AMERICAN MADE
U.S. DEPARTMENT OF ENERGY

Official Rules

Electronics Scrap Recycling Advancement Prize (E-SCRAP)

JANUARY 2025

Preface

The U.S. Department of Energy's **E**lectronics **Sc**rap **R**ecycling **A**dvancement **P**rize (**E-SCRAP**) will be governed by 15 U.S.C. §3719 and this Official Rules document. This is not a procurement under the Federal Acquisitions Regulations and will not result in a grant or cooperative agreement under 2 CFR 200. The Prize Administrator reserves the right to modify this Official Rules document if necessary and will publicly post any such notifications as well as notify registered prize participants.

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Modification Summary

Date	Modifications
Revision 1 January 2025	Page 11: Clarified Phase 1 language Page 24-25, 28: Modified additional Phase 2: Prototype submission questions and/or materials Page 25-28, 30: Adjusted weight for Phase 2: Prototype narrative questions Page 32, 36, 39: Modified additional Phase 3: Demonstrate submission questions and/or materials

Program Summary

1.1 Introduction

The U.S. Department of Energy (DOE) Office of Advanced Materials and Manufacturing Technologies Office (AMMTO) is launching the American-Made **E**lectronics **Sc**rap **R**ecycling **A**dvancement **P**rize (**E-SCRAP**) $3.95 million in prizes**,** this three-phase prize is designed to stimulate innovative approaches that reduce the costs and environmental impact of critical material recovery[1] from electronics scrap (e-scrap).[2] Competitors will optimize, validate, and integrate new and improved approaches along the entire recycling value chain[3] to increase the production and use of recovered critical materials. Competitors can win up to $800,000 in cash and $150,000 in national laboratory analysis support.

This prize focuses on innovative approaches, processes, or technologies in service of optimizing and implementing critical material separation and recovery from e-scrap. The prize is open to any competitor who works in waste collection and management, dismantling and sorting, separation, refining, validation, and material supply. This is a nonexhaustive list and those who are working in the recycling value chain are encouraged to apply.

Competitors are expected to:

- Build partnerships across the recycling value chain to optimize and integrate critical material separation and recovery technologies.
- Develop and demonstrate innovations along the recycling value chain to enhance the recovery of critical materials from e-scrap.
- Select at least one challenge (technical, supply chain,[4] or related logistics hurdle) that needs further development and establish high impact opportunities (co-recovery, feedstock flexibility, information sharing, material benchmarking) that will increase the domestic supply of critical materials from e-scrap.
- Create or enhance supply chains to increase material circularity (e.g., accelerating connectivity between collection, sorting, pretreatment, processing, refining, validation, and material qualification).

E-SCRAP offers more than $3 million in cash prizes and $900,000 in technical assistance for analysis, such as life cycle analysis (LCA) or techno-economic analysis (TEA). This prize seeks to build connectivity across the e-waste recycling value chain by working towards a demonstration of critical material recovery and subsequent use in new products, thereby displacing virgin feedstocks. The prize will emphasize data transparency between partners empowered by TEA and LCA. Analysis and assessment will validate, optimize, and streamline the integration of new and existing technologies across the recycling value chain. As competitors work to win cash prizes, they will be connected with a national lab to gain insights from analysis to inform cost and environmental impacts and support process and technology improvement, resulting in the long-term success of participants and U.S. manufacturing. Support will be provided by the following national laboratories: Argonne National Laboratory (Argonne), Idaho National

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[1] Recovery is inclusive of any circular economy pathway that allows reintroduction of critical materials from end-of-life products back into the economy. For example, it could be via recycling to recover a raw material feedstock or through the remanufacture of a critical material containing component.

[2] E-scrap can include communication devices such as mobile phones, home appliances, medical or office equipment—anything powered by electricity.

[3] "Recycling value chain" refers to the activities or processes that add value as materials are recovered from end-of-life products through the reintroduction of that material into the economy in a new product.

[4] "Supply chain" refers to the creation and/or production of products or goods that use critical materials (turbines, motors, batteries, solar panels, electronics, etc.)

Laboratory (INL), Lawrence Berkeley National Laboratory (LBL), National Renewable Energy Laboratory (NREL), Oak Ridge National Laboratory (ORNL), and Pacific Northwest National Laboratory (PNNL).

1.2 Background

1.2.1 Administration Goals

As the United States and the world confront the challenge of climate change, DOE is working to develop secure supply chains for the critical minerals and materials that are integral to building a clean energy economy. The United States is working towards a goal of having 50% of all new vehicle sales be electric vehicles (EVs) by 2030, a 100% greenhouse gas emissions-free electricity sector by 2035, and a net-zero carbon economy no later than 2050. Robust, sustainable domestic supply chains of critical materials are a vital piece to this transition.

Critical materials serve as the building blocks for clean energy technologies. They're used in the manufacturing of magnets for wind turbine generators, batteries for electric vehicles and grid storage, semiconductors for solar panels, electrolyzers to produce hydrogen, fuel cells, and more. In many cases, they are difficult to substitute, or if they are substituted, the efficiency of the technology is reduced.

Right now, we need to increase our domestic supply of critical materials to combat climate change, respond to emerging challenges and opportunities, and strengthen our energy independence. To have globally competitive supply chains, we need to increase efficiency and circularity while decreasing environmental and health impacts of conventional mining and manufacturing.[5]

1.2.2 What is a Critical Material?

DOE determines critical materials by their importance to clean energy and risk of supply disruption.[6] Globally, critical material demand is set to skyrocket by 400–600% over the next several decades, and, for minerals such as lithium and graphite used in electric vehicle (EV) batteries, demand will increase by even more—as much as 4,000% to meet climate goals.[7] The supply of these critical materials is susceptible to disruption caused by a lack of production, price volatility, increasing demand, non-market actions, and geographically concentrated production. As recent supply shortages have underscored, supply disruption can have ripple effects in crucial sectors of manufacturing. DOE's 2023 Critical Materials Assessment[8] identifies which materials are critical and near critical in both the short term (2020–2025) and long term (2025–2035). In all, DOE determined that all materials assessed as critical or near critical materials in either the short or medium term. Critical materials important to energy, based on the DOE's determination are:

> Aluminum, cobalt, copper, dysprosium, electrical steel, fluorine, gallium, iridium, lithium, magnesium, natural graphite, neodymium, nickel, platinum, praseodymium, silicon, silicon carbide, and terbium.

For more information, consult the Critical Materials Assessment.

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[5] https://www.whitehouse.gov/climate

[6] Section 7002(a)(2) of the Energy Act of 2020 (codified at 30 U.S.C. § 1606(a)(2)) authorizes the Secretary of Energy to determine critical materials according to the following statutory definition of a "critical material": Any non-fuel mineral, element, substance, or material that the Secretary of Energy determines: (i) has a high risk of a supply chain disruption; and (ii) serves an essential function in one or more energy technologies, including technologies that produce, transmit, store, and conserve energy; or a critical mineral [as designated by the Secretary of the Interior]

7 https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions .

[8] Critical Materials Assessment

1.2.3 Circular Economy Is a Pillar of DOE's Critical Mineral and Materials Strategy

DOE envisions reliable, resilient, affordable, diverse, sustainable, and secure domestic critical mineral and materials supply chains that support the clean energy transition and decarbonization of the energy, manufacturing, and transportation economies while promoting safe, sustainable, economic, and environmentally just solutions to meet current and future needs.[9] Part of DOE's strategy[10] to realizing its vision is to build a circular economy. Circular economy approaches extend the circulation of materials and products over multiple lifecycles to support economy-wide decarbonization, material security, and environmental sustainability. As the United States advances its clean energy transition and decarbonization of the energy, manufacturing, and transportation sectors, circular approaches become pivotal to mitigating supply chain vulnerabilities by unlocking domestic critical material sources. These approaches include reuse, repair, refurbish, repurpose, and recycle.[11] Moreover, such recycling approaches can produce critical material and critical-material-dependent products with limited adverse impacts and, in many instances, yield improved outcomes for both communities and the environment.[12],[13] We encourage competitors to explore the innovations from DOE's investments into critical material separation technologies as pathways to optimize and integrate critical material recovery from electronic waste streams.[14]

1.2.4 Opportunity of E-Scrap Recycling

E-scrap recycling can be a useful source to obtain critical materials. Examples of e-scrap include communication devices such as mobile phones, home appliances, medical or office equipment—anything powered by electricity. E-scrap represents the fastest growing waste stream with global e-scrap production projected to double 2014 levels by 2030. Nearly 83% of e-scrap was landfilled in 2019, representing a $47B value.[15] Electronics contain critical materials that are the building blocks to many of the clean energy technologies driving the U.S. transition to an electrified and carbon-free future. When diverted to waste, the increasing rate of e-scrap produced by consumers poses health and environmental challenges in the United States and across the globe where electronic waste is shipped. Diverting and reusing e-scrap materials through circular economy approaches such as recycling represents an opportunity to extend the useful life of critical materials and reduce the adverse effects of wasted e-scrap.

