

**FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT**



**ADVANCED RESEARCH PROJECTS AGENCY – ENERGY (ARPA-E)
U.S. DEPARTMENT OF ENERGY**

***SEEDING CRITICAL ADVANCES FOR LEADING ENERGY TECHNOLOGIES
WITH UNTAPPED POTENTIAL 2021 (SCALEUP 2021)***

**Announcement Type: Initial Announcement
Funding Opportunity No. DE-FOA-0002641
CFDA Number 81.135**

Timeline for SCALEUP:

Funding Opportunity Announcement (FOA) Issue Date:	December 16, 2021
First Deadline for Questions to ARPA-E-CO@hq.doe.gov:	5 PM ET, January 10, 2022
Submission Deadline for Concept Paper:	9:30 AM ET, January 20, 2022
Second Deadline for Questions to ARPA-E-CO@hq.doe.gov:	5 PM ET, April 15, 2022
Submission Deadline for Full Application:	9:30 AM ET, April 27, 2022
Submission Deadline for Replies to Reviewer Comments:	5 PM ET, June 2, 2022
Expected Date for Finalist Notifications:	June 2022
Completion of Oral Presentation:	July 2022
Expected Date for Final Award Selection Notifications:	August 2022
Total Amount to Be Awarded:	Approximately \$100 million, subject to the availability of appropriate funds.
Anticipated Awards:	ARPA-E may issue one, multiple, or no awards under this FOA. Awards may vary between \$5 million and \$20 million (Federal share).

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REQUIRED DOCUMENTS CHECKLIST

For an overview of the application process, see Section IV.A of the FOA.

For guidance regarding requisite application forms, see Sections IV.B and VII.G of the FOA.

For guidance regarding the content and form of the Concept Paper, Full Application, Replies to Reviewer Comments, and Oral Presentation see Sections IV.C, IV.D, IV.E, and IV.A.5 of the FOA.

SUBMISSION	COMPONENTS	OPTIONAL/ MANDATORY	FOA SECTION	DEADLINE
Concept Paper	<ul style="list-style-type: none">Each Applicant must submit a Concept Paper in Adobe PDF format by the stated deadline. Sections 1-4 of the Concept Paper must not exceed 4 pages in length and must include only the following:<ol style="list-style-type: none">Project Summary and ObjectivesPotential Impacts and Commercial OutcomesProject Plan and Technology StatusTeam Organization and CapabilitiesReferences (no page limit)	Mandatory	IV.C	9:30 AM ET, January 20, 2022
Full Application	<ul style="list-style-type: none">Each Applicant must submit a Technical Volume in Adobe PDF format by the stated deadline. The Technical Volume must include only the following:<ul style="list-style-type: none">Executive Summary (1 page max.)Sections 1-8 (20 pages max.)<ol style="list-style-type: none">Project Summary and ObjectivesTechnology StatusIntellectual Property (IP) StrategyPath to MarketProject PlanTeam Organization and CapabilitiesPotential ImpactsBudgetReferences and Business Documents (no page limit)Personal Qualification Summaries (each PQS limited to 3 pages in length, no cumulative page limit)The Technical Volume must be accompanied by:	Mandatory	IV.D	9:30 AM ET, April 27, 2022

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

	<ul style="list-style-type: none">• Letter(s) of Intent (no page limit, Adobe PDF format);• SF-424 (no page limit, Adobe PDF format);• Budget Justification Workbook/SF424A (no page limit, Microsoft Excel format);• Team Pitch Video (6 minute maximum length, describing the opportunity, team and technology; MP4 format, submitted via kiteworks™);• Project Plan Workbook (Excel format) – Applicants may use the Project Plan Workbook template available on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov);• Summary for Public Release (250 words max., Adobe PDF format);• Summary Slide (1 page limit, Microsoft PowerPoint format));• Completed and signed Business Assurances & Disclosures Form (no page limit, Adobe PDF format)			
Reply to Reviewer Comments	<ul style="list-style-type: none">• Each Applicant may submit a Reply to Reviewer Comments in Adobe PDF format. This submission is optional. The Reply may include only the following:<ul style="list-style-type: none">a. Up to 2 pages of text; and• Up to 1 page of images.	Optional	IV.E	5 PM ET, June 2, 2022
Oral Presentation	<ul style="list-style-type: none">• Selected Finalists will be invited to meet with ARPA-E representatives to present the contents of their Full Applications and provide ARPA-E an opportunity to ask questions regarding the proposed project.	Mandatory	IV.A.5	July 2022

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I. FUNDING OPPORTUNITY DESCRIPTION

A. AGENCY OVERVIEW

The Advanced Research Projects Agency – Energy (ARPA-E), an organization within the Department of Energy (DOE), is chartered by Congress in the America COMPETES Act of 2007 (P.L. 110-69), as amended by the America COMPETES Reauthorization Act of 2010 (P.L. 111-358), as further amended by the Energy Act of 2020 (P.L. 116-260) to:

- “(A) to enhance the economic and energy security of the United States through the development of energy technologies that—
- (i) reduce imports of energy from foreign sources;
 - (ii) reduce energy-related emissions, including greenhouse gases;
 - (iii) improve the energy efficiency of all economic sectors;
 - (iv) provide transformative solutions to improve the management, clean-up, and disposal of radioactive waste and spent nuclear fuel; and
 - (v) improve the resilience, reliability, and security of infrastructure to produce, deliver, and store energy; and
- (B) to ensure that the United States maintains a technological lead in developing and deploying advanced energy technologies.”

ARPA-E issues this Funding Opportunity Announcement (FOA) under the programmatic authorizing statute codified at 42 U.S.C. § 16538. The FOA and any awards made under this FOA are subject to 2 C.F.R. Part 200 as amended by 2 C.F.R. Part 910.

ARPA-E funds research on and the development of transformative science and technology solutions to address the energy and environmental missions of the Department. The agency focuses on technologies that can be meaningfully advanced with a modest investment over a defined period of time in order to catalyze the translation from scientific discovery to early-stage technology. For the latest news and information about ARPA-E, its programs and the research projects currently supported, see: <http://arpa-e.energy.gov/>.

ARPA-E funds transformational research. Existing energy technologies generally progress on established “learning curves” where refinements to a technology and the economies of scale that accrue as manufacturing and distribution develop drive down the cost/performance metric in a gradual fashion. This continual improvement of a technology is important to its increased commercial deployment. It is appropriately the focus of the private sector and can be spurred by early-stage R&D supported by the applied energy offices in DOE. By contrast, ARPA-E supports high-risk, potentially transformative research that has the potential to create fundamentally new learning curves. ARPA-E R&D projects typically start with cost/performance estimates for the proposed technology that are well above the level of the competitive

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incumbent technology. Given the high risk inherent in these projects, many will fail to progress, but some may succeed in generating a new learning curve with a projected cost/performance metric that is significantly lower than that of the incumbent technology.

ARPA-E funds technology with the potential to be disruptive in the marketplace. The mere creation of a new learning curve does not ensure market penetration. Rather, the ultimate value of a technology is determined by the marketplace, and impactful technologies ultimately become disruptive – that is, they are widely adopted and displace existing technologies from the marketplace or create entirely new markets. ARPA-E understands that definitive proof-of-market disruption takes time, particularly for energy technologies. Therefore, ARPA-E funds the development of technologies that, if technically successful, have clear disruptive potential, e.g., by demonstrating capability for manufacturing at competitive cost and deployment at scale.

ARPA-E funds applied research and development. The Office of Management and Budget defines “applied research” as an “original investigation undertaken in order to acquire new knowledge...directed primarily towards a specific practical aim or objective” and defines “experimental development” as “creative and systematic work, drawing on knowledge gained from research and practical experience, which is directed at producing new products or processes or improving existing products or processes.”¹ Applicants interested in receiving financial assistance for basic research (defined by the Office of Management and Budget as “experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts”)² should contact the DOE’s Office of Science (<http://science.energy.gov/>). Office of Science national scientific user facilities (<http://science.energy.gov/user-facilities/>) are open to all researchers, including ARPA-E Applicants and awardees. These facilities provide advanced tools of modern science including accelerators, colliders, supercomputers, light sources and neutron sources, as well as facilities for studying the nanoworld, the environment, and the atmosphere. Projects focused on early-stage R&D for the improvement of technology along defined roadmaps may be more appropriate for support through the DOE applied energy offices including: the Office of Energy Efficiency and Renewable Energy (<http://www.eere.energy.gov/>), the Office of Fossil Energy and Carbon Management (<https://www.energy.gov/fecm/office-fossil-energy-and-carbon-management>), the Office of Nuclear Energy (<http://www.energy.gov/ne/office-nuclear-energy>), and the Office of Electricity (<https://www.energy.gov/oe/office-electricity>).

¹ OMB Circular A-11 (https://www.whitehouse.gov/wp-content/uploads/2018/06/a11_web_toc.pdf), Section 84, pg. 3.

² OMB Circular A-11 (https://www.whitehouse.gov/wp-content/uploads/2018/06/a11_web_toc.pdf), Section 84, pg. 3.

B. PROGRAM BACKGROUND

The Seeding Critical Advances for Leading Energy technologies with Untapped Potential 2021 (SCALEUP 2021) Funding Opportunity Announcement provides a vital mechanism for the support of innovative energy R&D that complements ARPA-E's primary R&D focus on early-stage transformational energy technologies that still require proof-of-concept.

ARPA-E's mission is to develop transformational energy technologies in support of U.S. national security and economic competitiveness. ARPA-E funds the R&D of technologies to build and maintain U.S. technological leadership in highly competitive global energy markets, thus supporting American jobs and economic growth. ARPA-E's authorizing statute directs the Agency to develop linkages between its sponsored applied research and the marketplace.³ These linkages are central to realizing the public's return on technology investments.

An enduring challenge to ARPA-E's mission is that even technologies that achieve substantial technical advancement under ARPA-E support are at risk of being stranded in their development path once ARPA-E funding ends (averaging \$2.5M over three years). ARPA-E-funded technologies typically face significant remaining technical risks upon completion of an award's funding period. Experience across ARPA-E's diverse energy portfolios, and with a wide range of investors, indicates that pre-commercial "scaling" projects are critical to establishing that performance and cost parameters can be met in practice for these very early-stage technologies. These pre-commercial scaling projects aim to translate the performance achieved at bench scale to commercially scalable versions of the technology, integrate the technology with broader systems, provide extended performance data, and validate the manufacturability and reliability of new energy technologies. (These projects are often termed "pre-pilot" development in different industries.) Success in these scaling projects would enable industry, investors, and partners to justify substantial commitments of financial resources, personnel, production facilities, and materials to develop promising ARPA-E technologies into early commercial products.

The SCALEUP 2021 FOA builds upon ARPA-E-funded technologies by scaling the most promising ARPA-E-funded technologies in their development pathways leaves substantial intellectual property developed with American taxpayer dollars vulnerable to adoption by foreign competitors, who can and do capture it for continued development – and economic benefit – overseas. This harms national competitiveness, as U.S. industries often lose the lead on the development, scaling, and manufacturing of technologies necessary to compete in rapidly evolving global energy markets. These scaling energy technology projects will meet ARPA-E's statutory direction to achieve the above goals by "accelerating transformational technological

³ 42 U.S.C. §16538(c)(2)(a-c)

advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty”.⁴

C. PROGRAM OBJECTIVES

The objective of the ARPA-E SCALEUP 2021 FOA is to support the scaling of high-risk and potentially disruptive new technologies across the full spectrum of energy applications. This FOA focuses only on scale-up and pre-pilot projects of promising technologies that ARPA-E has funded – following highly competitive selection processes – and for which the scale-up would substantially build upon innovations achieved under the original ARPA-E award. Eligible projects will be based upon inventions that were conceived or first actually reduced to practice in the performance of work under the original ARPA-E award (“subject inventions”) with the intent to advance the innovative results to practical application. Only organizations leveraging subject inventions that were created during an ARPA-E award and reported in the iEdison system (with the exception of some software products (See Section III.B.) are eligible for funding under this program. SCALEUP 2021 Applicants are not required to have participated within the original ARPA-E award – alternatively, Applicants may be licensed or have purchased rights in such subject inventions, and thereby become eligible for the SCALEUP 2021 FOA.

Because of the breadth of energy technologies solicited under the SCALEUP 2021 FOA, technical and project targets are not specified. Therefore, ARPA-E asks Applicants to address how the proposed scale-up or pre-pilot project will sufficiently advance the technology to enable a path to market and ultimately lead to realized commercial impact. The proposed potential impacts must fall within the agency’s mission areas:⁵ reducing imported energy, reducing energy-related emissions with a primary focus on greenhouse gases, improving energy efficiency, providing transformative solutions to manage radioactive waste and spent nuclear fuel, improving the resilience, reliability, and security of energy infrastructure, and ensuring the U.S. maintains a technological lead in developing and deploying advanced energy technologies – including substantial U.S. manufacturing of resulting technologies. ARPA-E desires to fund projects for which the proof-of-concept R&D challenges have been addressed in a successful ARPA-E award, and which can establish a path to real-world impact through scaling R&D. For the SCALEUP 2021 FOA, Applicants must demonstrate the path to market, making the strongest case for how the proposed technology will scale and ultimately enable the technology to thrive in the open market. This includes building a Project Team with the skillset and capabilities necessary for scaling high-risk energy technologies during and beyond the completion of the SCALEUP 2021 project. Applicants should communicate the anticipated development path for bringing the technology to scale and market adoption, emphasizing where the proposed

⁴ Id.

⁵ See ARPA-E statutory goals at 42 U.S.C. §16538(c)(1) and (2)

SCALEUP 2021 project fits in that path and how successful completion will unlock the additional resources necessary to take the next step.

The ARPA-E SCALEUP 2021 FOA award selection process consists of three phases: 1) Concept Paper submissions, resulting in an encourage or discourage notification to applicants; 2) Full Application submissions, resulting in selection of Finalists; 3) Finalists who will be invited to provide Oral Presentations, leading to award selections.

The ARPA-E SCALEUP 2021 FOA seeks Applicants with an existing early-stage developmental prototype that demonstrates functionality in a controlled environment. Finalists selected for the SCALEUP 2021 Award will demonstrate a path to market and be well positioned for investment from the private sector (venture, strategic, philanthropic, internal, etc.). To support this expectation, Finalists will not be required to provide a cost share payment for the initial portion of the award (approximately the first year of the award). For example, those selected would then work to advance the existing developmental prototype to a manufacturable and commercially relevant product, meaning the research will seek to prove all functionality using pre-commercial manufacturing techniques. The project should be structured to answer critical questions required to reduce the associated technical and business risks.

D. TECHNICAL CATEGORIES OF INTEREST

Applications are sought that address one or more of ARPA-E's Mission Areas, without causing detriment to these Mission Areas, through the type of high-risk, transformational research described in Section I.A of the FOA. Concepts may span multiple disciplinary boundaries. In order to organize the submissions to this FOA for the purposes of merit review, ARPA-E requires that each Concept Paper and Full Application identify a Technical Subcategory or Subcategories for the proposed technology from the list provided below. Applicants may select a single Technical Subcategory or multiple Technical Subcategories for their proposed technology, as appropriate. The Applicant may select multiple Technical Subcategories from the same Technical Category or different Technical Categories.

The list of Technical Subcategories is intended to encompass the majority of energy-related technologies. If the proposed technology does not fall within any of the Technical Subcategories below, the Applicant should select from Category 7, "Other Energy Technologies," Subcategory L, "Other Energy Technologies Not Listed Above."

