Equitable, Affordable Solutions to Electrification

An American-Made Challenges Prize Supported by the U.S. Department of Energy

Prize Rules

Modification 1 - January 2022

Contents

Modification Summary

Date	Modifications
Revision 1 1/20/23	• Page 18 and 19: Changed the Phase 1 Concept paper from a publicly shared document to a private document.

Executive Summary

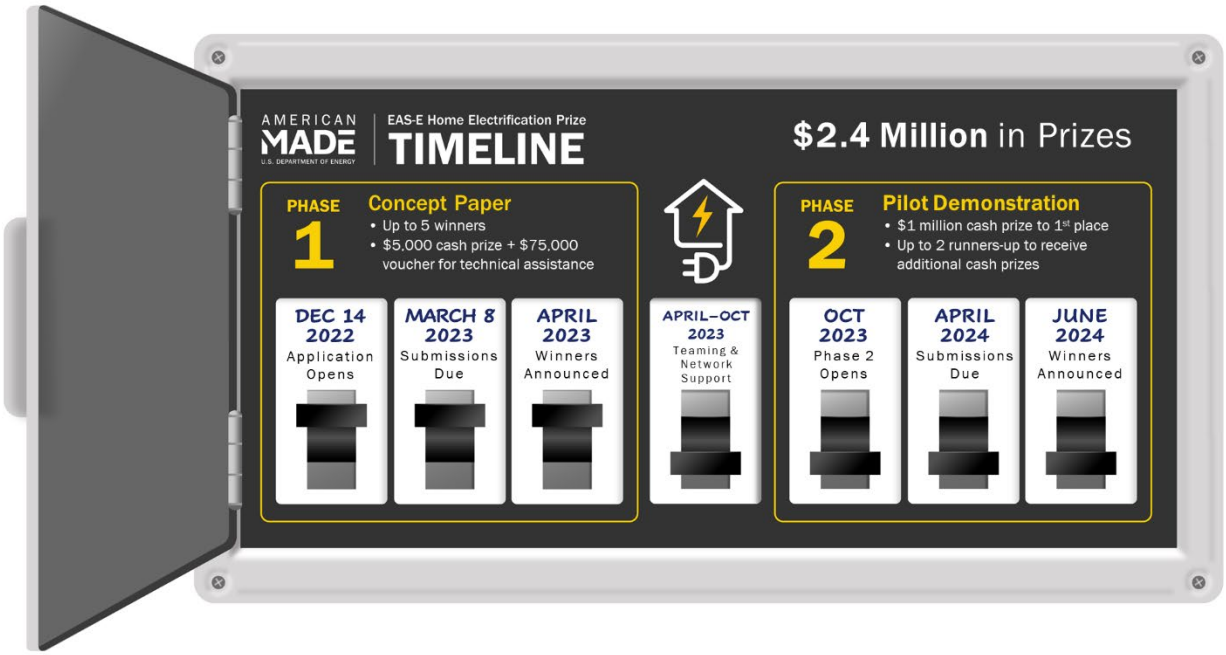
Building electrification is a decarbonization strategy that replaces combustion-based end uses (often for heating, transportation, or cooking) in homes with models that run on electricity. These electric end uses are more energy efficient, and when renewable generation sources such as wind or solar provide power to fully electrified buildings, emissions associated with operation are eliminated. However, the cost and complexities of whole-home electrification in some cases can be a barrier that slows widespread adoption by lower-income households, as well as those living in older homes and those located in colder climate regions.

The Equitable and Affordable Solutions to Electrification (EAS-E) Home Electrification Prize seeks innovative solutions that advance the affordability and accessibility of electrification retrofits in existing residential homes across all building types and geographies. The prize will support a suite of design solutions, tools, and/or technology innovations through early-stage pilots. Proposed solutions must address scale, impact, affordability, speed, ease, flexibility, novelty, rapid deployment, equitable benefits, and ideally provide multiple benefits at once. EAS-E Prize applicants can frame their proposed innovations against business-as-usual solutions for one or more baseline homes outlined in the rules, or develop their own electrification scenario relevant to their proposed innovations.

The EAS-E Home Electrification Prize consists of two phases (see timeline and award details below):

Phase 1. Concept Paper. Present an innovative solution that advances affordable home electrification. Compare the proposed solution(s) with current practice, document a capable team, identify market opportunities, outline risks, and describe intended Phase 2 demonstration plans.

Phase 2. Demonstration. Winning competitors from Phase 1 will finalize their teams, complete solution design documentation, evaluate the size of the potential market and the commercial viability of the solution, and demonstrate functional prototype solutions. With $75k in voucher support, pilot demonstrations must show that the solution is reliable and capable of broad application, and that it makes a substantial difference in the economic viability of electrifying the homes in question.


AMERICAN MADE
U.S. DEPARTMENT OF ENERGY
EAS-E Home Electrification Prize
TIMELINE
$2.4 Million in Prizes
PHASE 1
Concept Paper
• Up to 5 winners
• $5,000 cash prize + $75,000 voucher for technical assistance
DEC 14 2022
Application Opens
MARCH 8 2023
Submissions Due
APRIL 2023
Winners Announced
APRIL–OCT 2023
Teaming & Network Support
PHASE 2
Pilot Demonstration
• $1 million cash prize to 1st place
• Up to 2 runners-up to receive additional cash prizes
OCT 2023
Phase 2 Opens
APRIL 2024
Submissions Due
JUNE 2024
Winners Announced

1 EAS-E Home Electrification Prize Summary and Background

1.1 Prize Summary

The Equitable and Affordable Solutions to Electrification (EAS-E) Home[1] Electrification Prize provides up to $2.4 million in prizes for innovative solutions that advance electrification retrofits of existing residential homes across all building types and geographies. The EAS-E Home Electrification Prize is administered by the U.S. Department of Energy (DOE) Building Technologies Office (BTO), under the authority of the America Creating Opportunities for Manufacturing Pre-eminence in Technology and Economic Strength (COMPETES) Reauthorization Act of 2010, as amended (15 U.S.C. 3719). The goal of the EAS-E Prize is to support a suite of design solutions, tools, and/or technology innovations through early-stage pilot implementation that make electrification more affordable and accessible in existing U.S. homes. The prize consists of two phases: (1) Concept and (2) Demonstration. Upon completion of Phase 2, the awarded solutions will be nearly market ready, with anticipated deployment and scale-up occurring in the following 1–2 years. Figure 1 presents a summary of prize timeline and submissions requirements.

Competitors will propose electrification solutions that demonstrate significant system-level[2] advances in installation ease and affordability. Electrification solutions should consider the whole home, not just a single end use. Submissions should demonstrate novelty and cost improvements relative to current, commercially available solutions. "Novelty" can build off of existing solutions, but performance, utility, and/or market potential should be significantly expanded in response to the prize. The EAS-E Prize is structured to incentivize and advance innovative electrification retrofit solutions from concept to demonstration. Key objectives that proposed solutions must address in the prize are described in Table 1.

Table 1. Key Objectives for EAS-E Prize Solutions

Scale	Applicable to a large number of homes. Competitors must be able to estimate the number of households to which the proposed solution is applicable.
Impact	Substantially impacts the ease of retrofits, appliance upgrades, and/or load reduction. Demonstrated, for example, by estimating the magnitude of electric load reduction relative to standard practice.
Affordability	Affordable for the majority of homes relative to standard electrification practices. Affordability considerations may include the net monthly cost of ownership, financing approaches, and reductions in installation and/or operation costs.

[1] The term "home" is used throughout these rules to refer to residential households of all types (both owned and rented), including single- and multi-family buildings, along with manufactured homes.
[2] In this context, "system-level advances" refers to the need to optimize solutions across all end uses and relevant infrastructure in buildings rather than targeting end uses entirely independent of one another. For instance, load management may be needed when current draw to multiple end uses occurs simultaneously, or efficiency gains may be realized through sensing and coordination.

Speed	Faster to implement than current solutions. Solutions should facilitate rapid end-use electrification in homes, shortening time periods such as those attributable to third-party requirements, permits, supply chain, and inspections.
Ease	Simplifies the experience during installation and/or usage.
Flexibility	Can be applied across multiple end uses, housing types, climates, and configurations/situations.
Novelty	Offers performance and affordability that goes beyond existing commercial products or services, providing a clear advantage over business-as-usual solutions.
Rapid Deployment	Capable of rapid deployment by the close of the EAS-E Prize contest period, with consideration of workforce constraints for the technologies in question.
Equitable Benefits	Makes electrification easier in lower-income communities, not only through affordability but also by targeting solutions specific to dwellings more common in these communities.
Multiple Benefits	Provides more than one benefit. For example, load sharing to avoid panel replacement combined with time-of-use electricity pricing controls.