In addition to the environmental and economic benefits, expanding and establishing domestic e-scrap recycling can further Justice40[16] benefits because it will remediate pollution, increase environmental justice, provide workforce opportunities, and reintroduce recovered materials into domestic supply chains. See Appendix 2 for more information on Community Benefits.

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[9] What Are Critical Materials and Critical Minerals? | Department of Energy

[10] Critical Minerals & Materials Program | Department of Energy

[11] Potting, J., M. Hekkert, E. Worrell, and A. Hanemaaijer. 2017. "Circular Economy: Measuring Innovation in the Product Chain." The Hague, Netherlands: PBL Netherlands Environmental Assessment Agency. https://www.pbl.nl/sites/default/files/downloads/pbl-2016-circular-economy-measuring-innovation-in-product-chains-2544.pdf

[12] https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf

[13] https://www.whitehouse.gov/briefing-room/presidential-actions/2021/02/24/executive-order-on-americas-supply-chains/

[14] CRITICAL MINERALS & MATERIALS PROJECTS DATABASE

[15] Forti V., Baldé C.P., Kuehr R., Bel G. The Global E-waste Monitor 2020: Quantities, flows and the circular economy potential. United Nations University (UNU)/United Nations Institute for Training and Research (UNITAR) – co-hosted SCYCLE Programme, International Telecommunication Union (ITU) & International Solid Waste Association (ISWA), Bonn/Geneva/Rotterdam. GEM_2020_def_july1_low.pdf (ewastemonitor.info)

[16] Justice40 Initiative Fact Sheet

E-scrap recycling faces numerous challenges, including a fragmented recycling value chain, a complex and dynamic feedstock, and a rapidly evolving end-use market. In addition, information sharing on e-waste feedstock composition, contaminants, potential co-products, volume flow rates, concentration economics, and environmental and human hazards is necessary to enhance material recovery. Current practices are chemical and energy intensive, which pose a threat to environmental and human health. As e-scrap recycling technologies are developed and optimized, life cycle assessments and technoeconomic analysis (LCA/TEA) can help validate whether e-scrap streams are secure and sustainable source of critical materials compared to virgin feedstocks. See more information about LCA/TEA in Appendix 1.

DOE is compelled to enhance the stewardship of e-scrap because of its potential to bolster the recovery of critical materials from electronic waste streams and decarbonize the U.S. economy. DOE has invested in the research and development of numerous material separation technologies to recover critical materials from electronics scrap, including electrochemical recovery, bioleaching, membrane separation, acid-free dissolution, and automated disassembly. While a lot of progress has been made toward developing technologies to recover critical materials from e-scrap, the benefits to the U.S. critical materials supply chain, the environment, and society, cannot be realized without robust validation and integration efforts. Coordination between sorting and separation can co-optimize the processes to achieve economically competitive critical material recovery. Innovation is also needed to facilitate the integration of the separation technologies into the recycling value chain.

Therefore, the time is now for DOE to convene innovators, entrepreneurs, recyclers, and material markets to enable sustainable critical materials sources in the United States. The Prize is designed to stimulate circular supply chains in domestic manufacturing of critical materials as well as identifying, advancing, and testing innovative technologies and approaches by increasing awareness of opportunities to extend the lifetime of products in the economy through circularity.

1.3 Areas of Interest

E-SCRAP is interested in innovations that enhance the recovery of critical materials along the recycling value chain from end-of-life (EOL) products to reintroduction. Innovations of interest are those that optimize and implement critical material separation and recovery from electronics scrap.

Examples of innovations of interest include:

- Innovations focused on electronics scrap and could include communication devices such as mobile phones, home appliances, medical or office equipment—anything powered by electricity.
- Innovations that establish or expand the supply chains of the following critical materials for clean energy: aluminum, cobalt, copper, dysprosium, electrical steel, fluorine, gallium, iridium, lithium, magnesium, natural graphite, neodymium, nickel, platinum, praseodymium, silicon, silicon carbide, and terbium.
- Innovative approaches, processes, or technologies with improvements to collection and management of scrap, dismantling and sorting, separation, refining, validation, and material supply that serve the optimization and integration of critical material separation and recovery technologies from e-scrap.
- Innovative approaches, processes, or technologies in service of optimizing and implementing critical material separation and recovery from e-scrap.
- Innovative approaches to multiple recovery pathways including:
    - Material separation (e.g., Nd separation from shredded e-scrap)
    - Component recovery (e.g., targeted disassembly for removal of permanent magnets from motors or hard stick drives)
    - Reuse (e.g., recovery, validation, and integration of second-life magnets into electronic or energy applications)

- Integrated recycling value chains that optimize feedstock concentration (sorting and pretreatment) and material separation (e.g., electrochemically) to produce Nd from e-scrap.
- Innovative approaches to recovering one or more critical materials and value-added products in parallel or in series from e-scrap.

1.4 Areas Not of Interest

A nonexhaustive list of examples of innovations not of interest include:

- Separation or recovery of materials from batteries unless paired with the recovery of critical materials from other electronic devices.
- Research and development efforts that have not yet been proved at bench scale.

1.5 Prizes

There are three distinct Contests to which competitors can compete in as part of this prize: the *Phase 1: Incubate Contest*; the *Phase 2: Prototype Contest*; and the *Phase 3: Demonstrate Contest*. Collectively, these contests fast-track efforts to increase the domestic production and use of recovered critical materials by validating and demonstrating new and improved approaches along the recycling value chain from end-of-life (EOL) to reintroduction.

1.5.1 Phase 1: Incubate Contest

During the *Phase 1: Incubate Contest*, competitors will identify innovations that have the potential to substantially increase or expand the amount of critical materials recovered from electronics waste and to be used in U.S. manufacturing. Winners will receive $50,000 in cash and $30,000 of analysis technical assistance from one of the identified national laboratories. The funding and technical assistance are intended to help the competitor further develop their approach during *Phase 2*.

1.5.2 Phase 2: Prototype Contest

During the *Phase 2: Prototype Contest*, competitors will prototype their innovation and begin collecting and/or generating data that can be used to optimize technoeconomic strategy and life cycle impacts between partners along the recycling value chain. Winners will receive $150,000 in cash and $120,000 in analysis technical assistance provided by one of the identified national labs. The funding and technical assistance are intended to help the competitor further advance their approach during *Phase 3*. Selected winners are eligible to compete in the *Phase 3: Demonstrate Contest*.

1.5.3 Phase 3: Demonstrate Contest

During the *Phase 3: Demonstrate Contest*, competitors will begin implementing their innovation and identify how it will scale. Winners will receive $600,000 in cash. They will utilize technical assistance to optimize and validate the integration of their process or technology into the e-scrap recycling value chain.

1.5.4 Total Funding

In each phase, competitors will be evaluated by a panel of reviewers based on the criteria set in each contest rules. DOE will select winners based on reviewer input and the impact the proposed approach has on supply chains and may have on the manufacturing industry. The three phases offer more than $3 million in cash prizes and $900,000 in analysis technical assistance.

Table 1. Prize Phase Funding

Contest	Duration (Months)	Winners	Prize
Phase 1: Incubate	Six months	Up to 10	$50,000 in cash and $30,000 of analysis consulting during *Phase 2*
Phase 2: Prototype	Nine months	Up to five	$150,000 in cash and $120,000 in analysis technical support during *Phase 3*
Phase 3: Demonstrate	12 months	Up to three	$600,000 in cash

To learn more and sign up, go to www.herox.com/ESCRAP-Prize.

