating costs.** Defining a credible baseline for state-of-the-art processes will thus be a key element of successful applications.

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<sup>39</sup> Argonne National Laboratory. *Greenhouse Gases, Regulated Emissions, and Energy use in technologies model (GREET)*. 2022; Available from: <https://greet.es.anl.gov/>.

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Additionally, by the end of the project, successful applications must achieve:

- 100 continuous hours onstream;
- 500 total hours onstream; and,
- Minimum throughput of 5 L/D, with solids percentage appropriate to their proposed point of insertion into the overall treatment train.

All of these objectives must be met using real organic wastewaters for all go/no go milestones, although synthetic alternatives may be used in preliminary testing.

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

#### **iv. Topic Area 2: Reducing overall GHG emissions from WRRFs**

This topic seeks projects that meet or exceed the GHG emissions and/or cost reductions enumerated above for a more comprehensive treatment train within WRRFs, with a strong emphasis on GHG reductions while maintaining or decreasing operating costs. Compared to Topic Area 1, Topic Area 2 targets integration of multiple unit operations, at higher levels of technological readiness and larger scales, and imposes additional requirements as detailed below. As noted above, applications must specify which processes they propose to replace in their PFD and in the text, and provide justifications for why these processes were chosen, and articulate feasible technical paths to meet the specified metrics. **For this topic, the metrics will be applied at the overall WRRF level, i.e. proposed projects must achieve a 25% reduction in emissions without increasing operating costs vs. baseline operations of an entire facility.** Like Topic Area 1, defining a credible baseline for state-of-the art WRRF operations will thus be a key element of successful applications.

Given the high cost and complexity of pilot scale projects, DOE will conduct a detailed Go/No-Go review at the end of budget period 1. If feasible, this review will take place at the project site(s)). Applications should also include a discussion of potential project risks and mitigation strategies in their technical volume. Please see the section below (deliverables at the end of budget period 1) for what is expected of projects), also referred to as Front-End Loaded Engineering Design 2 (FEL-2). Only when projects receive a “Go” decision will they be authorized to move into the design / construction / operation phase of the project (budget period 2). Topic Area 2 is designed to develop and demonstrate new technologies to:

- Pilot alternative treatment trains that significantly reduce GHG emissions and/or operating costs for WRRFs, with a strong emphasis on GHG reductions;
- Assist technologies in maturing from bench/engineering scale (TRL 5 or less) to pilot scale or beyond (TRL 6-8); and
- Demonstrate the operation of continuous processes using real waste streams.

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Key outcomes to be provided as deliverables to DOE at the end of Budget Period 1 to inform the Go/No-Go review (see section VI.B.xiii) and decision include, but are not limited to:

- A Front-End Loaded – 2 (FEL-2) Basic Engineering Design package (-10%/+20% cost estimate accuracy) including but not limited to:
  - Preliminary mass and energy balances;
  - Preliminary process and instrumentation diagrams (P&IDs);
  - Preliminary equipment sizing and specifications;
  - Refined project schedule;
  - Refined project cost estimates +/- 20%;
  - Overall project execution strategy; and
  - Permitting and compliance planning.
- 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 pilot;
- An updated Life Cycle Analysis (LCA) quantifying the GHG reductions compared to commercial 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 pilot unit;
- A firm written commitment for the project site, including all applicable permits;
- Completed review of all National Environmental Policy Act (NEPA) considerations by the DOE's NEPA team;
- 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;
- A revised Techno-Economic Analysis (TEA) that clearly shows how the proposed treatment train(s), should they become operational, would result in substantive and measurable reductions in GHG emissions and/or operating costs.
- 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;
  - A plausible tech-to-market strategy;

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- As appropriate, comparisons of GHG reduction costs with plausible alternative strategies; or,
  - Net economic results from the production of any co-products.

Additionally, by the end of the project, successful applications must achieve:

- 500 continuous hours onstream;
- 1,000 total hours onstream; and,
- A minimum throughput of 50 L/D, with solids percentage appropriate to their proposed point of insertion into the overall treatment train.

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

### **C. Applications Specifically Not of Interest**

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

- Applications that fall outside the technical parameters specified in Section I.A. and I.B. of the FOA.
- Applications proposing incremental improvements to existing processes that do not meet the GHG or cost reduction targets.
- Projects that rely primarily on modeling, simulation, or digital twins. Successful applications must propose physical validation of their key innovations.
- Applications that do not locate their pilot or demonstration project at a WRRF.
- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).
- Applications that propose deployment of currently commercial technologies, such as conventional anaerobic digestion or thermal hydrolysis.
- Applications which propose the use of synthetic, as opposed to real waste feedstocks for major milestones and Go/No Go decision points.
- Applications with a substantial overlap with the Algae program of the EERE Bioenergy Technology Office.

### **D. Authorizing Statutes**

The programmatic authorizing statute is EAct 2005, Section 911 (a)(2)(C), as codified at 42 U.S.C. 16191(a)(2)(C).

Awards made under this announcement will fall under the purview of 2 Code of Federal Regulation (CFR) Part 200 as amended by 2 CFR Part 910.

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## II. Award Information

### A. Award Overview

#### i. Estimated Funding

EERE expects to make a total of approximately \$23M of federal funding available for new awards under this FOA, subject to the availability of appropriated funds. EERE anticipates making approximately 7-8 awards under this FOA. EERE may issue one, multiple, or no awards. Individual awards may vary between \$2M and \$4M.

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

Topic Area Number	Topic Area Title	Anticipated Number of Awards	Anticipated Minimum Award Size for Any One Individual Award (Fed Share)	Anticipated Maximum Award Size for Any One Individual Award (Fed Share)	Approximate Total Federal Funding Available for All Awards	Anticipated Period of Performance (months)
1	Decarbonization of WRRF Unit Processes	4-5	\$2M	\$2.5M	\$11M	36
2	Reducing overall GHG emissions from WRRFs	3	\$4M	\$4M	\$12M	36-60

EERE may establish more than one budget period for each award and fund only the initial budget period(s). Funding for all budget periods, including the initial budget period, is not guaranteed.

#### ii. Period of Performance

EERE anticipates making awards that will run from 36 up to 60 months in length, comprised of one or more budget periods. Project continuation will be contingent upon several elements, including satisfactory performance and Go/No-Go decision review. For a complete list, see Section VI.B.xiii. At the Go/No-Go decision points, EERE will evaluate project performance, project schedule adherence, the extent milestone objectives are met, compliance with

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reporting requirements, and overall contribution to the program goals and objectives. As a result of this evaluation, EERE 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.

**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 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 Federally Funded Research and Development Center (FFRDCs)**

In most cases, FFRDCs 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.

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### **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 eligibility requirements, it will be considered ineligible and removed from further evaluation.

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

##### **i. Statement of Restricted Eligibility**

As described in Section I.B.ii, this FOA is explicitly targeted at the widespread adoption and deployment of GHG reduction solutions at WRRFs, in the full understanding that costs will be a key element in such adoption. The vast majority of these deployments would take place at Water Resource Recovery Facilities (WRRFs). Thus, participation from WRRFs (and optionally engineering firms that tend to design and build actual installations) is essential. The specific eligibility requirements vary slightly by topic area.

For both topic areas, applicants are encouraged to propose project teams that include partnerships from a variety of eligible organizations and organization types. Such project team members may include, but are not limited to, public water systems, waste producers or haulers, and project development teams that otherwise meet the eligibility requirements listed below.

For both topic areas, 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.

##### **ii. Topic Area 1**

To be eligible for consideration under Topic Area 1, the project team must include at least one owner or operator of a WRRF (WRRF Partner) that would serve as either the prime recipient or a subrecipient. This WRRF Partner includes, but is not limited to, municipal utilities, tribal councils, regional sanitary authorities, or other governmental entities with direct responsibility for organic waste treatment and management.

The following domestic entities are eligible to participate on a project team as a prime recipient or subrecipient:

- WRRF Partners;
- For-profit entities;
- Non-profit entities; and
- State, local, and tribal government entities.



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The following domestic entities are eligible to participate on a project team as a subrecipient only:

- DOE/NNSA National Laboratories and non-DOE/NNSA National Laboratories/ Federally Funded Research and Development Centers (FFRDCs);
- Institutions of higher education; and
- Federal agencies and instrumentalities (other than DOE).

### iii. **Topic Area 2**

To be eligible for consideration under Topic Area 2, the project team must be led by (1) a WRRF Partner as defined in Topic Area 1 above, or (2) a non-profit or a for-profit entity with at least five years' experience with WRRF development and/or operations. All applications must include a WRRF partner as either the prime recipient or a subrecipient

The following domestic entities are eligible to participate on a project team as a prime recipient or subrecipient:

- WRRF Partners;
- Non-profit organizations with at least five years' experience with WRRF development and/or operations;
- For-profit entities with at least five years' experience with WRRF development and/or operations; and
- State, local, and tribal government entities that qualify as a WRRF Partner.

The following domestic entities are eligible to participate on a project team as a subrecipient<sup>40</sup>:

- Institutions of higher education;
- For-profit entities;
- Non-profit entities;
- State, local, and tribal government entities;
- DOE/NNSA National Laboratories and non-DOE/NNSA National Laboratories/ Federally Funded Research and Development Centers (FFRDCs); and
- Federal agencies and instrumentalities (other than DOE).

**Further, piloting or demonstration activities must occur at a WRRF utilizing real waste streams.**

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<sup>40</sup> If an entity falls under one the categories listed here and the entity meets the definition of a "WRRF Partner", the entity would be eligible to apply as either a prime recipient or subrecipient.

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#### **iv. Domestic Entities**

To qualify as a domestic entity, the entity must be organized, chartered or incorporated (or otherwise formed) under the laws of a particular state or territory of the United States; have majority domestic ownership and control; and have a physical place of business in the United States.

Entities banned from doing business with the United States government such as entities debarred, suspended, or otherwise excluded from or ineligible for participating in Federal programs are not eligible.

Non-profit 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.

#### **v. Foreign Entities**

In limited circumstances, DOE may approve a waiver to allow a foreign entity to participate as a prime recipient or subrecipient. A foreign entity may submit a Full Application to this FOA, but the Full Application must be accompanied by an explicit written waiver request. Likewise, if the applicant seeks to include a foreign entity as a subrecipient, the applicant must submit a separate explicit written waiver request in the Full Application for each proposed foreign subrecipient.

Appendix C lists the information that must be included in a foreign entity waiver request. The applicant does not have the right to appeal DOE's decision concerning a waiver request.

### **B. Cost Sharing**

The cost share for Topic Area 1 must be at least 20% of the total allowable costs (i.e., the sum of the government share, including FFRDC costs if applicable, and the recipient share of allowable costs equals the total allowable cost of the project)

For Topic Area 2, the cost share requirement is 50% of the total allowable costs for pilot, demonstration, and commercial application projects (Topic Area 2) and must come from non-federal sources unless otherwise allowed by law. (See 2 CFR 200.306 and 2 CFR 910.130 for the applicable cost sharing requirements.)

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

**i. Legal Responsibility**

Although the cost share requirement applies to the project as a whole, including work performed by members of the project team other than the prime recipient, the prime recipient is legally responsible for paying the entire cost share. If the funding agreement is terminated prior to the end of the project period, the prime recipient is required to contribute at least the cost share percentage of total expenditures incurred through the date of termination.

The prime recipient is solely responsible for managing cost share contributions by the project team and enforcing cost share obligation assumed by project team members in subawards or related agreements.

**ii. 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.

**iii. Cost Share Types and Allowability**

Every cost share contribution must be allowable under the applicable federal cost principles, as described in Section IV.J.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. Cost share may be provided by the prime recipient, subrecipients, or third parties (entities that do not have a role in performing the scope of work). Vendors/contractors may not provide cost share. Any partial donation of goods or services is considered a discount and is not allowable.

Cash contributions include, but are not limited to: personnel costs, fringe costs, supply and equipment costs, indirect costs and other direct costs.

In-kind contributions are those where a value of the contribution can be readily determined, verified and justified but where no actual cash is transacted in securing the good or service comprising the contribution. Allowable in-kind contributions include, but are not limited to: the donation of volunteer time or the donation of space or use of equipment.

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.

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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 for additional cost sharing requirements.

**iv. Cost Share Contributions by FFRDCs**

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

**v. Cost Share Verification**

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

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

**vi. Cost Share Payment**

EERE requires prime recipients to contribute the cost share amount incrementally over the life of the award. Specifically, the prime recipient's cost

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share for each billing period must always reflect the overall cost share ratio negotiated by the parties (i.e., the total amount of cost sharing on each invoice when considered cumulatively with previous invoices must reflect, at a minimum, the cost sharing percentage negotiated). As FFRDC funding will be provided directly to the FFRDC(s) by DOE, prime recipients will be required to provide project cost share at a percentage commensurate with the FFRDC costs, on a budget period basis, resulting in a higher interim invoicing cost share ratio than the total award ratio.

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

## C. Compliance Criteria

**Concept Papers, Full Applications, and Replies to Reviewer Comments must meet all compliance criteria listed below or they will be considered noncompliant. EERE will not review or consider noncompliant submissions,** including Letters of Intent, 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 by the applicable deadline due to server/connection congestion.