<u>CATEGORY</u>	<u>SUBCATEGORY</u>	<u>DESCRIPTION</u>
<u>CATEGORY 1:</u> GRID	<u>Subcategory A:</u> Grid Transmission	Technologies for the electricity transmission system (>69 kV) planning and operations, including both AC and DC systems.
	<u>Subcategory B:</u> Grid Distribution	Technologies for the electricity distribution system (≤69 kV) planning and operations including both AC and DC systems.
	<u>Subcategory C:</u> Modeling, Software, Algorithms, And Control For The Grid	Modeling, algorithms, or control methodologies that improve grid planning, operations, or markets.
	<u>Subcategory D:</u> Batteries – Grid Scale	Grid scale battery technologies.
	<u>Subcategory E:</u> Grid Scale (Non-Battery) Storage	Non-battery technologies for grid-scale storage such as: pumped-hydro, compressed air, high angular velocity flywheels, etc.
	<u>Subcategory F:</u> Grid Reliability	Technologies that maintain the efficient function of the grid during unusual events, particularly in the context of increasing renewable energy sources and/or distributed generation.
	<u>Subcategory G:</u> Grid – Other	Grid technologies that do not fit into one of the above categories.
	<u>Subcategory A:</u> Alternative Fuels (Non-Bio)	Technologies that create fuels that are substitutes for gasoline/diesel, but are not bio based.
	<u>Subcategory B:</u> Engines – Transportation	Improved engines/turbines for generation applications using liquid and/or gaseous fuels, for example increasing engine efficiency or reducing emitted GHGs
	<u>Subcategory C:</u> Electric Motors – Transportation	Technologies for improved electric motors specifically for transportation applications.
<u>CATEGORY 2:</u> TRANSPORTATION	<u>Subcategory D:</u> Fuel Cells - Transportation	Technologies for improved fuel cells specifically for transportation applications.

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<u>CATEGORY</u>	<u>SUBCATEGORY</u>	<u>DESCRIPTION</u>
	<u>Subcategory E:</u>	Advanced or alternative vehicle designs and/or key enabling technologies. Examples could include ultralightweight vehicles, advanced components, new vehicle designs and architectures, etc.
	Advanced Vehicle Designs and Materials	
	<u>Subcategory F:</u>	Technologies for traffic management, transportation behavior, self-driving cars and other advanced transportation management scenarios.
	Transportation Management	
	<u>Subcategory G:</u>	Technologies that include advances in semiconductor materials, substrates, circuit topologies, magnetic materials, inductors, dielectric materials, capacitors, transistors, device packaging, etc. or optimizations of electronic systems applied specifically to transportation applications.
	Power Electronics – Transportation	
	<u>Subcategory H:</u>	Technologies for advanced human powered vehicles, marine vessels, trains, etc.
	Non-Automotive Ground/Sea Transportation	
	<u>Subcategory I:</u>	Technologies for advanced airplanes
	Air Transportation	
	<u>Subcategory J:</u>	Technologies for improved batteries for a wide range of vehicle applications, including hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and battery electric vehicles (EVs).
	Batteries – Transportation	
	<u>Subcategory K:</u>	Technologies that apply thermal storage, and non-battery electric storage, such as supercapacitors and others specifically for transportation application.
	Non-Battery Storage For Transportation	
	<u>Subcategory L:</u>	Transportation energy technologies that do not fit one of the above categories,
	Transportation – Other	
<u>CATEGORY 3:</u> BUILDING EFFICIENCY	<u>Subcategory A:</u>	Technologies for new Combined Heat and Power (CHP) designs/scenarios.
	Combined Heat and Power	
	<u>Subcategory B:</u>	Technologies that improve the efficiency of building heating and cooling systems.
	Building Heating and Cooling	
	<u>Subcategory C:</u>	

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<u>CATEGORY</u>	<u>SUBCATEGORY</u>	<u>DESCRIPTION</u>
	Building Energy Demand Management	Demand response and/or management technologies such as smart meters, other building energy conservation technologies such as automatic control systems.
	<u>Subcategory D:</u>	Energy efficient and environmentally-friendly advanced lighting technologies.
	Lighting	
	<u>Subcategory E:</u>	Building designs leading to better energy efficiency; technologies that could be applied to windows, insulation, roofing, etc.
	Building Envelope	
	<u>Subcategory F:</u>	Building energy efficiency technologies that do not fit into one of the categories above.
	Building Efficiency – Other	
<u>CATEGORY 4:</u> POWER GENERATION AND ENERGY PRODUCTION: LIQUID AND GASEOUS FUELS/NUCLEAR	<u>Subcategory A:</u>	Improved generation designs which use a combination of technologies (for example- fuel cells and turbines) with liquid and/or gaseous fuels.
	Combined Processes – Generation with Liquid and/or Gaseous Fuels	
	<u>Subcategory B:</u>	Improved engines/turbines for generation applications using liquid and/or gaseous fuels.
	Stationary Engines/Turbines For Generation with Liquid and/or Gaseous Fuels	
	<u>Subcategory C:</u>	Improved fuel cells intended to be coupled with generation sources using liquid and/or gaseous fuels.
	Stationary Fuel Cells For Generation with Liquid and/or Gaseous Fuels	
	<u>Subcategory D:</u>	Technologies that enhance fission, or materials specifically for safe nuclear fission power generation.
	Nuclear Fission Power Generation and Materials	
	<u>Subcategory E</u>	Technologies that enhance fusion, or materials specifically for safe nuclear fusion power generation.
	Nuclear Fusion Power Generation and Materials	
	<u>Subcategory F:</u>	Technologies for carbon capture, use, and storage, excluding biological/agricultural carbon management.
	Carbon Capture	
	<u>Subcategory G:</u>	

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<u>CATEGORY</u>	<u>SUBCATEGORY</u>	<u>DESCRIPTION</u>
	Exploration And Extraction (Non-Geothermal) Of Conventional and Unconventional Liquid and/or Gaseous Resources	Technologies/tools for resource identification, classification, and modeling, as well as technologies to extract conventional and unconventional liquid and/or gaseous resources. This subcategory can include sensors and imaging technologies, predictive models and algorithms, drills, pumps, etc.
	<u>Subcategory H:</u>	Technologies that improve the planning and operation of power generation with liquid and/or gaseous fuels.
	Planning And Operations For Generation with Liquid and/or Gaseous Fuels	
	<u>Subcategory I:</u>	Technologies for storage, transportation, handling, and/or monitoring of combustible gases. This could include tanks, pipelines, pumps, sensors, etc.
	Infrastructure for Combustible Gas	
	<u>Subcategory J:</u>	Technologies that improve chemical or biological conversions of liquid and/or gaseous resources to more desired forms, and other forms of energy transduction, including downstream production of commodity chemicals.
	Chemical and Biological Conversions From Liquid and/or Gaseous Fuels	
	<u>Subcategory K:</u>	Technologies that will enable significant water savings in the generation of power, such as water recovery/recirculation systems or dry cooling of power plants.
	Water Conservation In Power Generation	
<u>CATEGORY 5:</u> POWER GENERATION: RENEWABLE	<u>Subcategory L:</u>	Generation technologies that do not fit into one of the categories above.
	Generation with Liquid and/or Gaseous Fuels – Other	
	<u>Subcategory A:</u>	Technologies that lead to better capture of wind resources. This could include different configurations, blade designs and materials. Also in this category could be tools for wind resource identification, classification, and modeling.
	Wind – Energy Capture	
	<u>Subcategory B:</u>	

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<u>CATEGORY</u>	<u>SUBCATEGORY</u>	<u>DESCRIPTION</u>
	Wind – Energy Conversion	Technologies that lead to better conversion of wind power into useable energy, such as generators and magnetic materials, electronics, etc. specifically designed for wind energy.
	<u>Subcategory C:</u> Geothermal Energy	Geothermal heat technologies including pumps, proppants, induced seismicity, enhanced geothermal systems (EGS), drilling, resource identification (sensors, models, tracers), zonal isolation techniques, robust equipment, low temperature generation, etc.
	<u>Subcategory D:</u> Hydro Energy	Technologies for capturing and/or converting hydrokinetic energy such as ocean, osmotic, tidal, etc., Technologies for hydro resource identification and modeling.
	<u>Subcategory E:</u> Solar – PV/CPV	Technologies for solar PV/CPV systems including materials, cell configurations, optical solar concentrators, BOS and other technologies for solar cells that convert light into electricity or fuel. Technologies to enable for cheaper installation or solar PV resource identification and modeling.
	<u>Subcategory F:</u> Solar – Non-PV	Technologies for non-PV conversion of solar energy including solar thermal conversion (materials, configurations, concentrators, and BOS), direct conversion of solar energy to fuels through thermal or catalytic routes, and other technologies that use or convert solar energy without PV conversion.
	<u>Subcategory G:</u> Power Electronics – Renewable Generation	Technologies that include advances in semiconductor materials, substrates, circuit topologies, magnetic materials, inductors, dielectric materials, capacitors, transistors, device packaging, etc. applied to renewable power generation.

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<u>CATEGORY</u>	<u>SUBCATEGORY</u>	<u>DESCRIPTION</u>
CATEGORY 6: BIOENERGY	<u>Subcategory H:</u> Renewable Power – Other	Renewable energy technologies that do not fit one of the above categories.
	<u>Subcategory A:</u> Biomass Production	Technologies that improve biomass characteristics, such as yield and sustainability, and decrease cost of production and/or water use.
	<u>Subcategory B:</u> Biofuel Production – Biological Methods	Technologies that utilize a biological agent in one or more principal step(s) of feedstock conversion to fuels.
	<u>Subcategory C:</u> Biofuel Production – Nonbiological Methods	Technologies that do not utilize any biological agent in the conversion of organic feedstock to fuels, such as thermochemical and hybrid approaches or biomimetics.
	<u>Subcategory D:</u> Bioenergy Supply Chain	Technologies critical to supply chain development, such as feedstock collection and handling.
	<u>Subcategory E:</u> Bioenergy – Other	Technologies for bioenergy which do not fit in one of the above subcategories. Including but not limited to bioreactors, balance of plant, bioproducts, microbial fuel cells, sensors, and biological or agricultural carbon management.
	<u>Subcategory A:</u> Water Production/Reuse	Technologies that enable cost-effective and energy efficient ways of providing fresh water.
	<u>Subcategory B:</u> Thermal Energy Storage	Thermal energy storage technologies that can apply to multiple applications.
	<u>Subcategory C:</u> Advanced Manufacturing	Technologies that enable energy-efficient manufacturing capabilities or methods or that use advanced manufacturing to enable new energy technologies.
	<u>Subcategory D:</u> Appliance And Consumer Electronics Efficiency (End Use)	Technologies that improve the energy efficiency of appliances and consumer electronics, including but not limited to: refrigerators, washers, dryers, televisions, stoves, personal computers, phones, etc.

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<u>CATEGORY</u>	<u>SUBCATEGORY</u>	<u>DESCRIPTION</u>
	<u>Subcategory E:</u> Data Centers And Computation	Technologies to improve the energy efficiency of large-scale computers, data centers, and computational infrastructure.
	<u>Subcategory F:</u> Industrial Efficiency – Materials	Technologies that improve the energy efficiency of or reduce emissions from producing industrial materials, including but not limited to glass, paper, iron, steel, plastics, aluminum, cement, etc.
	<u>Subcategory G:</u> Industrial Efficiency – Other	Technologies that improve the energy efficiency of industrial processes which are not covered by other subcategories.
	<u>Subcategory H:</u> Heat Recovery	Technologies for heat recovery including but not limited to thermoelectrics, Stirling engines, heat exchangers, conversion of waste heat, bottoming cycles, heat capture methods, materials, devices, etc.
	<u>Subcategory I:</u> High Temperature Materials	Materials designed specifically to withstand extremely high temperatures in order to enable new energy generation technologies.
	<u>Subcategory J:</u> Semiconductors	Technologies that enable the development of new semiconductor materials or the use of semiconductor materials in innovative applications.
	<u>Subcategory K:</u> Portable Power	Technologies for portable power applications such as piezoelectrics, portable fuel cells, batteries, etc.
	<u>Subcategory L:</u> Other Energy Technologies Not Listed Above	

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E. SCALING CATEGORIES

In addition to the Technical Category and Technical Subcategory list, Applicants will be required to self-identify a SCALEUP Category based on their technology and current scaling status. This SCALEUP Category will support ARPA-E’s reviewer application matching process to enable stronger matching of applications with reviewer qualifications.

The list of SCALEUP Categories is intended to encompass the majority of the scaling domain areas. If the proposed scaling category does not fall within any of the categories specified, the Applicant should select “Other”. Please note, the Applicant must select a single scaling category from the SCALEUP Category list below.

SCALING CATEGORY	DESCRIPTION
Biological Systems Scaling	Scaling of biological-based processes or technologies, such as agricultural or aquaculture based technologies, bacterial, fermentative processes, or any other technology where scaling the amount/production and/or maintenance of a biological component is the principal challenge.
Chemical Process Scaling	Scaling of chemical processes that do not involve the maintenance of biological systems, such as conversion of feedstocks into different products or mixtures, where scaling the reaction volume and/or quantity of desired products is the principal challenge.
Electrical Devices/Component Scaling	Scaling of electrical or electrochemical devices or component fabrication/assembly and/or manufacture, such as batteries, electronics, sensors, solid state devices, etc.
Grid Technology Scaling	Scaling of grid technologies related to infrastructure needed for transmission, distribution and providing services on the electrical grid for reliable operation or monitoring.
Materials Systems/Assemblies Scaling	Scaling of the manufacturing or fabrication of materials or material systems/assemblies using a range of feedstocks or refined materials to prepare higher-value products such as coatings, absorbents, metal organic frameworks (MOFs), and fuel cells.
Mechanical/Thermal Systems Scaling	Scaling of systems where mechanical and/or thermal components or systems are the primary scaling challenge, such as those related to engines and generators.

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Software Implementation Scaling	Scaling of primarily software-based technologies across all application areas where software deployment, adoption, availability of training data, or integration with hardware components are the primary scaling challenges.
Other Scaling	Scaling technology challenges not represented in the above.

II. AWARD INFORMATION

A. AWARD OVERVIEW

As described in Section I.C, this FOA includes a phased approach to fund scale-up or pre-pilot R&D: Concept Paper; Full Application, and Finalist/Oral Presentation phases.

The first phase is the Concept Paper process, which requires Applicants to provide:

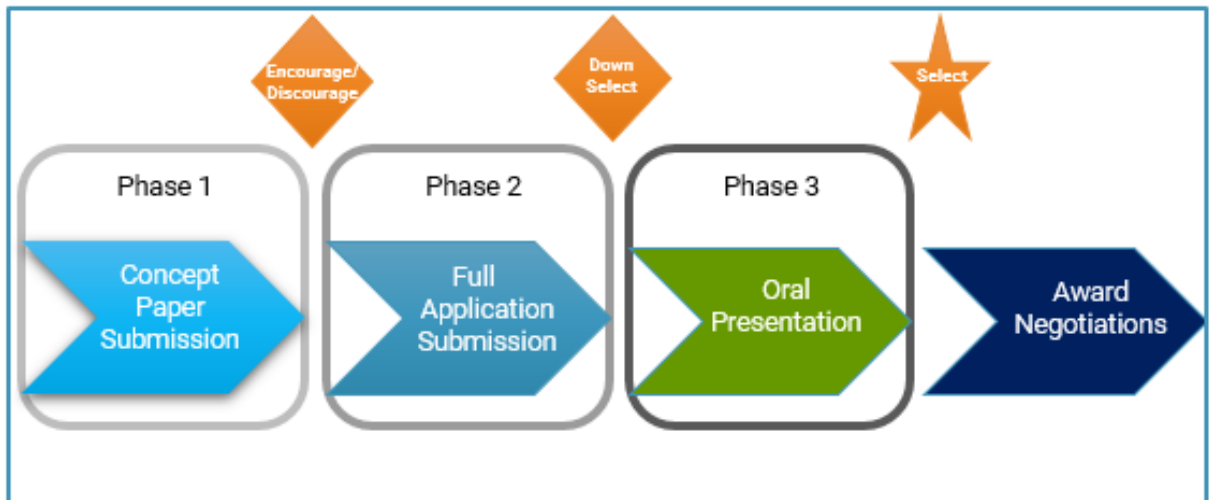
- a clear, concise, high-level statement of the problem to be solved;
- the goals, and objectives of the proposed project;
- the expected impact of ARPA-E funds on the development of the technology;
- the efforts by the Applicant to date to secure other funding;
- the state of the technology; and
- the skills/competencies of the Applicant's project team that are relevant to the proposed project.