1.6 Important Dates

Please refer to HeroX for important dates: www.herox.com/ESCRAP-Prize

1.7 All Phase Eligibility Requirements

The competition is open only 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 are eligible to 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 (e.g., 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.
- NREL employees not involved in the administration of the prize and all other national lab employees, including laboratory researchers, may participate as private individuals, provided they do not use their facilities at the national laboratories.
- 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 for participating in Federal programs are not eligible to compete.

- Individuals participating in a foreign government talent recruitment program[17] sponsored by a country of risk[18] and teams that include such individuals are not eligible to compete.
- Entities owned by, controlled by, or subject to the jurisdiction or direction of a government of a country 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 providing this submission package as part of my participation in this prize. I understand that the information contained in this submission will be relied on by the federal government to determine whether to issue a prize to the named competitor. 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 and § 287, and 31 U.S.C. §§ 3729-3733 and 3801-3812.

In keeping with the goal of growing a community of innovators, competitors are encouraged to form multidisciplinary teams while developing their concept. The HeroX platform provides a space where parties interested in collaboration can post information about themselves and learn about others who are also interested in competing in this contest.

1.7.1 Phase 1: Incubate Contest Eligibility

- Competitors may submit a maximum of two submissions. If more than two submissions are received from a competitor, the two most recently submitted submissions will be considered. Only one submission per competitor can win Phase 1.
- Competitors can be partners on multiple submissions but may only be the lead competitor on one funded submission. *Note: The cash prize award will be paid to the lead competitor as identified in the submission, if selected.*

1.7.2 Phase 2: Prototype Contest Eligibility

- Competitors can include winners and nonwinners from the Incubate Contest as well as new competitors.
- Competitors must be a for-profit business entity, such as a corporation or other organization that is formed in and maintains a primary place of business in the United States. Individuals or groups of individuals are not eligible to compete.
- Winning nonfederal government entities from Phase 1 will need to partner with a private entity.

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

[18] DOE has designated the following countries as foreign countries of risk: Iran, North Korea, Russia, and China. This list is subject to change.

- Winning individuals from Phase 1 will need to form a legal for-profit private entity to participate in Phase 2.

1.7.3 Phase 3: Demonstrate Contest Eligibility

- Only the winning private entities of the Prototype Contest are eligible to compete in the Demonstrate Contest.
- Competitors must be a for-profit business entity, such as a corporation or other organization that is formed in and maintains a primary place of business in the United States. Individuals or groups of individuals are not eligible to compete.

1.8 Program Goal Requirements

Only submissions relevant to the goals of this program are eligible to compete. The Prize Administrator must conclude that all the following statements are **true** when applied to your submission:

- The proposed approach establishes new or expands existing viable commercial enterprises.
- The proposed innovative approaches, processes, or technologies should establish or expand economically recovery of critical materials from electronics scrap.
- The competitor's submission enables or facilitates the recovery of critical materials from e-scrap.
- The competitor's submission enables a viable pathway of integrating critical material recovery into a domestic supply chain.
- The competitor will optimize and validate the efficiency or yield of critical materials from e-scrap.
- The proposed approach includes representation from multiple stages in the recycling value chain.
- The proposed innovation or approach establishes new or expands existing critical materials supply chains.
- The proposed innovation will move the industry beyond its current state.
- The proposed innovation does not involve the lobbying of any federal, state, or local government office.
- The proposed innovation is based on fundamental technical principles and is consistent with a basic understanding of the U.S. market economy.
- The proposed innovation is not a standalone theoretical modeling and analysis efforts.
- The proposed innovation has a clear financial or recycling value chain path to implementation.
- The submission content sufficiently confirms the competitor's intent to implement their innovation in a viable, U.S.-based supply chain in the near future. The commercial viability cannot solely depend on licensing fees of intellectual property.

1.9 Additional Requirements

Please read and comply with additional requirements in Appendix 1.

COMPETITORS WHO DO NOT COMPLY WITH THESE REQUIREMENTS MAY BE DISQUALIFIED.

Phase 1: Incubate Contest Rules

2.1 Introduction

The Incubate Contest is the first in E-SCRAP and has a total of $500,000 in cash prizes and $300,000 in national lab analysis support. Anyone meeting the eligibility requirements can compete in the Incubate Contest. **The following rules are for competitors in the Incubate Contest.** "You" and "your" reference competitors in the contest.

Incubate Contest Prizes
• Up to 10 winners • $500,000 in total cash prizes. Each winner receives a cash prize of $50,000 and $30,000 of analysis consultation from a national lab during Phase 2.

2.2 Goal

The Incubate Contest is seeking to award competitors who identify an innovation that will optimize and integrate critical material recovery processes and technologies into the e-scrap recycling value chain. Innovations will advance the economic competitiveness and environmental impacts of e-scrap recycling technologies and processes beyond the status quo[19] to establish or expand domestic critical material recovery.

The goal of the Incubate Contest period is focused on three key areas:

- **Opportunity and Innovation Identification:** Identify and describe what innovations are needed and what impact they will have on recovered critical materials from e-scrap.
- **Plan Development**: Develop a plan to validate and optimize the benefits of the innovation, including how it will be integrated into the recycling value chain.
- **Stakeholder Representation and Connectivity**: Identify partners in the recycling value chain that will provide inputs (upstream) or handle outputs (downstream) from the innovation's process or technology.

2.3 Prizes to Win

The Incubate Contest offers up to 10 cash prizes of $50,000 and $30,000 of analysis consultation from one of the identified national labs.

2.4 How to Enter

To enter the competition, complete a submission package online at www.herox.com/ESCRAP-Prize before the contest closing date.

2.5 Incubate Contest Process

The Incubate Contest consists of three steps:

1. **Identification and Submission** – Competitors will identify an innovation that will advance the status quo to deliver economic/environment improvements relative to the status quo. Potential teams should read the entire rules document and be familiar with the goals and submission requirements for the Phase 1 Contest. Competitors must complete their submission packages and submit online before the Incubate Contest closes.

19 Status Quo: improvement beyond technology that has been in operation past 10 years.

2. **Assessment** – The Prize Administrator screens submissions for eligibility and completion and assigns subject-matter expert reviewers to independently score the content of each submission. The judging criteria assess the following (more details can be found in Section 2.6).
   - **Innovation**: What is your innovation and why will it be impactful?
   - **Value Chain Insight & Opportunity**: How does your innovation integrate into the recycling value chain?
   - **Accomplishments and Team**: Does your team have the knowledge and experience to be successful? What have you accomplished to date?
   - **Plan**: What is your plan to implement the innovation?
3. **Announcement** – After the winners are publicly announced, the Prize Administrator notifies them and requests the necessary information to distribute cash prizes. After winning the Incubate Contest, winners go on to develop and refine their innovations in accordance with their plan to compete in the Prototype Contest.

2.6 What to Submit and Evaluation Criteria

A complete submission package for the Incubate Contest should include the following items:

- 90-second video (to be made public)
- Cover page
- Narrative that answers four questions about the innovation, value chain insight and opportunity, accomplishments and team, and plan (not to exceed 2,500 words)
- Summary PowerPoint slide (to be made public)
- Analysis support work slide
- Letters of support (optional)

All documents other than the video **must be uploaded as a PDF**.

> **Note**: Portions of the submission package are made available to the public. These have been denoted as such, and DOE does not intend to release the remaining parts of the submission to the public. See Appendix 1 for additional details.

Expert reviewers will evaluate your submission by assigning a single score for each scored submission section, based on their overall agreement or disagreement with a series of statements. Each section will be evaluated on a scale of 0 (strongly disagree) to 5 (strongly agree), as shown in Table 2.

Table 2. Evaluation Scale for Expert Reviewers

0	1	2	3	4	5
strongly disagree	disagree	slightly disagree	slightly agree	agree	strongly agree

2.6.1 Online Public Video

The video should answer your question: What is your innovation?

Suggested content you provide includes:

- The opportunity
- Your solution and why it is transformative.
- Who you are and why you will be successful.

Post your *publicly accessible,* 90-second video online (e.g., YouTube).

Be creative and produce a video that conveys the required information in exciting and interesting ways, but do not focus on time-consuming activities that only improve production values (i.e., technical elements such as décor, lighting, and cinematic techniques). Assistance from others with experience in this area may be helpful. Members of the American-Made Network may be able to help you create your video.