### i. Compliance Criteria

All applicant submissions must:

- comply with the applicable content and form requirements listed in Section IV. of the FOA;
- include all required documents;
- be successfully uploaded in EERE eXCHANGE <https://eere-eXCHANGE.energy.gov>, including clicking the "Submit" button; and
- be submitted by the deadline stated in the FOA.

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DOE will not review or consider submissions submitted through means other than EERE eXCHANGE, submissions submitted after the applicable deadline, or incomplete submissions.

**Applicants are strongly encouraged to submit their Concept Papers, Full Applications, and Replies to Reviewer Comments 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 to any of these documents, the applicant must resubmit the Concept Paper, Full Application, or Reply to Reviewer Comments before the applicable deadline. DOE will not extend the submission deadline for applicants that fail to submit required information by the applicable deadline due to server/connection congestion.

## 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 and non-DOE/NNSA Federally Funded Research and Development Centers Included as a Subrecipient

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

#### i. Authorization for non-DOE/NNSA FFRDCs

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

#### ii. Authorization for DOE/NNSA FFRDCs

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

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

*iii. Value/Funding*

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

*iv. Cost Share*

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

*v. Responsibility*

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

*vi. Limit on FFRDC Effort*

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

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

An entity may only submit one Concept Paper and one Full Application for each topic area of this FOA. If an entity submits more than one Concept Paper and one Full Application to the same topic area, EERE will request a determination from the applicant's authorizing representative as to which application should be reviewed. Any other submissions received listing the same entity as the applicant for the same topic area will not be 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 applicant on one Concept Paper and one Full Application for each topic area of this FOA.

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## 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 deadline, or 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 EERE 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 Calibri 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;

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subject line.*

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- 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; and
  - 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, Full Applications, and Replies to Reviewer Comments 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 Letter of Intent, Concept Paper, Full Application, or Reply to Reviewer Comments. Once the Letter of Intent, 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 to any of these documents, the applicant must resubmit the Letter of Intent, Concept Paper, Full Application, or Reply to Reviewer Comments before the applicable deadline.

EERE urges applicants to carefully review their Concept Papers, Full Applications, and Replies to Reviewer Comments 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.ii. 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 EERE 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 EERE eXCHANGE helpdesk for assistance ([EERE-eXCHANGESupport@hq.doe.gov](mailto:EERE-eXCHANGESupport@hq.doe.gov)). The EERE eXCHANGE helpdesk and/or the EERE eXCHANGE system administrators will assist applicants in resolving issues.

## 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 **50MB**. Files in excess of **50MB** cannot be uploaded, and hence cannot be submitted for review. If a file exceeds **50MB** 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:

**TechnicalVolume\_Part\_1**

**TechnicalVolume\_Part\_2**

## 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>	1 page maximum	The cover page should include the project title, the specific announcement Topic Area being addressed (if applicable), both the technical and business points of contact, names of all team member organizations, and any statements regarding confidentiality. For Topic Area 1: Identify the project team member that is a WRRF Partner as defined in Section III. For Topic Area 2, provide a short statement to demonstrate the applicant meets the eligibility requirements (i.e., must qualify as (1) a WRRF Partner or (2) be a non-profit or for-profit entities with at least five years' experience in the development and operations of WRRFs.
<b>Technology Description</b>	4 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> </ul>

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		<ul style="list-style-type: none"> <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> <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> <li>• Applicants may provide graphs, charts, or other data to supplement their Technology Description.</li> </ul>

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 posted on EERE eXCHANGE at the close of that phase.

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## D. Content and Form of the Full Application

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

Applicants will have approximately 30 days from receipt of the Concept Paper Encourage/Discourage notification on EERE eXCHANGE 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 clicking the “Create Concept Paper” button in EERE eXCHANGE, and should include that control number in the file name of their Full Application submission (i.e., *Control number\_Applicant Name\_Full Application*).

### i. Full Application Content Requirements

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:

Component	File Format	Page Limit	File Name
Technical Volume	PDF	25 for Topic Area 1; 30 for Topic Area 2	ControlNumber_LeadOrganization_TechnicalVolume
Resumes	PDF	2 pages each	ControlNumber_LeadOrganization_Resumes
Letters of Commitment	PDF	1 page each	ControlNumber_LeadOrganization_LOCs
Statement of Project Objectives	MS Word	10	ControlNumber_LeadOrganization_SOPO
SF-424	PDF	n/a	ControlNumber_LeadOrganization_App424
Budget Justification Workbook	MS Excel	n/a	ControlNumber_LeadOrganization_Budget_Justification
Summary/Abstract for Public Release	PDF	1	ControlNumber_LeadOrganization_Summary
Summary Slide	MS Powerpoint	1	ControlNumber_LeadOrganization_Slide

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Subrecipient Budget Justification	MS Excel	n/a	ControlNumber_LeadOrganization_Subrecipient_Budget_Justification
DOE Work Proposal for FFRDC, if applicable (see DOE O 412.1A, Attachment 3)	PDF	n/a	ControlNumber_LeadOrganization_WP
Authorization from cognizant Contracting Officer for FFRDC	PDF	n/a	ControlNumber_LeadOrganization_FFRDCAuth
SF-LLL Disclosure of Lobbying Activities	PDF	n/a	ControlNumber_LeadOrganization_SF-LLL
Foreign Entity and Foreign Work Waivers	PDF	n/a	ControlNumber_LeadOrganization_Waiver
Open Source Software Distribution Plan (if applicable)	PDF	n/a3	ControlNumber_LeadOrganization_OSSDP
Diversity Equity and Inclusion Plan	PDF	5	ControlNumber_LeadOrganization_DEIP
Current and Pending Support	PDF	n/a	ControlNumber_LeadOrganization_CPS
Process Flow Diagrams (PFDs)	PDF	1-3	ControlNumber_LeadOrganization_PFD
Transparency of Foreign Connections (if applicable)	PDF	n/a	ControlNumber_LeadOrganization_TFP
Potentially Duplicative Funding Notice (if applicable)	PDF	n/a	ControlNumber_LeadOrganization_PDFN

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**TechnicalVolume\_Part\_1**

**TechnicalVolume\_Part\_2**

**EERE will not accept late submissions that resulted from technical difficulties due to uploading files that exceed 50MB.**

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

## ii. Technical Volume

The Technical Volume must be submitted in 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”.

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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.

The Technical Volume to the Full Application may not be more than 25 pages for Topic Area 1, and 30 pages for Topic Area 2, 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. Note that process flow diagrams (PFDs) submitted with the technical volume do not count against the above page limit.

The Technical Volume should clearly describe and expand upon information provided in the Concept Paper. The Technical Volume must conform to the following content requirements:



SECTION/PAGE LIMIT	DESCRIPTION
<b>Cover Page</b>	<p>The cover page should include the project title, the specific FOA Topic Area being addressed (if applicable), both the technical and business points of contact, names of all team member organizations, names of the senior/key personnel and their organizations, and any statements regarding confidentiality. For Topic Area 1: Identify the project team member that is a WRRF Partner as defined in Section III. For Topic Area 2, provide a short statement to demonstrate the applicant meets the eligibility requirements (i.e., must qualify as (1) a WRRF Partner or (2) be a non-profit or for-profit entities with at least five years' experience in the development and operations of WRRFs.</p>
<b>Project Overview</b> (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> (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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<p><b>Workplan and Market Transformation Plan</b> (Approximately 40% of the Technical Volume)</p>	<p>The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure (WBS), Milestones, Go/No-Go Decision Points, and Project Schedule. A detailed 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>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 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. A milestone may be either a progress measure (which can be activity based) or a SMART technical milestone. SMART milestones should be Specific, Measurable, Achievable, Relevant, and Timely, and must demonstrate a technical achievement rather than simply completing a task. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project with at least one SMART technical milestone per year (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The applicant should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO.</li> <li>• <b>Go/No-Go Decision Points:</b> The applicant should provide a summary of project-wide Go/No-Go decision points at appropriate</li> </ul>
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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. At a minimum, 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. See Section VI.B.xiv. The applicant should also provide the specific technical criteria to be used to evaluate the project at the Go/No-Go decision point. The summary provided should be consistent with the SOPO. Go/No-Go decision points are considered “SMART” and can fulfill the requirement for an annual SMART milestone.

- End of Project Goal: The applicant should provide a summary of the end of project goal(s). At a minimum, each project must have one SMART end of project goal. The summary provided should be consistent with the SOPO.
- Project Schedule (Gantt Chart or similar): The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and Go/No-Go decision points.
- Buy America Requirements for Infrastructure Projects: Within the first 2 pages of the Workplan, include a short statement on whether the project will involve the construction, alteration, and/or repair of infrastructure in the United States. See Appendix D for applicable definitions and other information to inform this statement.
- Project Management: The applicant should discuss the team’s proposed management plan, including the following:
  - The overall approach to and organization for managing the work
  - The roles of each project team member
  - Any critical handoffs/interdependencies among project team members
  - The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices
  - The approach to project risk management
  - A description of how project changes will be handled
  - If applicable, the approach to Quality Assurance/Control
  - How communications will be maintained among project team members

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	<ul style="list-style-type: none"> <li>• Market Transformation Plan: 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, and product distribution.</li> </ul> </li> </ul>
<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>• Describe the technical services to be provided by DOE/NNSA FFRDCs, if applicable.</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 senior/key personnel;</li> <li>○ Business agreements between the applicant and each PI and senior/key personnel;</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> </ul>

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**iii. Resumes**

A resume provides information that can be used by reviewers to evaluate the individual's skills, experience, and potential for leadership within the scientific community. Applicants are required to submit a resume (limited to three pages) for each the Principal Investigator or Leader Project Manager and all Senior/Key Personnel that include the following:

1. Contact Information;
2. Education and training: Provide institution, major/area, degree, and year for undergraduate, graduate, and postdoctoral training;
3. Research and Professional Experience: Beginning with the current position, list professional/academic positions in chronological order with a brief description. List all current academic, professional, or institutional appointments, foreign or domestic, at the applicant institution or elsewhere, whether or not remuneration is received, and, whether full-time, part-time, or voluntary;
4. Awards and honors;
5. A list of up to 10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address if available electronically. Patents, copyrights, and software systems developed may be provided in addition to or substituted for publications. An abbreviated style such as the Physical Review Letters (PRL) convention for citations (list only the first author) may be used for publications with more than 10 authors;
6. Synergistic Activities: List up to five professional and scholarly activities related to the proposed effort; and
7. There should be no lapses in time over the past ten years or since age 18, which ever time period is shorter.

As an alternative to a resume, it is acceptable to use the biographical sketch format approved by the National Science Foundation (NSF). The biographical sketch format may be generated by the Science Experts Network Curriculum Vita (SciENCv), a cooperative venture maintained at <https://www.ncbi.nlm.nih.gov/sciencv/>, and is also available at <https://nsf.gov/bfa/dias/policy/nsfapprovedformats/biosketch.pdf>. The use of a format required by another agency is intended to reduce the administrative burden to researchers by promoting the use of common formats.

Save the resumes in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_Resumes".

**iv. Letters of Commitment**

Submit letters of commitment from all subrecipients third-party cost share providers, and WRRF Partners. If applicable, also include any letters of commitment from partners/end users (one-page maximum per letter). Save the letters of commitment in a single PDF file using the following convention for the title “ControlNumber\_LeadOrganization\_LOCs”.

**v. Statement of Project Objectives (SOPO)**

Applicants are required to complete a SOPO, which spells out their plan for the project, with a particular emphasis on quantifiable milestones and Go/No Go decision targets. A SOPO template is available on EERE eXCHANGE at <https://eere-eXCHANGE.energy.gov/>. The SOPO, including the Milestone Table, must not exceed 10 pages when printed using standard 8.5 x 11 paper with 1” margins (top, bottom, left, and right) with font not smaller than 12 point (except in figures or tables, which may be 10 point font). Save the SOPO in a single Microsoft Word file using the following convention for the title “ControlNumber\_LeadOrganization\_SOPO”.

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

Applicants are required to complete the SF-424 Application for Federal Assistance. This form is available on EERE eXCHANGE at <https://eere-eXCHANGE.energy.gov/>. 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\_424”.

**vii. Budget Justification Workbook**

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. 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

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Budget Justification Workbook in a single Microsoft Excel file using the following convention for the title  
“ControlNumber\_LeadOrganization\_Budget\_Justification”.

**viii. 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”.

**ix. Summary Slide**

Applicants are required to provide a single slide summarizing the proposed project. This slide is used during the evaluation process.

The Summary Slide template requires the following information:

- A technology summary;
- A description of the technology’s impact;
- Proposed project goals;
- Any key graphics (illustrations, charts and/or tables);
- The project’s key idea/takeaway;
- Project title, prime recipient, Principal Investigator, and senior/key personnel information; and
- Requested EERE funds and proposed applicant cost share.

Save the Summary Slide in a single Microsoft Powerpoint file using the following convention for the title “ControlNumber\_LeadOrganization\_Slide”.

**x. Subrecipient Budget Justification (if applicable)**

Applicants must provide a separate budget justification for each subrecipient 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”



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section above. Save each subrecipient budget justification in a Microsoft Excel file using the following convention for the title “ControlNumber\_LeadOrganization\_Subrecipient\_Budget\_Justification”.