Through this prize, DOE aims to create more opportunities and successes for electrification of the U.S. housing stock, with a focus on equitable solutions for all homeowners. The innovations developed and launched in response to this prize will also benefit the broader housing retrofit market by advancing building electrification solutions that are fast, easy, and affordable. Both design solutions/tools and technology innovations are eligible for the prize. Low-power electrification solutions that limit the electricity demand of individual appliances or the whole home (e.g., by avoiding electrical panel upgrades or controlling coincident loads) are strongly encouraged, because of their potential benefits to the project cost, speed of installation, and wider grid impacts. DOE strongly encourages comprehensive solutions that address multiple components of affordable electrification, as reflected in the scoring criteria used for the prize. A panel of advisory reviewers will evaluate submissions. The final decision will be determined by BTO, based on input from the reviewers.

The EAS-E Home Electrification Prize consists of two phases:

Phase 1. Concept Paper. In this phase, competitors will present an innovative design and/or technology solution that advances affordable electrification (see all solution goals in Table 1) in a concept paper of up to 3,000 words. This phase is focused on presenting the proposed solution(s), comparing them with current practice, forming a capable team, identifying market opportunities, outlining risks, and describing the intended Phase 2 demonstration. Up to five Phase 1 winners will receive a $5,000 cash prize each and will be eligible to compete in Phase 2. Additionally, Phase 1 winners will each receive a $75,000 voucher to work with DOE national laboratories and/or “Connectors” from the American-Made Network

that qualify as Voucher Service Providers. Section 4 provides more information about the use of vouchers and Section 3 outlines expectations for solution demonstrations.

Phase 2. Demonstration. In this phase, winning competitors from Phase 1 will finalize their teams, complete solution design documentation, evaluate the size of the potential market and the commercial viability of the solution, and demonstrate functional prototype solutions. The specific demonstration activities (e.g., laboratory or field testing) and the nature of any functional prototype solutions (e.g., hardware, software) will depend on the solution proposed, and it is the competitors' responsibility to justify the prototype and demonstration activities. Pilot demonstrations should show that the technology is reliable and capable of broad application, and that it makes a substantial difference in the economic viability of electrifying the homes in question. Up to three prizes will be awarded under Phase 2, with a top prize of $1 million. The remaining prize pool will be shared equally between the other Phase 2 winners.

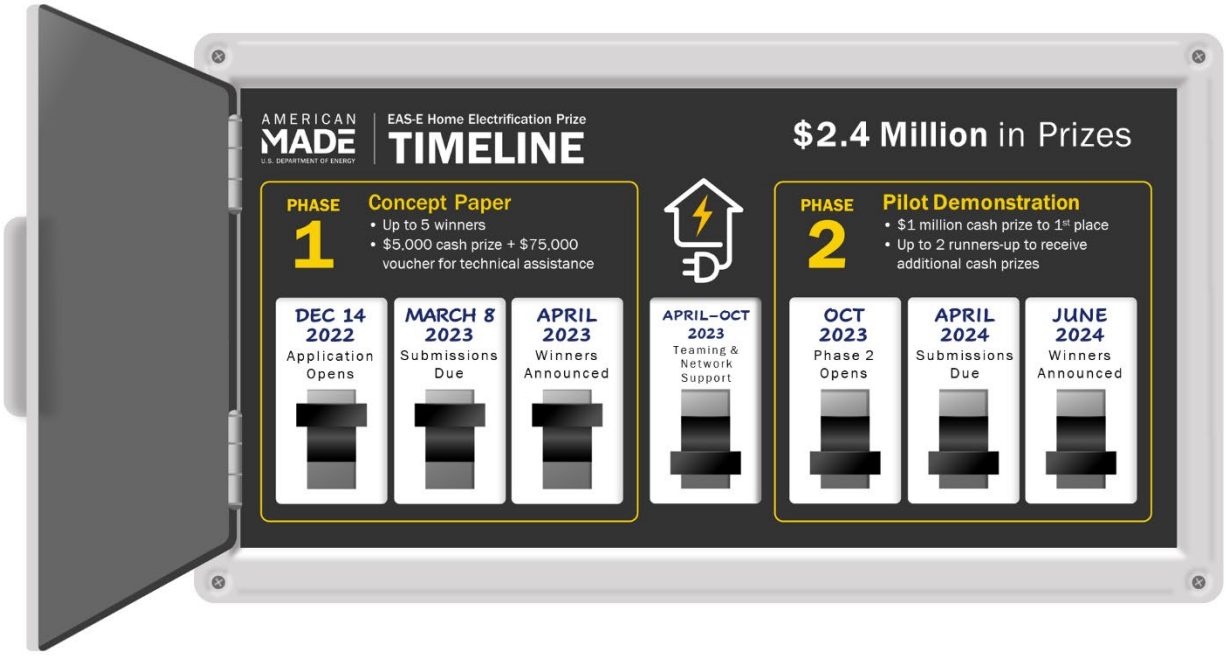


Figure 1. EAS-E Prize timeline and key dates.

Successful competitors should take a collaborative approach, teaming with complementary partners to provide a comprehensive solution with maximal viability. Competitors should independently seek out new team members and partners to support their Phase 2 applications. Phase 2 competitors will also be provided with technical assistance from both an American-Made Network Power Connector (see Section 4.1.1) and a Voucher Service Provider (VSP; see Section 4.1.2). The EAS-E Prize timeline includes a 6-month period between the end of Phase 1 and the start of Phase 2 to accommodate the teaming and voucher utilization process ahead of demonstration activities. Following the announcement of Phase 1 winners, competitors will work with the prize administration team and the Power Connector team to identify a VSP with access to pilot testing and demonstration resources and facilities that are suitable for the electrification solutions the competitors proposed in Phase 1.

In conjunction with the advisory review panel, DOE will judge solutions in both Phase 1 and Phase 2 based on the demonstrated size of their potential market and their potential impact within that market. Teams should refine estimates of market potential and solution impact from Phase 1 to Phase 2. Successful home electrification solutions should address all goals in Table 1 and have substantial

impacts on power demand, lower costs than panel/service upgrades or alternative business-as-usual solutions, and minimal to no impact on functionality, comfort, and service provided. Evaluation of submissions will also consider how the solution(s) can complement and support the existing workforce by creating new employment and business opportunities, while also helping ensure quality and consistency when installing home electrification measures. For instance, a strong application may include innovations that offer benefits to workers (e.g., improved time efficiency associated with installation or service), benefits to homeowners (e.g., reduced maintenance and longer service life), or benefits to manufacturers and distributors (e.g., standardization or easy configurability for shipping and storing). DOE will also evaluate the team's capabilities and partnering strategy, which should advance efforts to develop and commercialize the proposed solution.

1.2 Important Dates

Phase 1:

- **Submission Open:** December 14, 2022
- **Submission Close:** March 8, 2023, 3 p.m. ET
- **Winner Notification:** April 2023.

Phase 2:

- **Submission Open:** October 2023 (anticipated)
- **Submission Close:** April 2024 (anticipated)
- **Winner Notification:** June 2024 (anticipated).

1.3 Technical Background and Illustrative Scenarios

Home electrification is a decarbonization strategy that replaces combustion appliances in homes with electric products, often including heat pump technologies. Some homes will also add solar photovoltaics (PV), electric vehicle (EV) charging, and energy storage technologies (e.g., thermal and electric batteries). In some homes, load reduction strategies (e.g., building envelope upgrades) can improve the reliability, affordability, and performance of electrification upgrades. The synergy between building electrification and building decarbonization is strongest when electricity is supplied from low-carbon sources, such as on-site or local renewable resources (e.g., solar PV) or via the utility grid from renewable resources. For unvented combustion cooking appliances, removing direct emissions from homes may also lead to substantial improvements in indoor air quality. Similarly, eliminating vented combustion appliances (e.g., gas furnaces, water heaters, and clothes dryers) can contribute to reduced emissions to the outdoors.

This prize seeks the development and deployment of "easy electrification" approaches that are faster and more affordable for homeowners, and simplify electrification processes for contractors and implementers. For decarbonization to succeed nationally, it is also essential to limit impacts on electricity generation and electrical distribution networks. Therefore, strong applications to this prize should consider grid integration, responsiveness, and resiliency. The next sections provide illustrative example solutions and scenarios of homes that may benefit from the solutions the EAS-E Prize is seeking.