2.6.2 Cover Page

The cover page must list the following basic information about your submission:

- Project name
- Link to your 90-second online video
- Team members (names, contacts, and links to their LinkedIn profiles)
- Your city, state, and nine-digit zip code
- Website (if applicable)

2.6.3 Narrative

You should answer each of the following four questions provided in Table 3. The content bullets are only suggestions to guide your responses. You decide where to focus your answers. The individual answers to the four questions do not have a word limit; however, **the aggregate response to these four questions must not exceed 2,500 words,** not including captions, figures/graphs, and references. A word count must be included at the end of your submission (see template for details). You may also include **up to five supporting images, figures, or graphs**. The reviewers will score the questions based on the content you have provided. The narrative should be submitted as a PDF file.

Use the following template: https://www.herox.com/ESCRAP-Prize/resource/1688

Table 3. Topics to Address in the Phase 1: Incubate Narrative

Topic and Percent of Score	Suggested Content to Include	What the Score Will Be Based On
Question 1: ***Innovation*** What is your innovation and why will it be impactful? This section is 25% weight of your total score.	• Describe the innovation, its value proposition, and how it will deliver an expansion of critical materials recovered from e-scrap. • Describe how your innovation improves on the status quo from an environmental impact standpoint while maintaining economic competitiveness using evidence-based validation (e.g., product-market fit, interviews, case studies, literature).	• The competitor identifies an innovation that advances the recovery of critical materials from e-scrap and provides a clear value proposition. A considerable amount of high-quality effort was put into defining the opportunity and advancing the innovation concept. • The competitor comprehensively describes the innovation's expected impacts (economic competitiveness and/or life-cycle

	• Describe how you will leverage opportunities to continue advancing your innovation to improve beyond its current status by using metrics and the expected capacity. • Indicate how your innovation can expand or establish the recovery of critical materials from e-scrap. Where possible, indicate the potential to recover multiple critical materials and noncritical material co-products. • Describe challenges with e-scrap recycling that can impact disadvantaged, underserved, and/or marginalized communities and the benefit your proposed innovation will reduce or eliminate the issues.	impact of critical materials recovery) beyond the status quo. • The competitor provides a compelling case for how the innovation will continue to advance beyond its current state through feedstock processing and validation, improved performance (e.g. yield, life cycle impacts, concentration), and capacity growth. Competitor provides an example that demonstrates how their innovation moves beyond the existing technology. • The competitor indicates the potential to produce multiple streams of critical materials and/or noncritical coproducts from identified feedstock(s). • The competitor demonstrates insight into the impact e-scrap recycling can have on disadvantaged, underserved, and/or marginalized communities. This includes environmental and economic benefits, hazards, and workforce implications.
Question 2: ***Value Chain Insight and Opportunity*** How does your innovation integrate into the recycling value chain? This section is 25% weight of your total score.	• Explain why the opportunity has not yet been realized and why now is the right time to address it. • Detail how your innovation enables the optimization and/or integration of critical material separation technologies into the complete recycling value chain, particularly between end-of-life and reintroduction phases. Explain the ripple effects and impacts on other stakeholders within the recycling value chain due to your innovation, emphasizing environmental and economic viability improvements in the supply chain. • Provide details on anticipated challenges to successfully realizing the recycling value chain opportunity and how this innovation can overcome these challenges.	• The competitor demonstrates an understanding of the opportunity, why it has not yet been realized, and why now is the right time to address it. • The competitor identifies and clearly explains an opportunity to expand capacity for critical materials recovered from e-scrap that, if realized, will deliver substantial environmental and economic benefits. • The competitor demonstrates insight into the full recycling value chain (waste stream, processes needed, end markets) and provides estimates of expected impacts based on reasonable assumptions. • The competitor describes the approach to utilize partnerships

	• Highlight existing information gaps within the recycling value chain and explain how your strategy involves partnerships and engagement will address them. • Describe the inputs and outputs based on your role in the recycling value chain and how you will engage with entities upstream and downstream from your operations to optimize the economics and life cycle impacts of recycling.	and engagement across the recycling value chain to close existing information gaps by optimizing and integrating the innovation. • The competitor provides comprehensive detail on the inputs and outputs relevant to the innovation's role within the recycling value chain and provides proactive strategies for engaging with entities upstream and downstream.
Question 3: ***Accomplishments and Team*** Does your team have the knowledge and experience to be successful? What have you accomplished to date? This section is 20% weight of your total score.	• Introduce your team and describe the team makeup. Highlight knowledge, experience, and skills that make your team capable of realizing the innovation. • Describe your team's readiness to meet your goals and whether your team requires additional talent and/or resources. Identify any potential gaps and how the team will overcome them. • What partnerships does your team currently have and what partnerships does your team still need to form to be successful? • Indicate representation of organizations across the recycling value chain through partnerships, agreements, and connections that facilitate material flow and information sharing. This can include collection, sorting, separation, recovery, refining, and validation of materials.	• The team is diverse and has the knowledge, experience, and skills to realize the innovation. • The team has identified any relevant gaps in resources to be addressed. • The team demonstrates a comprehensive network of partnerships or affiliations across the recycling value chain relevant to the innovation and the team clearly outlines how they will engage partnerships that are currently lacking. • The team spans multiple stages of the recycling value chain to inform optimization and off-takes that validate innovative approaches to establishing and expanding critical material production from e-scrap.
Question 4: ***Plan*** What is your plan to implement the innovation?	• Describe where you stand in your innovation's development cycle and develop a plan with SMART[20] goals to advance your innovation from the current state toward implementation in a viable supply chain.	• The stated goals are ambitious and show commitment to an accelerated development timeline. Meeting them will demonstrate critical progress toward implementing the innovation. • The proposed metrics are clear,

20 A SMART action plan incorporates five characteristics of a goal: specific, measurable, attainable, relevant, and time-based. For more information about SMART goal planning, see: https://www.atlassian.com/blog/productivity/how-to-write-smart-goals.

This section is 20% weight of your total score.	• Describe your team's proposed metrics that will be used to determine success. • Describe risks and mitigation strategies to your innovation and how you will address them. • Demonstrate an understanding of the adoption readiness levels and indicate adoption risks of the technology and how you plan to decrease those risks.[21] • How will you leverage analysis support in Phase 2 from a national lab? • Describe any analysis that has done been previously. • Describe how you will validate the continued advancement of your technology or process. • Describe the specific strategies and activities that you plan to use to engage, educate, gain trust, and obtain buy-in from disadvantaged, underserved, and/or marginalized communities.	well defined, and enable actionable steps toward progressing the optimization, validation, and integration of the technology or process. • The competitor showcases proactive risk management with effective and viable strategies to mitigate identified risks. • The competitor demonstrates an understanding of the core risk areas facing adoption readiness and outlines a plan to decrease those risks. • The competitor clearly outlines past analysis experiences and their relevance in demonstrating the team's capability to effectively utilize the support. • The competitor indicates what they aim to learn from the analysis consultation with a national lab and how the analysis will help them gain insights to inform design improvements, increasing the innovation's impact in a viable supply chain. • The approach to engage disadvantaged, underserved, and/or marginalized communities describes at least one measurable goal with concrete actions and is likely to be successful.
Reviewer Recommendation This recommendation is 10% weight of your total score.	There is no direct corresponding submission requirement for this score. Rather, it is an overall assessment of the total potential impact of the innovation compared to the team's likelihood of success.	The submission demonstrates a potentially impactful innovation with a strong likelihood of success.

2.6.4 Submission Summary Slide

The summary slide should be a PowerPoint slide submitted as a PDF. It will be made public.

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Make your own public-facing, one-slide submission summary that contains technically specific details but can be understood by most people. There is no template, so feel free to present the information as you see fit. Please make any text readable in a standard printout and conference room projection.

2.6.5 Analysis Support Work Slide

The analysis support work slide should be a PowerPoint slide submitted as a PDF.

It should:

- Briefly describe any analysis, such as LCA or TEA, you have already done.
- Describe how the technical support and consultation for analysis from the national labs will help you deepen your insights into the recycling value chain opportunity and advance your innovation.
- State any preference of which lab (Argonne, INL, LBL, NREL, ORNL, and PNNL) you would like to provide analysis support and the reason for the preference.

2.6.6 Letters of Support (Optional)

Competitors may also attach one-page letters of support or intent from other relevant entities (e.g., potential users/partners of the proposed innovation). Letters of support from partners or others that are critical to the success of their proposed solution will likely increase their score. General letters of support from parties that are not critical to the execution of a competitor's solution will likely not factor into their score. A letter of support must not exceed one page. All letters must be combined into a single PDF document.