**xi. 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 WP in accordance with the requirements in DOE Order 412.1A, Work Authorization System, Attachment 3, available at: <https://www.directives.doe.gov/directives-documents/400-series/0412.1-BOrder-a-chg1-AdmChg> Save the WP in a single PDF file using the following convention for the title “ControlNumber\_LeadOrganization\_WP”.

**xii. 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”.

**xiii. SF-LLL: Disclosure of Lobbying Activities (required)**

Prime recipients and subrecipients may not use any federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Prime recipients and subrecipients are required to complete and submit SF-LLL, “Disclosure of Lobbying Activities” (<https://www.grants.gov/web/grants/forms/sf-424-individual-family.html>) to ensure that non-federal funds have not been paid and will not be paid to any person for influencing or attempting to influence any of the following in connection with the 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”.

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**xiv. Waiver Requests: Foreign Entity and Foreign Work (if applicable)****i. Foreign Entity Participation:**

For projects selected under this FOA, all recipients and subrecipients must qualify as domestic entities. See Section III. To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application. Appendix C lists the information that must be included in a waiver request.

**ii. Performance of Work in the United States (Foreign Work Waiver)**

As set forth in Section IV.J.iii., all work under EERE funding agreements must be performed in the United States. To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application. Appendix C lists the information that must be included in a foreign work waiver request.

Save the Waivers in a single PDF file using the following convention for the title “ControlNumber\_LeadOrganization\_Waiver”.

**xv. Open Source Software Distribution Plan**

Applicants that elect to work with Water-TAP and/or Water-DAMS strongly encouraged to submit an Open Source Software Distribution Plan as part of their Full Application. This plan describes how software produced under this FOA will be distributed. Submission of an Open Source Software Distribution Plan is required; failure to submit a complete Plan may result in a determination of non-compliance for your Full Application. Guidance for preparing an Open Source Software Distribution Plan is included in Appendix I of the FOA. Save the Open Source Software Distribution Plan in a single Microsoft Word file using the following convention for the title “ControlNumber\_LeadOrganization\_OSSDP”.

**xvi. Diversity, Equity and Inclusion Plan**

As part of the application, applicants are required to describe how diversity, equity, and inclusion objectives will be incorporated in the project. Specifically, applicants are required to submit a Diversity, Equity, and Inclusion Plan that describes the actions the applicant will take to foster a welcoming and inclusive environment, support people from groups underrepresented in STEM, advance equity, and encourage the inclusion of individuals from these groups in the project; and the extent the project activities will be located in or benefit underserved communities (also see Section I.A.iii.). The plan should include at least one SMART milestone per Budget Period supported by metrics to measure the success of the proposed actions, and will be incorporated into the award if

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selected. The Diversity, Equity, and Inclusion Plan should contain the following information:

- Equity Impacts: the impacts of the proposed project on underserved communities, including social and environmental impacts.
- Benefits: The overall benefits of the proposed project, if funded, to underserved communities; and
- How diversity, equity, and inclusion objectives will be incorporated in the project.

The following is a non-exhaustive list of actions that can serve as examples of ways the proposed project could incorporate diversity, equity, and inclusion elements. These examples should not be considered either comprehensive or prescriptive. Applicants may include appropriate actions not covered by these examples.

- a. Include faculty or students from Minority Serving Institutions as PI/co-PI, senior personnel, and/or student researchers, as applicable;
- b. Enhance or collaborate with existing diversity programs at your home organization and/or nearby organizations;
- c. Collaborate with students, researchers, and staff in Minority Serving Institutions;
- d. Disseminate results of research and development in Minority Serving Institutions or other appropriate institutions serving underserved communities;
- e. Implement evidence-based, diversity-focused education programs (such as implicit bias training for staff) in your organization;
- f. Identify Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses and Veteran Owned Businesses to solicit as vendors and sub-contractors for bids on supplies, services and equipment.

The Diversity, Equity, and Inclusion Plan must not exceed 5 pages. Save the Diversity, Equity and Inclusion Plan in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_DEIP".

### **xvii. Current and Pending Support**

Current and pending support is intended to allow the identification of potential duplication, overcommitment, potential conflicts of interest or commitment, and all other sources of support. As part of the application, the principal investigator and senior/key personnel at the applicant and subrecipient level must provide a list of all sponsored activities, awards, and appointments, whether paid or unpaid; provided as a gift with terms or conditions or provided as a gift without terms or conditions; full-time, part-time, or voluntary; faculty, visiting, adjunct, or honorary; cash or in-kind; foreign or domestic; governmental or private-

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sector; directly supporting the individual's research or indirectly supporting the individual by supporting students, research staff, space, equipment, or other research expenses. **All connections with** foreign government-sponsored talent recruitment programs must be identified in current and pending support.

For every activity, list the following items:

- The sponsor of the activity or the source of funding
- The award or other identifying number
- The title of the award or activity. If the title of the award or activity is not descriptive, add a brief description of the research being performed that would identify any overlaps or synergies with the proposed research
- The total cost or value of the award or activity, including direct and indirect costs and cost share. For pending proposals, provide the total amount of requested funding
- The award period (start date – end date)
- The person-months of effort per year being dedicated to the award or activity

To identify overlap, duplication of effort, or synergistic efforts, append a description of the other award or activity to the current and pending support.

Details of any obligations, contractual or otherwise, to any program, entity, or organization sponsored by a foreign government must be provided on request to either the applicant institution or DOE. **Supporting documents of any identified source of support must be provided to DOE on request, including certified translations of any document.**

PIs and senior/key personnel must provide a separate disclosure statement listing the required information above regarding current and pending support. Each individual must sign and date their respective disclosure statement and include the following certification statement:

I, [Full Name and Title], certify to the best of my knowledge and belief that the information contained in this Current and Pending Support Disclosure Statement is true, complete and accurate. I understand that any false, fictitious, or fraudulent information, misrepresentations, half-truths, or omissions of any material fact, may subject me to criminal, civil or administrative penalties for fraud, false statements, false claims or otherwise. (18 U.S.C. §§ 1001 and 287, and 31 U.S.C. 3729-3733 and 3801-3812). I further understand and agree that (1) the statements and representations made herein are material to DOE's funding

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decision, and (2) I have a responsibility to update the disclosures during the period of performance of the award should circumstances change which impact the responses provided above.

The information may be provided in the format approved by the National Science Foundation (NSF), which may be generated by the Science Experts Network Curriculum Vita (SciENCv), a cooperative venture maintained at <https://www.ncbi.nlm.nih.gov/sciencv/>, and is also available at <https://www.nsf.gov/bfa/dias/policy/nsfapprovedformats/cps.pdf>. The use of a format required by another agency is intended to reduce the administrative burden to researchers by promoting the use of common formats. If the NSF format is used, the individual must still include a signature, date, and a certification statement using the language included in the paragraph above.

Save the Current and Pending Support in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_CPS".

#### Definitions:

Current and pending support – (a) All resources made available, or expected to be made available, to an individual in support of the individual's RD&D efforts, regardless of (i) whether the source is foreign or domestic; (ii) whether the resource is made available through the entity applying for an award or directly to the individual; or (iii) whether the resource has monetary value; and (b) includes in-kind contributions requiring a commitment of time and directly supporting the individual's RD&D efforts, such as the provision of office or laboratory space, equipment, supplies, employees, or students. This term has the same meaning as the term Other Support as applied to researchers in NSPM-33: For researchers, Other Support includes all resources made available to a researcher in support of and/or related to all of their professional RD&D efforts, including resources provided directly to the individual or through the organization, and regardless of whether or not they have monetary value (e.g., even if the support received is only in-kind, such as office/laboratory space, equipment, supplies, or employees). This includes resource and/or financial support from all foreign and domestic entities, including but not limited to, gifts provided with terms or conditions, financial support for laboratory personnel, and participation of student and visiting researchers supported by other sources of funding.

Foreign Government-Sponsored Talent Recruitment Program – An effort directly or indirectly organized, managed, or funded by a foreign government, or a foreign government instrumentality or entity, to recruit science and technology professionals or students (regardless of citizenship or national origin, or whether

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having a full-time or part-time position). Some foreign government-sponsored talent recruitment programs operate with the intent to import or otherwise acquire from abroad, sometimes through illicit means, proprietary technology or software, unpublished data and methods, and intellectual property to further the military modernization goals and/or economic goals of a foreign government. Many, but not all, programs aim to incentivize the targeted individual to relocate physically to the foreign state for the above purpose. Some programs allow for or encourage continued employment at United States research facilities or receipt of federal research funds while concurrently working at and/or receiving compensation from a foreign institution, and some direct participants not to disclose their participation to United States entities. Compensation could take many forms including cash, research funding, complimentary foreign travel, honorific titles, career advancement opportunities, promised future compensation, or other types of remuneration or consideration, including in-kind compensation.

Senior/key personnel – an individual who contributes in a substantive, meaningful way to the scientific development or execution of a research, development and demonstration (RD&D) project proposed to be carried out with DOE award.<sup>41</sup>

[1] Typically, these individuals have doctoral or other professional degrees, although individuals at the masters or baccalaureate level may be considered senior/key personnel if their involvement meets this definition. Consultants, graduate students, and those with a postdoctoral role also may be considered senior/key personnel if they meet this definition.

### **xviii. Process Flow Diagrams**

As detailed in Section I.B., Process Flow Diagrams are required. Save the Process Flow Diagrams in a single PDF file using the following convention for the title “ControlNumber\_LeadOrganization\_PFD.”

### **xix. Transparency of Foreign Connections**

Applicants must identify the following as they relate to the proposed recipient and subrecipients. U.S. National Laboratories, domestic government entities, and institutions of higher education are only required to respond to items 1, 2 and 9, and if applying as to serve as the prime recipient, must provide complete

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<sup>41</sup> Typically, these individuals have doctoral or other professional degrees, although individuals at the masters or baccalaureate level may be considered senior/key personnel if their involvement meets this definition. Consultants, graduate students, and those with a postdoctoral role also may be considered senior/key personnel if they meet this definition.

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responses for project team members that are not U.S. National Laboratories, domestic government entities, or institutions of higher education.

1. Entity name, website address and mailing address;
2. The identity of all owners, principal investigators, project managers, and senior/key personnel who are a party to any *Foreign Government-Sponsored Talent Recruitment Program* of a foreign country of risk (i.e., China, Iran, North Korea, and Russia);
3. The existence of any joint venture or subsidiary that is based in, funded by, or has a foreign affiliation with any foreign country of risk, including the People's Republic of China;
4. Any current or pending contractual or financial obligation or other agreement specific to a business arrangement, or joint venture-like arrangement with an enterprise owned by a foreign state or any foreign entity;
5. Percentage, if any, that the proposed recipient or subrecipient has foreign ownership or control;
6. Percentage, if any, that the proposed recipient or subrecipient is wholly or partially owned by an entity in a foreign country of risk;
7. The percentage, if any, of venture capital or institutional investment by an entity that has a general partner or individual holding a leadership role in such entity who has a foreign affiliation with any foreign country of risk;
8. Any technology licensing or intellectual property sales to a foreign country of risk, during the 5-year period preceding submission of the proposal;
9. Any foreign business entity, offshore entity, or entity outside the United States related to the proposed recipient or subrecipient;
10. Complete list of all directors (and board observers), including their full name, citizenship and shareholder affiliation, date of appointment, duration of term, as well as a description of observer rights as applicable;
11. Complete capitalization table for your entity, including all equity interests (including LLC and partnership interests, as well as derivative securities). Include both the number of shares issued to each equity holder, as well as the percentage of that series and all equity on a fully diluted basis. Identify the principal place of incorporation (or organization) for each equity holder. If the equity holder is a natural person, identify the citizenship(s). If the recipient or subrecipient is a publicly traded company, provide the above information for shareholders with an interest greater than five percent;
12. A summary table identifying all rounds of financing, the purchase dates, the investors for each round, and all the associated governance and information rights obtained by investors during each round of financing; and
13. An organization chart to illustrate the relationship between your entity and the immediate parent, ultimate parent, and any intermediate parent, as well as any subsidiary or affiliates. Identify where each entity is incorporated.

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DOE reserves the right to request additional or clarifying information based on the information submitted.

Save the Transparency of Foreign Participation information in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_TFP."

## **xx. Potentially Duplicative Funding Notice**

If the applicant or project team member has other active awards of federal funds, the applicant must determine whether the activities of those awards potentially overlap with the activities set forth in its application to this FOA. If there is a potential overlap, the applicant must notify DOE in writing of the potential overlap and state how it will ensure any project funds (i.e., recipient cost share and federal funds) will not be used for identical cost items under multiple awards. Likewise, for projects that receive funding under this FOA, if a recipient or project team member receives any other award of federal funds for activities that potentially overlap with the activities funded under the DOE award, the recipient must promptly notify DOE in writing of the potential overlap and state whether project funds from any of those other federal awards have been, are being, or are to be used (in whole or in part) for one or more of the identical cost items under the DOE award. If there are identical cost items, the recipient must promptly notify the DOE Contracting Officer in writing of the potential duplication and eliminate any inappropriate duplication of funding.

Save the Potentially Duplicative Funding Notice in a single PDF file using the following convention for the title "PDFN.pdf."