The content and criteria for the Concept Paper are described further in Sections IV.C and V.A of the FOA respectively.

Applicants will be notified whether they are Encouraged or Discouraged to submit a Full Application. Full Applications are due on April 27, 2022. Based on the Full Applications, ARPA-E will select Finalists, all of which will be invited to participate in Oral Presentations. Following Oral Presentations, ARPA-E will make selections for award negotiations.

This process is visualized in Figure 1.

Figure 1. FOA Process Overview for SCALEUP



ARPA-E expects to make approximately \$100 million available for new awards under this FOA, with individual awards up to \$20 million (Federal share), subject to the availability of appropriated funds. ARPA-E anticipates making approximately 5-8 awards under this FOA. ARPA-E may issue one, multiple, or no awards.

The period of performance for funding agreements is anticipated to be approximately 36 months.

ARPA-E seeks Applications for projects that have progressed beyond proof-of-concept and need to demonstrate scalability, reliability, and domestic manufacturability.

Submissions requiring scale-up or pre-pilot R&D can propose a project with the goal of delivering on the project objectives at the conclusion of the period of performance. These submissions must contain an appropriate cost and project duration plan that is described in sufficient technical detail to allow reviewers to meaningfully evaluate the proposed project.

For the SCALEUP 2021 Awards, projects should expect a minimum of two phased budget periods. ARPA-E's determinations for proceeding from one budget period to the next will be based on rigorous milestone criteria that will be negotiated with the Applicant. Budget period 1 will be for the completion of activities such as preliminary design, permitting, limited preparatory R&D, development of a detailed Risk Mitigation Plan (RMP), and similar preparatory activities. Budget period 2, for execution of the scale-up or pre-pilot, will follow the successful completion of budget period 1. The transition from budget period 1 to budget period 2 is contingent upon compliance with the award terms and conditions, including ARPA-E's decision

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on achievement of milestone criteria, and a determination that continuation is in the best interest of the Government. Activities during this second budget period may include construction/modification of an existing facility or manufacturing line and will end after completion of a negotiated cumulative run time and project milestones.

Applicants should provide sufficient evidence to demonstrate the technical viability of their proposed technology and project. Applicants are encouraged to submit proof-of-concept demonstration data that supports the probability of success of the proposed project.

ARPA-E will provide support at the highest funding level only for applications with significant productization and market risk, aggressive timetables, and careful management and mitigation of the associated risks.

ARPA-E plans to fully fund each selected applicant's negotiated budget at the time of award.

1. PARTNERING REQUIREMENTS

Applicants must propose one or more SCALEUP Commercialization Partners in their Full Applications.

Commercialization Partners may include potential customers, end-users, suppliers, corporate investors, manufacturers, and distributors, etc. It is preferable for Applicants to have at least one Commercialization Partner that represents the viewpoint and needs of the target customer to help ensure market adoption for the technology after the completion of the SCALEUP project. Commercialization Partners may be included as members of the Project Team or may be included as non-member third parties.

Commercialization Partners can make a contribution of cash, in-kind (e.g., a demonstration site, intellectual property, etc.) or via other justifiable means that will be integral to the success of the project. Commercialization Partners are expected to actively participate in the project. Commercialization Partners make contributions with the goal that the technology will be successfully proven and commercialized.

For the Concept Paper, Letter(s) of Intent from Commercialization Partners are not required; however, at least one is required for the Full Application. Submission information regarding the Letter of Intent is provided in Section IV.D.4 of the FOA.

2. OPTIONAL FINANCIAL PARTNERS

Applicants may propose Financial Partners for their proposed project. A Financial Partner is an investing organization willing to provide the Applicant with funding for the cost share contribution to the project. Financial Partners may include venture capitalists,

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accelerators/incubators, angel/impact investors, etc. Financial Partners take on investment risk with the goal that the technology will be successfully proven and commercialized. Financial Partners provide cost share contributions without actively participating in research activities in the project.

Financial Partners are optional, and hence not a requirement of the SCALEUP 2021 FOA; however, their inclusion by an Applicant and commitment to the proposed project will be considered as a factor in Full Application selections. Applicants should include Letter(s) of Intent from any committed Financial Partner(s) with the Full Application. Submission information regarding the Letter of Intent is provided in Section IV.D.4 of the FOA.

B. RENEWAL AWARDS

At ARPA-E's sole discretion, awards resulting from this FOA may be renewed by adding one or more budget periods, extending the period of performance of the initial award, or issuing new award. Renewal funding is contingent on: (1) availability of funds appropriated by Congress for the purpose of this program; (2) substantial progress towards meeting the objectives of the approved application; (3) submittal of required reports; (4) compliance with the terms and conditions of the award; (5) ARPA-E approval of a renewal application; and (6) other factors identified by the Agency at the time it solicits a renewal application.

C. ARPA-E FUNDING AGREEMENTS

For projects selected for participation in the SCALEUP Program, ARPA-E will provide financial assistance through cooperative agreements, other transactions, and similar agreements. ARPA-E provides financial and other support to projects that have the potential to realize ARPA-E's statutory mission. ARPA-E does not use such agreements to acquire property or services for the direct benefit or use of the U.S. Government.

Congress directed ARPA-E to "establish and monitor project milestones, initiate research projects quickly, and just as quickly terminate or restructure projects if such milestones are not achieved."⁶ Accordingly, ARPA-E has substantial involvement in the direction of projects, as described in Section II.D of the FOA.

⁶ U.S. Congress, Conference Report to accompany the 21st Century Competitiveness Act of 2007, H. Rpt. 110-289 at 171-172 (Aug. 1, 2007).

1. COOPERATIVE AGREEMENTS

ARPA-E generally uses Cooperative Agreements to provide financial and other support to Prime Recipients.⁷

Cooperative Agreements involve the provision of 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.

ARPA-E encourages Prime Recipients to review the Model Cooperative Agreement, which is available at <https://arpa-e.energy.gov/?q=site-page/funding-agreements>.

2. FUNDING AGREEMENTS WITH FFRDCs/DOE LABS, GOGOs, AND FEDERAL INSTRUMENTALITIES

Any Federally Funded Research and Development Centers (FFRDC) involved as a member of a Project Team must provide the information requested in the “FFRDC Lab Authorization” and “Field Work Proposal” section of the Business Assurances & Disclosures Form, which is submitted with the Full Application.

When a FFRDC/DOE Lab is a member of a Project Team, ARPA-E executes a funding agreement directly with the FFRDC/DOE Lab and a single, separate Cooperative Agreement with the Prime Recipient, the lead entity for the rest of the Project Team. Notwithstanding the use of multiple agreements, the Prime Recipient under the Cooperative Agreement is the lead organization for the entire project, including all work performed by the FFRDC/DOE Lab and the rest of the Project Team.

Funding agreements with DOE/NNSA FFRDCs take the form of Work Authorizations issued to DOE/NNSA FFRDCs through the DOE/NNSA Field Work Proposal system for work performed under Department of Energy Management & Operation Contracts. Funding agreements with non-DOE/NNSA FFRDCs, GOGOs (including NETL), and Federal instrumentalities (e.g., Tennessee Valley Authority) will be consistent with the sponsoring agreement between the U.S. Government and the Laboratory. Any funding agreement with a FFRDC or GOGO will have similar terms and conditions as ARPA-E’s Model Cooperative Agreement (<https://arpa-e.energy.gov/technologies/project-guidance/pre-award-guidance/funding-agreements>).

⁷ The term “Prime Recipient” is defined in FOA Section VIII.

Non-DOE GOGOs and Federal agencies may be proposed to provide support to the project team members on an Applicant's project, through a Cooperative Research and Development Agreement (CRADA) or similar agreement.

3. OTHER TRANSACTION AUTHORITY

ARPA-E may use its "other transactions" authority under the America COMPETES Reauthorization Act of 2010 to enter into an other transaction agreement with Prime Recipients on a case-by-case basis.

ARPA-E may negotiate an other transaction agreement when it determines that the use of a standard cooperative agreement, grant, or contract is not feasible or appropriate for a project.

In general, an other transaction agreement would require a cost share of at least 50%. See Section III.C of the FOA.

D. STATEMENT OF SUBSTANTIAL INVOLVEMENT

ARPA-E is substantially involved in the direction of projects from inception to completion. For the purposes of an ARPA-E project, substantial involvement means:

- Project Teams must adhere to ARPA-E's agency-specific and programmatic requirements.
- ARPA-E may intervene at any time in the conduct or performance of work under an award.
- ARPA-E does not limit its involvement to the administrative requirements of an award. ARPA-E may have substantial involvement in the direction and redirection of the technical, design, and execution aspects of the project as a whole.
- During award negotiations, ARPA-E and Prime Recipients mutually establish an aggressive schedule of quantitative milestones and deliverables that must be met every quarter. In addition, ARPA-E will negotiate and establish phased budget periods as necessary. ARPA-E's determinations for proceeding from a budget period to the next will be based on rigorous "Go/No-Go" decision criteria that will be negotiated with the Applicants. If the Prime Recipient fails to achieve any of the "Go/No-Go" milestones and deliverables as determined by the ARPA-E Contracting Officer, ARPA-E may, at its discretion, renegotiate the statement of project objectives or schedule of milestones and deliverables for the project. Alternatively, ARPA-E may suspend or terminate the award in accordance with 2 C.F.R. §§ 200.338 and 200.339.
- ARPA-E may provide guidance and/or assistance to the Prime Recipient to accelerate the commercial deployment of ARPA-E-funded technologies. Guidance and assistance

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provided by ARPA-E may include coordination with other Government agencies and nonprofit organizations⁸ to provide mentoring and networking opportunities for Prime Recipients. ARPA-E may also organize and sponsor events to educate Prime Recipients about key barriers to the deployment of their ARPA-E-funded technologies. In addition, ARPA-E may establish collaborations with private and public entities to provide continued support for the development and deployment of ARPA-E-funded technologies.

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⁸ The term “nonprofit organizations” or “nonprofits” is defined in FOA Section VIII.

III. ELIGIBILITY INFORMATION

A. SCALEUP 2021 ELIGIBLE APPLICANTS

Organizations leveraging subject inventions that were created during an ARPA-E award and reported in the iEdison system are eligible for funding under this program. Organizations may also leverage software, developed and reported (in technical reports or otherwise) under an ARPA-E award, that will be used in manufacturing, as “firmware” in manufactured products, or deployed on energy infrastructure or large scale energy systems. For both subject inventions and software, note that “ARPA-E seeks Applications for projects that...demonstrate scalability, reliability, and domestic manufacturability” (quoting from Section II.A of the FOA), and Applicants are required to agree to the U.S. Competitiveness Provision requirements detailed in Section V.E.7 of the FOA as part of an award under this FOA.

SCALEUP Applicants are not required to have participated within the original ARPA-E award – alternatively, Applicants may be licensed or have purchased rights in such subject inventions or software and thereby become eligible for the SCALEUP 2021 FOA. This FOA is open to the following Applicants that propose to scale subject inventions or software that have resulted from ARPA-E awards:

- i) Current and former ARPA-E awardees (except Institutions of Higher Education⁹ and FFRDCs/DOE Laboratories) that own/control subject invention(s) or software arising from their ARPA-E award(s);
- ii) Entities that are licensees¹⁰ of subject invention(s) or software arising from any ARPA-E award(s); or
- iii) Consortia – specified below – that have title to or are licensees of subject invention(s) or software arising from an ARPA-E award.

The eligible Applicants described in (i) or (ii) above may propose as a Standalone Applicant¹¹ as the lead organization for a Project Team,¹² or as a member of a Project Team that may include

⁹ The term “Institutions of Higher Education” or “educational institutions” is defined in FOA Section VIII.

¹⁰ Prior to any award, ARPA-E may inspect any licenses and/or assignment or other transfer of rights documents to confirm the Applicant/licensee-assignee has the necessary rights to conduct research, and commercialize, the results of its proposed research project.

¹¹ The term “Standalone Applicant” is defined in FOA Section VIII. A Standalone Applicant must be its own Commercialization Partner.

¹² The term “Project Team” is defined in FOA Section VIII.

for-profit entities, educational institutions, and nonprofits¹³ that are incorporated in the United States, including U.S. territories, and FFRDCs/DOE Laboratories.

ARPA-E welcomes the participation of educational institutions and FFRDCs/Labs, as Project Team Members and Consortia Members, but not as Standalone Applicants or Leads of Project Teams. This is in light of this FOA's goal of rapidly advancing commercialization of energy technologies resulting from ARPA-E funding. Commercialization of such inventions of educational institutions and FFRDCs/Labs occurs not by these entities but through licenses to for-profit businesses. These businesses have the incentive, ability and organizational capacity to directly attract financial support – such as the 20%-33^{1/3}% cost share for SCALEUP projects – and manufacturing support for commercialization of inventions. Educational institutions and FFRDCs/Labs are encouraged to participate as Project Team Members and Consortia Members in the proposals of businesses who license their – or others' - inventions arising from ARPA-E-funded research.

Consortia in (iii) above:

- Must include one or more U.S. for-profit businesses;
- May include for-profit entities, educational institutions, and nonprofits that are incorporated in the United States, including U.S. territories, and FFRDCs/DOE Laboratories; and
- Must designate one member of the consortium as the consortium representative to the Project Team. The consortium representative must be incorporated in the United States. Each consortium must have an internal governance structure and a written set of internal rules. Upon request, the consortium entity must provide a written description of its internal governance structure and internal rules to the Contracting Officer ([ARPA-E- CO@hq.doe.gov](mailto:ARPA-E-CO@hq.doe.gov)).

Unincorporated consortia must provide the Contracting Officer with a collaboration agreement, commonly referred to as the articles of collaboration, which sets out the rights and responsibilities of each consortium member. This collaboration agreement binds the individual consortium members together and shall include the consortium's:

- Management structure;

¹³ 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 as a Prime Recipient or Subrecipient.

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

Foreign entities, whether for-profit or otherwise, are eligible to apply for funding as Standalone Applicants, as the lead organization for a Project Team, or as a member of a Project Team. Foreign entities must designate in the Full Application a subsidiary or affiliate incorporated (or otherwise formed or to be formed) under the laws of a State or territory of the United States to receive funding. The Full Application must state the nature of the corporate relationship between the foreign entity and domestic subsidiary or affiliate. The Applicant may request a waiver of this requirement in the Business Assurances & Disclosures Form, which is submitted with the Full Application and can be found at <https://arpa-e-foa.energy.gov/>. Refer to the Business Assurances & Disclosures Form for guidance on the content and form of the request.

B. SUBJECT INVENTION DISCLOSURE

ARPA-E allows for multiple technologies with subject inventions to be combined into one SCALEUP application, as long as all are necessary for technology scaling purposes. **ARPA-E is requiring only principal subject invention(s) and award number(s) be submitted per application in eXCHANGE.** Any additional subject invention disclosures shall be referenced in the Project Plan Workbook.

SCALEUP 2021 applicants must propose leveraging/further developing subject inventions that were created during an ARPA-E award. See immediately below (Some software products are exempt from this requirement - see "Software Report Numbers" below.) To be eligible for a SCALEUP 2021 award, the relevant subject invention(s) must be reported to the Department of Energy:

- a. prior to the SCALEUP 2021 Concept Paper deadline and
- b. in accordance with the terms of the respective ARPA-E award(s).