2.7 Scoring Process

Only submissions that meet the eligibility criteria and include the five elements will pass the Phase 1 screening for eligibility. Ineligible submissions will not be reviewed by the advisory reviewer panel and will not be considered for award.

The scoring of submissions will proceed as follows:

1. **Screening:** The Prize Administrator and DOE will screen each application for overall eligibility and completeness. Each submission must have the main elements requested as part of the submission package:
   1.1. Online Public Video
   1.2. Cover page
   1.3. Narrative, including answers to all four areas
   1.4. Submission Summary Slide
   1.5. Analysis Support Work Slide
   1.6. Letters of Support (Optional)

2. **Scoring:** A panel of expert reviewers will read, score, and comment on each submission. The narrative questions receive a weighted score based on the bulleted list of statements. The final score from an individual reviewer[22] for a submission package will be calculated based on the weighing shown in Table 4. All reviewers' scores will then be averaged for a final reviewer score for the submission package. The final review process considers reviewer scores when deciding the winners of the awards.

[22] Reviewers may not have personal or financial interests in, or be an employee, officer, director, or agent of, any entity that is a registered participant in this contest or have a familial or financial relationship with an individual who is a registered competitor.

Table 4: Scoring Weight for Incubate Phase Submission

Question	Weight (%)
Narrative Question 1 – Innovation	25
Narrative Question 2 – Value Chain Insight and Opportunity	25
Narrative Question 3 – Accomplishments and Team	20
Narrative Question 4 – Plan	20
Reviewer Recommendation	10

3. **Reviewer Comments:** Expert reviewers also provide comments on the submissions they review. The Prize Administrator intends to provide comments to teams after the winners are announced for each phase. These comments are intended to help teams continue to improve and iterate on their work. The comments are the opinions of the expert reviewers and do not represent the opinions of DOE.

4. **Interviews**: The Prize Administrator may decide to hold a short virtual or in-person interview with a subset of the teams. Interviews would be held prior to the announcement of winners and would serve to help clarify questions the Prize Administrator may have. Attending interviews is not required, and interviews are not an indication of winning.

The final determination of winners takes reviewer scores, discussions with reviewers (if applicable), interview findings (if applicable), and the program policy factors listed in Appendix 1 into account. DOE is the judge and final decision maker and may elect to award all, none, or some of the submissions accepted at each submission deadline.

2.8 Additional Requirements

Please read and comply with additional requirements in Appendix 1.

COMPETITORS WHO DO NOT COMPLY WITH THESE REQUIREMENTS MAY BE DISQUALIFIED.

Phase 2: Prototype Contest Rules

3.1 Introduction

The Prototype Contest is the second in the E-SCRAP three-contest series, and it offers a total of $750,000 in cash prizes and $120,000 in analysis technical assistance. Any competitor meeting the Phase 2 eligibility requirements can compete in the Prototype Contest. Winning the Prototype Contest is required to compete in the Demonstrate Contest. **The following rules are for competitors interested in the Prototype Contest. "You" and "your" refer to competitors in the contest.**

Prototype Contest Prizes
• Up to five winners • $750,000 in total cash prizes • Each winner receives a cash prize of $150,000 and $120,000 in analysis from a national lab.

3.2 Goal

The Prototype Contest is seeking to award competitors who demonstrate progress in developing their innovation while collecting and/or generating data that can be used to optimize technoeconomic strategy of critical material separation and recovery between partners along the recycling value chain.

The goal of the Prototype Contest period is focused on three key areas:

- **Deepen Insight:** Leverage national laboratory expert analysis consultation and/or other resources to understand and evaluate the environmental, economic, and supply chain benefits of the innovation and e-scrap recycling value chain.
- **Validate Innovation:** Advance innovation toward implementation in a recycling value chain by proving the technology or process reliability recovers high quality critical materials in a relevant recycling value chain with improved environmental and/or economic benefits over the status quo.
- **Share Information** Cooperate with entities upstream and downstream to optimize processes for economic and environmental efficiency by sharing technoeconomic benefits and tradeoffs to incorporating critical materials recovery into the e-scrap recovery recycling value chain.

3.3 Prizes to Win

The Prototype Contest offers up to five cash prizes of $150,000 and $120,000 in analysis from a national lab.

3.4 How to Enter

Complete a submission package online at www.herox.com/ESCRAP-Prize before the contest closing date.

3.5 Prototype Contest Process

The Prototype Contest consists of three steps:

1. **Preparation and Submission** – Competitors will integrate their innovations and connections into the recycling value chain to validate and optimize benefits.
2. **Assessment** – The Prize Administrator screens submissions for eligibility and completion and assigns subject-matter expert reviewers to independently score the content of each submission. The judging criteria assess the following (more details can be found in Section 3.6).
   - **Innovation Advancement:** How has your innovation progressed towards implementation?
   - **Value Chain Coordination:** What partnerships have been made and how will they be leveraged?

- **Data and Analysis:** How are you generating needed data for analysis and how will these insights advance the innovation?
- **Value Chain Integration:** How is the innovation optimized to connect with upstream and downstream partners?
- **Plan:** How will you engage across the recycling value chain and advance your innovation in an informed way?

3. Announcement – After the winners are publicly announced, the Prize Administrator notifies them and requests the necessary information to distribute cash prizes. After winning the Prototype Contest, winners go on to develop and refine their innovations in accordance with their plan to compete in the Demonstrate Contest.

3.6 What to Submit and Evaluation Criteria

A complete submission for the Prototype Contest must include the following items:

- Cover page
- Link to your 90-second online video
- Narrative that answers four questions about innovation advancement, value chain coordination, data gathering, and plan (not to exceed 5,000 words)
- Summary PowerPoint slide (public)
- Analysis support work slide

All documents other than the video must be uploaded as a PDF.

> **Note**: Portions of the submission package are made available to the public. These have been denoted as such, and DOE does not intend to release the remaining parts of the submission to the public. See Appendix 1 for additional details.

Expert reviewers will evaluate your submission by assigning a single score for each scored submission section, based on their overall agreement or disagreement with a series of statements. Each section will be evaluated on a scale of 0 (strongly disagree) to 5 (strongly agree), as shown in Table 2.

3.6.1 Online Public Video

Your video should answer the question: What is your innovation?

Suggested content includes:

- The opportunity
- Your innovation and why it is transformative
- Who you are and why you will be successful
- How have you advanced your innovation so far?

Post your *publicly accessible,* 90-second video online (e.g., YouTube).
Phase 1 participants are encouraged to update their previous video. Be creative and produce a video that conveys the required information in exciting and interesting ways, but do not focus on time-consuming activities that only improve production values (i.e., technical elements such as décor, lighting, and cinematic techniques). Assistance from others with experience in this area may be helpful. Members of the American-Made Network may be able to help you create your video.

3.6.2 Cover Page

The cover page must list the following basic information about your submission:

- Project name
- Link to your 90-second online video
- Team members (names, contacts, and links to their LinkedIn profiles)
- Your city, state, and nine-digit zip code
- Website (if applicable)

3.6.3 Narrative

You should answer each of the following five questions provided in Table 5. The content bullets are only suggestions to guide your responses. You decide where to focus your answers. The individual answers to the five questions do not have a word limit; however, **the aggregate response to these five questions must not exceed 5,000 words,** not including captions, figures/graphs, and references. A word count must be included at the end of your submission (see template for details). You may also include **up to five supporting images, figures, or graphs**. The reviewers will score the questions based on the content you have provided. The narrative should be submitted as a PDF file.