## **xxi. Additional Requirements**

Research progress in water and wastewater treatment has been hindered by the absence of accessible water treatment data, a lack of standardized methods for assessing technology performance or the benefits of technology innovation, and minimal systems-level analytical research and tools. The DOE is focused on addressing these deficiencies to enable advanced water and wastewater technology research by providing a secure and publicly accessible data management system, developing a standardized open-source analytical platform for consistently evaluating pipe parity of technologies treating a variety of water and wastewater sources, and through innovative systems-level analyses and tool development. This open-source analytical platform is a central, strategic and non-biased service to the water treatment community that uses analysis and innovative tools to align research. All projects funded through this FOA have the option to update their initial TEA and LCA using Water-TAP and Water DAMS in order to validate the potential of their advanced water resource recovery system against the current state-of-the-art technology at the beginning, during, and at the end of the project.

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Water-DAMS provides DOE and the public access to foundational data that will enable researchers and decision-makers to identify and quantify opportunities for technology innovation to reduce the cost and energy intensity of water and wastewater treatment and quantify the security, resiliency, and circular economy benefits of tapping these water and wastewater sources. It will be a flexible, secure, and adaptable data management system to facilitate automated data collection, standardization, secure internal data sharing, and public information dissemination. Water-DAMS platform will include an internal data management system as well as a public-facing dissemination tool. Applicants to this FOA may share the relevant data and modeling results with DOE when using these tools. In addition, applicants are encouraged to share the data and results more broadly with the public.

The internal data management system can be used for securely storing data (e.g., experimental performance data, proprietary information, interim modeling results, background literature) within each project team. It is built within the Data Foundry on the secure OpenEI platform. The collaboration space facilitates interaction and data sharing. This collaboration space has been tailored to water treatment and system research needs, and specifically will enable secure collaboration for DOE and project partners, proper attribution of metadata, data curation, standardization of data formats, and will be integrated with the public-facing repository to allow select data to be easily shared externally and disseminated to the public, if the applicant chooses. Water-DAMS aims to serve as the nation's primary source of publicly available information relevant to RD&D on water and wastewater treatment technologies. The collaboration space provides project teams with a secure, collaborative environment to organize, curate, and standardize data prior to sharing results with DOE or more broadly with the public, if the applicant chooses.

The Water-TAP is a techno-economic evaluation platform that consistently benchmarks technologies and treatment trains across sectors, spatio-temporal contexts, and pipe parity as well as other performance metrics. It will provide a publicly accessible evaluation tool that will use open-source models and data housed in Water-DAMS. This tool aims to serve as the national standard for calculating pipe parity and other performance metric comparisons of alternative water and wastewater treatment technologies. Performance metrics are listed in Section I.B.

The tool will deliver evaluation of multiple pipe parity metrics, uncertainty characterization, integrate with more detailed process models, allow for flexible user-defined inputs, and be adaptable to different types of water and wastewater treatment trains. The framework includes the capability to specify source water conditions, module treatment trains, and target specifications for treated water and wastewater. Given the resulting mass and energy balance information, the tool will allow users to estimate relevant capital and operating expenses, again based on user inputs for critical equipment design considerations such as membrane flux or other sizing criteria,

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equipment lifetime/maintenance requirements, economy of scale considerations (e.g. maximum throughput capacities, exponential cost scaling factors), and input/output demands such as treatment chemicals, anti-fouling agents, etc. Additionally, users will be able to input labor and other fixed operating expenses. This information will all be utilized to calculate the competitiveness of water and wastewater treatment technologies on the basis of pipe parity and other performance metrics. This tool supports Monte Carlo simulation and/or other uncertainty analysis techniques.

## **E. Content and Form of Replies to Reviewer Comments**

If replies to reviewer comments are applicable, EERE will provide applicants with reviewer comments following the 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 the 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 post the Reviewer Comments in EERE eXCHANGE. The expected submission deadline is on the cover page of the FOA; however, it is the applicant’s responsibility to monitor EERE eXCHANGE 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 EERE eXCHANGE or relying on the expected date alone. Applicants should anticipate having approximately three (3) business days to submit Replies to Reviewer Comments.

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

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

<b>SECTION</b>	<b>PAGE LIMIT</b>	<b>DESCRIPTION</b>
<b>Text</b>	2 pages max	Applicants may respond to one or more reviewer comments or supplement their Full Application.
<b>Optional</b>	1 page max	Applicants may use this page however they wish; text, graphs, charts, or other data to respond to reviewer comments or supplement their Full Application are acceptable.

## F. Post Selection Information Requests

If selected for award, EERE reserves the right to request additional or clarifying information regarding the following (non-exhaustive list):

- Personnel proposed to work on the project and collaborating organizations (See Section VI.B.xviii. Participants and Collaborating Organizations);
- Current and Pending Support (See Sections IV.E.xvii and VI.B.xix. Current and Pending Support);
- A Data Management Plan describing how all research data displayed in publications resulting from the proposed work will be digitally accessible at the time of publications, in accordance with Section VI.B.xxi.;
- 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; and
- Environmental Questionnaire.
- [List any additional requirements here]

## G. Unique Entity Identifier (UEI) and System for Award Management (SAM)

Each applicant (unless the applicant has an exception approved by the federal awarding agency under 2 CFR 25.110(d)) is required to: (1) Be registered in the SAM at <https://www.sam.gov> before submitting its application; (2) provide a valid UEI 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 UEI, 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 will 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.

**NOTE: Due to the high demand of UEI requests and SAM registrations, entity legal business name and address validations are taking longer than expected to process. Entities should start the UEI and SAM registration process as soon as possible. If entities have technical difficulties with the UEI validation or SAM registration process they should utilize the [HELP](#) feature on [SAM.gov](#). SAM.gov will work entity service tickets in the order in which they are received and asks that entities not create multiple service tickets for the same request or technical issue. Additional**

entity validation resources can be found here: [GSAFSD Tier 0 Knowledge Base - Validating your Entity](#).

## H. Submission Dates and Times

All required submissions must be submitted in EERE eXCHANGE no later than 5 p.m. Eastern Time on the dates provided on the cover page of this FOA.

## I. Intergovernmental Review

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

## J. Funding Restrictions

### i. Allowable Costs

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

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

- Federal Acquisition Regulation (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 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 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.

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

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 pre-award costs incurred prior to receiving written authorization from the Contracting Officer. If the applicant elects to undertake activities that DOE determines 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 for their project 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. Likewise, if an application 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.

**iii. Performance of Work in the United States (Foreign Work Waiver)****1. Requirement**

All work performed under EERE awards must be performed in 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 whether the work is performed by the prime recipient, subrecipients, contractors or other project partners.

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**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 foreign work waiver, the applicant must submit a written waiver request to EERE. Appendix C lists the necessary information that must be included in a request for a foreign work waiver.

Save the waiver request(s) in a single PDF file. 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.

**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. Real property and equipment purchased with project funds (federal share and recipient cost share) are subject to the requirements at 2 CFR 200.310, 200.311, 200.313, and 200.316 (non-Federal entities, except for-profit entities) and 2 CFR 910.360 (for-profit entities). For projects selected for award under this FOA, the recipient may (1) take disposition action on the real property and equipment; or (2) continue to use the real property and equipment after the conclusion of the award period of performance, with Contracting Officer approval.

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The recipient's written Request for Continued Use must identify the property and include: a summary of how the property will be used (must align with the authorized project purposes); a proposed use period, (e.g., perpetuity, until fully depreciated, or a calendar date where the recipient expects to submit disposition instructions); acknowledgement that the recipient shall not sell or encumber the property or permit any encumbrance without prior written DOE approval; current fair market value of the property; and an Estimated Useful Life or depreciation schedule for equipment.

When the property is no longer needed for authorized project purposes, the recipient must request disposition instructions from DOE. For-profit entity disposition requirements are set forth at 2 CFR 910.360. Property disposition requirements for other non-federal entities are set forth in 2 CFR 200.310 – 200.316.

#### **vii. Buy America Requirements for Infrastructure Projects**

Pursuant to the Build America Buy America Act, subtitle IX of BIL (Buy America, or "BABA"), federally assisted projects which involve infrastructure work, undertaken by applicable recipient types, require that:

- All iron, steel, and manufactured products used in the infrastructure work are produced in the United States; and
- All construction materials used in the infrastructure work are manufactured in the United States.

Whether a given project must apply this requirement is project-specific and dependent on several factors, such as the recipient's entity type, whether the work involves "infrastructure," as that term is defined in Section 70914 of the Bipartisan Infrastructure Law, and whether the infrastructure in question is publicly owned or serves a public function.

Applicants are strongly encouraged to consult Appendix D of this FOA to determine whether their project may have to apply this requirement, both to make an early determination as to the need of a waiver, as well as to determine what impact, if any, this requirement may have on the proposed project's budget.

In general, whether a given project must apply this requirement is dependent on several factors, such as the recipient's entity type, whether the work involves "infrastructure," as that term is defined in Section 70914 of the BIL (discussed in more detail in Appendix D), based in part on whether the infrastructure in question is publicly owned or serves a public function. For this FOA specifically, all projects subject to this FOA are considered "infrastructure" within the Buy

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America provision of BIL, based on implementation guidance from the Office of Management and Budget (OMB) issued on April 18, 2022.

Moreover, based on the OMB guidance, the Buy America requirements of the BIL do not apply to DOE projects in which the prime recipient is a for-profit entity; the requirements only apply to projects whose prime recipient is a “non-Federal entity,” e.g., a State, local government, Indian tribe, Institution of Higher Education, or nonprofit organization. Subawards should conform to the terms of the prime award from which they flow; in other words, for-profit prime recipients are not required to flow down these Buy America requirements to subrecipients, even if those subrecipients are non-Federal entities as defined above. Conversely, prime recipients which are non-Federal entities must flow the Buy America requirements down to all subrecipients, even if those subrecipients are for-profit entities. Finally, for all applicants—both non-Federal entities and for-profit entities—DOE is including a program policy factor that the Selection Official may consider in determining which Full Applications to select for award negotiations that considers whether the applicant has made a commitment to procure U.S. iron, steel, manufactured products, and construction materials in its project.

The DOE financial assistance agreement will require each recipient: (1) to fulfill the commitments made in its application regarding the procurement of U.S.-produced products, and (2) to fulfill the commitments made in its application regarding the procurement of other key component metals and manufactured products domestically that are deemed available in sufficient and reasonably available quantities or of a satisfactory quality at the time of award negotiation. Applicants may seek waivers of these requirements in very limited circumstances and for good cause shown. Further details on requesting a waiver can be found in Appendix D and the terms and conditions of an award.

Applicants are strongly encouraged to consult Appendix D for more information.

### **viii. 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” (<https://www.grants.gov/web/grants/forms/sf-424-individual-family.html>) to ensure that non-federal funds have not been paid and will not be paid to any person for influencing or attempting to influence any of the following in connection with the application:

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- 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.

#### **ix. Risk Assessment**

Pursuant to 2 CFR 200.206, DOE will conduct an additional review of the risk posed by applications submitted under this FOA. Such risk assessment will consider:

1. Financial stability;
2. Quality of management systems and ability to meet the management standards prescribed in 2 CFR 200 as amended and adopted by 2 CFR 910;
3. History of performance;
4. Audit reports and findings; and
5. The applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-federal entities.

DOE may make use of other publicly available information and the history of an applicant's performance under DOE or other federal agency awards.

Depending on the severity of the findings and whether the findings were resolved, DOE may elect not to fund the applicant.

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.

Further, as DOE invests in critical infrastructure and funds critical and emerging technology areas, DOE also considers possible vectors of undue foreign influence in evaluating risk. If high risks are identified and cannot be sufficiently mitigated, DOE may elect to not fund the applicant.

#### **x. Invoice Review and Approval**

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

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

**xi. Prohibition Related to Foreign Government-Sponsored Talent Recruitment Programs**

**a. Prohibition**

Persons participating in a *Foreign Government-Sponsored Talent Recruitment Program of a Foreign Country of Risk* are prohibited from participating in projects selected for federal funding under this FOA. Should an award result from this FOA, the recipient must exercise ongoing due diligence to reasonably ensure that no individuals participating on the DOE-funded project are participating in a *Foreign Government-Sponsored Talent Recruitment Program of a Foreign Country of Risk*. Consequences for violations of this prohibition will be determined according to applicable law, regulations, and policy. Further, the recipient must notify DOE within five (5) business days upon learning that an individual on the project team is or is believed to be participating in a foreign government talent recruitment program of a foreign country of risk. DOE may modify and add requirements related to this prohibition to the extent required by law.

**b. Definitions**

1. **Foreign Government-Sponsored Talent Recruitment Program.** An effort directly or indirectly organized, managed, or funded by a foreign government, or a foreign government instrumentality or entity, to recruit science and technology professionals or students (regardless of citizenship or national origin, or whether having a full-time or part-time position). Some foreign government-sponsored talent recruitment programs operate with the intent to import or otherwise acquire from abroad, sometimes through illicit means, proprietary technology or software, unpublished data and methods, and intellectual property to further the military modernization goals and/or economic goals of a foreign government. Many, but not all, programs aim to incentivize the targeted individual to relocate physically to the foreign state for the above purpose. Some programs allow for or encourage continued employment at United States research facilities or

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receipt of federal research funds while concurrently working at and/or receiving compensation from a foreign institution, and some direct participants not to disclose their participation to U.S. entities. Compensation could take many forms including cash, research funding, complimentary foreign travel, honorific titles, career advancement opportunities, promised future compensation, or other types of remuneration or consideration, including in-kind compensation.