SCALEUP Applicants found to be noncompliant or nonresponsive may not be merit reviewed or considered for award (see Section III.D of the FOA).

1. FINDING YOUR SUBJECT INVENTION NUMBER

SCALEUP 2021 Applicants may find their subject invention number in the iEdison database found at: <https://iEdison.gov>. iEdison allows government grantees and contractors to report government-funded subject inventions, patents, and utilization data via the web to the Department of Energy for any previously funded award. A detailed guide for ARPA-E awardees on iEdison can be found on the ARPA-E website here: <https://arpa-e.energy.gov/technologies/project-guidance/post-award-guidance/subject-invention-reporting>.

If the SCALEUP Applicant filed an invention report prior to ARPA-E using iEdison and the period of reporting ended prior to the rollout of iEdison in 2016, ARPA-E will accept a DOE S Number for inventions that meet these criteria. The Format for a DOE-S# is “S” + 6 digits (S-#####).

SCALEUP Applicants may find they have several project record identifiers associated with their ARPA-E award. To provide clarity, listed below are the different types of record identifiers you may find.

Eligible ARPA-E Award Number or DOE National Lab Work Authorization

- Enter a single ARPA-E award number into eXCHANGE. Format is: DE-AR + 7 digits OR national lab work authorizations are 2 digits + / + CJ000 + “/” 2 digits + “/” + two digits
- Example of an award number is DE-AR0000159
- Example of DOE work authorization is 13/CJ000/10/01

Eligible iEdison Invention Numbers

- Enter a single subject invention number into eXCHANGE. Format is: 7 or 8 digits + “-” + 2 digits + “-” + 4 digits
- Example of subject invention number: 9412501-10-0123

Software Report

Software inventions reduced to practice under an ARPA-E award must be reported in ePIC. Although the ePIC system is not presently set up to release a unique identifier of the software report, ARPA-E will validate the associated ARPA-E award. To complete the software report in ePIC, navigate to the “Project Reports” tab. For more detailed guidance please refer to the ePIC training guide here: <https://arpa-e.energy.gov/technologies/project-guidance/post-award-guidance/project-management-tool-epic>.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

For SCALEUP Applicants that are proposing a developed software that is not associated with a subject invention reported in iEdison, when entering information in eXCHANGE, enter the title of the software.

C. COST SHARING¹⁴

Applicants are bound by the cost share proposed in their Full Applications.

1. COST SHARE DEFERRED FOR INITIAL PERIOD OF AWARD

As specified in Section V.E.4 of the FOA, for the initial portion of the award – approximately the first year of the award – cost share payment will be deferred. The cost-share requirements/reduction in this section will be required for Total Projects Costs after this initial portion of the award. See Section V.E.4 of the FOA for details.

2. BASE COST SHARE REQUIREMENT

ARPA-E generally uses Cooperative Agreements to provide financial and other support to Prime Recipients (see Section II.C.1 of the FOA). For a Cooperative Agreement awarded under this FOA, the Prime Recipient must provide at least 33.3% of the Total Project Cost¹⁵ as cost share, except as provided in Section III.C.3 of the FOA.¹⁶

3. REDUCED COST SHARE REQUIREMENT

Project teams may qualify for a reduced cost share of 20% if they qualify under one of the following specified applicant categories:

- Small businesses – or consortia of small businesses – will provide at least 20% of the Total Project Cost as cost share.
- Project Teams where a small business is the lead organization and small businesses perform greater than or equal to 80%, but less than 100%, of the total work under the funding agreement (as measured by the Total Project Cost) are entitled to the same cost

¹⁴ Refer to Section V.E.3-4 for the FOA cost share payment schedule and reporting details.

¹⁵ The term “Total Project Cost” is defined in FOA Section VIII.

¹⁶ Energy Policy Act of 2005, Pub.L. 109-58, Sec. 988(c).

share reduction provided to Standalone small businesses or consortia of small businesses.

Projects that do not meet any of the above criteria are subject to the minimum cost share requirements described in Section III.C.2 of the FOA.

4. LEGAL RESPONSIBILITY

Although the cost share requirement applies to the Project Team as a whole, the funding agreement makes the Prime Recipient legally responsible for paying, or ensuring payment of the entire cost share. The Prime Recipient's cost share obligation is expressed in the funding agreement as a static amount in U.S. dollars (cost share amount) and as a percentage of the Total Project Cost (cost share percentage). If the funding agreement is terminated prior to the end of the period of performance, the Prime Recipient is required to contribute at least the cost share percentage of total expenditures incurred after the first year through the date of termination.

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

5. COST SHARE ALLOCATION

Each Project Team is free to determine how much each Project Team member will contribute towards the cost share requirement. 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.

6. COST SHARE TYPES AND ALLOWABILITY

Every cost share contribution must be allowable under the applicable Federal cost principles, as described in Section IV.G of the FOA.

Project Teams may provide cost share in the form of cash or in-kind contributions. Cash contributions may be provided by the Prime Recipient or Subrecipients. Allowable in-kind contributions include but are not limited to personnel costs, indirect costs, facilities and administrative costs, rental value of buildings or equipment, and the value of a service, other resource, or third-party in-kind contribution. Project Teams may use funding or property received from state or local governments to meet the cost share requirement, so long as the funding or property was not provided to the state or local government by the Federal Government.

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

- Revenues or royalties from the prospective operation of an activity beyond the period of performance;
- 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.

In addition, Project Teams may not use independent research and development (IR&D) funds¹⁷ to meet their cost share obligations under cooperative agreements. However, Project Teams may use IR&D funds to meet their cost share obligations under “other transaction” agreements.

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. 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 may wish to refer to 2 C.F.R. Parts 200 and 910, and 10 C.F.R Part 603 for additional guidance on cost sharing, specifically 2 C.F.R. §§ 200.306 and 910.130, and 10 C.F.R. §§ 603.525-555.

7. COST SHARE CONTRIBUTIONS BY FFRDCs AND GOGOs

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 a non-Federal source.

Because GOGOs/Federal Agencies are funded by the Federal Government, GOGOs/Federal Agencies may not provide cost share for the proposed project. However, the GOGO/Agency

¹⁷ As defined in Federal Acquisition Regulation Subsection 31.205-18.

costs would be included in Total Project Costs for purposes of calculating the cost-sharing requirements of the Applicant.

8. COST SHARE VERIFICATION

Upon selection for award negotiations, Applicants are required to provide information and documentation regarding their cost share contributions. Please refer to Section V.E.3 of the FOA for guidance on the requisite cost share information and documentation.

D. OTHER

1. COMPLIANT CRITERIA

The Concept Paper submission is deemed compliant if:

- The Applicant meets the eligibility requirements in Section III.A of the FOA;
- The Concept Paper complies with the content and form requirements in Section IV.C of the FOA; and
- The Applicant entered all required information, successfully uploaded all required documents, and clicked the “Submit” button in ARPA-E eXCHANGE by the deadline stated in the FOA.

Concept Papers found to be noncompliant may not be merit reviewed or considered for award. ARPA-E may not review or consider noncompliant Concept Papers, including Concept Papers submitted through other means, Concept Papers submitted after the applicable deadline, and incomplete Concept Papers. A Concept Paper is incomplete if it does not include all required information. ARPA-E will not extend the submission deadline for Applicants who fail to submit required information and documents due to server/connection congestion.

Full Applications are deemed compliant if:

- The Applicant submitted a compliant and responsive Concept Paper;
- The Applicant meets the eligibility requirements in Section III.A of the FOA;
- The Full Application complies with the content and format requirements in Section IV.D of the FOA; and

- The Applicant entered all required information, successfully uploaded all required documents, and clicked the “Submit” button in ARPA-E eXCHANGE by the deadline stated in the FOA.

Full Applications found to be noncompliant may not be merit reviewed or considered for award. ARPA-E may not review or consider noncompliant Full Applications, including Full Applications submitted through other means, Full Applications submitted after the applicable deadline, and incomplete Full Applications. A Full Application is incomplete if it does not include required information and documents, such as Forms SF-424 and SF-424Ae. ARPA-E will not extend the submission deadline for Applicants who fail to submit required information and documents due to server/connection congestion.

Replies to Reviewer Comments are deemed compliant if:

- The Applicant successfully uploads its response to ARPA-E eXCHANGE by the deadline stated in the FOA; and
- The Replies to Reviewer Comments comply with the content and form requirements of Section IV.E of the FOA.

ARPA-E will not review or consider noncompliant Replies to Reviewer Comments, including Replies submitted through other means and Replies submitted after the applicable deadline. ARPA-E will not extend the submission deadline for Applicants who fail to submit required information due to server/connection congestion. ARPA-E will review and consider each compliant and responsive Full Application, even if no Reply is submitted or if the Reply is found to be noncompliant.

2. RESPONSIVENESS CRITERIA

ARPA-E performs a preliminary technical review of Concept Papers and Full Applications. The following types of submissions may be deemed nonresponsive and may not be reviewed or considered:

- Submissions that do not identify a subject invention from a prior or ongoing ARPA-E award.
- Submissions that have been submitted in response to other currently issued ARPA-E FOAs.
- Submissions that are not scientifically distinct from applications submitted in response to this FOA or other currently issued ARPA-E FOAs.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

- Submissions for basic research aimed solely at discovery and/or fundamental knowledge generation.
- Submissions for early stage R&D projects aimed at developing a proof-of-concept demonstration.
- Submissions for proposed technologies that represent incremental improvements to existing technologies.
- Submissions for proposed technologies that are not based on sound scientific principles (e.g., violates a law of thermodynamics).
- Submissions for proposed technologies that are not transformational, as described in Section I.A of the FOA.
- Submissions for proposed technologies that do not have the potential to become disruptive in nature, as described in Section I.A of the FOA.
- Submissions that are not distinct in technical approach or objective from activities currently supported by or actively under consideration for funding by any other office within Department of Energy.
- Submissions that are not distinct in technical approach or objective from activities currently supported by or actively under consideration for funding by other government agencies or the private sector.
- Submissions that are not distinct and propose increasing throughput or incremental improvement of an existing pilot or manufacturing facility.
- Submissions that describe but do not propose a technology scaling R&D plan that allows ARPA-E to evaluate the submission under the applicable merit review criteria provided in Section V.A of the FOA.
- Submissions that are not scaling technology developed under ARPA-E awards (both prior and ongoing), and do not have a confirmed Subject Invention report filing with ARPA-E/iEdison.
- Submissions that fail to adequately demonstrate ownership or licensing of the intellectual property necessary to accomplish the proposed project.

3. LIMITATION ON NUMBER OF SUBMISSIONS

Organizations may not use the same subject invention in more than one application to this FOA. More than one application can be made when organizations have multiple subject inventions for different fields of use.

IV. APPLICATION AND SUBMISSION INFORMATION

A. APPLICATION PROCESS OVERVIEW

Under the SCALEUP 2021 FOA, ARPA-E will notify encouraged Applicants to submit Full Applications based on the Concept Paper submissions, select Finalists for Oral Presentations based on the Full Applications, and select Finalists for Award Negotiations following Finalists' Oral Presentations.

1. REGISTRATION IN ARPA-E eXCHANGE

The first step in applying to this FOA is registration in ARPA-E eXCHANGE, ARPA-E's online application portal. For detailed guidance on using ARPA-E eXCHANGE, please refer to Section IV.H.1 of the FOA and the "ARPA-E eXCHANGE User Guide" (<https://arpa-e-foa.energy.gov/Manuals.aspx>).

2. CONCEPT PAPERS

Applicants must submit a Concept Paper by the deadline stated in the FOA. Section IV.C of the FOA provides instructions on submitting a Concept Paper.

ARPA-E performs a preliminary review of Concept Papers to determine whether they are compliant and responsive, as described in Section III.D of the FOA. Concept Papers found to be noncompliant or nonresponsive may not be merit reviewed or considered for award. ARPA-E makes an independent assessment of each compliant and responsive Concept Paper based on the criteria and program policy factors in Sections V.A.1 and V.B.1 of the FOA.

ARPA-E will encourage a subset of Applicants to submit Full Applications. Other Applicants will be discouraged from submitting a Full Application in order to save them the time and expense of preparing an application submission that is unlikely to be selected for award negotiations. By discouraging the submission of a Full Application, ARPA-E 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. Unsuccessful Applicants should continue to submit innovative ideas and concepts to future ARPA-E FOAs.

3. FULL APPLICATIONS

Applicants must submit a Full Application by the deadline stated in the FOA. Applicants will have approximately 45 days from receipt of the Encourage/Discourage notification to prepare and submit a Full Application. Section IV.D of the FOA provides instructions on submitting a Full Application.

ARPA-E performs a preliminary review of Full Applications to determine whether they are compliant and responsive, as described in Section III.D of the FOA. Full Applications found to be noncompliant or nonresponsive may not be merit reviewed or considered for award. ARPA-E makes an independent assessment of each compliant and responsive Full Application based on the criteria and program policy factors in Sections V.A.2 and V.B.1 of the FOA.

4. REPLY TO FULL APPLICATION REVIEWER COMMENTS

Once ARPA-E has completed its review of Full Applications, reviewer comments on compliant and responsive Full Applications are made available to Applicants via ARPA-E eXCHANGE. Applicants may submit an optional Reply to Reviewer Comments, which must be submitted by the deadline stated in the FOA. Section IV.E of the FOA provides instructions on submitting a Reply to Reviewer Comments.

ARPA-E performs a preliminary review of Replies to determine whether they are compliant, as described in Section III.D of the FOA. ARPA-E will review and consider compliant Replies only. ARPA-E will review and consider each compliant and responsive Full Application, even if no Reply is submitted or if the Reply is found to be non-compliant.

5. FINALIST ORAL PRESENTATION

Based on merit review of Full Application submissions, ARPA-E will select Finalists. The Finalists proceed to the final evaluation phase, Oral Presentations. Applicants not selected as Finalists will receive a notification of their non-selection.

The invited Finalists will meet with ARPA-E representatives to present the contents of their Full Applications and provide ARPA-E an opportunity to ask questions regarding the proposed project. The information provided by Finalists to ARPA-E through the Oral Presentation contributes to ARPA-E's selection decisions.

In addition to the project, plan and stakeholder engagement, Finalists should include detail on their current and future funding aspirations, an overview of financial projections (with and without SCALEUP), clearly describe their plan to meet the US Competitiveness provisions

referenced in Section V.E.7 of the FOA, and key risks to be mitigated for successful project execution and follow on.

A maximum of two team members (one of which is the Principal Investigator) from the Applicant organization are permitted to present the Oral Presentations. Proposed Commercialization Partners will be invited to separate, non-confidential virtual presentations to discuss their role in the proposed SCALEUP project. Finalists and their Commercialization Partner(s) will be given a minimum of 2-weeks to prepare for Oral Presentations. Supplemental questions on each Finalist's proposed SCALEUP project will also be provided to the Applicant by ARPA-E within this timeframe. Furthermore, additional questions may arise during Oral Presentations, and Finalists should be prepared to provide verbal responses to ARPA-E. An estimated timeline for the oral presentation is represented in Figure 2, "Estimated Oral Presentation Timeline".

Figure 2: Estimated Oral Presentation Timeline

Estimated Oral Presentation Timeline:

- **One hour** – Applicants provide project plan overview
- **30 minutes** – Break
- **45 minutes** – Separate Partner interviews
- **45 minutes** – Applicant Q&A

ARPA-E will arrange to meet with the invited Finalists and their proposed Commercialization Partners in person at ARPA-E offices or a mutually agreed upon location. Alternatively, ARPA-E may invite certain Finalists to present to ARPA-E via webinar, videoconference, or conference call.

ARPA-E will not directly reimburse Finalists nor their proposed Commercialization Partners for travel and other expenses relating to the Oral Presentations, nor will these costs be eligible for reimbursement as pre-award costs.