Use the following template: https://www.herox.com/ESCRAP-Prize/resource/1689

Table 5: Topics to Address in the Phase 2: Prototype Narrative

Topic and Percent of Score	Suggested Content to Include	What the Score Will Be Based On
Question 1: ***Innovation Advancement*** How has your innovation progressed toward implementation? This section is 20% weight of your total score.	• Describe your innovation, its value proposition, and how it will deliver critical materials capacity expansion with improved economic/environment impacts relative to the status quo. Explain how the development and maturity of the innovation has evolved over the course of the prize. • Indicate how the critical materials produced compare (in quality, volume, price, life cycle impacts) to critical materials currently in the marketplace. • Describe anticipated challenges to validating the value and performance of the innovation and how the challenges can be overcome. • Provide estimates of e-scrap feedstock availability and the potential critical materials yield and capacity. Where possible, indicate the flexibility of your innovation to recover multiple critical materials from a variety of feedstocks.	• The competitor demonstrates the economic and environmental significance of the innovation and exhibits progress toward validating the benefits of the innovation, including, in particular, its ability to facilitate an increased critical materials production capacity from e-scrap. • The competitor provides initial indication of the quality and purity of critical materials recovered compared to current critical materials markets. Plans to validate the material quality and purity of critical materials recovered through collaboration with a national laboratory should be outlined in question 4, “Plan.” • The competitor should demonstrate the repeatability and consistency of material quality and purity. Plans to improve shortfalls in quality, purity and repeatability should be addressed in question 4, “Plan.” • The competitor indicates the potential to produce multiple

	• Describe how you will optimize the recovery process from the identified feedstock, considering factors such as availability, capacity, and efficiency, to ensure effective extraction of critical materials from e-scrap? • Indicate how the recovery of critical materials is run in parallel or in sequence with the recovery of noncritical materials as value-added coproducts. • Describe the impact of your innovation and recycling value chain on disadvantaged, underserved, and/or marginalized communities and how your understanding has evolved over the prize.	streams of critical materials from an identified feedstock. • The competitor has identified at least one feedstock that will serve as a test case for recovering critical materials. They have established access to the feedstock and indicated its availability and capacity to produce critical materials from e-scrap. • The competitor identifies the value added through recovery of coproducts (critical materials or noncritical materials) and how each contribute to one another. The recovery of multiple critical materials should be prioritized. • The competitor demonstrates deepening insight into the impact of the proposed recycling value chain on disadvantaged, underserved, and/or marginalized communities.
Question 2: ***Value Chain Coordination*** What partnerships have been made and how will they be leveraged? This section is 20% weight of your total score.	• Describe how you have engaged entities across the recycling value chain to share information about input and output requirements and how you will use that collaboration to optimize the technoeconomic performance of the critical materials recycling value chain. Indicate what you will learn from these partnerships. • Exhibit knowledge (source, composition, cost, location, capacity) of current input feedstocks and indicate how your process or technology will facilitate the recovery of critical materials from the input feedstock. Comment on the type and amount of e-scrap included in the feedstock and the expected critical materials yield. • Describe what the outputs of your process or technology are and how the key performance metrics	• The competitor demonstrates knowledge of the full e-scrap recycling value chain and which entities the outputs and inputs of their process/technology are directed to and from. The competitor also demonstrates knowledge of the metrics that drive the neighboring entities' economic and technological success. • The competitor demonstrates connections across the recycling value chain and a plan to exchange and utilize to inform process or technology optimization. • The competitor addresses the viability of the recycling value chain to accommodate the co-production of one or more critical materials and co-production of non-critical materials. • The competitor identifies potential customers and the

	compare to the requirements by entities downstream. • Address the economic viability of the recycling value chain including the influence of coproduction of noncritical materials outputs.	critical (and byproduct) material characteristics (structure, composition, price, etc.) to serve as a benchmark for the material produced through recovery from e-scrap.
Question 3: ***Data and Analysis*** How are you generating needed data for analysis and how will these insights advance the innovation? This section is 15% weight of your total score.	• Describe the LCA, TEA, or other analysis that a national laboratory will perform during Phase 3 to assess the potential impact of your innovation and opportunities to improve it and/or increase the impact. What insights do you expect to gain and how will you incorporate them into your plan? How have insights from national lab analysis consultation been incorporated into your understanding, if applicable? • Describe what was learned during analysis consultation and how it informs the data collection during Phase 2, if relevant. • Describe what characterization and data collection will be performed to inform LCA and TEA by a national lab in Phase 3. • Describe how you will evaluate & collect data on characteristics that drive the economics/environmental aspects, such as your LCA/TEA work. ○ How does all of this produce critical materials? • Describe how LCA and TEA metrics inform technology adoption risks and chart a path to reduce those risks (adoption risks include: value proposition, market acceptance, resource maturity, and license to operate).[23] • Describe how LCA metrics can assess your innovation's impact on disadvantaged, underserved, and/or marginalized communities	• The team describes what insights the national lab or other analysis provided and how it will be used to improve their innovation and increase impact. The proposed analysis makes sense, is likely to provide insights to improve their innovation and impact, and the competitor is poised to incorporate those insights into future plans. • The competitor demonstrates a plan to gather relevant information that informs technology or process optimization during prototyping and demonstration. • The competitor details a comprehensive plan for data collection and characterization specifically tailored to inform LCA and TEA and has strategies to ensure high-quality data collection for accurate assessment of economic and environmental impact. • The competitor indicates the adoption readiness level of their technology or process and outlines how data collected through TEA, LCA, or other analysis will empower them to reduce adoption risks. • Indicates metrics that will be collected to understand impact of technology or process on disadvantaged, underserved, or marginalized communities.

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Question 4: ***Value Chain Integration*** How is the innovation optimized to connect with upstream and downstream partners? This section is 20% weight of your total score.	• What are the partnerships that will allow you to integrate your innovation into existing and new recycling value chains? • What value does your innovation offer to these potential partners within existing or new recycling value chains? How does it align with their objectives or enhance their operations? • Describe how progress made throughout the prize actively decreases project risks and adoption risks (value proposition, market acceptance, resource maturity, and license to operate). • How will you ensure continuous collaboration and alignment of goals with these partners for a long-term partnership? • What strategies are in place to optimize outputs to specifically meet the needs or requirements of downstream partners? • How will you incorporate feedback from both upstream and downstream partners to continuously improve or adapt? Do you have processes in place for gathering and implementing this feedback?	• The competitor demonstrates their ability to improve economic and environmental benefits of the innovation. This includes working with a partner organization to optimize inputs/feedstock or to optimize outputs to meet downstream partner needs/requirements. • The competitor illustrates how the innovation aligns the goals of partners, showcasing mutual benefits. • The competitor assesses and reports progress toward enhancing adoption readiness. The commercial adoption readiness tool can be used. • The competitor outlines measures to ensure continuous collaboration and engagement with partners. • The competitor has established clearly defined processes for gathering feedback from both upstream and downstream partners. • The competitor identifies and engages with customers who will offtake the produced critical materials. Special emphasis will be placed on purchasing agreements or commitments.
Question 5: ***Plan*** How will you engage across the recycling value chain and advance your innovation in an informed way? This section is 15% weight of your total score.	• Provide a detailed plan with SMART goals for advancing your innovation from the current state toward implementation in a viable e-scrap recycling value chain. Competitors can revise their previous plan. Include metrics that will be used to determine success. • Describe the risks to the plan to advance your innovation and mitigation strategies to address them. • Identify upstream or downstream optimization that can occur by cooperating with recycling value	• The stated goals are ambitious, address risks, and show commitment to an accelerated implementation timeline. Meeting the stated goals will demonstrate critical progress toward implementing the innovation into a viable e-scrap recycling value chain. • The competitor identifies potential risks and has identified appropriate mitigation actions to minimize them. • The competitor demonstrates an understanding of what

	chain partners to improve the efficiency of your process/technology. • Describe your team's capability, expertise, and resources to execute the proposed activities and meet the goals. • How do you intend to effectively measure material quality, purity, and price against relevant benchmarks in the dynamic critical materials marketplace? • Describe progress made in engaging, educating, gaining trust, or obtaining buy-in from disadvantaged, underserved, and/or marginalized communities. Include challenges or barriers identified and how you plan to continue to engage these communities.	performance levels and coordination are needed to integrate the innovation into a new or existing e-scrap recycling value chain and maximize recovered critical materials output in economically viable way with minimized environmental impact. • The team demonstrates the knowledge and ability to properly execute their proposed activities while meeting their specified goals. • The competitor outlines a plan to identify key performance metrics in collaboration with potential off-take partners. • The competitor outlines a plan to collaborate with a National Lab in Phase 3 to validate key performance metrics and compare them to the status quo. • The competitor outlines a plan to collaborate with potential off-take partners to assess the price of produced materials and compare results to benchmarks in the current critical materials marketplace. • The approach to community engagement describes concrete actions, is strong, and demonstrates progress.
Reviewer Recommendation This recommendation is 10% weight of your total score.	There is no direct corresponding submission requirement for this score. Rather, it is an overall assessment of the total potential impact of the innovation compared to the team's likelihood of success.	The submission demonstrates a potentially impactful innovation and has a strong likelihood of success.