2. **Foreign Country of Risk.** DOE has designated the following countries as foreign countries of risk: Iran, North Korea, Russia, and China. This list is subject to change.

## **xii. Foreign Collaboration Considerations**

- a. Consideration of new collaborations with foreign entities and governments. The recipient will be required to provide DOE with advanced written notification of any potential collaboration with foreign entities or governments in connection with its DOE-funded award scope. The recipient will then be required to await further guidance from DOE prior to contacting the proposed foreign entity or government regarding the potential collaboration or negotiating the terms of any potential agreement.
- b. Existing collaborations with foreign entities and governments. The recipient will be required to provide DOE with a written list of all existing foreign collaborations in which has entered in connection with its DOE-funded award scope.
- c. Description of collaborations that should be reported: In general, a collaboration will involve some provision of a thing of value to, or from, the recipient. A thing of value includes but may not be limited to all resources made available to, or from, the recipient in support of and/or related to the DOE award, regardless of whether or not they have monetary value. Things of value also may include in-kind contributions (such as office/laboratory space, data, equipment, supplies, employees, students). In-kind contributions not intended for direct use on the DOE award but resulting in provision of a thing of value from or to the DOE award must also be reported. Collaborations do not include routine workshops, conferences, use of the recipient's services and facilities by foreign investigators resulting from its standard published process for evaluating requests for access, or the routine use of foreign facilities by awardee staff in accordance with the recipient's standard polices and procedures.

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## 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%)**

This criterion involves consideration of the following factors:

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

#### ii. Full Applications

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

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

This criterion involves consideration of the following factors:

###### Technical Merit and Innovation

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

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### 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 (25%)**

This criterion involves consideration of the following factors:

#### Research Approach, Workplan and SOPO

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

#### Identification of Technical Risks

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

#### Baseline, Metrics, and Deliverables

- The level of clarity in the definition of the baseline, metrics, and milestones;
- 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, Open Source Software Distribution Plan, etc., and product distribution.

### **Criterion 3: Team and Resources (15%)**

This criterion involves consideration of the following factors:

- 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;

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- 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.

**Criterion 4: Diversity, Equity, and Inclusion (10%)**

This criterion involves consideration of the following factors:

- The quality and manner in which the measures incorporate diversity, equity and inclusion goals in the project; and
- Extent to which the project benefits underserved communities.

**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 "DOE Merit Review Guide for Financial Assistance," effective September 2020, which is available at: <https://energy.gov/management/downloads/merit-review-guide-financial-assistance-and-unsolicited-proposals-current>.

**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 exhibits technological diversity when compared to the existing DOE project portfolio and other projects selected from the subject FOA;
- The degree to which the proposed project, including proposed cost share, optimizes the use of available EERE funding to achieve programmatic objectives;

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- The level of industry involvement and demonstrated ability to accelerate commercialization and overcome key market barriers;
  - The degree to which the proposed project is likely to lead to increased employment and manufacturing in the United States;
  - The degree to which the proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty; and
  - The degree to which the proposed project, or group of projects, represent a desired geographic distribution (considering past awards and current applications);
  - The degree to which the proposed project incorporates diversity, equity, and inclusion elements, including but not limited to team members from Minority Serving Institutions (e.g. Historically Black Colleges and Universities (HBCUs)/Other Minority Institutions), Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Veteran Owned Businesses, or members within underserved communities.

**Diversity (other than technological)**

- The degree to which the proposed project collectively represents diverse types and sizes of applicant organizations.

**Optimize Funding**

- The degree to which the proposed project avoids duplication/overlap with other publicly or privately funded work.

**Complementary Efforts**

- The degree to which the proposed project supports complementary efforts or projects, which, when taken together, will best achieve the research goals and objectives.

**Market Impact**

- The degree to which the proposed project enables new and expanding market segments.

**EE/Deployment**

- The degree to which the project's solution or strategy will maximize deployment or replication.

**Tech Transfer**

- The degree to which the project promotes increased coordination with nongovernmental entities for demonstration of technologies and research applications to facilitate technology transfer.

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## 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.iii. of the FOA). The invited applicant(s) will meet with EERE representatives to provide clarification on the contents of the Full Applications and to provide EERE an opportunity to ask questions regarding the proposed project. The information provided by applicants to EERE through Pre-Selection Interviews contributes to EERE's selection decisions.

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

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

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

### iii. 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

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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.

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 CFR 200.206.

#### **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 Negotiation Dates**

EERE anticipates notifying applicants selected for negotiation of award and negotiating awards by the dates provided on the cover page of this FOA.

## **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 post these notifications to EERE eXCHANGE.

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

A notification 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.

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**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 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

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and receive an award if the application is selected. These requirements are as follows:

**1. EERE Funding Opportunity Exchange (eXCHANGE)**

Register and create an account on EERE eXCHANGE at <https://eere-eXCHANGE.energy.gov>. This account will allow the user to apply to any open EERE FOAs that are currently in EERE eXCHANGE.

Beginning on July 29, 2022\*, eXCHANGE will be updated to integrate with [Login.gov](https://login.gov). As of September 30, 2022\*, potential applicants will be required to have a Login.gov account to access [EERE eXCHANGE](#). As part of the eXCHANGE registration process, new users will be directed to create an account in Login.gov. Please note that the email address associated with Login.gov must match the email address associated with the eXCHANGE account. For more information, refer to the eXCHANGE Multi-Factor Authentication (MFA) Quick Guide in the [Manuals section](#) of 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 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. System for Award Management**

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

**3. 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 [https://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect\\_Ready\\_Set\\_Go.pdf](https://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf).

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\* Please note that these dates are tentative and subject to change.



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**4. 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 Letters of Intent, Concept Papers, and Full Applications will not be accepted through Grants.gov.

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

Submission of an application and supplemental information under this FOA through electronic systems used by the DOE, 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 Participation**

All applicants selected for an award under this FOA and project participants (including subrecipients and contractors) who anticipate involving foreign nationals in the performance of an award, may be required to provide DOE with specific information about each foreign national to satisfy requirements for foreign national participation. A "foreign national" is defined as any person who is not a United States citizen by birth or naturalization. The volume and type of information collected may depend on various factors associated with the award. DOE concurrence may be required before a foreign national can participate in the performance of any work under an award.

DOE may elect to deny foreign national's participation in the award. Likewise, DOE may elect to deny a foreign national's access to a DOE sites, information, technologies, equipment, programs or personnel.

**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.

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**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/rtc.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 NEPA (42 U.S.C. 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 <https://www.energy.gov/nepa>.

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 recipient may be required to prepare the records and the costs to prepare the necessary records may be included as part of the project costs.

**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

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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.

**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 Classified Information Nondisclosure Agreement (<https://fas.org/sgp/othergov/sf312.pdf>), Form 4414 Sensitive Compartmented Information Disclosure Agreement (<https://fas.org/sgp/othergov/intel/sf4414.pdf>),

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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.

**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 unusual 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).

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

**x. 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 ten (10) years from the date the subject invention was disclosed to EERE on the utilization of the subject invention and efforts made by prime recipient or their licensees or assignees to stimulate such utilization. The reports must include information regarding the status of development, date of first commercial sale or use, gross royalties received by the prime recipient, and such other data and information as EERE may specify.

**xi. 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>.

**xii. Reporting**

Reporting requirements are identified on the Federal Assistance Reporting Checklist, attached to the award agreement.

**xiii. 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. At the Go/No-Go decision points, EERE will evaluate project performance, project schedule adherence, meeting milestone objectives, compliance with reporting requirements, and overall contribution to the EERE program goals and objectives. Federal funding beyond the Go/No-Go decision point (continuation funding) is contingent upon (1) availability of federal funds appropriated by Congress for the purpose of this program; (2) the availability of future-year budget authority; (3) recipient's technical progress compared to the Milestone Summary Table stated in Attachment 1 of the award; (4) recipient's submittal of required reports; (5) recipient's compliance with the terms and conditions of the award; (6) EERE's Go/No-Go decision; (7) the recipient's submission of a continuation application; and (8) written approval of the continuation application by the Contracting Officer.

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

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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.

**xiv. 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.

**xv. Uniform Commercial Code (UCC) Financing Statements**

Per 2 CFR 910.360 (Real Property and Equipment) when a piece of equipment is purchased by a for-profit recipient or subrecipient with federal funds, and when the federal share of the financial assistance agreement is more than \$1,000,000, the recipient or subrecipient must:

Properly record, and consent to the Department's ability to properly record if the recipient fails to do so, UCC financing statement(s) for all equipment in excess of \$5,000 purchased with project funds. These financing statement(s) must be approved in writing by the Contracting Officer prior to the recording, and they shall provide notice that the recipient's title to all equipment (not real property) purchased with federal funds under the financial assistance agreement is conditional pursuant to the terms of this section, and that the government retains an undivided reversionary interest in the equipment. The UCC financing statement(s) must be filed before the Contracting Officer may reimburse the recipient for the federal share of the equipment unless otherwise provided for in the relevant financial assistance agreement. The recipient shall further make any amendments to the financing statements or additional recordings, including appropriate continuation statements, as necessary or as the Contracting Officer may direct.

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**xvi. Implementation of Executive Order 13798, Promoting Free Speech and Religious Liberty**

States, local governments, or other public entities may not condition sub-awards in a manner that would discriminate, or disadvantage sub-recipients based on their religious character.

**xvii. Participants and Collaborating Organizations**

If selected for award negotiations, the selected applicant must submit a list of personnel who are proposed to work on the project, both at the recipient and subrecipient level and a list of collaborating organizations within 30 days after the applicant is notified of the selection. Recipients will have an ongoing responsibility to notify DOE of changes to the personnel and collaborating organizations, and submit updated information during the life of the award.

**xviii. Current and Pending Support**

If selected for award negotiations, within 30 days of the selection notice, the selectee must submit 1) current and pending support disclosures and resumes for any new PIs or senior/key personnel and 2) updated disclosures if there have been any changes to the current and pending support submitted with the application. Throughout the life of the award, the Recipient has an ongoing responsibility to submit 1) current and pending support disclosure statements and resumes for any new PI and senior/key personnel and 2) updated disclosures if there are changes to the current and pending support previously submitted to DOE. Also See. Section IV.E.xvii.

**xix. U.S. Manufacturing Commitments**

A primary objective of DOE's multi-billion dollar research, development and demonstration investments is to cultivate new research and development ecosystems, manufacturing capabilities, and supply chains for and by U.S. industry and labor. Therefore, in exchange for receiving taxpayer dollars to support an applicant's project, the applicant must agree to the following U.S. Competitiveness Provision as part of an award under this FOA.

**U.S. Competitiveness**

The Recipient agrees that any products embodying any subject invention or produced through the use of any subject invention will be manufactured substantially in the United States unless the Recipient can show to the satisfaction of DOE that it is not commercially feasible. In the event DOE agrees to foreign manufacture, there will be a requirement that the Government's support of the technology be recognized in some appropriate

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manner, e.g., alternative binding commitments to provide an overall net benefit to the U.S. economy. The Recipient agrees that it will not license, assign or otherwise transfer any subject invention to any entity, at any tier, unless that entity agrees to these same requirements. Should the Recipient or other such entity receiving rights in the invention(s): (1) undergo a change in ownership amounting to a controlling interest, or (2) sell, assign, or otherwise transfer title or exclusive rights in the invention(s), then the assignment, license, or other transfer of rights in the subject invention(s) is/are suspended until approved in writing by DOE. The Recipient and any successor assignee will convey to DOE, upon written request from DOE, title to any subject invention, upon a breach of this paragraph. The Recipient will include this paragraph in all subawards/contracts, regardless of tier, for experimental, developmental or research work.

A subject invention is any invention conceived or first actually reduced in performance of work under an award. An invention is any invention or discovery which is or may be patentable.

As noted in the U.S. Competitiveness Provision, at any time in which an entity cannot meet the requirements of the U.S. Competitiveness Provision, the entity may request a modification or waiver of the U.S. Competitiveness Provision. For example, the entity may propose modifying the language of the U.S. Competitiveness Provision in order to change the scope of the requirements or to provide more specifics on the application of the requirements for a particular technology. As another example, the entity may request that the U.S. Competitiveness Provision be waived in lieu of a net benefits statement or U.S. manufacturing plan. The statement or plan would contain specific and enforceable commitments that would be beneficial to the U.S. economy and competitiveness. Commitments could include manufacturing specific products in the U.S., making a specific investment in a new or existing U.S. manufacturing facility, keeping certain activities based in the U.S. or supporting a certain number of jobs in the U.S. related to the technology. If DOE, in its sole discretion, determines that the proposed modification or waiver promotes commercialization and provides substantial U.S. economic benefits, DOE may grant the request and, if granted, modify the award terms and conditions for the requesting entity accordingly.

The U.S. Competitiveness Provision is implemented by DOE pursuant to a Determination of Exceptional Circumstances (DEC) under the Bayh-Dole Act and DOE Patent Waivers. See Section VIII.J. Title to Subject Inventions of this FOA for more information on the DEC and DOE Patent Waivers.