1.3.1 Example Technologies and Strategies for EAS-E Solutions

The EAS-E Prize will award design/tool and technology solutions that support low-power electrification opportunities, limit costly and time-consuming electrical service work (by utilities or electricians), manage loads with minimal cost and intrusion, and advance the transition to electric space and water heating in

cold climates and in homes with limited electric power. EAS-E Prize solutions should ideally limit additional strain on the electric grid and should facilitate future building-grid interactions (e.g., demand response, time-of-use pricing, and emission-based controls that align electricity demand with periods of lower grid carbon intensity). During Phase 2 demonstration activities, the proposed solutions are not required to comply with current building codes or be listed under relevant safety standards. However, for such solutions, competitors should outline the path to compliance in their market transition plans. Proposed solutions can build off of existing solutions, but the prize submissions must demonstrate substantial novelty, improvements in performance and usability, expansion in scope, and market potential. Examples of potential technologies and strategies that could be included as elements of an "easy electrification" solution include, but are not limited to:

- Sharing of electrical loads to limit required wiring/panel upgrades and to address space constraints in existing panels (e.g., load sharing for cooktop and water heating).
- Dynamic control of electrical loads across the whole home or for key end uses (e.g., appliance load controls that account for whole home electrical demand and ensure it does not exceed rated panel amperage, like existing products for EV charging).
- Smart appliances and equipment that can modulate and manage their own power demand in real time based on whole home electrical demand or a central controller (e.g., heat pumps for heating, ventilating, and air conditioning [HVAC] or water heating, refrigerators). Smart appliances could include small onboard batteries that provide load management and peak shaving capabilities.
- Simplified installations, including do-it-yourself (DIY) approaches (e.g., window unit cold climate heat pump).
- Drop-in heat pump solutions for existing wall or floor furnaces and fireplaces.
- New appliance form factors that address space constraints in existing homes (e.g., shorter water heaters for height-constrained spaces).
- Low-power appliances that reduce the need for electrical panel upgrades and can leverage existing electrical circuits in the home without impacts to consumer utility (e.g., 120V water heaters and 120V HVAC heat pumps).
- Automated home electrification design specifications and support (e.g., automated electrical load code calculations).
- Least-cost comprehensive design solutions (e.g., a repeatable upgrade package for electrifying existing manufactured housing).
- Repeatable solutions that use existing load control and low-power devices to avoid panel upgrades in cold climate homes.
- Design tools that support the use of low-power appliances and load controls.

1.3.2 Illustrative Scenarios

In order to illustrate real-world applications for the electrification advancements outlined above, we offer four example housing scenarios that reflect opportunities for improved ease and affordability of electrification: a manufactured home, a multi-family building, and two single-family homes. *These scenarios are not intended to address all electrification opportunities, relevant regions, technologies, or housing types*. Many of the solutions listed above could apply across multiple scenarios (e.g., to both manufactured and site-built single-family homes), while others may be specific to certain contexts.

EAS-E Prize applicants should frame their proposed innovations against a baseline home. This baseline can either borrow from or combine aspects of the examples presented below, or respondents can develop their own baseline example(s). Proposed solutions that are comprehensive and address multiple

electrification opportunities or end uses in the chosen baseline will receive higher scores (see Sections 2.3 and 3.3 for scoring criteria).

Single-Section U.S. Department of Housing and Urban Development (HUD) Code Manufactured Home

The single-section HUD code manufactured home pictured in Figure 2 represents a prototypical manufactured home constructed in the 1970s. It is located in the hot-humid Southeastern International Energy Conservation Code (IECC) Climate Zone 2A[3] (HUD Thermal Zone 1[4]). Due to the construction methods and the requirements of the HUD code, manufactured homes present several distinct opportunities for innovation and standardization when converting to an all-electric home. Typically, older manufactured homes are notable for having limited electrical service due to their smaller footprint and reliance on fuel burning appliances, commonly using an on-site propane tank. In this example scenario, the main service is rated at only 30 amps, and several end uses need to be electrified in order to eliminate on-site combustion. Current electrification solutions require extra costs in the manufactured home scenario. These added costs can be due to the location of the water heater (often in an exterior closet with limited clearance and side-arm cold water entry), the location of HVAC ducts (typically within an underbelly attached to the bottom of the framed floor), and very low clearance heights from attic and roof construction methods. See Table 2 for details on all features of this scenario. The end uses that could be electrified include:

- Propane forced air furnace
- Propane cooking range
- Propane 40-gallon domestic hot water (DHW)
- Propane vented clothes dryer.

[3] https://codes.iccsafe.org/content/IECC2021P1/chapter-3-ce-general-requirements
[4] See § 460.101 Climate Zones in the Energy Conservation Program: Energy Conservation Standards for Manufactured Housing (https://www.federalregister.gov/documents/2022/05/31/2022-10926/energy-conservation-program-energy-conservation-standards-for-manufactured-housing)

Figure 2. Example of a single-section HUD code home.

Table 2. Summary Features of a Single-Section Manufactured Home

House Feature	Feature Description
Vintage	1970s
Floor area	800 ft^2
Stories	One
IECC Climate Zone	2A
Garage	None
Water heating	40-gallon propane natural draft water heater, side cold water entry, located in an exterior closet, sealed from the home, no 120V in closet
Space heating	Propane-fired ducted forced air furnace located in a small interior closet, with leaky, poorly insulated ducts in the belly; 40 kBtu/hr (thousand British Thermal Units per hour) and 80 AFUE (annual fuel utilization efficiency)
Space cooling	Window air conditioner (AC) in bedroom

Air leakage	15 air changes per hour at a 50-pascal pressure difference (ACH_{50})
Cooking	Four-burner propane range
Clothes dryer	120V propane vented clothes dryer
Electric panel	30A panel and service, no free circuit spaces, no arc- or ground-fault circuit interrupter (AFCI or GFCI) protection; indoor panel is wired as a subpanel, with main service feed, meter, and disconnect located on a power pole 20 ft from dwelling
House wiring	Romex three-conductor copper wiring
Foundation	Pier and beam foundation with vinyl skirting, underbelly floor insulation at R-19, detached, ripped, and hanging down in various locations
Above grade walls	R-13 fiberglass batts
Windows	Single-pane, aluminum framed
Attic	Low-clearance, maximum height of 24 in, R-19 fiberglass batts
Roof	Low-slope roof, 20 years old

Low-Rise Multi-family Building

The low-rise multi-family building pictured in Figure 3 represents a six-unit building located in an urban environment in a cold climate region (IECC Climate Zone 5A), constructed in the 1950s. Each unit has two bedrooms, with a floor area of 750 ft^2. Multi-family building configurations have distinct innovation opportunities when converting the dwelling units to be all-electric. As is common in such buildings, this scenario includes several shared resources, including a central gas boiler, a central DHW system, and shared laundry facilities. The building lacks whole-building overcurrent protection, which would ensure that the building electrical service does not exceed capacity and overheat. For tenant retention, the property must remain occupied during electrification upgrades, so interventions must occur rapidly and involve minimal interior work and disruption to basic services. Notably, upgrades to multi-family buildings and rental housing units are subject to potential split incentives between landlords and tenants. See Table 3 for details on all features of this scenario. The end uses that could be electrified include:

- Gas central boiler for space heating
- Gas cooking ranges in each unit
- Gas central boiler serving hot water to all units
- Shared gas vented clothes driers (3).

Figure 3. Exterior image of a low-rise multi-family building.

Table 3. Summary Features of a Low-Rise Multi-family Building

House Feature	Feature Description
Vintage	1950s
Floor area	750 ft^2 per unit, six units (two per floor) plus common areas
Stories	Three
IECC Climate Zone	5A
Garage	None
Water heating	Shared natural gas boiler in unconditioned basement, 199 kBtu/hr
Space heating	Two shared natural gas boilers in unconditioned basement, 80 AFUE, 199 kBtu/hr
Space cooling	Window AC in each unit

Air leakage	15 ACH_{50}
Cooking	Natural gas, four-burner cooking range
Clothes dryer	Three shared 120V natural gas vented clothes dryers in unconditioned basement
Electric panel	50-amp subpanel in each unit. Building service does not have overcurrent protection. No free circuit spaces, no AFCI or GFCI protection
House wiring	Original two-conductor knob and tube wiring
Foundation	Unconditioned basement with slab floor
Above grade walls	Brick cladding, uninsulated
Windows	Single-pane, wood frame
Attic	None
Roof	Flat roof membrane, uninsulated

Mild Climate Single-Family

The home pictured in Figure 4 represents a one-story, single-family bungalow located in a marine climate region (IECC Climate Zone 3C). The 1,350-ft^2 dwelling was constructed in 1928, but has been subject to unpermitted additions and remodeling over time. The home has space limitations in the compact crawlspace foundation, in the attic, and indoors, all of which motivate innovative approaches to envelope upgrades and the addition of new electrical loads. For example, the home lacks an attached garage or basement for locating equipment, so the water heater is located in the laundry room just off the kitchen. The home has a 100-amp electrical service panel and the need to electrify a large number of end uses. In addition to typical end uses in other scenarios, this home includes a gas log set fireplace, two wall-mounted gas ovens, and requires installation of an EV charger. See Table 4 for details on all features of this scenario. The end uses that could be electrified include:

- Gas 80-kBtu floor furnace
- Gas log set fireplace
- Gas four-burner cooktop and double stack wall ovens
- Gas 40-gallon vented DHW
- Gas vented clothes dryer
- EV charging

Figure 4. Example single-family detached home in a mild climate.