Note: The Oral Presentation process is distinct from pre-selection clarifications (See Section IV.A.6 of the FOA).

6. PRE-SELECTION CLARIFICATIONS

Throughout each FOA phase: Concept Paper, Full Application and Oral Presentation, ARPA-E may, at the Contracting Officer's discretion, conduct a pre-selection clarification process and/or perform a "down-select." Through the pre-selection clarification process, ARPA-E may obtain

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

additional information from select Applicants through pre-selection meetings, webinars, videoconferences, conference calls, written correspondence, or site visits that can be used to accept or reject the Applicant's proposal. ARPA-E will not reimburse Applicants for travel and other expenses relating to pre-selection meetings or site visits, nor will these costs be eligible for reimbursement as pre-award costs.

Participation in a pre-selection meeting or site visit with ARPA-E does not signify that Applicants have been selected for the SCALEUP Award.

7. SELECTION FOR SCALEUP AWARD NEGOTIATIONS

ARPA-E carefully considers all of the information obtained through the application process and makes an independent assessment based on the criteria and program policy factors in Sections V.A.1 and V.B.1 of the FOA. The Selection Official may select all or part of a Full Application for award negotiations. The Selection Official may also postpone a final selection determination on one or more Full Applications until a later date, subject to availability of funds and other factors. ARPA-E will enter into award negotiations only with selected Finalists.

Finalists are promptly notified of ARPA-E's selection determination. Please refer to Section V.D of the FOA for guidance on award notifications.

B. APPLICATION FORMS

Required forms for Full Applications are available on ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov>), including the SF-424 and Budget Justification Workbook/SF-424A. Applicants may use the templates available on ARPA-E eXCHANGE, including the Concept Paper, Technical Volume of the Full Application, Project Plan Workbook, Summary Slide, Summary for Public Release, Reply to Reviewer Comments, and Business Assurances & Disclosures Form. A sample response to the Business Assurances & Disclosures Form is available on ARPA-E eXCHANGE.

C. CONTENT AND FORM OF CONCEPT PAPERS

The Concept Paper is mandatory (i.e., in order to submit a Full Application, an Applicant must submit a compliant and responsive Concept Paper) and must conform to the following formatting requirements:

- The Concept Paper Sections 1-4 must not exceed 4 pages in length including graphics, figures, and/or tables.
- The Concept Paper must be submitted in Adobe PDF format.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

- The Concept Paper must be written in English.
- All pages must be formatted to fit on 8-1/2 by 11-inch paper with margins not less than one inch on every side. Single space all text and use Times New Roman typeface, a black font color, and a font size of 12 point or larger (except in figures and tables).
- The ARPA-E assigned Control Number, the Lead Organization Name, and the Principal Investigator's Last Name 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.
- The first paragraph must include the Lead Organization's Name and Location, Principal Investigator's Name, ARPA-E/iEdison Number, Proposed Funding Requested (Federal and Awardee's Cost Share), and Project Duration.

Concept Papers found to be noncompliant or nonresponsive may not be merit reviewed or considered for award (see Section III.D of the FOA).

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

A fillable Concept Paper template is available on ARPA-E eXCHANGE at <https://arpa-e-foa.energy.gov>.

Concept Papers must conform to the content requirements described below. If Applicants exceed the maximum page length indicated above, ARPA-E will review only the authorized number of pages and disregard any additional pages.

D. CONTENT AND FORM OF FULL APPLICATIONS

Full Applications must conform to the following formatting requirements:

- Each document must be submitted in the file format prescribed below.
- The Full Application must be written in English.
- All pages must be formatted to fit on 8-1/2 by 11-inch paper with margins not less than one inch on every side. Single space all text and use Times New Roman

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

typeface, a black font color, and a font size of 12 point or larger (except in figures and tables).

- The ARPA-E assigned Control Number, the Lead Organization Name, and the Principal Investigator's Last Name 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.

Fillable Full Application template documents are available on ARPA-E eXCHANGE at <https://arpa-e-foa.energy.gov>.

Full Applications must conform to the content requirements described below.

Component	Required Format	Description and Information
Technical Volume	PDF	The centerpiece of the Full Application. Provides a detailed description of the proposed scaling, or pre-pilot R&D project and Project Team. A Technical Volume template is available on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov).
Team Pitch Video	MP4 (submitted via kiteworks™)	A Team Pitch Video (6-minute limit) that describes the opportunity, team, and technology.
Project Plan Workbook	XLS	The Workbook includes critical performance, scaling, and financial metrics. A Project Plan Workbook template is available on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov).
Letter(s) of Intent	PDF	Applicants must provide letter(s) from all third-party collaborators (including Commercialization or Financial Partners) that propose to provide all or part of the required cost share (e.g., cash, services, or property), as well as those not contributing cost share.
SF-424	PDF	Application for Federal Assistance (https://arpa-e-foa.energy.gov). Applicants are responsible for ensuring that the proposed costs listed in eXCHANGE match those listed on forms SF-424 and SF-424A. Inconsistent submissions may impact ARPA-E's final award determination.
Budget Justification Workbook/SF-424A	XLS	Budget Information – Non-Construction Programs (https://arpa-e-foa.energy.gov)

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

Summary for Public Release	PDF	Short summary of the proposed project. Intended for public release. A Summary for Public Release template is available on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov).
Summary Slide	PPT	A four-panel project slide summarizing different aspects of the proposed project. A Summary Slide template is available on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov).
Business Assurances & Disclosures Form	PDF	Requires the Applicant to make responsibility disclosures and disclose potential conflicts of interest within the Project Team. Requires the Applicant to describe the additionality and risks associated with the proposed project, disclose applications for funding currently pending with Federal and non-Federal entities, and disclose funding from Federal and non-Federal entities for work in the same technology area as the proposed R&D project. If the Applicant includes a FFRDC/DOE Lab, requires the Applicant to provide written authorization from the cognizant Federal agency and, if a DOE/NNSA FFRDC/DOE Lab, a Field Work Proposal. This form is available on ARPA-E eXCHANGE at https://arpa-e-foa.energy.gov . A sample response to the Business Assurances & Disclosures Form is also available on ARPA-E eXCHANGE.

ARPA-E provides detailed guidance on the content and form of each component below.

1. FIRST COMPONENT: TECHNICAL VOLUME

The Technical Volume must be submitted in Adobe PDF format. A Technical Volume template is available at <https://arpa-e-foa.energy.gov>. The Technical Volume must conform to the content and form requirements included within the template. The cumulative length of the Technical volume shall not exceed 20 pages. Suggested page lengths are provided for each section as a guideline. An Executive Summary and Bibliographic references section are required as part of the Technical Volume, but will not be counted towards the 20-page cumulative length of the Technical Volume. If Applicants exceed the maximum page lengths specified for each section, ARPA-E will review only the authorized number of pages and disregard any additional pages.

Applicants must provide sufficient citations and references to the primary research literature to justify the claims and approaches made in the Technical Volume. ARPA-E and reviewers may review primary research literature in order to evaluate applications. However, ARPA-E and reviewers are under no obligation to review cited sources (e.g., Internet websites).

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

2. SECOND COMPONENT: TEAM PITCH VIDEO

The Team Pitch Video is limited to 6-minutes in length and should describe the opportunity, team, and technology for the proposed project. More specifically, the Team Pitch Video should focus on addressing the following: (1) describing the problem, proposed solution, and how that solution compares to existing alternatives; (2) describing the target market(s) and company's competitive advantage; (3) introducing the Project Team, highlighting knowledge, experience and unique capabilities; (4) describing strategic hires and partnerships for the proposed project; (5) explaining why/how the SCALEUP award will substantively change the likelihood of your success. All Team Pitch Videos that exceed the 6-minute length will not be viewed beyond the 6-minute time limit. Teams should focus content on addressing elements 1 through 5 and not on video production aesthetics.

To upload and submit the Team Pitch Video presentation video file, Applicants must utilize the DOE kiteworks™ platform. All Applicants who submit a Concept Paper and receive a notification to encourage submission of a Full Application (as outlined in Section V.D.2 of the FOA) will automatically receive an invitation via email within approximately 1-week of Concept Paper notifications to create an account on DOE's kiteworks™ platform, which will enable them to submit a Team Pitch Video as part of their Full Application. As noted in Section V.D.2, Applicants may submit a Full Application even if they receive a notification discouraging them from doing so. If such an Applicant intends to submit a Full Application, the Applicant must notify ARPA-E of their intent by sending an email to ARPA-E-CO@hq.doe.gov within 1-week of notification, with the subject line "Intent to Submit SCALEUP 2021 Full Application Team Pitch Video" so that they may receive an invitation to create an account on the kiteworks™ platform and submit the Team Pitch Video component of their Full Application.

To start the Team Pitch Video submission process, Applicants should click the kiteworks™ web-link in their email inbox to enter their email address and create an account. Use the confirmation link sent via email to activate the kiteworks™ account. Within the kiteworks™ platform, select "Upload" in the upper-left corner and click "Upload Files." Browse for the video file on your computer, select the file, and click "Open."

To facilitate efficient assignment of Team Pitch Videos to ARPA-E reviewers, Applicants must include their ARPA-E assigned Control Number (Control Number format is: Last 4 digits of FOA number, "-", unique 4-digit identifier from eXCHANGE submission) for the SCALEUP 2021 application (found on eXCHANGE) and company name in the file name of the Team Pitch Video.

An example of an acceptable file name format is: "2641-####_CompanyName".

Figure 3 below summarizes the file transfer instructions provided above:

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

Figure 3: kiteworks™ File Transfer Instructions

- 1 Click the link in your email and enter your email address in Kiteworks.
- 2 Choose a password and create your Kiteworks account.
- 3 Check your email for the confirmation link to activate your Kiteworks account.

The screenshot shows the 'Sign in' page of the Kiteworks application. It features a text input field for 'Username or email' with the placeholder 'email@email.com' and a blue 'Next' button. Below the button, it says 'SSO - Single Sign-On' and 'Secured by Accellion'. At the bottom, there is a small disclaimer about the system being a Federal computer system and a consent statement.

The screenshot shows the 'Create account' page. It has a text input field for 'Email' with the placeholder 'email@email.com'. Below it are two password fields: 'Password' and 'Confirm Password', both with a strength indicator (a green checkmark and a lock icon). The 'Confirm Password' field also shows requirements: 1 number, 1 uppercase character, 1 special character, and 8 characters minimum. A blue 'Create account' button is at the bottom.

The screenshot shows the 'Welcome to "kiteworks"' page. It states 'Your account has been created.' and 'To start using the system, please activate your account.' There is a blue 'Activate account' button. At the bottom, it says 'Secured by Accellion'.

- 4 Select "Upload" in the upper-left corner and click "Upload Files". Browse for the video file on your computer, select the file, and click "Open".
- 5 Your video will then be uploaded to Kiteworks. You're all done.

The screenshot shows the 'Upload Files' dialog box. It has a search bar at the top. Below it, there are buttons for 'Compose', 'Upload', '+ New', and 'More'. The 'Upload' button is highlighted. Below the buttons, there is a list of files with columns for 'Name' and 'Size'. The file 'mi-Finalist Videos' is listed.

The screenshot shows the 'kiteworks' file list. It has a search bar at the top. Below it, there are buttons for 'Compose', 'Upload', '+ New', and 'More'. The 'Upload' button is highlighted. Below the buttons, there is a list of files with columns for 'Name' and 'Size'. The file 'Screen Recording 2020-06-24 at 12.43.47 PM.mov' is listed.

Additionally, it is important to note for pitch presentation videos that:

1. If a new video file submission is required for any reason, the original file must be deleted or the file name must be changed. Two files of the same name cannot be uploaded to kiteworks™.
2. The file size limit is 2GB.
3. Videos may take several minutes to fully upload to the kiteworks™ platform, and Applicants are responsible for allocating sufficient time to upload Team Pitch Videos ahead of the Full Application submission deadline.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

3. THIRD COMPONENT: PROJECT PLAN WORKBOOK

The Project Plan Workbook must be submitted in XLS format. A Project Plan Workbook template is available at <https://arpa-e-foa.energy.gov>. The Project Plan Workbook requires information on the following data fields and metrics: (1) original ARPA-E project performance goals, progress by project-end, status to-date, and future targets (where applicable); (2) scaling metric progress to-date and proposed targets for the project; (3) follow-on funding since original ARPA-E award; (4) total product sales to-date; (5) list of commercial/financial partners and contact information; (6) past financial performance and future financial projections for the company, with and without the proposed ARPA-E award; (7) summary of intellectual property relevant to the proposed project, including the primary subject invention from the original ARPA-E award and any supplemental subject inventions included in the proposed project. Applicants must complete all required fields in accordance with the instructions provided in the template and must document all assumptions and resources as appropriate within the Project Plan Workbook template.

4. FOURTH COMPONENT: LETTER(S) OF INTENT

The Letter(s) of Intent must be submitted in Adobe PDF format. A Letter of Intent from at least one Commercialization Partner is required for the Full Application. Commercialization Partners may or may not be members of the proposed Project Team. Applicants should provide letter(s) from all third-party collaborators (including Commercialization or Financial Partners). Each letter should state the intended role of the third-party, including their authority within the proposed project, and clearly describe any constraints/restrictions. Any letters should also specify whether the third-party is committed to providing a specific minimum dollar amount of cost share for the Total Proposed Project Cost. If committed to providing cost share, in the budget justification, identify the following information: (1) the name of the organization; (2) the proposed dollar amount to be provided; (3) the amount as a percentage of the total project cost; and (4) the proposed type of cost share – cash, services, or property (e.g., equipment or facilities). Where equipment or facilities are offered, each should be described and the basis for their value provided in the budget justification if their use will be charged to the project.

Financial Partners are optional, and hence not a requirement of the SCALEUP 2021 FOA; however, their inclusion by an Applicant and commitment to the proposed project will be considered in Awardee selections. Applicants should include Letter(s) of Intent from any committed Financial Partner(s) with the Full Application. Financial Partners may be included as members of the Project Team or may be included as non-member third parties.

5. FIFTH COMPONENT: SF-424

The SF-424 must be submitted in Adobe PDF format. This form is available on ARPA-E eXCHANGE at <https://arpa-e-foa.energy.gov>.

The SF-424 includes instructions for completing the form. Applicants must complete all required fields in accordance with the instructions. Applicants may identify and include in Block 14 the entities, their addresses, and corresponding census tract numbers for any project activities that will occur within any designated Qualified Opportunity Zone (QOZ). To locate Qualified Opportunity Zones go to: <https://www.cdfifund.gov/opportunity-zones>.

Prime Recipients and Subrecipients are required to complete SF-LLL (Disclosure of Lobbying Activities), available at <https://www.grants.gov/forms/post-award-reporting-forms.html>, if any non-Federal funds have been paid or will be paid to any person for influencing or attempting to influence 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 in connection with your application or funding agreement. The completed SF-LLL must be appended to the SF-424.

ARPA-E provides the following supplemental guidance on completing the SF-424:

- Each Project Team should submit only one SF-424 (i.e., a Subrecipient should not submit a separate SF-424).
- The list of certifications and assurances in Block 21 can be found at <http://energy.gov/management/downloads/certifications-and-assurances-use-sf-424>.
- The dates and dollar amounts on the SF-424 are for the entire period of performance (from the project start date to the project end date), not a portion thereof.
- Applicants are responsible for ensuring that the proposed costs listed in eXCHANGE match those listed on forms SF-424 and SF-424A. Inconsistent submissions may impact ARPA-E's final award determination.