3.6.4 Submission Summary Slide

The summary slide should be a PowerPoint slide submitted as a PDF. It will be made public.

Make your own public-facing, one-slide submission summary that contains technically specific details but can be understood by most people. There is no template, so feel free to present the information as you see fit. Please make any text readable in a standard printout and conference room projection.

3.6.5 Analysis Support Work Slide

The analysis support work slide should be a PowerPoint slide submitted as a PDF.

It should:

- Briefly describe any analysis, such as LCA or TEA, that has been done. Include any insights or progress made during this Phase 2 contest (either via national lab consultation or separately).
- Describe the LCA, TEA, or other analysis you would like a national laboratory to perform during *Phase 3* to help you deepen your insights and improve your innovation and/or increase the impact in a viable supply chain.
- State any preference for which lab (Argonne, INL, LBL, NREL, ORNL, and PNNL) will perform analysis during Phase 3 with the rational for the preference.

3.7 Scoring Process

Only submissions that meet the eligibility criteria and include the five elements will pass the Phase 1 screening for eligibility. Ineligible submissions will not be reviewed by the advisory reviewer panel and will not be considered for award.

The scoring of submissions will proceed as follows:

1. **Screening:** The Prize Administrator and DOE will screen each application for overall eligibility and completeness. Each submission must have the main elements requested as part of the submission package:
   - Cover page
   - Video
   - Narrative, including answers to all five areas.
   - Submission Summary Slide
   - Analysis Support Work Slide
2. **Scoring:** A panel of expert reviewers will read, score, and comment on each submission. The narrative questions receive a weighted score, based on the bulleted list of statements. The final score from an individual reviewer[24] for a submission package will be calculated based on the weighing shown in Table 6. All reviewers' scores will then be averaged for a final reviewer score for the submission package. The final review process considers reviewer scores when deciding the winners of the awards.

Table 6: Scoring Weight for Prototype Phase Submission

Question	Weight (%)
Narrative Question 1 – Innovation Advancement	20
Narrative Question 2 – Value Chain Coordination	20
Narrative Question 3 – Data Gathering	15
Narrative Question 4 – Value Chain Integration	20
Narrative Question 4 – Plan	15
Reviewer Recommendation	10

3. **Reviewer Comments:** Expert reviewers also provide comments on the submissions they review. The Prize Administrator intends to provide comments to teams after the winners are announced

[24] Reviewers may not have personal or financial interests in, or be an employee, officer, director, or agent of, any entity that is a registered participant in this contest or have a familial or financial relationship with an individual who is a registered competitor.

for each phase. These comments are intended to help teams continue to improve and iterate on their work. The comments are the opinions of the expert reviewers and do not represent the opinions of DOE.

4. **Interviews**: The Prize Administrator may decide to hold a short virtual or in-person interview with a subset of the teams. Interviews would be held prior to the announcement of winners and would serve to help clarify questions the Prize Administrator may have. Attending interviews is not required, and interviews are not an indication of winning.

The final determination of winners takes reviewer scores, discussions with reviewers (if applicable), interview findings (if applicable), and the program policy factors listed in Appendix 1 into account. DOE is the judge and final decision maker and may elect to award all, none, or some of the submissions accepted at each submission deadline.

3.8 Additional Requirements

Please read and comply with additional requirements in Appendix 1.

COMPETITORS WHO DO NOT COMPLY WITH THESE REQUIREMENTS MAY BE DISQUALIFIED.

Phase 3: Demonstrate Contest Rules

4.1 Introduction

The Demonstrate Contest is the third in the E-SCRAP three-contest series, offering a total of $1.8 million in cash prizes. Only winners of the Prototype Contest can compete in the Demonstrate Contest. **The following guidelines are for competitors interested in the Demonstrate Contest. "You" and "your" reference competitors in the contest.**

Demonstrate Contest Prizes
• Up to three winners • $1.8 million in total cash prizes • Each winner receives a cash prize of $600,000

4.2 Goal

The Demonstrate Contest is seeking to award competitors who will begin implementing their innovation and demonstrate the potential to scale.

The goal of the Demonstrate Contest period is focused on three key areas:

- **Plan Execution:** Demonstrate that you are advancing your innovation and achieving the metrics for success and established information and data feedback loops to optimize material flow from upstream and to downstream processes.
- **Material and Process Validation:** Establish how materials and processes compare to existing material feedstocks to demonstrate the benefits and tradeoffs of using critical materials recovered from e-scrap compared to raw sources.
- **Post Contest Planning:** Develop a long-term plan to implement and scale your innovation into the recycling value chain.

4.3 Prizes to Win

The Demonstrate Contest offers three $600,000 cash prizes.

4.4 How to Enter

Complete a submission package online at www.herox.com/ESCRAP-Prize before the contest closing date.

4.5 Demonstrate Contest Process

The Demonstrate Contest consists of three important steps:

1. **Demonstration and Submission** – Competitors will begin to implement and demonstrate the potential of their innovation into the recycling value chain.
2. **Assessment** – The Prize Administrator screens submissions for eligibility and completion and assigns subject-matter expert reviewers to independently score the content of each submission. The judging criteria assess the following (more details can be found in Section 4.6).
   - **LCA/TEA Analysis Impact:** What is the impact of the innovation and how have the economic and environmental benefits been validated?
   - **Capacity Expansion:** What is the potential to scale the impacts of the innovation?
   - **Material Validation:** How is the innovation validating materials?
   - **Post Prize Plan:** What is your plan to advance the innovation to deployment and achieve scale post-prize?

3. **Announcement** – After the winners are publicly announced, the Prize Administrator notifies them and requests the necessary information to distribute cash prizes.

4.6 What to Submit and Evaluation Criteria

A complete submission for the Demonstrate Contest must include the following items:

- Cover Page
- Link to your updated 90-second online video
- Narrative that answers four questions about the LCA/TEA Analysis Impact, Capacity Expansion, Value Chain Integration, and Post Prize Plan (not to exceed 7,500 words)
- Summary PowerPoint slide (public)
- Committed partnership or support letter(s)

> **Note**: Portions of the submission package are made available to the public. These have been denoted as such and DOE does not intend to release the remaining parts of the submission to the public. See Appendix 1 for additional details.

All documents other than the video must be uploaded as a PDF.

Expert reviewers will evaluate your submission by assigning a single score for each scored submission section, based on their overall agreement or disagreement with a series of statements. Each section will be evaluated on a scale of 0 (strongly disagree) to 5 (strongly agree), as shown in Table 2.

4.6.1 Online Public Video

Your video should answer the question: What is your innovation?

Suggested content includes:

- The opportunity
- Your innovation and why it is transformative
- Who you are and why you will be successful
- How have you advanced your innovation so far?

Post your *publicly accessible,* 90-second video online (e.g., YouTube).

Be creative and produce a video that conveys the required information in exciting and interesting ways, but do not focus on time-consuming activities that only improve production values (i.e., technical elements such as décor, lighting, and cinematic techniques). Assistance from others with experience in this area may be helpful. Members of the American-Made Network may be able to help you create your video.

4.6.2 Cover Page

The cover page must list the following basic information about your submission.

- Project name
- Link to your updated 90-second online video
- Team members (names, contacts, and links to their LinkedIn profiles)
- Your city, state, and nine-digit zip code
- Website (if applicable)

4.6.3 Narrative

You should answer each of the following four questions provided in Table 7. The content bullets are only suggestions to guide your responses. You decide where to focus your answers. The individual answers to the four questions do not have a word limit; however, **the aggregate response to these four questions must not exceed 7,500 words,** not including captions, figures/graphs, and references. A word count must be included at the end of your submission (see template for details). You may also include **up to eight supporting images, figures, or graphs**. The reviewers will score the questions based on the content you have provided. The narrative should be submitted as a PDF file.