Table 4. Summary Features of a Mild Climate Single-Family Home

House Feature	Feature Description
Vintage	1928
Floor area	1350 ft^2
Stories	One
IECC Climate Zone	3C
Garage	None
Water heating	40-gallon, atmospherically vented natural gas water heater in kitchen closet/laundry room with minimal clearances and no 120V outlet in closet
Space heating	80 kBtu/hr natural gas floor furnace in central hallway (design load: 42 kBtu/hr); one natural gas log set fireplace
Space cooling	None

Air leakage	15 ACH_{50}
Cooking	Natural gas four-burner cooktop; separate double-stack natural gas wall ovens
Clothes dryer	120V natural gas vented clothes dryer located in shared kitchen/laundry room
Electric panel	100-amp panel and service, no free circuit spaces, no AFCI or GFCI protection
House wiring	Mixture of original two-conductor knob and tube, plus modern Romex three-conductor copper wiring from various unpermitted remodels; numerous exposed splices visible in vented crawlspace.
Foundation	Vented crawlspace, poured concrete stem wall, height clearance varies from 12 to 36 ft, severely degraded fiberglass batts, no ground moisture barrier
Above grade walls	Lathe and plaster, 2x4 uninsulated, 1x4 diagonal sheathing, tar paper, cement stucco
Windows	Original, wood framed, single-pane glazing, no modern flashing
Attic	Gable wall venting; 4:12 roof slope over main house; unvented, compact roof over family room addition; existing sparse R-13 fiberglass batting; rodent feces and evidence of pests; attic height at roof peak is 42 in
Roof	15-year-old, single-ply asphalt shingle roof; four skylights; no gutters

Cold Climate Single-Family

The 3,100-ft^2, 1910s vintage, single-family home pictured in Figure 5 is located in a cold climate (IECC Climate Zone 5A). This large, 3.5-story home presents several opportunities for electrification innovations. The home's climate and large floor area compel thoughtful approaches to the conversion from fuel-fired to electric space heating. In addition, the current heating system uses steam radiators. A benefit of being located in a cold climate is that the home does not necessarily require mechanical cooling. The home has limited electrical capacity, and there are some unique end uses that could be electrified, such as a vintage, six-burner gas stove with pilot lights that is not a standard replacement size. See Table 5 for details on all features of this scenario. The end uses that could be electrified include:

- Gas 120 kBtu/hr boiler with steam radiators
- Two wood fireplaces, masonry chimney
- Gas six-burner range with standing pilot lights
- Gas 40-gallon vented DHW
- Gas vented clothes dryer.

Figure 5. Example single-family detached dwelling in a cold climate.

Table 5. Summary Features of a Cold Climate Single-Family Home

House Feature	Feature Description
Vintage	1910
Floor area	3100 ft^2, including basement
Stories	3.5, including basement and finished attic
IECC Climate Zone	5A
Garage	None
Water heating	40-gallon, atmospherically vented natural gas water heater in unconditioned basement with no 120V outlet nearby
Space heating	120 kBtu/hr natural gas boiler, 80 AFUE in unconditioned basement, hot water radiators throughout conditioned space (design load: 94 kBtu/hr); heat lamps in each of three bathrooms; two masonry chimneys and wood fireplaces

Space cooling	None
Air leakage	15 ACH_{50}
Cooking	Natural gas six-burner range with standing pilot lights, 40” wide
Clothes dryer	120V natural gas vented clothes dryer in unconditioned basement
Electric panel	100-amp panel and service, no free circuit spaces, no AFCI or GFCI protection
House wiring	Original two-conductor knob and tube wiring
Foundation	Unconditioned, partly finished walk-out basement, slab floor, poured concrete stem wall; finished basement has carpet on top of slab, wall paneling, and drop ceilings
Above grade walls	Lathe and plaster, 2x4 balloon-framed uninsulated, 1x4 diagonal sheathing, tar paper, brick cladding
Windows	Exterior storm windows plus wood framed, single-pane glazing, no modern flashing
Attic	Unpermitted finished attic, knee walls, 2x6 rafters, 6:12 roof slope; R-19 in flat attic knee wall sections
Roof	15-year-old, single-ply asphalt shingle roof; no gutters

2 Phase 1: Concept Paper

The concept paper submission should summarize how the design solutions/tools and/or technology innovations address affordable electrification, targeting scenarios similar to the examples provided in Section 1.3.2. The paper should address all the key objectives listed in Table 1 and should highlight team strengths and capabilities that are relevant to subsequent demonstration activities in Phase 2.

Prize entrants must complete a submission package fulfilling the requirements of Section 2.1 online at https://www.herox.com/easeprize before the contest closing date.

2.1 Submission Package

The following items constitute the submission package for Phase 1 of the EAS-E Prize. These items must be submitted through the HeroX platform:

- PowerPoint summary slide (to be made public)
- Concept paper: PDF, up to 3,000 words, using a font that is at least 11 point (not public)
- Team CVs (not public)
- Letter(s) of commitment or support (OPTIONAL, not public).

Summary Slide (to be made public)
Competitors should submit a one-slide summary in PowerPoint that contains technically specific details that can be understood by a general reader. The slide will be made public and should include: • Competitor or team name and team leader • Submission title • Description of the proposed "easy electrification" solution • Summary of applicable market segment • Estimate of potential impact • Plan for demonstration activities (see Section 3 for demonstration information). Competitors should make any text readable in a standard printout and conference-room projection.

Concept Paper (not public)
Concept paper submissions should be up to 3,000 words in PDF format, and should: • Identify the baseline housing scenario(s) (see Section 1.3.2) and affordable electrification opportunities to be addressed • Describe business-as-usual solutions for addressing the selected scenario(s) • Provide an explanation and description of the novel design/tool and/or technical solution(s) • Explain how the proposed solution addresses the objectives described in Table 1 • Estimate the market potential and cost of solution(s) • Review benefits and costs of the solution(s) compared to existing (business-as-usual) solutions • Summarize risks and barriers to the solution's success • Summarize and justify the methods proposed for Phase 2 demonstration • List team members, resources, relevant experience, and relevant letters of support.
Team CVs (not public)
Competitors should attach a one-page resume/curriculum vitae for each team member in PDF format. Include all currently known team members. *Note: submissions do not need to have a full team committed for a successful Phase 1 submission.*

Letters of Commitment or Support (optional, not public)
Competitors may attach one-page letters of support, intent, or commitment, in PDF format, from other relevant entities to provide context. This could include letters of support from partners, potential users of the proposed solution(s), or others that you believe are critical to the success of your proposed solution. Please do not submit multipage letters.

See Appendix 1 of this document for additional requirements. COMPETITORS WHO DO NOT COMPLY WITH THE ADDITIONAL REQUIREMENTS IN APPENDIX 1 OF THIS DOCUMENT MAY BE DISQUALIFIED.

2.2 Phase 1 Process

Phase 1 of the EAS-E Prize consists of the following steps:

1. **Preparation, Activation, and Submission**: Potential competitors should read the entire rules document and be familiar with expectations for both phases. Successful applicants will build a team and present solutions in Phase 1 that have viability in the subsequent demonstration phase. Following the guidelines for the submission package above, competitors should compose a concept paper outlining the electrification scenario they wish to address. (See the illustrative scenarios in Section 1.3.2 for examples. Concept papers addressing other scenarios should provide a similar level of detail.) The concept paper should propose innovations in line with the review categories below. It should be clear that the team can demonstrate the proposed innovations within the timeframe of the prize if they are selected to advance. Competitors must complete their submission packages and submit them online through the HeroX platform before the Phase 1 submission deadline.
2. **Assessment:** The Prize Administrator will assign subject matter expert advisory reviewers to independently score the content of each submission. The advisory reviewers may be composed of federal and nonfederal subject matter experts with expertise in relevant areas. Advisory reviewers will review submissions and provide input to BTO. The selection of winners will be made by a BTO official, who will not: (a) have personal or financial interests in—or be an employee, officer, director, or agent of—any entity that is a registered participant in the prize; or (b) have a familial or financial relationship with an individual who is a registered participant in the prize.
3. **Announcement**: Approximately 60 days after Phase 1 closes, the Prize Administrator will notify winners and request the necessary information to distribute cash prizes. The Prize Administrator will then publicly announce winners. The Phase 1 (Concept Paper) winners may then develop their solutions in accordance with their plan to compete in Phase 2 (Demonstration) of the contest. Only winners from Phase 1 will be eligible to compete in Phase 2.

OTHER REQUIREMENTS:

- Winning teams will be required to submit an Internal Revenue Service (IRS) W-9 form and automated clearing house (ACH) forms as well as signing a prize acceptance form in order for payment to be issued.