6. SIXTH COMPONENT: BUDGET JUSTIFICATION WORKBOOK/SF-424A

Applicants are required to complete the Budget Justification Workbook/SF-424A Excel spreadsheet. This form is available on ARPA-E eXCHANGE at <https://arpa-e-foa.energy.gov>.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

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. The SF-424A form included with the Budget Justification Workbook will “auto-populate” as the Applicant enters information into the Workbook. Applicants should carefully read the “Instructions and Summary” tab provided within the Budget Justification Workbook.

Subrecipient information must be submitted as follows:

- Each Subrecipient incurring greater than or equal to 10% of the Total Project Cost must complete a separate Budget Justification workbook to justify its proposed budget. These worksheets must be inserted as additional sheets within in the Prime Recipient’s Budget Justification.
- Subrecipients incurring less than 10% of the Total Project Cost are not required to complete a separate Budget Justification workbook. However, such Subrecipients are required to provide supporting documentation to justify their proposed budgets. At a minimum, the supporting documentation must show which tasks/subtasks are being performed, the purpose/need for the effort, and a sufficient basis for the estimated costs.

ARPA-E provides the following supplemental guidance on completing the Budget Justification Workbook/SF-424A:

- Applicants may request funds under the appropriate object class category tabs as long as the item and amount requested are necessary to perform the proposed work, meet all the criteria for allowability under the applicable Federal cost principles, and are not prohibited by the funding restrictions described herein.
- If Patent costs are requested, they must be included in the Applicant’s proposed budget (see Section IV.G.3 of the FOA for more information on Patent Costs).
- For more information, please refer to the ARPA-E Budget Justification Guidance document at <https://arpa-e-foa.energy.gov>.

7. SEVENTH COMPONENT: SUMMARY FOR PUBLIC RELEASE

Applicants are required to provide a 250-word maximum Summary for Public Release. A Summary for Public Release template is available on ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov>). The Summary for Public Release must be submitted in Adobe PDF format. This summary should not include any confidential, proprietary, or privileged information. The

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summary should be written for a lay audience (e.g., general public, media, Congress) using plain English.

250 Words	SUMMARY FOR PUBLIC RELEASE	<p>Briefly describe the proposed effort; summarize its objective(s) and project plan approach. Include context for how these goals and objectives are crucial for the commercial success of your technology. Specify what the technology product will be, at what scale (e.g., volume, number, weight, etc.) and how it will be delivered by the end of project. Describe its potential impact on “ARPA-E Mission Areas” (see Section I.A of the FOA). The summary should be written at technical level suitable for a high-school science student and is designed for public release.</p> <p>INSTRUCTIONS:</p> <p>(1) The Summary for Public Release <u>shall not exceed 250 words and one paragraph</u>.</p> <p>(2) The Summary for Public Release <u>shall consist only of text</u>—no graphics, figures, or tables.</p> <p>(3) For applications selected for award negotiations, the Summary may be used as the basis for a public announcement by ARPA-E; therefore, <u>this Cover Page and Summary should not contain confidential or proprietary information</u>. See Section VII.I of the FOA for additional information on marking confidential information</p>
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8. EIGHTH COMPONENT: SUMMARY SLIDE

Applicants are required to provide a single PowerPoint slide summarizing the proposed project. The slide must be submitted in Microsoft PowerPoint format. This slide will be used during ARPA-E’s evaluation of Full Applications. A summary slide template, including content requirements, is available on ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov>).

9. NINTH COMPONENT: BUSINESS ASSURANCES & DISCLOSURES FORM

Applicants are required to provide the information requested in the Business Assurances & Disclosures Form. The information must be submitted in Adobe PDF format. A fillable Business Assurances & Disclosures Form template is available on ARPA-E eXCHANGE at <https://arpa-e-foa.energy.gov>. A sample response to the Business Assurances & Disclosures Form is also available on ARPA-E eXCHANGE.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

As described in the Business Assurances & Disclosures Form, the Applicant is required to:

- Disclose conditions bearing on responsibility, such as criminal convictions and Federal tax liability;
- Disclose potential conflicts of interest within the Project Team.

In addition, ARPA-E is required by statute to “accelerat[e] transformational technological advances in areas that industry is by itself not likely to undertake because of technical and financial uncertainty.”¹⁸ In accordance with ARPA-E’s statutory mandate, the Applicant is required to:

- Describe the additionality and risks associated with the proposed R&D project;
- Disclose any applications for the same project or related work currently pending with any Federal or non-Federal entities; and
- Disclose all funding for work in the same technology area as the proposed project received from any Federal or non-Federal entity within the last 5 years.

Finally, the Applicant may use the Business Assurances & Disclosures Form to request authorization to perform some work overseas.

E. CONTENT AND FORM OF REPLIES TO REVIEWER COMMENTS

Written feedback on the Full Application is made available to Applicants before the submission deadline for Replies to Reviewer Comments. Applicants have a brief opportunity to prepare a short Reply to Reviewer Comments responding to one or more comments or supplementing their Full Application. A fillable Reply to Reviewer Comments template is available on ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov>).

Replies to Reviewer Comments must conform to the following requirements:

- The Reply to Reviewer Comments must be submitted in Adobe PDF format.
- The Reply to Reviewer Comments must be written in English.

¹⁸ America COMPETES Act, Pub. L. No. 110-69, § 5012 (2007), as amended (codified at 42 U.S.C. § 16538).

- All pages must be formatted to fit on 8-1/2 by 11-inch paper with margins not less than one inch on every side. Use Times New Roman typeface, a black font color, and a font size of 12 points or larger (except in figures and tables).
- 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.

ARPA-E may not review or consider noncompliant Replies to Reviewer Comments (see Section IV.E of the FOA). ARPA-E will review and consider each compliant and responsive Concept Paper and Full Application, even if no Reply is submitted or if the Reply is found to be noncompliant.

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

SECTION	PAGE LIMIT	DESCRIPTION
Text	2 pages maximum	Applicants may respond to one or more reviewer comments or supplement their Concept Paper or Full Application.
Images	1 page maximum	Applicants may provide graphs, charts, or other data to respond to reviewer comments or supplement their Concept Paper or Full Application.

F. INTERGOVERNMENTAL REVIEW

This program is not subject to Executive Order 12372 (Intergovernmental Review of Federal Programs).

G. FUNDING RESTRICTIONS

1. ALLOWABLE COSTS

All expenditures must be allowable, allocable, and reasonable in accordance with the applicable Federal cost principles. Pursuant to 2 C.F.R. § 910.352, the cost principles in the Federal Acquisition Regulations (48 C.F.R. Part 31.2) apply to for-profit entities. The cost principles contained in 2 C.F.R. Part 200, Subpart E apply to all entities other than for-profit entities.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

2. PRE-AWARD COSTS

ARPA-E will not reimburse any pre-award costs incurred by Applicants before they are selected for award negotiations. Please refer to Section VI.A of the FOA for guidance on award notices.

Upon selection for award negotiations, Applicants may incur pre-award costs at their own risk, consistent with the requirements in 2 C.F.R. Part 200, as modified by 2 C.F.R. Part 910, and other Federal laws and regulations. ARPA-E generally does not accept budgets as submitted with the Full Application. Budgets are typically reworked during award negotiations. ARPA-E is under no obligation to reimburse pre-award costs if, for any reason, the Applicant does not receive an award or the award is made for a lesser amount than the Applicant expected, or if the costs incurred are not allowable, allocable, or reasonable.

3. PATENT COSTS

For Subject Inventions disclosed to DOE under an award, ARPA-E will reimburse the Prime Recipient – in addition to allowable costs associated with Subject Invention disclosures, up to \$50,000 of expenditures for filing and prosecution of United States patent applications, including international applications (“PCT application”) submitted to the United States Patent and Trademark Office (USPTO).

The Prime Recipient may request a waiver of the \$50,000 cap.

4. FOREIGN TRAVEL

ARPA-E generally does not fund projects that involve foreign travel. Recipients are required to obtain written authorization from the authorized ARPA-E Official before incurring any foreign travel costs and provide trip reports with their reimbursement requests.

5. PERFORMANCE OF WORK IN THE UNITED STATES

ARPA-E strongly encourages interdisciplinary and cross-sectoral collaboration spanning organizational boundaries. Such collaboration enables the achievement of scientific and technological outcomes that were previously viewed as extremely difficult, if not impossible.

ARPA-E requires all work under ARPA-E funding agreements to be performed in the United States – i.e., Prime Recipients must expend 100% of the Total Project Cost in the United States. However, Applicants may request a waiver of this requirement where their project would materially benefit from, or otherwise requires, certain work to be performed overseas.

Applicants seeking a waiver of this requirement are required to include an explicit request in

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the Business Assurances & Disclosures Form, which is part of the Full Application submitted to ARPA-E. Such waivers are granted where there is a demonstrated need, as determined by ARPA-E.

6. PURCHASE OF NEW EQUIPMENT

All equipment purchased under ARPA-E funding agreements must be made or manufactured in the United States, to the maximum extent practicable. This requirement does not apply to used or leased equipment. Prime Recipients are required to notify the ARPA-E Contracting Officer reasonably in advance of any single purchase of equipment items that are not made or manufactured in the United States with a total acquisition cost of \$250,000 or greater. The ARPA-E Contracting Officer will provide consent to purchase or reject within 30 calendar days of receipt of the Recipient's notification.

7. LOBBYING

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

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

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

8. CONFERENCE SPENDING

Prime Recipients and Subrecipients may not use any Federal funds to:

- Defray the cost to the United States Government of a conference held by any Executive branch department, agency, board, commission, or office which is not directly and programmatically related to the purpose for which their ARPA-E award is made and for which the cost to the United States Government is more than \$20,000; or

To circumvent 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 a conference.

9. INDEPENDENT RESEARCH AND DEVELOPMENT COSTS

ARPA-E does not fund Independent Research and Development (IR&D) as part of an indirect cost rate under its financial assistance awards. IR&D, as defined at FAR 31.205-18(a), includes cost of effort that is not sponsored by an assistance agreement or required in performance of a contract, and that consists of projects falling within the four following areas: (i) basic research, (ii) applied research, (iii) development, and (iv) systems and other concept formulation studies.

ARPA-E's goals are to enhance the economic and energy security of the United States through the development of energy technologies and ensure that the United States maintains a technological lead in developing and deploying advanced energy technologies. ARPA-E accomplishes these goals by providing financial assistance for energy technology projects and has well recognized and established procedures for supporting research through competitive financial assistance awards based on merit review of proposed projects. Reimbursement for independent research and development costs through the indirect cost mechanism could circumvent this competitive process.

To ensure that all projects receive similar and equal consideration, eligible organizations may compete for direct funding of independent research projects they consider worthy of support by submitting proposals for those projects to ARPA-E. Since proposals for these projects may be submitted for direct funding, costs for independent research and development projects are not allowable as indirect costs under ARPA-E awards. IR&D costs, however, would still be included in the direct cost base that is used to calculate the indirect rate so as to ensure an appropriate allocation of indirect costs to the organization's direct cost centers.

10. PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT

Per 2 C.F.R. § 200.216, recipients and subrecipients are prohibited from obligating or expending grant funds to: (1) procure or obtain; (2) extend or renew a contract to procure or obtain; or (3) 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 Public Law 115–232, section 889, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE

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Corporation (or any subsidiary or affiliate of such entities). Refer to 2 C.F.R. § 200.216 for possible additional prohibitions and limitations.

H. OTHER SUBMISSION REQUIREMENTS

1. USE OF ARPA-E eXCHANGE

To apply to this FOA, Applicants must register with ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov/Registration.aspx>). Concept Papers, Full Applications, and Replies to Reviewer Comments must be submitted through ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov/login.aspx>). ARPA-E will not review or consider applications submitted through other means (e.g., fax, hand delivery, email, postal mail). For detailed guidance on using ARPA-E eXCHANGE, please refer to the “ARPA-E eXCHANGE Applicant Guide” (<https://arpa-e-foa.energy.gov/Manuals.aspx>).

Upon creating an application submission in ARPA-E eXCHANGE, Applicants will be assigned a Control Number. Applicants will receive a single Control Number for the Applicant Phase of the SCALEUP 2021 FOA. A control number format is 4 digits + “-” plus 4 digits (ex. 1015 – 1355) and is different than an ARPA-E award or work authorization number. Note: Applicant organizations may only submit one Concept Paper and Full Application per Subject Invention to this FOA. Any supplemental or related subject invention disclosures may be referenced in the Project Plan Workbook.

Once logged in to ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov/login.aspx>), Applicants may access their submission by clicking the “My Submissions” link in the navigation on the left side of the page. Every application that the Applicant has submitted to ARPA-E and the corresponding Control Number is displayed on that page. If the Applicant submits more than one application to a particular FOA, a different Control Number is shown for each application.

Applicants are responsible for meeting all submission deadline in ARPA-E eXCHANGE.

Applicants are strongly encouraged to submit their applications at least 48 hours in advance of the submission deadline. Under normal conditions (i.e., at least 48 hours in advance of the submission deadline), Applicants should allow at least 1 hour to submit a Full Application. In addition, Applicants should allow at least 15 minutes to submit a Reply to Reviewer Comments.

Applicants should not wait until the last minute to begin the submission process. During the final hours before the submission deadline, Applicants may experience server/connection congestion that prevents them from completing the necessary steps in ARPA-E eXCHANGE to submit their applications. Once the application is submitted in ARPA-E eXCHANGE, Applicants may revise or update their application until the expiration of the applicable deadline. **ARPA-E**

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

will not extend the submission deadline for Applicants that fail to submit required information and documents due to server/connection congestion.

ARPA-E may not review or consider incomplete applications and applications received after the deadline stated in the FOA. Such applications may be deemed noncompliant (see Section III.D of the FOA). Following is the entire list of errors could cause an application to be deemed “incomplete” and thus noncompliant:

- Failing to comply with the format and content requirements in Section IV of the FOA;
- Failing to enter required information in ARPA-E eXCHANGE;
- Failing to complete all required documents (including the Team Pitch Video) and comply with submission length requirements, as specified in the Application Documents;
- Failing to upload required document(s) to ARPA-E eXCHANGE;
- Failing to click the “Submit” button in ARPA-E eXCHANGE by the deadline stated in the FOA;
- Uploading the wrong document(s) or application(s) to ARPA-E eXCHANGE; and
- Uploading the same document twice, but labeling it as different documents. (In other words, failing to submit a required document.)

ARPA-E urges Applicants to carefully review their applications and to allow sufficient time for the submission of required information and documents.

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V. APPLICATION REVIEW INFORMATION

A. CRITERIA

ARPA-E performs an initial review of Concept Papers and Full Applications to determine whether they are compliant and responsive (see Section III.D of the FOA). ARPA-E also performs a preliminary review of Replies to Reviewer Comments to determine whether they are compliant.

These criteria will be used to evaluate Applications at every stage of the process.

1. CRITERIA FOR CONCEPT PAPERS AND FULL APPLICATIONS

(1) *Project Feasibility and Technical Merit* (33.33%) - This criterion involves consideration of the following subject matter, but shall not be considered or interpreted as subfactors to be separately scored:

- The problem to be addressed, technology scaling challenges, and timeline for the proposed project;
- How R&D activities subsequent to the original ARPA-E award have helped mitigate any technical and business risks;
- Whether the technology is ready for immediate scaling, and that successful project completion will result in a commercially investable system, product, or service;
- Whether clearly defined, and reasonable, budget and timelines with project outcomes, tasks, milestones, Go/No Go Decision Points, and final deliverables have been proposed;
- Whether necessary intellectual property (IP) rights exist or can be obtained, and well-defined pathways for strengthening the IP position throughout the proposed project have been proposed;
- Whether key risk areas for the project and technology, and freedom to operate, including a comprehensive mitigation strategy to be implemented during and following the completion of the project, have been identified and proposed;
- Whether justification to support the goals and objectives of the proposed project

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

have been identified, and are likely, from a technical perspective, to achieve the identified performance, yield, conversion, throughput, scale, cost, and/or efficiency metrics, etc. of the proposed project;

- The sufficiency of the detailed techno-economic analysis, including major cost factors and performance metrics; and
- The sufficiency of the Project Plan used to manage people and resources to successfully complete the proposed project with appropriate allocation levels.