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**xx. Interim Conflict of Interest Policy for Financial Assistance**

The DOE interim Conflict of Interest Policy for Financial Assistance (COI Policy)<sup>42</sup> is applicable to all non-Federal entities applying for, or that receive, DOE funding by means of a financial assistance award (e.g., a grant, cooperative agreement, or technology investment agreement) and, through the implementation of this policy by the entity, to each Investigator who is planning to participate in, or is participating in, the project funded wholly or in part under the DOE financial assistance award. The term “Investigator” means the PI and any other person, regardless of title or position, who is responsible for the purpose, design, conduct, or reporting of a project funded by DOE or proposed for funding by DOE. Recipients must flow down the requirements of the interim COI Policy to any subrecipient non-federal entities. Further, for DOE funded projects, the recipient must include all financial conflicts of interest (FCOI) (i.e., managed and unmanaged/ unmanageable) in their initial and ongoing FCOI reports.

It is understood that non-federal entities and individuals receiving DOE financial assistance awards will need sufficient time to come into full compliance with DOE’s interim COI Policy. To provide some flexibility, DOE allows for a staggered implementation. Specifically, prior to award, applicants selected for award negotiations must: ensure all Investigators complete their significant financial disclosures; review the disclosures; determine whether a FCOI exists; develop and implement a management plan for FCOIs; and provide DOE with an initial FCOI report that includes all FCOIs (i.e., managed and unmanaged/ unmanageable). Recipients will have 180 days from the date of the award to come into full compliance with the other requirements set forth in DOE’s interim COI Policy. Prior to award, the applicant must certify that it is, or will be within 180 days of the award, compliant with all requirements in the COI Policy.

**xxi. Data Management Plan (DMP)**

Each applicant whose Full Application is selected for award negotiations will be required to submit a DMP during the award negotiations phase. A DMP explains how, when appropriate, data generated in the course of the work performed under an EERE award will be shared and preserved in order to validate the results of the proposed work or how the results could be validated if the data is 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 publications.

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42 DOE’s interim COI Policy can be found at PF 2022-17 FAL 2022-02 Department of Energy Interim Conflict of Interest Policy Requirements for Financial Assistance.

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## **xxii. Fraud, Waste and Abuse**

The mission of the DOE Office of Inspector General (OIG) is to strengthen the integrity, economy and efficiency of the Department's programs and operations including deterring and detecting fraud, waste, abuse and mismanagement. The OIG accomplishes this mission primarily through investigations, audits, and inspections of DOE activities to include grants, cooperative agreements, loans, and contracts.

The OIG maintains a Hotline for reporting allegations of fraud, waste, abuse, or mismanagement. To report such allegations, please visit <https://www.energy.gov/ig/ig-hotline>.

Additionally, recipients of DOE awards must be cognizant of the requirements of [2 CFR 200.113 Mandatory disclosures](#), which states:

The non-Federal entity or applicant for a Federal award must disclose, in a timely manner, in writing to the Federal awarding agency or pass-through entity all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award. Non-Federal entities that have received a Federal award including the term and condition outlined in appendix XII of 2 CFR Part 200 are required to report certain civil, criminal, or administrative proceedings to SAM (currently FAPIIS). Failure to make required disclosures can result in any of the remedies described in [2 CFR 200.339](#). (See also [2 CFR part 180](#), [31 U.S.C. § 3321](#), and [41 U.S.C. § 2313](#).) [[85 FR 49539](#), Aug. 13, 2020]

Applicants and subrecipients (if applicable) are encouraged to allocate sufficient costs in the project budget to cover the costs associated for personnel and data infrastructure needs to support performance management and program evaluation needs including but not limited to independent program and project audits to mitigate risks for fraud, waste, and abuse.

## **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: [D-WRRF@ee.doe.gov](mailto:D-WRRF@ee.doe.gov). Questions must be submitted not later than 3 business days prior to the application due date and time. Prior to submitting a question to the email above, please confirm that a similar question has not already been answered on the Q&A file. Please note, feedback on individual concepts will not be provided through Q&A.

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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.

### **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**

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. Applicants are advised to not include any critically sensitive proprietary detail.

If an application includes trade secrets or information that is commercial or financial, or information that is confidential or privileged, it is furnished to the Government in confidence with the understanding that the information shall be used or disclosed only for evaluation of the application. Such information will be withheld from public disclosure to the extent permitted by law, including the Freedom of Information Act. Without assuming any liability for inadvertent

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disclosure, EERE will seek to limit disclosure of such information to its employees and to outside reviewers when necessary for merit review of the application or as otherwise authorized by law. This restriction does not limit the Government's right to use the information if it is obtained from another source.

Full Applications, and other submissions containing confidential, proprietary, or privileged information must be marked as described below. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under the Freedom of Information Act or otherwise. The U.S. Government is not liable for the disclosure or use of unmarked information, and may use or disclose such information for any purpose.

The cover sheet of the Full Application, and other submission must be marked as follows and identify the specific pages containing trade secrets, confidential, proprietary, or privileged information:

**Notice of Restriction on Disclosure and Use of Data:**

Pages [list applicable pages] of this document may contain trade secrets, confidential, proprietary, or privileged information that 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 confidential, proprietary, or privileged information must be marked as follows: "Contains Trade Secrets, Confidential, Proprietary, or Privileged Information Exempt from Public Disclosure." In addition, each line or paragraph containing proprietary, privileged, or trade secret information must be clearly marked with double brackets or highlighting.

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

In conducting the merit review evaluation, the Go/No-Go Reviews and Peer Reviews, 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, including EERE contractors. The applicant, by submitting its application, consents to the use of non-federal reviewers/administrators. Non-federal reviewers must sign conflict of interest (COI) and non-disclosure acknowledgements (NDA) prior to reviewing an application. Non-federal personnel conducting administrative activities must sign an NDA.

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

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

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

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

## **H. 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.

## **I. Retention of Submissions**

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

## **J. Title to Subject Inventions**

Ownership of subject inventions is governed pursuant to the authorities listed below:

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

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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.

- **Advance and Identified Waivers:** For an applicant not covered by a Class Patent Waiver or the Bayh-Dole Act, the applicant 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.
- **DEC:** On June 07, 2021, DOE approved a DETERMINATION OF EXCEPTIONAL CIRCUMSTANCES (DEC) UNDER THE BAYH-DOLE ACT TO FURTHER PROMOTE DOMESTIC MANUFACTURE OF DOE SCIENCE AND ENERGY TECHNOLOGIES. In accordance with this DEC, all awards, including sub-awards, under this FOA shall include the U.S. Competitiveness Provision in accordance with Section VI.B.xix. U.S. Manufacturing Commitments of this FOA. A copy of the DEC can be found at <https://www.energy.gov/gc/determination-exceptional-circumstances-decs>. Pursuant to 37 CFR § 401.4, any nonprofit organization or small business firm as defined by 35 U.S.C. 201 affected by any DEC has the right to appeal it by providing written notice to DOE within 30 working days from the time it receives a copy of the determination.

## **K. 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.



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**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.

**L. Rights in Technical Data**

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

“Limited Rights Data”: The U.S. government will not normally require delivery of confidential or trade secret-type technical data developed solely at private expense prior to issuance of an award, except as necessary to monitor technical progress and evaluate the potential of proposed technologies to reach specific technical and cost metrics.

Government Rights in Technical Data Produced Under Awards: The U.S. government normally retains unlimited rights in technical data produced under government financial assistance awards, including the right to distribute to the public. However, pursuant to special statutory authority, certain categories of data generated under EERE awards may be protected from public disclosure for up to five years after the data is generated (“Protected Data”). For awards permitting Protected Data, the protected data must be marked as set forth in the awards intellectual property

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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.

## **M. 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. anticipating

## **N. Export Control**

The U.S. government regulates the transfer of information, commodities, technology, and software considered to be strategically important to the U.S. to protect national security, foreign policy, and economic interests without imposing undue regulatory burdens on legitimate international trade. There is a network of federal agencies and regulations that govern exports that are collectively referred to as “Export Controls”. All recipients and subrecipients are responsible for ensuring compliance with all applicable United States Export Control laws and regulations relating to any work performed under a resulting award.

The recipient must immediately report to DOE any export control violations related to the project funded under the DOE award, at the recipient or subrecipient level, and provide the corrective action(s) to prevent future violations.

## **O. Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment**

As set forth in 2 CFR 200.216, recipients and subrecipients are prohibited from obligating or expending project funds (federal funds and recipient cost share) to procure or obtain; extend or renew a contract to procure or obtain; or enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in Section 889 of Public Law 115-232, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).

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See Public Law 115-232, Section 889, 2 CFR 200.216, and 2 CFR 200.471 for additional information.

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

All information provided by the applicant must to the greatest extent possible exclude PII. The term “PII” refers to information which can be used to distinguish or trace an individual's identity, such as their name, social security number, biometric records, 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. (See OMB Memorandum M-17-12 dated January 3, 2017)

By way of example, applicants must screen resumes to ensure that they do not contain PII such as personal addresses, personal landline/cell phone numbers, and personal emails. **Under no circumstances should Social Security Numbers (SSNs) be included in the application.** Federal agencies are prohibited from the collecting, using, and displaying unnecessary SSNs. (See, the Federal Information Security Modernization Act of 2014 (Pub. L. No. 113-283, Dec 18, 2014; 44 U.S.C. § 3551).

## **Q. Annual Independent Audits**

If a for-profit entity is a prime recipient and has expended \$750,000 or more of DOE awards during the entity's fiscal year, an annual compliance audit performed by an independent auditor is required. For additional information, please refer to 2 CFR 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 awards during the non-federal entity's fiscal year, then a Single or Program-Specific Audit is required. For additional information, please refer to 2 CFR 200.501 and Subpart F.

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

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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. The following is an example of how to calculate cost sharing amounts for a project with \$1,000,000 in federal funds with a minimum 20% non-federal cost sharing requirement:

- Formula: Federal share (\$) divided by federal share (%) = Total Project Cost  
Example: \$1,000,000 divided by 80% = \$1,250,000
- Formula: Total Project Cost (\$) minus federal share (\$) = Non-federal share (\$)  
Example: \$1,250,000 minus \$1,000,000 = \$250,000
- Formula: Non-federal share (\$) divided by Total Project Cost (\$) = Non-federal share (%)  
Example: \$250,000 divided by \$1,250,000 = 20%

### What Qualifies For Cost Sharing

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

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

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

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

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

### **General Cost Sharing Rules on a DOE Award**

1. Cash Cost Share – encompasses all contributions to the project made by the recipient or subrecipient(s), for costs incurred and paid for during the project. This includes when an organization pays for personnel, supplies, equipment for their own company with organizational resources. If the item or service is reimbursed for, it is cash cost share. All cost share items must be necessary to the performance of the project.
2. In-Kind Cost Share – encompasses all contributions to the project made by the recipient or subrecipient(s) that do not involve a payment or reimbursement and represent donated items or services. In-Kind cost share items include volunteer personnel hours, donated existing equipment, donated existing supplies. The cash value and calculations thereof for all In-Kind cost share items must be justified and explained in the Cost Share section of the project Budget Justification. All cost share items must be necessary to the performance of the project. If questions exist, consult your DOE contact before filling out the In-Kind cost share section of the Budget Justification.
3. Funds from other federal sources MAY NOT be counted as cost share. This prohibition includes FFRDC subrecipients. Non-federal sources include any source not originally derived from federal funds. Cost sharing commitment letters from subrecipients must be provided with the original application.
4. Fee or profit, including foregone fee or profit, are not allowable as project costs (including cost share) under any resulting award. The project may only incur those costs that are allowable and allocable to the project (including cost share) as determined in accordance with the applicable cost principles prescribed in FAR Part 31 for For-Profit entities and 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.

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

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

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

- (1)** They are verifiable from the recipient's records.
- (2)** They are not included as contributions for any other federally-assisted project or program.
- (3)** They are necessary and reasonable for the proper and efficient accomplishment of project or program objectives.
- (4)** They are allowable under the cost principles applicable to the type of entity incurring the cost as follows:
  - a.** For-profit organizations. Allowability of costs incurred by for-profit organizations and those nonprofit organizations listed in Attachment C to OMB Circular A-122 is determined in accordance with the for-profit cost principles in 48 CFR Part 31 in the FAR, 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; and
  - 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

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will be consumed in the performance of the award or fully depreciated by the end of the award. In cases where the full value of a donated capital asset is to be applied as cost sharing or matching, that full value must be the lesser or the following:

- a. The certified value of the remaining life of the property recorded in the recipient's accounting records at the time of donation; or
  - b. The current fair market value. If there is sufficient justification, the Contracting Officer may approve the use of the current fair market value of the donated property, even if it exceeds the certified value at the time of donation to the project. The Contracting Officer may accept the use of any reasonable basis for determining the fair market value of the property.
- (2) Valuing services of others' employees. If an employer other than the recipient furnishes the services of an employee, those services are valued at the employee's regular rate of pay, provided these services are for the same skill level for which the employee is normally paid.
- (3) Valuing volunteer services. Volunteer services furnished by professional and technical personnel, consultants, and other skilled and unskilled labor may be counted as cost sharing or matching if the service is an integral and necessary part of an approved project or program. Rates for volunteer services must be consistent with those paid for similar work in the recipient's organization. In those markets in which the required skills are not found in the recipient organization, rates must be consistent with those paid for similar work in the labor market in which the recipient competes for the kind of services involved. In either case, paid fringe benefits that are reasonable, allowable, and allocable may be included in the valuation.
- (4) Valuing property donated by third parties.
- a. Donated supplies may include such items as office supplies or laboratory supplies. Value assessed to donated supplies included in the cost sharing or matching share must be reasonable and must not exceed the fair market value of the property at the time of the donation.
  - b. Normally only depreciation or use charges for equipment and buildings may be applied. However, the fair rental charges for land and the full value of equipment or other capital assets may be allowed, when they will be consumed in the performance of the award or fully depreciated by the end of the award, provided that the Contracting Officer has approved the charges. When use charges are applied, values must be determined in accordance with the usual accounting policies of the recipient, with the following qualifications:

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- i.** The value of donated space must not exceed the fair rental value of comparable space as established by an independent appraisal of comparable space and facilities in a privately-owned building in the same locality.
  - ii.** The value of loaned equipment must not exceed its fair rental value.
  