2.3 How Winners Are Determined

The scoring of submissions will proceed as follows:

Advisory Reviewer Panel Scoring:

- After reviewing all elements of the submission package, each advisory reviewer will assign a score between 1 and 5 for each review category based on the descriptive statements below. Note that scores in categories 1, 4 and 5 are doubled.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

- The scores from each individual advisory reviewer will be collected via the HeroX platform, and scores will be weighted as indicated in the Phase 1 Review Categories table.
- All advisory reviewer scores will then be averaged for a final score for the submission package.

Interviews: BTO, at its sole discretion, may request a short interview with all or selected competitors. The interviews would be held prior to the announcement of winners and would serve to help clarify questions the judges may have. Attending an interview is not required, and an interview request is not an indication of winning.

Final Determination: The final determination of winners will take the advisory reviewers' scores and the interview findings (if applicable) into account. The director of BTO is the final selection official of the competition and will make the final determination.

Phase 1 Review Categories Advisory reviewers give a score of 1 to 5 for each category below:	
Category #	**Equity, Affordability, and Inclusion (40%)**
1	Proposed solution improves the energy security of low- and moderate-income (LMI) households and disadvantaged communities (e.g., by reducing household operating costs associated with utility bills and maintenance). This could be achieved by reducing energy use, load shifting to off-peak periods, or a combination of these and other strategies. (Score will be doubled—up to ten points possible).
2	The concept paper includes market characterization that addresses racially and/or economically diverse communities.
3	Plans for Phase 2 solution demonstration include engaging racially and/or economically diverse communities as part of testing.
4	**Upfront cost.** Purchase and installation costs are less than current, business-as-usual solutions. (Score will be doubled—up to ten points possible).
5	**Operating costs.** Energy and maintenance costs are less than current, business-as-usual solutions. (Score will be doubled—up to ten points possible).
Category #	**Innovation and Impact (35%)**
6	**Scale.** Solution is applicable to a large number of homes.
7	**Impact.** Solution will have substantial impacts on load reduction or ease of electrification in each affected home.
8	**Speed.** Solution is faster to implement than current solutions, reducing delays due to third-party requirements, permits, supply chain, and inspections.
9	**Ease.** Solution simplifies installation and improves ease of use.
10	**Flexibility**. Solution has potential applications across multiple end uses, housing types, climates, and configurations/situations.
11	**Novelty.** Solution is novel, without similar/equivalent solutions available in the market.
12	**Multiple benefits**. Solution provides more than one benefit (e.g., load control for overcurrent protection and price optimization controls).

Category #	Technical Feasibility (15%)
13	Solution is technically feasible and practical to deploy.
14	Risks or limitations associated with the solution are well defined and clearly articulated.
15	Proposed Phase 2 demonstration activities are feasible and appropriate to advance deployment.
Category #	Team and Partnering Strategy (10%)
16	The team's track record demonstrates notable entrepreneurial and team-building qualities and has a high likelihood of achieving commercial success.
17	The team does not have any major gaps in expertise or missing partners that may limit the success of the technology.

2.4 Additional Terms and Conditions

See Appendix 1 for additional requirements. COMPETITORS WHO DO NOT COMPLY WITH THE ADDITIONAL REQUIREMENTS IN APPENDIX 1 MAY BE DISQUALIFIED.

3 Phase 2: Demonstration

In Phase 2, winning competitors from Phase 1 will finalize their teams, complete solution design documentation, evaluate the market (i.e., households and demographics) and the commercial viability of the solution, and demonstrate functional prototype solutions. The specific demonstration activities (e.g., laboratory and field testing) and the nature of any functional prototype solutions (e.g., hardware, software) will depend on the solution proposed, and it is the competitors' responsibility to justify the prototype and demonstration activities. Demonstrations should show that the technology is reliable and capable of broad application, and that it makes a substantial difference in the technical or economic viability of electrifying the homes in question. In Phase 2, competitors must demonstrate through pilot testing that the concept is viable and has a path to successful implementation at scale. The Phase 2 submissions must address all the key objectives listed in Table 1.

Leading up to the demonstration, competitors should ideally create a cross-functional team of experts in building science, home electrification/decarbonization retrofits, technology commercialization, and other relevant disciplines. Validating the technical viability of the working solution and demonstrating a path toward commercial viability is required. Completing validation of the working solution with an industry partner is highly encouraged.

Enter a submission package fulfilling the requirements of Section 3.1 online at https://www.herox.com/easeprize before the Phase 2 submission deadline. Only winning teams from Phase 1 of this prize contest are eligible to compete in Phase 2.

3.1 Submission Package

The following items constitute the submission package[5] for Phase 2 of the EAS-E Prize. These items must be submitted through the HeroX platform:

- Cover page (to be made public)
- Summary slide (to be made public)
- Video (to be made public)
- Technical narrative (not public)
- Solution documentation (not public)
- Demonstration report (not public)
- Transition to market plan (not public)
- Letter(s) of commitment or support (OPTIONAL, not public).

Cover Page (to be made public)
Competitors should list basic information about the submission in a one-page cover page in PDF format: • Submission title • Short description of proposed solution(s) (200 words or less) • Key project members and partners (names; contact information, including city and state; links to professional profiles).

Summary Slide (to be made public)
Competitors should submit a one-slide summary in PowerPoint that contains technically specific details that can be understood by a general reader. The slide will be made public and should include information about: • **Need/Challenge:** Describe the critical electrification opportunities being addressed. • **Proposed Solution:** Include a picture and/or graphic that best captures the solution, innovation, and/or approach, along with a short description of the image. • **Partnering/Team:** Describe the team and why it has a competitive edge. Competitors should make any text readable in a standard printout and conference-room projection, but should not include any proprietary information, as this slide will be made public.

[5] Competitors who are submitting information in the technical narrative or other documents (e.g., design specifications) for which they are requesting treatment as confidential business information must submit the materials according to the instructions in Section A.10 of Appendix 1.

Video (will be made public)

Competitors should submit a video of no more than three minutes. The video should be publicly accessible online (e.g., YouTube, Vimeo) and submitted as a hyperlink via HeroX. Videos should be creative and convey the required information in exciting and interesting ways, but production value (i.e., technical elements such as décor, lighting, and cinematic techniques) is not part of the scoring criteria.

Suggested content could include:

- Description of the team, the solution, and what it will do to make home electrification easier in challenging homes.
- Demonstration of the working prototype by recording an outline or demonstration of the performance tests and/or validation process.
- Description of next steps to technically advance the solution.

Technical Narrative (not public)

In a narrative of up to 3,000 words and up to five figures, in PDF format, competitors should update their concept paper from Phase 1 to address any changes in either the market or the proposed solution that are relevant to the novelty, performance, or potential impact of the proposed solution. Changes might include updates on the design concepts or the estimated cost of the proposed solution or the business-as-usual base case. As before, the revised concept paper should address the key solution goals listed in Table 1.

Solution Documentation (not public)

In a narrative of up to 5,000 words and up to 10 figures, in PDF format, competitors should provide solution documentation to show the design of the solution and how it works. The contents will depend strongly on the nature of the proposed solution, and it is the responsibility of the submitting team to ensure that the documentation provided is appropriate and sufficient to characterize the solution. For example, design tools might include decision process diagrams; lists of inputs, outputs, and assumptions; and screenshots illustrating the user experience of the tool. Where appropriate, documentation could also include publicly available source code and user instruction (e.g., solution code hosted on GitHub or similar sources). Submissions that include technology solutions may provide graphics, digital drawings, schematic designs, and technical specifications.

Demonstration Report (not public)

The Demonstration Phase requires the project team to test and demonstrate a functional prototype of their solution that is consistent with the solution documentation. In a demonstration report of up to 2,500 words and up to five figures, in PDF format, teams should summarize the method used to assess the performance of the proposed solution and document the demonstration results, including lessons learned on solution cost, installation, market potential, and in situ performance. For technology solutions, demonstration might involve development and testing of functional prototypes under laboratory and possibly field conditions. For design solutions and tools, demonstration could involve creating a functional prototype of the tool that can be tested and used in a demonstration setting. The demonstration report should describe any needed industry engagement and evaluation.

Transition to Market Plan (not public)

In a narrative of up to 2,000 words and up to three figures, in PDF format, the transition to market plan should detail a 3-year road map, including key pathways and barriers to advancing the solution toward market viability. The plan should identify key issues with the design/tool and/or technology for future analysis as well as exploring and evaluating market, manufacturing, intellectual property, and next-stage resource factors. The plan can incorporate elements of a cost-performance model and manufacturing and scalability analysis as well as market, customer, and stakeholder discovery. The solution team should review the draft plan with relevant industry advisors during the competition and incorporate their feedback.