(2) *Commercial Viability, Strategy, and Impact* (33.33%) - This criterion involves consideration of the following subject matter, but shall not be considered or interpreted as subfactors to be separately scored :

- How the goals and objectives of the proposed project are likely to lead to commercialization of the technology;
- How well the path to market approach addresses both immediate and long-term commercialization factors;
- The significance of the technology's value proposition compared to existing solutions;
- Evidence of previous market validation efforts with findings that support a path to market and the proposed project goals and objectives;
- Sufficiency of supply chain and distribution channel pathways demonstrating compelling knowledge of existing channel availability and known gaps;
- Significance of the technology's value proposition as it applies to the proposed customer(s) and/or end-user(s);
- Potential commercialization risk areas and forward-looking mitigation strategies; and
- Extent to which the commercialized technology will reduce greenhouse gas emissions, in addition to the technology's impact on at least one of ARPA-E's mission

areas in Section I.A of the FOA.

(3) *Project Team Qualifications, Experience, and Capabilities* (33.33%) - This criterion involves consideration of the following subject matter, but shall not be considered or interpreted as subfactors to be separately scored:

- Capabilities of the individuals performing the project, the key capabilities of the organizations comprising the Project Team, the roles and responsibilities of each organization supporting the proposed project, and demonstrated capabilities to advance the project to completion, as evidenced by:
 - A record of successful scale-up and commercialization of new technologies;
 - The ability to collect and analyze data, manage unexpected contingencies, and troubleshoot problems.
- Sufficiency of plans to access the equipment and facilities necessary to accomplish the proposed scaling effort and/or a clear plan to obtain access to necessary equipment and facilities;
- Commitment of Commercialization and Financial Partner(s) that will help enable the success of the project and ultimately the technology.
- Ability of the project team to clearly/succinctly communicate and describe the technical/commercial vision, including communication abilities demonstrated in the required video presentation.
- Applicants' previous work with ARPA-E. Applicants lack of prior work experience with ARPA-E (e.g. licensees of ARPA-E subject inventions) will not be disadvantaged for this subfactor.

Submissions will not be evaluated against each other since they are not submitted in accordance with a common work statement. The above criteria will be weighted as follows:

Project Feasibility and Technical Merit	33.33%
Commercial Viability, Strategy, and Impact	33.33%
Project Team Qualifications, Experience, and Capabilities	33.33%

2. CRITERIA FOR REPLIES TO REVIEWER COMMENTS

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

ARPA-E has not established separate criteria to evaluate Replies to Reviewer Comments. Instead, Replies to Reviewer Comments are evaluated as an extension of the Full Application.

3. CRITERIA FOR ORAL PRESENTATIONS

ARPA-E has not established separate criteria to evaluate the Oral Presentation. Instead, the Oral Presentation is evaluated as an extension of the Full Application.

B. REVIEW AND SELECTION PROCESS

1. PROGRAM POLICY FACTORS

In addition to the above criteria, ARPA-E may consider the following program policy factors in determining which Concept Papers to encourage to submit a Full Application and which Finalists to select for award negotiations:

- I. **ARPA-E Portfolio Balance.** Project balances ARPA-E portfolio in one or more of the following areas:
 - a. Diversity of technical personnel in the proposed Project Team;
 - b. Technological diversity;
 - c. Organizational diversity;
 - d. Geographic diversity;
 - e. Technical, team, or commercialization risk; or
 - f. Stage of technology development.
- II. **Relevance to ARPA-E Mission Advancement.** Project contributes to one or more of ARPA-E's key statutory goals:
 - a. Reduction of U.S. dependence on foreign energy sources;
 - b. Stimulation of U.S. manufacturing and/or software development
 - c. Reduction of energy-related emissions;
 - d. Increase in U.S. energy efficiency;
 - e. Enhancement of U.S. economic and energy security; or
 - f. Promotion of U.S. advanced energy technologies competitiveness.
- III. **Synergy of Public and Private Efforts.**
 - a. Avoids duplication and overlap with other publicly or privately funded projects;

- b. Promotes increased coordination with nongovernmental entities for demonstration of technologies and research applications to facilitate technology transfer; or
 - c. Increases unique research collaborations.
- IV. **Low likelihood of other sources of funding.** High technical and/or financial uncertainty that results in the non-availability of other public, private, or internal funding or resources to support the project.
- V. **High-Leveraging of Federal Funds.** Project leverages Federal funds to optimize advancement of programmatic goals by proposing cost share above the required minimum or otherwise accessing scarce or unique resources.
- VI. **High Project Impact Relative to Project Cost.**
- VII. **Qualified Opportunity Zone (QOZ).** Whether the entity is located in an urban and economically distressed area including a Qualified Opportunity Zone (QOZ) or the proposed project will occur in a QOZ or otherwise advance the goals of QOZ. The goals include spurring economic development and job creation in distressed communities throughout the United States. For a list or map of QOZs go to:
<https://www.cdfifund.gov/Pages/Opportunity-Zones.aspx>.

2. ARPA-E REVIEWERS

By submitting an application to ARPA-E, Applicants consent to ARPA-E's use of Federal employees, contractors, and experts from educational institutions, nonprofits, industry, and governmental and intergovernmental entities as reviewers. ARPA-E selects reviewers based on their knowledge and understanding of the relevant field and application, their experience and skills, and their ability to provide constructive feedback on applications.

ARPA-E requires all reviewers to complete a Conflict-of-Interest Certification and Nondisclosure Agreement through which they disclose their knowledge of any actual or apparent conflicts and agree to safeguard confidential information contained in Concept Papers, Full Applications, Replies to Reviewer Comments, and Oral Presentations. In addition, ARPA-E trains its reviewers in proper evaluation techniques and procedures.

Applicants are not permitted to nominate reviewers for their applications. Applicants may contact the Contracting Officer by email (ARPA-E-CO@hq.doe.gov) if they have knowledge of a potential conflict of interest or a reasonable belief that a potential conflict exists.

3. ARPA-E SUPPORT CONTRACTOR

ARPA-E utilizes contractors to assist with the evaluation of applications and project management. To avoid actual and apparent conflicts of interest, ARPA-E prohibits its support contractors from submitting or participating in the preparation of applications to ARPA-E.

By submitting an application to ARPA-E, Applicants represent that they are not performing support contractor services for ARPA-E in any capacity and did not obtain the assistance of ARPA-E's support contractor to prepare the application. ARPA-E will not consider any applications that are submitted by or prepared with the assistance of its support contractors.

C. ANTICIPATED ANNOUNCEMENT AND AWARD DATES

ARPA-E expects to announce selections for award negotiations in approximately August 2022 and to award funding agreements in approximately December 2022.

D. AWARD NOTICES

1. REJECTED SUBMISSIONS

Noncompliant and nonresponsive Concept Papers and Full Applications are rejected by the Contracting Officer and are not merit reviewed or considered for award. The Contracting Officer sends a notification letter by email to the technical and administrative points of contact designated by the Applicant in ARPA-E eXCHANGE. The notification letter states the basis upon which the Concept Paper or Full Application was rejected.

2. CONCEPT PAPER NOTIFICATIONS

ARPA-E promptly notifies Applicants of its determination to encourage or discourage the submission of a Full Application. ARPA-E sends a notification letter by email to the technical and administrative points of contact designated by the Applicant in ARPA-E eXCHANGE. ARPA-E provides feedback in the notification letter in order to guide further development of the proposed technology.

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, ARPA-E intends to convey its lack of programmatic interest in the proposed project. Such assessments do not necessarily

reflect judgments on the merits of the proposed project. The purpose of the Concept Paper phase is to save Applicants the considerable time and expense of preparing a Full Application that is unlikely to be selected for award negotiations.

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

3. FULL APPLICATION – FINALIST NOTIFICATIONS/ORAL PRESENTATION INVITATION

ARPA-E will promptly notify Applicants of its Finalist determinations. ARPA-E sends a notification letter by email to the technical and administrative points of contact designated by the Applicant in ARPA-E eXCHANGE. The notification letter may inform Applicants that their Full Application was selected as a Finalist, or not selected.

Written feedback on Full Applications is made available to Applicants before the submission deadline for Replies to Reviewer Comments. By providing feedback, ARPA-E intends to guide the further development of the proposed technology and to provide a brief opportunity to respond to reviewer comments.

As part of the evaluation and selection process, ARPA-E will invite Finalists to provide an Oral Presentation. ARPA-E will arrange to meet with the invited Finalists in person at the ARPA-E offices or a mutually agreed upon location. Alternatively, ARPA-E may invite certain Finalists and their proposed Commercialization Partners to present to ARPA-E via webinar, videoconference, or conference call.

Finalist will have a minimum of 2 weeks from receipt of the invitation letter to prepare for and complete the Oral Presentation. During the Oral Presentation, Finalists will meet with ARPA-E representatives to present the contents of the Full Application and provide ARPA-E an opportunity to ask questions regarding the proposed project. The information provided by Finalists to ARPA-E through the Oral Presentation contributes to ARPA-E's selection decisions.

4. SELECTION NOTIFICATIONS

a. SUCCESSFUL FINALISTS

ARPA-E will promptly notify Finalists of its selections for award negotiations. ARPA-E sends a notification letter by email to the technical and administrative points of contact designated by the Applicant in ARPA-E eXCHANGE. The notification letter may inform Finalists that they were

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

selected for an ARPA-E award or not selected. Alternatively, ARPA-E may notify one or more Finalists that their selection determination will be made at a later date, subject to the availability of funds and other factors.

ARPA-E has discretion to select all or part of a proposed project for negotiation of an award. A notification letter selecting a Finalist for award negotiations does not authorize the Finalist to commence performance of the project. **ARPA-E selects Finalists for award negotiations, not for award.** Finalists do not receive an award until award negotiations are complete and the Contracting Officer executes the funding agreement. ARPA-E may terminate award negotiations at any time for any reason.

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

b. POSTPONED SELECTION DETERMINATIONS

A notification letter postponing a final selection determination until a later date does not authorize the Finalist to commence performance of the project. ARPA-E may ultimately determine to select or not select the Finalist for award negotiations.

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

c. NON-SELECTION OF FINALISTS

By not selecting a Finalist, ARPA-E 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. ARPA-E hopes that unsuccessful Finalists will submit innovative ideas and concepts for future FOAs.

E. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS

The following administrative and national policy requirements apply to Prime Recipients. The Prime Recipient is 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 a FFRDC contractor. Prime Recipients are required to flow down these requirements to their Subrecipients through subawards or related agreements.

1. DUNS NUMBER AND SAM, FSRS, AND FEDCONNECT REGISTRATIONS

Prime Recipients and Subrecipients are required to obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number at <http://fedgov.dnb.com/webform> and to register with the

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System for Award Management (SAM) at <https://www.sam.gov/SAM/> and obtain a Unique Entity Identifier.

Prime Recipients and Subrecipients should commence this process as soon as possible in order to expedite the execution of a funding agreement. Obtaining a DUNS number and registering with SAM could take several weeks.

Prime Recipients are also required to register with the Federal Funding Accountability and Transparency Act Subaward Reporting System (FSRS) at <https://www.fsrs.gov/>.¹⁹ Prime Recipients are required to report to FSRS the names and total compensation of each of the Prime Recipient's five most highly compensated executives and the names and total compensation of each Subrecipient's five most highly compensated executives. Please refer to <https://www.fsrs.gov/> for guidance on reporting requirements.

ARPA-E may not execute a funding agreement with the Prime Recipient until it has obtained a DUNS number and completed its SAM and FSRS registrations. In addition, the Prime Recipient may not execute subawards with Subrecipients until they obtain a DUNS number and complete their SAM registration. Prime Recipients and Subrecipients are required to keep their SAM and FSRS data current throughout the duration of the project.

Finally, Prime Recipients are required to register with FedConnect in order to receive notification that their funding agreement has been executed by the Contracting Officer and to obtain a copy of the executed funding agreement. Please refer to <https://www.fedconnect.net/FedConnect/> for registration instructions.

2. NATIONAL POLICY ASSURANCES

Project Teams, including Prime Recipients and Subrecipients, are required to comply with the National Policy Assurances attached to their funding agreement in accordance with 2 C.F.R. 200.300. Please refer to Attachment 6 of ARPA-E's Model Cooperative Agreement (<https://arpa-e.energy.gov/?q=site-page/funding-agreements>) for information on the National Policy Assurances.

3. PROOF OF COST SHARE COMMITMENT AND ALLOWABILITY

Upon selection for award negotiations, the Prime Recipient must confirm in writing that the proposed cost share contribution is allowable in accordance with applicable Federal cost principles.

¹⁹ The Federal Funding Accountability and Transparency Act, P.L. 109-282, 31 U.S.C. 6101 note.

The Prime Recipient is also required to provide cost share commitment letters from Subrecipients or third parties that are providing cost share, whether cash or in-kind. Each Subrecipient or third party that is contributing cost share must provide a letter on appropriate letterhead that is signed by an authorized corporate representative.

4. COST SHARE PAYMENTS

All proposed cost share contributions must be reviewed in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred. (Refer to Section III.C of the FOA for guidance on cost share requirements.)

Minimum cost share payments must be provided on the following schedule:

- a. Cost share is deferred for approximately the first year of the awarded project, specifically: the period beginning on the agreement's effective date and ending on the date on which the Prime Recipient incurs costs in an amount equal to 1/3rd of the estimated Total Project Costs as shown in the approved award budget.
- b. Thereafter, Prime Recipients subject to the Base Cost Share requirement set forth in Section III.C.2 of the FOA will share 33.3% of all ~~remaining~~ project costs incurred, including cost share deferred during the first third of the project.
- c. Prime Recipients subject to the Reduced Cost Share requirement set forth in Section III.C.3 of the FOA will share 20% of all project costs incurred.
- d. For b. immediately above,
 - The entirety of the cost share owed for the expended award project costs must be paid by the end of the award POP or at earlier termination. That is, if the award is terminated at, for example, 18-months, the cost share for the 18-month period must be contributed/paid by the recipient.
 - The Prime Recipient is required to pay the cost share amount as a percentage of the total project costs in each invoice period in which it is due.

Applicants selected for award negotiations may propose alternate cost share payment schedules. Proposed alternate schedules must not, at any time during the proposed period of performance, result in cumulative cost share payments less than the amount resulting from application of the minimum payment schedule above. At the agreement's conclusion (i.e., award expiration or termination), the Prime Recipient is required to pay its share (i.e., percentage) of the Total Project Cost incurred to date as of the termination or end date of the award.

ARPA-E may deny reimbursement requests, in whole or in part, or modify or terminate funding agreements where Prime Recipients (or Project Teams) fail to comply with ARPA-E's cost share payment requirements.

5. ENVIRONMENTAL IMPACT QUESTIONNAIRE

By law, ARPA-E is required to evaluate the potential environmental impact of projects that it is considering for funding. In particular, ARPA-E must determine before funding a project whether the project qualifies for a categorical exclusion under 10 C.F.R. § 1021.410 or whether it requires further environmental review (i.e., an environmental assessment or an environmental impact statement).

To facilitate and expedite ARPA-E's environmental review, Prime Recipients are required to complete an Environmental Impact Questionnaire during award negotiations. This form is available at <https://arpa-e.energy.gov/technologies/project-guidance/pre-award-guidance/required-forms-and-templates>. The Environmental Impact Questionnaire is due within 21 calendar days of the selection announcement.