- (5)** Documentation. The following requirements pertain to the recipient's supporting records for in-kind contributions from third parties:
  - a.** Volunteer services must be documented and, to the extent feasible, supported by the same methods used by the recipient for its own employees.
  
  - b.** The basis for determining the valuation for personal services and property must be documented.

## APPENDIX B – SAMPLE COST SHARE CALCULATION FOR BLENDED COST SHARE PERCENTAGE

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

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

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

Each task must be calculated individually as follows:

**Task 1**

\$1,000,000 divided by 80% = \$1,250,000 (Task 1 Cost)

Task 1 Cost minus federal share = non-federal share

\$1,250,000 - \$1,000,000 = \$250,000 (non-federal share)

**Task 2**

\$500,000 divided 80% = \$625,000 (Task 2 Cost)

Task 2 Cost minus federal share = non-federal share

\$625,000 - \$500,000 = \$125,000 (non-federal share)

**Task 3**

\$400,000 / 50% = \$800,000 (Task 3 Cost)

Task 3 Cost minus federal share = non-federal share

\$800,000 - \$400,000 = \$400,000 (non-federal share)

**Task 4**

Federal share = \$100,000

Non-federal cost share is not mandated for outreach = \$0 (non-federal share)

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The calculation may then be completed as follows:

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

Blended Cost Share %

Non-federal share (\$775,000) divided by Total Project Cost (\$2,775,000) = 27.9% (non-federal)

Federal share (\$2,000,000) divided by Total Project Cost (\$2,775,000) = 72.1% (federal)

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## APPENDIX C – WAIVER REQUESTS FOR: 1. FOREIGN ENTITY PARTICIPATION; AND 2. FOREIGN WORK

### 1. Waiver for Foreign Entity Participation

Many of the technology areas DOE funds fall in the category of critical and emerging technologies (CETs). CETs are a subset of advanced technologies that are potentially significant to United States national and economy security.<sup>43</sup> For projects selected under this FOA, all recipients and subrecipients must be organized, chartered or incorporated (or otherwise formed) under the laws of a state or territory of the United States; have majority domestic ownership and control; and have a physical location for business operations in the United States. To request a waiver of this requirement, an applicant must submit an explicit waiver request in the Full Application.

#### Waiver Criteria

Foreign entities seeking to participate in a project funded under this FOA must demonstrate to the satisfaction of DOE that:

- a. Its participation is in the best interest of the United States industry and United States economic development;
- b. The project team has appropriate measures in place to control sensitive information and protect against unauthorized transfer of scientific and technical information;
- c. Adequate protocols exist between the United States subsidiary and its foreign parent organization to comply with export control laws and any obligations to protect proprietary information from the foreign parent organization;
- d. The work is conducted within the United States and the entity acknowledges and demonstrates that it has the intent and ability to comply with the U.S. Competitiveness Provision (see Section VI.B.xxi.); and
- e. The foreign entity will satisfy other conditions that may be deemed necessary by DOE to protect United States government interests.

#### Content for Waiver Request

A Foreign Entity waiver request must include the following:

- a. Information about the entity: name, point of contact, and proposed type of involvement in the project;
- b. Country of incorporation, the extent of the ownership/level control by foreign entities, whether the entity is state owned or controlled, a summary of the ownership breakdown of the foreign entity and the percentage of

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<sup>43</sup> See, Critical and Emerging Technologies List Update ([whitehouse.gov](https://www.whitehouse.gov)).

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- ownership/control by foreign entities, foreign shareholders, foreign state or foreign individuals;
- c. The rationale for proposing a foreign entity participate (must address criteria above);
  - d. A description of the project's anticipated contributions to the United States economy;
    - How the project will benefit the United States, including manufacturing, contributions to employment in the United States and growth in new markets and jobs in the United States;
    - How the project will promote domestic American manufacturing of products and/or services;
  - e. A description of how the foreign entity's participation is essential to the project;
  - f. A description of the likelihood of Intellectual Property (IP) being created from the work and the treatment of any such IP; and
  - g. Countries where the work will be performed (Note: if any work is proposed to be conducted outside the United States, the applicant must also complete a separate request foreign work waiver).

DOE may also require:

- A risk assessment with respect to IP and data protection protocols that includes the export control risk based on the data protection protocols, the technology being developed and the foreign entity and country. These submissions could be prepared by the project lead (if not the prime recipient), but the prime recipient must make a representation to DOE as to whether it believes the data protection protocols are adequate and make a representation of the risk assessment – high, medium or low risk of data leakage to a foreign entity.
- Additional language to be added to any agreement or subagreement to protect IP, mitigate risk or other related purposes.

**DOE may require additional information before considering the waiver request.**

**DOE's decision concerning a waiver request is not appealable.**

## **2. Waiver for Performance of Work in the United States (Foreign Work Waiver)**

As set forth in Section IV.J.iii., all work under EERE funding agreements must be performed in 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.

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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 for a foreign work waiver 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 U.S. 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 U.S. 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. Information about the entity(ies) involved in the work proposed to be conducted outside the United States. (i.e., entity that seeks a waiver and the entity(ies) that will conduct the 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 D -- REQUIRED USE OF AMERICAN IRON, STEEL, MANUFACTURED PRODUCTS, AND CONSTRUCTION MATERIALS BUY AMERICA REQUIREMENTS FOR INFRASTRUCTURE PROJECTS

### A. Definitions

For purposes of the Buy America requirements, based both on the statute and OMB Guidance Document dated April 18, 2022, the following definitions apply:

**Construction materials** includes an article, material, or supply—other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives—that is or consists primarily of:

- non-ferrous metals;
- plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
- glass (including optic glass);
- lumber; or
- drywall.

**Infrastructure** includes, at a minimum, the structures, facilities, and equipment for, in the United States, roads, highways, and bridges; public transportation; dams, ports, harbors, and other maritime facilities; intercity passenger and freight railroads; freight and intermodal facilities; airports; water systems, including drinking water and wastewater systems; electrical transmission facilities and systems; utilities; broadband infrastructure; and buildings and real property. Infrastructure includes facilities that generate, transport, and distribute energy.

Moreover, according to the OMB guidance document:

When determining if a program has infrastructure expenditures, Federal agencies should interpret the term “infrastructure” broadly and consider the definition provided above as illustrative and not exhaustive. When determining if a particular construction project of a type not listed in the definition above constitutes “infrastructure,” agencies should consider whether the project will serve a public function, including whether the project is publicly owned and operated, privately operated on behalf of the public, or is a place of public accommodation, as opposed to a project that is privately owned and not open to the public. Projects with the former qualities have greater indicia of infrastructure, while projects with the latter quality have fewer. Projects consisting solely of the purchase, construction, or improvement of a private home for personal use, for example, would not constitute an infrastructure project.

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The Agency, not the applicant, will have the final say as to whether a given project includes infrastructure, as defined herein. Accordingly, in cases where the “public” nature of the infrastructure is unclear, but the other relevant criteria are met, DOE strongly recommends that applicants complete their full application with the assumption that Buy America requirements will apply to the proposed project.

**Project** means the construction, alteration, maintenance, or repair of infrastructure in the United States.

### **B. Buy America Requirements for Infrastructure Projects (“Buy America” requirements)**

In accordance with Section 70914 of the BIL, none of the project funds (includes federal share and recipient cost share) may be used for a project for infrastructure unless:

(1) all iron and steel used in the project are produced in the United States--this means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States;

(2) all manufactured products used in the project are produced in the United States—this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation; and

(3) all construction materials are produced in the United States—this means that all manufacturing processes for the construction material occurred in the United States.

The Buy America requirements only apply to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does the Buy America requirements apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project, but are not an integral part of the structure or permanently affixed to the infrastructure project.

These requirements must flow down to all sub-awards, all contracts, subcontracts, and purchase orders for work performed under the proposed project, except where the prime recipient is a for-profit entity. Based on guidance from the Office of Management and Budget (OMB), the Buy America requirements of the BIL do not apply to DOE projects in which the prime recipient is a for-profit entity; the requirements only apply to projects whose prime recipient is a State, local government, Indian tribe, Institution of Higher Education, or nonprofit organization.

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For additional information related to the application and implementation of these Buy America requirements, please see OMB Memorandum M-22-11, issued April 18, 2022:

<https://www.whitehouse.gov/wp-content/uploads/2022/04/M-22-11.pdf>

Note that for all applicants—both non-Federal entities and for-profit entities—DOE is including a Program Policy Factor that the Selection Official may consider in determining which Full Applications to select for award negotiations that considers whether the applicant has made a commitment to procure U.S. iron, steel, manufactured products, and construction materials in its project.

### **C. Waivers**

The DOE financial assistance agreement will require each recipient: (1) to fulfill the commitments made in its application regarding the procurement of U.S.-produced products and (2) to fulfill the commitments made in its application regarding the procurement of other key component metals and manufactured products domestically that are deemed available in sufficient and reasonably available quantities or of a satisfactory quality at the time of award negotiation.

In limited circumstances, DOE may waive the application of the Buy America requirements where DOE determines that:

- (1) applying the Buy America requirements would be inconsistent with the public interest;
- (2) the types of iron, steel, manufactured products, or construction materials are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality; or
- (3) the inclusion of iron, steel, manufactured products, or construction materials produced in the United States will increase the cost of the overall project by more than 25 percent.

If an applicant or recipient is seeking a waiver of the Buy America requirements, it may submit a waiver request after it has been notified of its selection for award negotiations. A waiver request must include:

- A detailed justification for the use of “non-domestic” iron, steel, manufactured products, or construction materials to include an explanation as to how the non-domestic item(s) is essential to the project;
- A certification that the applicant or recipient made a good faith effort to solicit bids for domestic products supported by terms included in requests for proposals, contracts, and nonproprietary communications with potential suppliers;

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- Applicant/Recipient name and Unique Entity Identifier (UEI);
  - Total estimated project cost, DOE and cost-share amounts;
  - Project description and location (to the extent known);
  - List and description of iron or steel item(s), manufactured goods, and construction material(s) the applicant or recipient seeks to waive from Domestic Content Procurement Preference requirement, including name, cost, country(ies) of origin (if known), and relevant PSC and NAICS code for each;
  - Waiver justification including due diligence performed (e.g., market research, industry outreach) by the applicant or recipient; and
  - Anticipated impact if no waiver is issued

DOE may require additional information before considering the waiver request.

Waiver requests are subject to public comment periods of no less than 15 days and must be reviewed by the Made in America Office. There may be instances where an award qualifies, in whole or in part, for an existing waiver described at [DOE Buy America Requirement Waiver Requests | Department of Energy](#)

DOE's decision concerning a waiver request is not appealable.

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## APPENDIX E – GLOSSARY

**Applicant** – The lead organization submitting an application under the FOA.

**Continuation application** – A non-competitive application for an additional budget period within a previously approved project period. At least ninety (90) days before the end of each budget period, the Recipient must submit to EERE its continuation application, which includes the following information:

- i. A report on the Recipient’s progress towards meeting the objectives of the project, including any significant findings, conclusions, or developments, and an estimate of any unobligated balances remaining at the end of the budget period. If the remaining unobligated balance is estimated to exceed 20 percent of the funds available for the budget period, explain why the excess funds have not been obligated and how they will be used in the next budget period.
- ii. A detailed budget and supporting justification if there are changes to the negotiated budget, or a budget for the upcoming budget period was not approved at the time of award.
- iii. A description of any planned changes from the negotiated Statement of Project Objectives and/or Milestone Summary Table.

**Cooperative Research and Development Agreement (CRADA)** – a contractual agreement between a national laboratory contractor and a private company or university to work together on research and development. For more information, see <https://www.energy.gov/gc/downloads/doe-cooperative-research-and-development-agreements>

**Federally Funded Research and Development Centers (FFRDC)** - FFRDCs are public-private partnerships which conduct research for the United States government. A listing of FFRDCs can be found at <http://www.nsf.gov/statistics/ffrdclist/>.

**Go/No-Go Decision Points**: – A decision point at the end of a budget period that defines the overall objectives, milestones and deliverables to be achieved by the recipient in that budget period. As of a result of EERE’s review, EERE may take one of the following actions: 1) authorize federal funding for the next budget period; 2) recommend redirection of work; 3) discontinue providing federal funding beyond the current budget period; or 4) place a hold on federal funding pending further supporting data.