The transition to market plan could include any of the following elements:

- **Value Proposition and Market Opportunity:** Quantify the market opportunity and describe the value proposition and competitive differentiation. Include an explanation of why the proposed solution would be commercially relevant (e.g., needs that the solution would address, how previous solutions have fallen short) and how the solution will be tested and qualified in the market.
- **Risk Mitigation Strategy:** Identify techno-economic challenges to be overcome for the proposed solution to be commercially relevant, and discuss any scalability, regulatory, cost, intellectual property, or integration risks and considerations. Describe the strategy to address and/or mitigate these challenges. Discuss any other factors key to the successful realization of energy savings potential, cost reduction targets, or installation time targets, as well as any known or perceived barriers to market adoption/dissemination and plans for mitigating those barriers.
- **Cost-Performance Model:** Identify the key cost and performance drivers for the proposed solutions as well as use cases for buildings. Affordability must be analyzed and evaluated.
- **Scalability Risk Analysis:** Include a plan to identify and mitigate factors that may significantly affect scale-up to millions of applications.
- **Market, Customer, and Stakeholder Discovery:** Identify the best paths to market at the end of the competition. Present initial product specifications, target markets, the size of each market, and an analysis of competing products. Competitive landscape surveys and value chain mapping may also be presented. Comparative advantages and key features of the solution being developed should be identified.

Letters of Commitment or Support (optional, not public)
Competitors may attach one-page letters of support, intent, or commitment, in PDF format, from other relevant entities to provide context. This could include letters of support from pilot partners, potential users of the proposed solution(s), manufacturing facilities, or others that you have identified as critical to the success of your proposed solution. Please do not submit multipage letters.

3.2 Phase 2 Process

Phase 2 of the EAS-E Prize consists of the following steps:

1. **Preparation, Activation, and Submission**: Phase 1 winning teams are eligible to compete in Phase 2, as long as the team retains a minimum of one entity that was part of the Phase 1 team. Teams should include interdisciplinary partners to build, test, validate, and enhance their solutions. By the end of Phase 2, teams should be prepared to participate in a live or virtual event to demonstrate a working prototype of their design tools and/or technologies and prove that their solution works and meets the goals of the prize. Competitors must complete their submission packages and submit them online through the HeroX platform before the Phase 2 submission deadline.
2. **Assessment:** The Prize Administrator will assign subject matter expert advisory reviewers to independently score the content of each submission. The advisory reviewers may be composed of federal and nonfederal subject matter experts with expertise in relevant areas. Advisory reviewers will review submissions and provide input to BTO. The selection of winners will be made by a BTO official, who will not: (a) have personal or financial interests in—or be an employee, officer, director, or agent of—any entity that is a registered participant in the prize; or (b) have a familial or financial relationship with an individual who is a registered participant in the prize.
3. **Announcement**: Approximately 60 days after Phase 2 closes, the Prize Administrator will notify winners and request the necessary information to distribute cash prizes. The Prize Administrator will then publicly announce winners.

OTHER REQUIREMENTS:

- All teams will be required to schedule a brief (15-minute) virtual interview with a panel of advisory reviewers, which will be used to clarify any questions the reviewers may have.
- Winning teams will be required to submit an Internal Revenue Service (IRS) W-9 form and automated clearing house (ACH) forms as well as signing a prize acceptance form in order for payment to be issued.

3.3 How Winners Are Determined

All items in the submission package, with the exception of the cover page, will be considered when scoring each submission.

The scoring of submissions will proceed as follows:

Advisory Reviewer Panel Scoring:

- After reviewing all elements of the submission package and participating in the team interview, each advisory reviewer will assign a score between 1 and 5 for each review category based on the descriptive statements below. Note that scores in categories 1 and 2 are doubled.

- The scores from each individual reviewer for each category will be collected via the HeroX platform, and scores will be weighted as indicated below.
- All advisory reviewer scores will then be averaged for a final score for the submission package.

Final Determination: The final determination of winners will take the advisory reviewers' scores and the interview findings into account. The director of BTO is the final selection official of the competition and will make the final determination.

Phase 2 Review Categories Advisory reviewers give a score of 1 to 5 for each category below:				
1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Category #				
Innovation and Impact (30%)				
1	The proposed solution presents an innovative approach to affordable electrification opportunities (score will be doubled—up to ten points possible).			
2	The proposed solution can make significant advancements in affordable whole-home electrification (score will be doubled—up to ten points possible).			
3	The proposed solution will serve a significant number of homes.			
4	The proposed solution will create new market or business opportunities that may lead to more, safer, and/or higher-paying jobs in the building industry.			
Technical Feasibility and Goals (30%)				
5	The proposed solution documentation is free of any major technical flaws that would compromise the solution's performance.			
6	The risks or limitations associated with the proposed solution are well understood and articulated.			
7	The solution is minimally invasive to occupants and the building.			
8	There are no regulatory or policy barriers that prevent the implementation of the solution.			
9	The applicant applied a rigorous validation effort to demonstrate the performance of the solution using appropriate tools and facilities.			
10	The proposed solution achieved the performance targets included in the demonstration plan.			
Transition to Market Plan (20%)				
11	The plan defines a reasonable path for the proposed technology solution toward commercial viability and success.			
12	The value proposition and market opportunity are strong and well defined; there is sufficient evidence to quantify the opportunity, including market, customer, and stakeholder discovery.			

13	The plan describes the manufacturing and scalability risk analysis and includes a plan to mitigate factors that may significantly affect production costs and scale-up.
14	The team provided adequate information to identify the key affordability issues for the proposed technology as well as use cases for buildings.
Team and Partnering Strategy (10%)	
15	The team's track record demonstrates notable entrepreneurial qualities and has a high likelihood of achieving commercial success.
16	The team has engaged all stakeholders or partners necessary to successfully implement the solution. Partners that are critical to the success of the project have demonstrated their support by being part of the team or offering a letter of support.
Diversity, Equity, and Inclusion (10%)	
17	Proposed technologies significantly improve energy security of LMI households and disadvantaged communities (e.g., by reducing household operating costs associated with utility bills and maintenance). This could be achieved by reductions in energy use, load shifting to off-peak periods, or a combination of these and other strategies.
18	Demonstration engages racially and/or economically diverse communities.

3.4 Additional Terms and Conditions

See Appendix 1 for additional requirements. COMPETITORS WHO DO NOT COMPLY WITH THE ADDITIONAL REQUIREMENTS IN APPENDIX 1 MAY BE DISQUALIFIED.

4 American-Made Network

The American-Made Network endeavors to cultivate resources and build connections to enhance, accelerate, and amplify the efforts of the competitors. The objective is to link participants with ideas, people, resources, investors, and relevant industry expertise, all of which are necessary to take innovative ideas, refine them, and bring them to market. The American-Made Network is comprised of Connectors, Power Connectors, and Voucher Service Providers (VSPs).

The American-Made Network will support competitors in the EAS-E Prize in the following ways:

4.1 Connectors

Connectors are entities capable of identifying and recruiting contest participants as well as supporting competitors on their innovation journeys. Connectors can be incubators, universities, think tanks, industry groups, or any other enablers seeking to help competitors win by performing support activities. These activities may include:

- Attracting a diverse range of talented individuals to become contest competitors
- Helping competitors refine their innovations, develop business plans, work with mentors, and connect with investors and industry partners
- Providing in-kind resources, tools, and facilities to accelerate competitors' abilities to innovate, test, and refine their solutions while reducing technology and business risks
- Connecting competitors to regional prototyping and manufacturing expertise, facilities, and experts
- Providing their facility's capabilities to assist the Phase 1 winners with their voucher work.

Connectors that support competitors in the EAS-E Prize are financially rewarded based on the table below. More information on Connector recognition awards can be found in the Connector Guidelines on HeroX.

Recognition Reward Name	Anticipated Number of Rewards	Dollar Amounts	Details*
Recruitment Event	Up to 25	$1,000	Distributed to Connectors who host an in-person or virtual recruitment event for the EAS-E Prize with at least 15 attendees.
Phase 1: Concept Paper	Up to one per winning Phase 1 Competitor	$2,500 per competitor	Distributed to Connectors who recruit and/or support competitors who go on to win Phase 1.

4.1.1 Power Connectors

Power Connectors are Connectors who play a more substantial role in the competition and receive funds to expand and amplify DOE's and the National Renewable Energy Laboratory's (NREL's) efforts. A Power Connector operates under a contract with NREL and is funded to provide direct technical assistance to the Prize Administrator and competitors. Power Connector services are free of charge to competitors who win in Phase 1. Power Connectors will work with winning teams from Phase 1 to make connections to VSPs and provide teams with technical assistance throughout Phase 2.

4.1.2 Voucher Service Providers (VSPs)

DOE national laboratories and all Connectors within the American-Made Network are eligible to be VSPs in the EAS-E Prize if they have facilities and capabilities relevant to the outcomes sought by the prize. Winners of Phase 1 will each receive a $75,000 voucher they may use to fund work in Phase 2 of the prize. Entities interested in helping competitors through the voucher program can visit the following site for details on how to become a Connector: https://network.americanmadechallenges.org/ or reach out to buildingsprize@nrel.gov.