6. INTELLECTUAL PROPERTY AND DATA MANAGEMENT PLANS

ARPA-E requires every Project Team to negotiate and establish an Intellectual Property Management Plan for the management and disposition of intellectual property arising from the project. The Prime Recipient must submit a completed and signed Intellectual Property Management plan to ARPA-E within six weeks of the effective date of the ARPA-E funding agreement. All Intellectual Property Management Plans are subject to the terms and conditions of the ARPA-E funding agreement and its intellectual property provisions, and applicable Federal laws, regulations, and policies, all of which take precedence over the terms of Intellectual Property Management Plans.

ARPA-E has developed a template for Intellectual Property Management Plans (<https://arpa-e.energy.gov/technologies/project-guidance/post-award-guidance/project-management-reporting-requirements>) so as to facilitate and expedite negotiations between Project Team members. ARPA-E does not mandate the use of this template. ARPA-E and DOE do not make any warranty (express or implied) or assume any liability or responsibility for the accuracy, completeness, or usefulness of the template. ARPA-E and DOE strongly encourage Project Teams to consult independent legal counsel before using the template.

Awardees are also required, post-award, to submit a Data Management Plan (DMP) that addresses how data generated in the course of the work performed under an ARPA-E award will be preserved and, as appropriate, shared publicly. The Prime Recipient must submit a completed and signed DMP as part of the Team's Intellectual Property Management Plan to ARPA-E within six weeks of the effective date of the ARPA-E funding agreement.

7. U.S. COMPETITIVENESS

A primary objective of DOE's multi-billion dollar research, development, and demonstration investments – including ARPA-E awards - is advancement of new energy technologies, 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. The following requirement is intended to apply to both subject inventions made under a new SCALEUP (2021) award and to the subject inventions made under prior awards that are to be advanced under the new SCALEUP (2021) award. A "Confirmatory License" confirming application of the following obligation and the other retained rights of the Government will be required of all awardees.

U.S. Competitiveness

The Contractor (Prime Recipient in ARPA-E awards) 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 Contractor 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 manner, e.g., alternative binding commitments to provide an overall net benefit to the U.S. economy. The Contractor 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 Contractor 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 Contractor 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 Contractor will include this paragraph in all subawards/contracts, regardless of tier, for experimental, developmental or research work.

A subject invention is any invention of the contractor conceived or first actually reduced to practice in the performance of work under an award. An invention is any invention or

discovery which is or may be patentable. The contractor includes any awardee, recipient, sub-awardee, or sub-recipient.

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 VII.A, "Title to Subject Inventions", of this FOA for more information on the DEC and DOE Patent Waiver.

8. CORPORATE FELONY CONVICTIONS AND FEDERAL TAX LIABILITY

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

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

For purposes of these representations the following definitions apply: A Corporation includes any entity that has filed articles of incorporation in any of the 50 states, the District of Columbia, or the various territories of the United States (but not foreign corporations). It includes both for-profit and nonprofit organizations.

9. APPLICANT RISK ANALYSIS

If selected for award negotiations, ARPA-E may evaluate the risks posed by the Applicant using the criteria set forth at 2 CFR §200.206(b)(ii). ARPA-E may require special award terms and conditions or terminate award negotiations depending upon results of the risk analysis.

10. RECIPIENT INTEGRITY AND PERFORMANCE MATTERS

Prior to making a Federal award, ARPA-E is required to review and consider any information about Applicants that is contained in the Office of Management and Budget's designated integrity and performance system accessible through SAM (currently the Federal Awardee Performance and Integrity Information System or FAPIIS) (41 U.S.C. § 2313 and 2 C.F.R. 200.206).

Applicants may review information in FAPIIS and comment on any information about itself that a Federal awarding agency previously entered into FAPIIS.

ARPA-E will consider any written comments provided by Applicants during award negotiations, in addition to the other information in FAPIIS, in making a judgment about an Applicant's integrity, business ethics, and record of performance under Federal awards when reviewing potential risk posed by Applicants as described in 2 C.F.R. §200.206.

11. NONDISCLOSURE AND CONFIDENTIALITY AGREEMENTS REPRESENTATIONS

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

- (1) **It does not and will not** require its employees or contractors to sign internal nondisclosure or confidentiality agreements or statements prohibiting or otherwise restricting its employees or contractors from lawfully reporting waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.
- (2) **It does not and will not** use any Federal funds to implement or enforce any nondisclosure and/or confidentiality policy, form, or agreement it uses unless it contains the following provisions:
 - a. *"These provisions are consistent with and do not supersede, conflict with, or otherwise alter the employee obligations, rights, or liabilities created by existing statute or Executive order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule,*

or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive orders and statutory provisions are incorporated into this agreement and are controlling.”

- b. The limitation above shall not contravene requirements applicable to Standard Form 312, Form 4414, or any other form issued by a Federal department or agency governing the nondisclosure of classified information.
- c. Notwithstanding provision listed in paragraph (a), a nondisclosure 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 disclosure 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.

F. REPORTING

Recipients are required to submit periodic, detailed reports on technical, financial, and other aspects of the project, as described in Attachment 4 to ARPA-E's Model Cooperative Agreement (<https://arpa-e.energy.gov/technologies/project-guidance/pre-award-guidance/funding-agreements>).

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VI. AGENCY CONTACTS

A. COMMUNICATIONS WITH ARPA-E

Upon the issuance of a FOA, only the Contracting Officer may communicate with Applicants. ARPA-E personnel and our support contractors are prohibited from communicating (in writing or otherwise) with Applicants regarding the FOA. This “quiet period” remains in effect until ARPA-E’s public announcement of its project selections for award negotiations.

During the “quiet period,” Applicants are required to submit all questions regarding this FOA to ARPA-E-CO@hq.doe.gov. Questions and Answers (Q&As) about ARPA-E and the FOA are available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, please send an email with the FOA name and number in the subject line to ARPA-E-CO@hq.doe.gov. Due to the volume of questions received, ARPA-E will only answer pertinent questions that have not yet been answered and posted at the above link.

- ARPA-E will post responses on a weekly basis to any questions that are received that have not already been addressed at the link above. ARPA-E may re-phrase questions or consolidate similar questions for administrative purposes.
- ARPA-E will cease to accept questions approximately 10 business days in advance of each submission deadline. Responses to questions received before the cutoff will be posted approximately three (3) business day in advance of the submission deadline. ARPA-E may re-phrase questions or consolidate similar questions for administrative purposes.
- Responses are published in a document specific to this FOA under “CURRENT FUNDING OPPORTUNITIES – FAQs” on ARPA-E’s website (<http://arpa-e.energy.gov/faq>).

Applicants may submit questions regarding ARPA-E eXCHANGE, ARPA-E’s online application portal, to ExchangeHelp@hq.doe.gov. ARPA-E will promptly respond to emails that raise legitimate, technical issues with ARPA-E eXCHANGE. ARPA-E will refer any questions regarding the FOA to ARPA-E-CO@hq.doe.gov.

ARPA-E will not accept or respond to communications received by other means (e.g., fax, telephone, mail, hand delivery). Emails sent to other email addresses will be disregarded.

During the “quiet period,” only the Contracting Officer may authorize communications between ARPA-E personnel and Applicants. The Contracting Officer may communicate with Applicants as

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necessary and appropriate. As described in Section IV.A.6 of the FOA, the Contracting Officer may arrange pre-selection meetings and/or site visits during the “quiet period.”

B. DEBRIEFINGS

ARPA-E does not offer or provide debriefings. ARPA-E provides Applicants with a notification encouraging or discouraging the submission of a Full Application based on ARPA-E’s assessment of the Concept Paper. In addition, ARPA-E provides Applicants with reviewer comments on Full Applications before the submission deadline for Replies to Reviewer Comments.

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VII. OTHER INFORMATION

A. 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 subject inventions unless a waiver is granted (see below):
 - Class Patent Waiver for Domestic Large Businesses: DOE has issued a class patent waiver that applies to this FOA. Under this class patent waiver, domestic large businesses may elect title to their subject inventions similar to the right provided to the domestic small businesses, educational institutions, and nonprofits by law. In order to avail itself of the class patent waiver, a domestic large business must agree to the U.S. Competitiveness Provision in accordance with Section V.E.7 of the FOA.
 - Advance and Identified Waivers: For applicants that do not fall under the class patent waiver or the Bayh-Dole Act, those applicants may request a patent waiver that will cover subject inventions that may be made 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 DOE within the time frames 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 made to a Bayh-Dole entity (domestic small businesses and nonprofit organizations) shall include the U.S. Competitiveness Provision in accordance with Section V.E.7 of the FOA. A copy of the DEC may be found on the DoE website. Pursuant to 37 CFR § 401.4, any Bayh-Dole entity affected by this 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.

B. GOVERNMENT RIGHTS IN SUBJECT INVENTIONS

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

1. GOVERNMENT USE LICENSE

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

2. MARCH-IN RIGHTS

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

The U.S. Government may exercise its march-in rights 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 satisfactory manner;
- The owner has not met public use requirements specified by Federal statutes in a reasonably satisfactory manner; or
- The U.S. Manufacturing requirement has not been met.

C. 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.

- Background or “Limited Rights Data”: The U.S. Government will not normally require delivery of 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.
- Generated Data: The U.S. Government normally retains very broad 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 ARPA-E awards may be protected from public disclosure for up to five years in accordance with provisions that will be set forth 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.

D. PROTECTED PERSONALLY IDENTIFIABLE INFORMATION

Applicants may not include any Protected Personally Identifiable Information (Protected PII) in their submissions to ARPA-E. Protected PII is defined as data that, if compromised, could cause harm to an individual such as identity theft. Listed below are examples of Protected PII that Applicants must not include in their submissions.

- Social Security Numbers in any form;
- Place of Birth associated with an individual;
- Date of Birth associated with an individual;
- Mother’s maiden name associated with an individual;
- Biometric record associated with an individual;
- Fingerprint;
- Iris scan;
- DNA;
- Medical history information associated with an individual;
- Medical conditions, including history of disease;
- Metric information, e.g., weight, height, blood pressure;
- Criminal history associated with an individual;
- Ratings;
- Disciplinary actions;
- Performance elements and standards (or work expectations) are PII when they are so intertwined with performance appraisals that their disclosure would reveal an individual’s performance appraisal;
- Financial information associated with an individual;
- Credit card numbers;

- Bank account numbers; and
- Security clearance history or related information (not including actual clearances held).

E. FOAs AND FOA MODIFICATIONS

FOAs are posted on ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov/>), Grants.gov (<http://www.grants.gov/>), and FedConnect (<https://www.fedconnect.net/FedConnect/>). Any modifications to the FOA are also posted to these websites. You can receive an e-mail when a modification is posted by registering with FedConnect as an interested party for this FOA. It is recommended that you register as soon as possible after release of the FOA to ensure that you receive timely notice of any modifications or other announcements. More information is available at <https://www.fedconnect.net>.

F. OBLIGATION OF PUBLIC FUNDS

The Contracting Officer is the only individual who can make awards on behalf of ARPA-E or obligate ARPA-E to the expenditure of public funds. A commitment or obligation by any individual other than the Contracting Officer, either explicit or implied, is invalid.

ARPA-E awards may not be transferred, assigned, or assumed without the prior written consent of a Contracting Officer.

G. REQUIREMENT FOR FULL AND COMPLETE DISCLOSURE

Applicants are required to make a full and complete disclosure of the information requested in the Business Assurances & Disclosures Form. Disclosure of the requested information is mandatory. Any failure to make a full and complete disclosure of the requested information may result in:

- The rejection of a Concept Paper, Full Application, and/or Reply to Reviewer Comments;
- 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

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

- Civil and/or criminal penalties.

H. RETENTION OF SUBMISSIONS

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

I. MARKING OF CONFIDENTIAL INFORMATION

ARPA-E will use data and other information contained in Concept Papers, Full Applications, and Replies to Reviewer Comments strictly for evaluation purposes.

Concept Papers, Full Applications, Replies to Reviewer Comments, 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 Concept Paper, Full Application, Reply to Reviewer Comments, or other submission must be marked as follows and identify the specific pages containing confidential, proprietary, or privileged information:

Notice of Restriction on Disclosure and Use of Data:

Pages [____] of this document may contain 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.

The header and footer of every page that contains confidential, proprietary, or privileged information must be marked as follows: "Contains Confidential, Proprietary, or Privileged Information Exempt from Public Disclosure." In addition, every line and paragraph containing proprietary, privileged, or trade secret information must be clearly marked with double brackets or highlighting.

J. COMPLIANCE AUDIT REQUIREMENT

A prime recipient organized as a for-profit entity expending \$750,000 or more of DOE funds in the entity's fiscal year (including funds expended as a Subrecipient) must have an annual compliance audit performed at the completion of its fiscal year. For additional information, refer to Subpart F of: (i) 2 C.F.R. Part 200, and (ii) 2 C.F.R. Part 910.

If an educational institution, nonprofit organization, or state/local government is either a Prime Recipient or a Subrecipient, and has expended \$750,000 or more of Federal funds in the entity's fiscal year, the entity must have an annual compliance audit performed at the completion of its fiscal year. For additional information refer to Subpart F of 2 C.F.R. Part 200.

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VIII. GLOSSARY

Applicant: The entity that submits the application to ARPA-E. In the case of a Project Team, the Applicant is the lead organization listed on the application.

Application: The entire submission received by ARPA-E, including the Concept Paper, Full Application, Reply to Reviewer Comments, and Small Business Grant Application (if applicable).

ARPA-E: Is the Advanced Research Projects Agency – Energy, an agency within the U.S. Department of Energy.

Commercialization Partner: Partners that make a contribution of cash, in-kind (e.g., a demonstration site, intellectual property, etc.) or via other justifiable means that will be integral to the success of the project. Commercialization Partners are expected to actively participate in the project.

Cost Sharing: Is the portion of project costs from non-Federal sources that are borne by the Prime Recipient (or non-Federal third parties on behalf of the Prime Recipient), rather than by the Federal Government.

Deliverable: A deliverable is the quantifiable goods or services that will be provided upon the successful completion of a project task or sub-task.

DOE: U.S. Department of Energy

DOE/NNSA: U.S. Department of Energy/National Nuclear Security Administration

Financial Partner: An investing organization willing to provide the Applicant with funding for the cost share contribution to the project.

FFRDCs: Federally Funded Research and Development Centers

FOA: Funding Opportunity Announcement

For-Profit Organizations (Other than Small Businesses) (or *large businesses*): Means entities organized for-profit other than small businesses as defined elsewhere in this Glossary.

GOCOs: U.S. Government Owned, Contractor Operated laboratories

Institutions of Higher Education (or *educational institutions*): Has the meaning set forth at 20 U.S.C. 1001.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

Milestone: A milestone is the tangible, observable measurement that will be provided upon the successful completion of a project task or sub-task.

Nonprofit Organizations (or *nonprofits*): Has the meaning set forth at 2 C.F.R. § 200.70.

Prime Recipient: The signatory to the funding agreement with ARPA-E.

Project Team: A Project Team consists of the Prime Recipient, Subrecipients, and others performing or otherwise supporting work under an ARPA-E funding agreement.

Small Business: Small businesses are domestically incorporated entities that meet the criteria established by the U.S. Small Business Administration's (SBA) "Table of Small Business Size Standards Matched to North American Industry Classification System Codes" (NAICS) (<http://www.sba.gov/content/small-business-size-standards>).

Standalone Applicant: An Applicant that applies for funding on its own, not as part of a Project Team.

Subject Invention: Any invention conceived or first actually reduced to practice under an ARPA-E funding agreement.

Task: A task is an operation or segment of the work plan that requires both effort and resources. Each task (or sub-task) is connected to the overall objective of the project, via the achievement of a milestone or a deliverable.

Total Project Cost: The sum of the Prime Recipient share and the Federal Government share of total allowable costs. The Federal Government share generally includes costs incurred by GOGOs, FFRDCs, and GOCOs.

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