**Project** – The entire scope of the cooperative agreement which is contained in the recipient’s Statement of Project Objectives.

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Recipient or “Prime Recipient” – A non-federal entity that receives a federal award directly from a federal awarding agency to carry out an activity under a federal program. The term recipient does not include subrecipients.

Subrecipient – A non-federal entity that receives a subaward from a pass-through entity to carry out part of a federal program; but does not include an individual that is a beneficiary of such program. A subrecipient may also be a recipient of other federal awards directly from a federal awarding agency. Also, a DOE/NNSA and non-DOE/NNSA FFRDC may be proposed as a subrecipient on another entity’s application. See section III.E.i.

## APPENDIX F – DEFINITION OF TECHNOLOGY READINESS LEVELS

TRL 1:	Basic principles observed and reported
TRL 2:	Technology concept and/or application formulated
TRL 3:	Analytical and experimental critical function and/or characteristic proof of concept
TRL 4:	Component and/or breadboard validation in a laboratory environment
TRL 5:	Component and/or breadboard validation in a relevant environment
TRL 6:	System/subsystem model or prototype demonstration in a relevant environment
TRL 7:	System prototype demonstration in an operational environment
TRL 8:	Actual system completed and qualified through test and demonstrated
TRL 9:	Actual system proven through successful mission operations

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## APPENDIX G – LIST OF ACRONYMS

COI	Conflict of Interest
DEC	Determination of Exceptional Circumstances
DEI	Diversity, Equity, and Inclusion
DMP	Data Management Plan
DOE	Department of Energy
DOI	Digital Object Identifier
EERE	Energy Efficiency and Renewable Energy
FAR	Federal Acquisition Regulation
FFATA	Federal Funding and Transparency Act of 2006
FOA	Funding Opportunity Announcement
FOIA	Freedom of Information Act
FFRDC	Federally Funded Research and Development Center
GAAP	Generally Accepted Accounting Principles
IPMP	Intellectual Property Management Plan
M&O	Management and Operating
MPIN	Marketing Partner ID Number
MSI	Minority-Serving institution
MYPP	Multi-Year Program Plan
NDA	Non-Disclosure Acknowledgement
NEPA	National Environmental Policy Act
NNSA	National Nuclear Security Agency
OMB	Office of Management and Budget
OSTI	Office of Scientific and Technical Information
PII	Personal Identifiable Information
R&D	Research and Development
RFI	Request for Information
RFP	Request for Proposal
SAM	System for Award Management
SOPO	Statement of Project Objectives
SPOC	Single Point of Contact
STEM	Science, Technology, Engineering, and Mathematics
TIA	Technology Investment Agreement
TRL	Technology Readiness Level
UCC	Uniform Commercial Code
UEI	Unique Entity Identifier
WBS	Work Breakdown Structure
WP	Work Proposal

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## APPENDIX H – TEA/LCA RESOURCES

The following list of resources provides basic information on greenhouse gas emissions inventory, life cycle assessment (LCA), techno-economic assessment (TEA), and more.

### 1. Life cycle analysis and techno-economic analysis training [USDOE]

This series of short videos provide trainings on best practices for conducting LCA and TEA analysis. Produced by the Advanced Materials and Manufacturing Technologies Office (AMMTO) and Industrial Efficiency and Decarbonization Office (IEDO) at USDOE.

[Life Cycle Assessment and Techno-Economic Analysis Training | Department of Energy](#)

### 2. Searchable Clearinghouse of Wastewater Technology (SCOWT) [USEPA]

Search through reports, case studies, and trainings related to centralized wastewater treatment facilities from around the country. Includes useful examples of LCA analysis for different treatment trains and technologies, and energy analysis for WRRFs of different scales. Collated by the USEPA.

[Wastewater Technology Clearinghouse \(epa.gov\)](#)

### 3. Calculating GHG emissions from a WRRF

GHG emissions from WRRFs can be roughly broken down into three categories:

1) direct emissions (usually in the form of CH<sub>4</sub> and N<sub>2</sub>O) from sources owned or controlled by the reporting entity;

2) indirect emissions from the production of energy purchased by the reporting entity.

These emissions are generally tied to the consumption of electricity, heat, or steam;

3) indirect emissions from all other sources, including emissions from material extraction and production, and the production processes of fuels and services. These emissions are sometimes known as “embedded/embodied energy” or “embedded/embodied carbon”.

*Direct emissions* from wastewater treatment can be challenging to characterize and are the source of ongoing research both domestically and internationally. Table 1, adapted from Parravicini et al. (2022), shows the emissions factors and required inventory data to calculate emissions of CH<sub>4</sub> and N<sub>2</sub>O based on the treatment process at the wastewater plant. These values were calculated based on 2019 IPCC report values, mass balance calculation, and literature review from a variety of sources. Emissions can be converted from CH<sub>4</sub> and N<sub>2</sub>O to CO<sub>2</sub> eq by multiplying the results by 25 and 298 respectively (USEPA, 2022).

**Table 1. Emissions factors and inventory requirements for direct GHG emissions from WRRFs (adapted from Parravicini et al., 2022)**

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<b>GHG emissions category</b>	<b>Inventory data required</b>	<b>Emission factors</b>
Direct emissions from dissolved CH <sub>4</sub> produced in sewers and stripped at the WWTP	<ol style="list-style-type: none"> <li>1) Influent COD load (kg/PE/y)</li> <li>2) COD load in sludge (kg/PE/y)</li> </ol>	0.0075 kg CH <sub>4</sub> /kg (COD <sub>influent</sub> – COD <sub>sludge</sub> )
Direct N <sub>2</sub> O emissions from wastewater treatment	<ol style="list-style-type: none"> <li>1) Influent N load (kg/PE/yr)</li> <li>2) Effluent N load (kg/PE/yr)</li> <li>3) level of treatment (N removal degree)</li> </ol>	<ol style="list-style-type: none"> <li>1) For COD and NH<sub>4</sub> + removal only: 0.016 kg N<sub>2</sub>O-N/kg N<sub>influent</sub></li> <li>2) 70% &lt; N-removal ≤ 85%: 0.008 kg N<sub>2</sub>O-N/kg N<sub>influent</sub></li> <li>3) For N removal plant with AD N-removal &gt; 85%: 0.001 kg N<sub>2</sub>O-N/kg N<sub>influent</sub> for N removal plant without primary settler and AD</li> </ol>
Direct emissions from biogas valorization or upgrade	Methane production (N m <sup>3</sup> /PE/y) CHP slip and other fugitive emissions	1.5% of CH <sub>4</sub> burned in CHP or 1% of upgraded CH <sub>4</sub> (based on average value for all technologies available on the market)
Direct emissions from sludge stabilization and handling onsite	<ol style="list-style-type: none"> <li>1) COD and N in sludge produced (g COD/PE/d)</li> <li>2) Type of sludge stabilizer</li> <li>3) Methane production (N m<sup>3</sup>/PE/y)</li> <li>4) Further COD load degraded in storage tank</li> </ol>	<ol style="list-style-type: none"> <li>1) Anaerobic sludge stabilization: 1.5% of CH<sub>4</sub> produced</li> <li>2) Storage anaerobic sludge (3% further COD degradation): 0.34 g CH<sub>4</sub>/PE-d</li> <li>3) Storage aerobic sludge (2% further COD degradation): 0.15 g CH<sub>4</sub>/PE-d</li> </ol>
Direct emissions from sludge stabilization and dewatering in sludge reed bed	<ol style="list-style-type: none"> <li>1) COD load in sludge produced (g COD/PE/d)</li> <li>2) N load in sludge produced (kg/PE/yr)</li> </ol>	0.0025 kg CH <sub>4</sub> / kg COD <sub>sludge</sub> 0.00023 kg N <sub>2</sub> O-N/ kg N <sub>sludge</sub>

*Indirect energy-based emissions* can be calculated using the USEPA’s Simplified GHG Emissions Calculator. This excel-based calculator is designed to provide a rough estimate for small businesses and low emitters to inventory their GHG emissions. The calculator includes estimates for emissions from stationary combustion, mobile sources, refrigeration, and

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purchased gases, as well as emissions from purchased electricity and steam based on location.

[Simplified GHG Emissions Calculator | US EPA](#)

*Indirect embodied carbon* can be estimated using an inventory analysis and emissions data from LCA databases such as ICE (managed by Circular Ecology). [Embodied Carbon Footprint Database - Circular Ecology](#).

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## APPENDIX I – OPEN SOURCE SOFTWARE

Open Source Software Distribution Plan.

Applicants that are applying to one or more Topic Areas for which open source software distribution is required must submit a plan describing how software produced under this FOA will be distributed. For a DOE National Laboratory or a FFRDC, the data rights clause, including rights and requirements pertaining to computer software, in its M&O Contract shall apply and shall take precedence over any requirement set forth in this Appendix. The plan must include the following elements:

1. A complete description of any existing software that will be modified or incorporated into software produced under this FOA, including a description of the license rights. The license rights must allow the modified or incorporated software to be distributed as open source.
2. A discussion of the open source license that the applicant plans to use for the software it plans to produce under the FOA, and how that choice furthers the goals of this FOA. The discussion must also address how the license conforms to the conditions listed below.
3. A method for depositing the software in a source code repository.
4. A method for sharing and disseminating the software and other information to team members or others when multiple parties will contribute to the development of the software or the FOA requires that the software or other information be shared or disseminated to others.

Open Source Definition: Open source licenses must conform to all of the following conditions:

### **Free Redistribution**

The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale. The rights attached to the software must apply to all to whom the software is redistributed without the need for execution of an additional license by those parties.

### **Source Code**

The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable

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reproduction cost preferably, i.e., downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately obfuscated source code and intermediate forms such as the output of a preprocessor or translator are not allowed.

### **Derived Works**

The license must allow modifications and derived works, and permit the option of distributing the modifications and derived works under the same terms as the license of the original software.

### **Integrity of the Author's Source Code**

The license may restrict source-code from being distributed in modified form only if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.

### **No Restriction Against Fields of Endeavor**

The license must not restrict anyone from making use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business, or from being used for genetic research.

### **License Must Not Be Specific to a Product or Technology**

The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution. No provision of the license may be predicated on any individual technology or style of interface.

### **License Must Not Restrict Other Software**

The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.

### Examples of Acceptable Licenses

Apache License, 2.0

<http://www.apache.org/licenses>

The 2.0 version of the Apache License was approved by the Apache Software Foundation (ASF) in 2004. The goals of this license revision were to reduce the number of frequently asked questions, to allow the license to be reusable without modification by any project (including

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non-ASF projects), to allow the license to be included by reference instead of listed in every file, to clarify the license on submission of contributions, to require a patent license on contributions that necessarily infringe the contributor's own patents, and to move comments regarding Apache and other inherited attribution notices to a location outside the license terms

The result is a license that is compatible with other open source licenses, while remaining true to and supportive of collaborative development across both nonprofit and commercial organizations.

All packages produced by the ASF are implicitly licensed under the Apache License, Version 2.0, unless otherwise explicitly stated.

GNU General or Public License (GPLv3)

<http://www.gnu.org/licenses/gpl.html>

The GNU General Public License (GNU GPL or simply GPL) is the most widely used free software license, originally written by Richard Stallman for the GNU Project.

The GPL is the first copyleft license for general use, which means that derived works must be distributed under the same license terms. Under this philosophy, the GPL grants the recipients of a computer program the rights of the free software definition and uses copyleft to ensure the freedoms are preserved, even when the work is changed or additions are made. This aspect distinguishes the GPL from permissive free software licenses, including the BSD licenses. The license's copyright disallows modification of the license. Copying and distributing the license is allowed because the GPL requires recipients to get "a copy of this License along with the Program". According to the GPL FAQ, anyone can make a new license using a modified version of the GPL as long as he or she uses a different name for the license, does not mention "GNU", and removes the preamble, though the preamble can be used in a modified license if permission to use it is obtained from the Free Software Foundation (FSF).

GNU Library or "Lesser" General Public License (LGPLv3) <http://www.gnu.org/licenses/lgpl.html>

The GNU Lesser General Public License (formerly the GNU Library General Public License) or LGPL is a free software license published by the Free Software Foundation (FSF). It was designed as a compromise between the strong-copyleft GNU General Public License or GPL and permissive licenses such as the BSD licenses and the MIT License. The GNU Library General Public License (as the LGPL was originally named) was published in 1991, and adopted the version number 2 for parity with GPL version 2. The LGPL was revised in minor ways in the 2.1 point release, published in 1999, when it was renamed the GNU Lesser General Public License to reflect the FSF's position that not all libraries should use it. Version 3 of the LGPL was published in 2007 as a list of additional permissions applied to GPL version 3.

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The LGPL places copyleft restrictions on the program governed under it but does not apply these restrictions to other software that merely link with the program. There are, however, certain other restrictions on this software.

The LGPL is primarily used for software libraries, although it is also used by some stand-alone applications, most notably Mozilla and OpenOffice.org.

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<http://opensource.org/licenses/MIT>

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Software packages that use one of the versions of the MIT License include Expat, PuTTY, the Mono development platform class libraries, Ruby on Rails, Lua (from version 5.0 onwards), and the X Window System, for which the license was written.

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