A list of Connectors in the Network with suitable capabilities to work with the winners of Phase 1 on their demonstration activities will be released and made available on HeroX.com. Although working with the national labs or Connectors in Phase 2 is optional, teams may identify new organizations that can join the American-Made Network to become Connector VSPs, thereby allowing use of the voucher won in Phase 1. Additional information regarding vouchers can be found in Section 4.2 and in the Voucher Guidelines on HeroX.

4.2 Vouchers

Winners of Phase 1 will each receive a $75,000 voucher for technical assistance at national laboratories and/or American-Made Network Connector facilities that qualify as VSPs to pilot and demonstrate their Phase 2 solutions. Additional resources and information regarding vouchers can be found on the EAS-E Prize HeroX platform under Voucher Guidelines and Voucher Capabilities. The Prize Administrator and

Power Connectors will provide competitors with opportunities to meet with potential VSPs following the Phase 1 winner announcement.

4.3 Find Help

Visit https://americanmadechallenges.org/network.html to review and contact the members of the American-Made Network that have signed up to help you succeed.

5 Eligibility and Teams

Only submissions relevant to the technical areas laid out in Section 1 of this document will be considered. The Prize Administrator has the right to refuse any submission for incompleteness or unresponsiveness to the technical topic areas.

The competition is open to individuals; private entities (for-profits and nonprofits); nonfederal government entities such as states, counties, tribes, and municipalities; and academic institutions, subject to the following requirements:

- An individual prize competitor (who is not competing as a member of a group) must be a U.S. citizen or permanent resident.
- A group of individuals competing as one team may win, provided that the online account holder of the submission is a U.S. citizen or permanent resident. Individuals competing as part of a team may participate if they are legally authorized to work in the United States.
- Private entities must be incorporated in and maintain a primary place of business in the United States.
- Academic institutions must be based in the United States.
- DOE employees, employees of sponsoring organizations, members of their immediate families (i.e., spouses, children, siblings, or parents), and persons living in the same household as such persons, whether or not related, are not eligible to participate in the prize.
- Individuals who worked at DOE (federal employees or support service contractors) within six months prior to the submission deadline of any contest are not eligible to participate in any prize contests in this program.
- Federal entities and federal employees are not eligible to participate in any portion of the prize.
- DOE national laboratory employees cannot compete in the prize.
- Entities and individuals publicly banned from doing business with the U.S. government, such as entities and individuals debarred, suspended, or otherwise excluded from or ineligible to participate in federal programs, are not eligible to compete in the prize.
- Entities identified in Department of Homeland Security (DHS) Binding Operational Directives (BOD) as publicly banned from doing business with the U.S. government are not eligible to compete. See https://cyber.dhs.gov/directives/.
- Entities and individuals identified as restricted parties on one or more screening lists of the Departments of Commerce, State, or the Treasury are not eligible to compete. See the Consolidated Screening List: https://2016.export.gov/ecr/eg_main_023148.asp.
- This prize is expected to positively impact U.S. economic competitiveness. Participation in a foreign government talent recruitment program[6] could conflict with this objective by resulting in

[6] A foreign government talent recruitment program is defined as an effort directly or indirectly organized, managed, or funded by a foreign government to recruit science and technology professionals or students (regardless of citizenship or national origin, and whether having a full-time or part-time position). Some foreign government-sponsored talent recruitment programs operate with the intent to import or otherwise acquire from abroad, sometimes through illicit means, proprietary technology or software, unpublished

unauthorized transfer of scientific and technical information to foreign government entities. Therefore, individuals participating in foreign government talent recruitment programs of foreign countries of risk[7] are not eligible to compete. Further, *teams* that include individuals participating in foreign government talent recruitment programs of foreign countries of risk are not eligible to compete.

- To be eligible, an individual authorized to represent the competitor must agree to and sign the following statement upon registration with HeroX:

> I am submitting this submission package as part of my participation in this Prize. I certify under penalty of perjury that the named competitor meets the eligibility requirements for this prize competition and complies with all other rules contained in the Official Rules document. I understand false statements or misrepresentations may result in civil and/or criminal penalties under 18 U.S.C. § 1001.

data and methods, and intellectual property to further the military modernization goals and/or economic goals of a foreign government. Many, but not all, programs aim to incentivize the targeted individual to physically relocate to the foreign state for the above purpose. Some programs allow for or encourage continued employment at U.S. research facilities or receipt of federal research funds while concurrently working at and/or receiving compensation from a foreign institution, and some direct participants not to disclose their participation to U.S. entities. Compensation could take many forms, including cash, research funding, complimentary foreign travel, honorific titles, career advancement opportunities, promised future compensation, or other types of remuneration or consideration, including in-kind compensation.

[7] Currently, the list of countries of risk includes Russia, Iran, North Korea, and China.

Appendix: Additional Terms and Conditions

A.1 Requirements

Your submission for the EAS-E Home Electrification Prize is subject to the following terms and conditions:

- You must post the final content of your submission online at https://www.herox.com/EASEPrize before each phase closes. Late submissions or any other method of submission will be rejected.
- Materials to be treated as confidential, proprietary, or privileged business information must be submitted according to the instructions in Section A.10. Unmarked or improperly marked submissions will be deemed to have been provided with unlimited rights and may be used in any manner and for any purpose whatsoever.
- You must include all the required elements in your submission. The Prize Administrator will disqualify your submission after an initial screening if you fail to provide all required submission elements. The Prize Administrator may provide an opportunity to rectify submission errors due to technical challenges.
- Your submission must be in English and in a format readable by Microsoft Word or Adobe PDF. Scanned handwritten submissions will be disqualified.
- Submissions will be disqualified if they contain any matter that, in the sole discretion of the Prize Administrator, is indecent, obscene, defamatory, libelous, lacking in professionalism, or demonstrating a lack of respect for people or life on this planet.
- If you click "Accept" on the HeroX platform and register for any part of the contest described in this document, these rules will form a valid and binding agreement between you and DOE and is in addition to the existing HeroX Terms of Use for all purposes relating to these contests. You should print and keep a copy of these rules. These provisions only apply to the contest described here and no other contest on the HeroX platform or anywhere else.
- The Prize Administrator, when feasible, will give competitors an opportunity to fix nonsubstantive mistakes or errors in their submission packages. This applies only to publicly available submission materials.
- As part of your submission to this contest, you will be required to sign the following statement:

> I am providing this submission package as part of my participation in this prize. I understand that I am providing this submission to the federal government. I certify under penalty of perjury that the named competitor meets the eligibility requirements for this prize competition and complies with all other rules contained in the Official Rules document. I further represent that the information contained in the submission is true and contains no misrepresentations. I understand false statements or misrepresentations to the federal government may result in civil and/or criminal penalties under 18 U.S.C. § 1001.

A.2 Verification for Payments

The Prize Administrator will verify the identity and role of all winning competitors before distributing any prizes. Receiving a prize payment is contingent upon fulfilling all requirements contained herein. The Prize Administrator will notify winning competitors using the email contact information provided by the individual or entity that was responsible for the submission. Each winning competitor will be required to sign and return to the Prize Administrator, within 30 days of the date on the notice, a completed NREL Request for ACH Banking Information form and a completed W-9 form. In the sole discretion of the Prize Administrator, a winning competitor will be disqualified from the competition and receive no prize funds if: (1) the person/entity does not respond to notifications; (2) the person/entity fails to sign and return the

required documentation within the required time period; (3) the notification is returned as undeliverable; or (4) the submission or person/entity is disqualified for any other reason.

In the event of a dispute as to any registration, the authorized account holder of the email address used to register will be deemed to be the competitor. The "authorized account holder" is the natural person or legal entity assigned an email address by an internet access provider, online service provider, or other organization responsible for assigning email addresses for the domain associated with the submitted address. All competitors may be required to show proof of being an authorized account holder.

A.3 Teams and Single Entity Awards

The Prize Administrator will award a single dollar amount to the designated primary submitter, whether consisting of single or multiple entities. The primary submitter is solely responsible for allocating any prize funds among its member competitors or teammates as they deem appropriate. The Prize Administrator will not arbitrate, intervene, advise on, or resolve any matters or disputes between team members or competitors.

A.4 Submission Rights

By making a submission and consenting to the rules of the contest, a competitor grants to DOE, the Prize Administrator, and any other third parties supporting DOE in the contest a license to display publicly and use the portions of the submission designated as "public" for government purposes. This license includes posting or linking to the public portions of the submission on Prize Administrator or HeroX applications, including the contest website, DOE websites, and partner websites, and the inclusion of the submission in any other media worldwide. The submission may be viewed by DOE, the Prize Administrator, and judges and reviewers for contest purposes, including but not limited to screening and evaluation. The Prize Administrator and any third parties acting on their behalf will also have the right to publicize competitors' names, and, as applicable, the names of competitors' team members and organization(s) that participated in the submission, on the contest website indefinitely.

By entering, the competitor represents and warrants that:

1. The competitor's entire submission is an original work by the competitor and the competitor has not included third-party content (such as writing, text, graphics, artwork, logos, photographs, likenesses of any third party, musical recordings, clips of videos, television programs, or motion pictures) in or in connection with the submission, unless: (1) otherwise requested by the Prize Administrator and/or disclosed by the competitor in the submission; and (2) the competitor has either obtained the rights to use such third-party content or the content of the submission is considered in the public domain without any limitations on use.
2. Unless otherwise disclosed in the submission, the use thereof by the Prize Administrator, or the exercise by the Prize Administrator of any of the rights granted by the competitor under these rules, does not and will not infringe or violate any rights of any third party or entity, including, without limitation, patent, copyright, trademark, trade secret, defamation, privacy, publicity, false light, misappropriation, intentional or negligent infliction of emotional distress, confidentiality, or any contractual or other rights.
3. All persons who were engaged by the competitor to work on the submission or who appear in the submission in any manner have: (1) given the competitor their express written consent to enter the submission for exhibition and other exploitation in any manner and in any and all media, whether now existing or hereafter discovered, throughout the world; (2) provided written permission to include their name, image, or pictures in or with the submission (or, if including a minor who is not the competitor's child, the competitor must have the permission of the minor's

parent or legal guardian), and the competitor may be asked by the Prize Administrator to provide permission in writing; and (3) not been and are not currently under any union or guild agreement that results in any ongoing obligations resulting from the use, exhibition, or other exploitation of the submission.

A.5 Copyright

Each competitor represents and warrants that the competitor is the sole author and copyright owner of the submission; that the submission is an original work of the competitor or that the competitor has acquired sufficient rights to use and to authorize others, including DOE, to use the submission, as specified throughout the Official Rules; that the submission does not infringe upon any copyright or any other third-party rights of which the competitor is aware; and that the submission is free of malware.

A.6 Contest Subject to Applicable Law

This contest is subject to all applicable federal laws and regulations. Participation constitutes each participant's full and unconditional agreement to these Official Rules and administrative decisions, which are final and binding in all matters related to the contest. This notice is not an obligation of funds; the final award is contingent upon the availability of appropriations.

A.7 Resolution of Disputes

DOE is solely responsible for administrative decisions, which are final and binding in all matters related to the contest. Neither DOE nor the Prize Administrator will arbitrate, intervene, advise on, or resolve any matters or disputes between team members or competitors.

A.8 Publicity

Prize winners (collectively, "winners") will be featured on the DOE and NREL websites.

Except where prohibited, participation in the contest constitutes each winner's consent to DOE's and its agents' use of each winner's name, likeness, photograph, voice, opinions, and/or hometown and state information for promotional purposes, through any form of media worldwide, without further permission, payment, or consideration.

A.9 Liability

Upon registration, all participants agree to assume any and all risks of injury or loss in connection with or in any way arising from participation in this contest. Upon registration, except in the case of willful misconduct, all participants agree to and, thereby, do waive and release any and all claims or causes of action against the federal government and its officers, employees, and agents for any and all injury and damage of any nature whatsoever (whether existing or thereafter arising; whether direct, indirect, or consequential; and whether foreseeable or not) arising from their participation in the contest, whether the claim or cause of action arises under contract or tort.

DOE has determined that no liability insurance naming DOE as an insured will be required of competitors to enter this competition per 15 U.S.C. 3719(i)(2). Competitors should assess the risks associated with their proposed activities and adequately insure themselves against possible losses.

A.10 Record Retention and Freedom of Information Act

All materials submitted to DOE as part of a submission become DOE records and are subject to the Freedom of Information Act. Submissions containing material sought to be treated as 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 submission must be marked as follows and must identify the specific pages containing trade secrets and/or confidential, proprietary, or privileged information:

> Notice of Restriction on Disclosure and Use of Data: Pages [list applicable pages] of this document may contain trade secrets and/or confidential, proprietary, or privileged information that is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes. [End of Notice]

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

Competitors will be notified of any Freedom of Information Act requests for their submissions in accordance with 10 CFR part 1004. Competitors may then have the opportunity to review materials and work with a Freedom of Information Act representative prior to the release of materials. DOE will make its own determination about the status of the information and treat it according to its determination. DOE makes the final determination. If a submission includes trade secrets or information that is commercial or financial, or information that is confidential or privileged, it is furnished to the Government in confidence, with the understanding that the information shall be used or disclosed only for evaluation of the application. Such information will be withheld from public disclosure to the extent permitted by law, including the Freedom of Information Act. Without assuming any liability for inadvertent disclosure, DOE will seek to limit disclosure of such information to its employees and to outside reviewers when necessary for review of the application or as otherwise authorized by law. This restriction does not limit the government's right to use the information if it is obtained from another source.

A.11 Privacy

If you choose to provide HeroX with personal information by registering or completing the submission package through the contest website, you understand that such information will be transmitted to DOE and may be kept in a system of records. Such information will be used only to respond to you in matters regarding your submission and/or the contest unless you choose to receive updates or notifications about other contests or programs from DOE on an opt-in basis. DOE and NREL are not collecting any information for commercial marketing.

A.12 General Conditions

DOE reserves the right to cancel, suspend, and/or modify the contest, or any part of it, at any time. If any fraud, technical failure, or any other factor beyond DOE's reasonable control impairs the integrity or proper functioning of the contests, as determined by DOE in its sole discretion, DOE may cancel the contest. Any performance toward contest goals is conducted entirely at the risk of the competitor, and DOE shall not compensate any competitors for any activities performed in furtherance of this prize.

Although DOE may indicate that it will select up to several winners for each contest, DOE reserves the right to only select competitors who are likely to achieve the goals of the program. If, in DOE's

determination, no competitors are likely to achieve the goals of the program, DOE will select no competitors to be winners and will award no prize money.

A.13 Program Policy Factors

Although the scores of the advisory reviewers will be carefully considered, it is the role of the Prize Judge to maximize the impact of contest funds. Some factors outside the control of competitors and beyond the independent advisory reviewers' scope of review may need to be considered to accomplish this goal. In addition to the advisory reviewers' scores, the below program policy factors may be considered in determining winners:

- Geographic diversity and potential economic impact of projects.
- Whether the use of additional DOE funds and provided resources are nonduplicative and compatible with the stated goals of this program and the DOE mission generally.
- The degree to which the submission exhibits technological or programmatic diversity when compared to the existing DOE project portfolio and other competitors.
- The level of industry involvement and demonstrated ability to accelerate commercialization and overcome key market barriers.
- The degree to which the submission is likely to lead to increased employment and manufacturing in the United States or provide other economic benefit to U.S. taxpayers.
- The degree to which the submission will accelerate transformational technological, financial, or workforce advances in areas that industry by itself is not likely to undertake because of technical or financial uncertainty.
- The degree to which the submission supports complementary DOE-funded efforts or projects, which, when taken together, will best achieve the goals and objectives of DOE.
- The degree to which the submission expands DOE's funding to new competitors and recipients who have not been supported by DOE in the past.
- The degree to which the submission enables new and expanding market segments.
- Whether the project promotes increased coordination with nongovernmental entities for the demonstration of technologies and research applications to facilitate technology transfer.
- Whether the submission content sufficiently confirms the competitor's intent to commercialize early-stage technology and establish a viable U.S.-based business in the near future.

A.14 National Environmental Policy Act (NEPA) Compliance

This prize is subject to NEPA (42 U.S.C. 4321, *et seq.*). NEPA requires federal agencies to integrate environmental values into their decision-making processes by considering the potential environmental impacts of their proposed actions. For additional background on NEPA, please see DOE's NEPA website at http://nepa.energy.gov/.

Although NEPA compliance is a federal agency responsibility and the ultimate decisions remain with the federal agency, all participants in the Phase 2 contest will be required to assist in the timely and effective completion of the NEPA process in the manner most pertinent to their participation in the prize competition.

A.15 Definition

"Prize Administrator" in this document represents both NREL and BTO and their staff. Ultimate decision-making authority regarding contest matters rests with the director of the DOE Building Technologies Office.

A.16 Return of Funds

As a condition of receiving a prize, competitors agree that if the prize was made based on fraudulent or inaccurate information provided by the competitor to DOE, DOE has the right to demand that any prize funds or the value of other noncash prizes be returned to the government.

ALL DECISIONS BY DOE ARE FINAL AND BINDING IN ALL MATTERS RELATED TO THE CONTEST.

Equitable, Affordable Solutions to Electrification

An American-Made Challenges Prize Supported by the U.S. Department of Energy

Prize Rules

DECEMBER 2022