Use the following template: https://www.herox.com/ESCRAP-Prize/resource/1690

Table 7. Topics to Address in the Demonstrate Phase Narrative

Topic and Percent of Score	Suggested Content to Include	What the Score Will Be Based On
Question 1: ***LCA/TEA Analysis Impact*** What is the impact of the innovation and how have the economic and environmental benefits been validated? This section is 25% weight of your total score.	• Describe your innovation's value proposition and how it will deliver critical materials capacity expansion with improved economic/environment impacts relative to the status quo. Explain how the development and maturity of the innovation has evolved over the course of the prize. • Show how you know this is a significant opportunity using evidence-based validation. Describe how the activities during the prize have informed your understanding of the significance of implementing the technology or process. • What specific quantitative metrics can be presented to illustrate the environmental and economic benefits of the innovation compared to the status quo? • How do the analysis results highlight the economic/environmental advantages or improvements offered by the innovation in comparison to the status quo?	• The competitor demonstrates the economic and environmental significance of the innovation using TEA, LCA, and/or other analysis results. • In collaboration with potential off-take partners and national laboratories, the competitor identifies key metrics to validate quality and performance of the process and or produced critical material. • In collaboration with a national laboratory, the competitor assesses and validates material quality, purity, price, performance, and the repeatability of their process and or produced materials and compare results to the status quo. • The competitor indicates the technoeconomic viability of the technology or process to recover one or more critical materials from e-scrap. • The competitor provides evidence-based life-cycle impacts and economic metrics and how they

		compare to the status quo-baseline. • The competitor illustrates the direct impact of the innovation on economic outcomes and environmental factors through well-defined metrics. • The competitor shares how LCA will assess social and community impacts of the technology or process integration.
Question 2: *Capacity Expansion* What is the potential to scale the impacts of the innovation? This section is 25% weight of your total score.	• Describe advancements to the innovation that indicate the scalability of the technology or process. • Demonstrate the scalability and credibility of the critical materials production process where quality, purity, and repeatability of the critical material production process is comparable to current critical materials markets. • Describe how progress made during Phase 3 will inform the ability to scale and replicate critical materials recovery from e-scrap. • Indicate the flexibility of the process to handle variability in the feedstock. Explore how the process can adapt to multiple feedstocks. • Provide estimates of e-scrap feedstock availability and the potential critical materials yield and capacity. Where possible indicate the flexibility of your innovation to recover critical materials from a variety of feedstocks. • Indicate the value proposition of scalability on life cycle impacts and economic competitiveness.	• The competitor demonstrates the ability to produce critical materials from e-scrap with at least one feedstock that they have established is available and accessible. Multiple feedstocks are preferred. Materials produced should be assessed in collaboration with a national laboratory as stated in Question 1. • The competitor demonstrates the process to produce critical materials is credible; the critical materials produced by the competitor repeatably meets quality and purity benchmarks set by critical materials currently in the marketplace. • The competitor demonstrates how the process can adapt to variations in the feedstock to maintain productivity, material quality, and costs. • The competitor presents a detailed plan indicating how the progress achieved will be translated into scalable processes for critical materials recovery.

		• The competitor works with national laboratories to validate the repeatability of their process and reports on the current production capacity and production rate. • The competitor communicates the potential to reduce life cycle impacts and foster economic competitiveness through scaling. • The competitor describes the societal benefits of scaling and deploying the technology or process, emphasizing broader positive implications beyond business and industry.
Question 3: **Material Validation** How is the innovation validating materials? This section is 20% weight of your total score.	• Characterize key material properties through a third party; purity, composition, structure • Identify cost per unit mass of material produced. • Describe the capacity of production in mass per unit time and whether this capacity of production can be maintained. • Baseline material metrics by comparing cost and material quality to primary sources of material in the marketplace. • Where possible, collaborate with downstream partner to demonstrate key performance indicators using the recycled material feedstock.	• Characterize output material properties such as purity, composition, and structure. • Document output material costs including CAPEX and OPEX. • Material costs are compared to current market prices. • Benchmarking: compare material production costs to current primary sources of similar material. Use a range of prices to account for fluctuations in price. • Benchmarking: compare material quality to primary materials in the current marketplace. • If possible, establish when material produce has been sold in the market (e.g. successfully reintroduced into the supply chain). • If possible, work with a partner to demonstrate/pilot the feasibility of using

		recovered materials in domestic manufacturing.
Question 4: ***Post Prize Plan*** What is your plan to advance the innovation to deployment and achieve scale post prize? This section is 20% weight of your total score.	• Estimate the potential capacity/magnitude of critical materials production. Base your estimates on TEA, industry partnerships, and available feedstock. • Describe your plan to scale and replicate the recycling value chain post prize. • Indicate how economically competitive (costs) your critical materials outputs are compared to the status quo and how it changes with scaling. • Describe how you will continue advancing your innovation towards commercial adoption and full-scale deployment post-prize. What kind of support will you need to ensure your innovation can succeed post prize? How will you secure this support? • How has your understanding of and approach to community benefits evolved over the prize? • What is your actionable plan to expand the benefits of your technology or process on disadvantaged, underserved, and/or marginalized communities?	• The competitor utilizes data from TEA, LCA, and material and process assessments with nation laboratories, input from industry partnerships, and knowledge about available feedstock to design a plan for expanded production capacity. The plan is flexible and adaptable to changes in the market. • The competitor plans to explore the possibility of handling additional feedstocks and producing an expanded portfolio of critical materials. • Appropriate metrics to measure progress have been identified. • The approach to implement the innovation to full-scale deployment and commercial adoption beyond the prize is well-reasoned and feasible (may include business plan, Go-to-Market plan, market analysis, customer acquisition and/or partnership plans). • The competitor demonstrates deepening insight into the impact of the proposed supply chain on communities. • The post prize plan to expand on community benefits is actionable and likely to succeed.
Reviewer Recommendation This recommendation is 10% weight of your total score.	There is no direct corresponding submission requirement for this score. Rather, it is an overall assessment of the total potential impact of the innovation compared to the team's likelihood of success.	The submission demonstrates a potentially impactful innovation and has a strong likelihood of success.

4.6.4 Submission Summary Slide

The summary slide should be a PowerPoint slide submitted as a PDF. It will be made public.

Make your own public-facing, one-slide submission summary that contains technically specific details but can be understood by most people. There is no template, so feel free to present the information as you see fit. Please make any text readable in a standard printout and conference room projection.

4.6.5 Committed Partnership or Support Letter

Competitors should attach one-page letters of support or intent from other relevant entities (e.g., potential users/partners of the proposed innovation). Letters of support from partners or others that are critical to the success of their proposed solution will likely increase their score. This includes letters of support from partners that can share information to optimize and integrate the innovation. General letters of support from parties that are not critical to the execution of a competitor's solution will carry less weight in scoring. A letter of support must not exceed one page. All letters must be combined into a single PDF document.

4.6.6 Participation in LCA Commons and Material Reuse Clearing House

Competitors must engage with DOE to provide recovered material specifications to include in DOE's LCA commons and material reuse clearing house. Specification such as key structural and chemical characteristics, process capacity, costs, and energy, water, and chemical embodiment are important in matching with manufacturer requirements. DOE aims to facilitate increased recycled content in U.S. manufacturing by comparing and matching recovered material specifications with manufacturer requirements.

4.7 Scoring Process

Only submissions that meet the eligibility criteria and include the five elements will pass the Phase 3 screening for eligibility. Ineligible submissions will not be reviewed by the advisory reviewer panel and will not be considered for award.

The scoring of submissions will proceed as follows:

1. **Screening:** The Prize Administrator and DOE will screen each application for overall eligibility and completeness. Each submission must have the main elements requested as part of the submission package:
   - Cover page
   - Updated video
   - Narrative, including answers to all four areas
   - Submission Summary Slide
   - Legally binding committed partnership/support letter
2. **Scoring:** A panel of expert reviewers will read, score, and comment on each submission. The narrative questions receive a weighted score, based on the bulleted list of statements. The final score from an individual reviewer for a submission package equals the total weighted sum of the scores for all the sections. All reviewers' scores are then averaged for a final reviewer score for the submission package. The final prize judge considers reviewer scores when deciding the winners of the Prize. The

final score from an individual reviewer[25] for a submission package will be calculated based on the weighing shown in Table 8. All reviewers' scores will then be averaged for a final reviewer score for the submission package. The final review process considers reviewer scores when deciding the winners of the awards.

Table 8: Scoring Weight for Demonstrate Phase Submission

Question	Weight (%)
Narrative Question 1 – LCA/TEA Analysis Impact	25
Narrative Question 2 – Capacity Expansion	25
Narrative Question 3 – Material Validation	20
Narrative Question 4 – Post Prize Plan	20
Reviewer Recommendation	10

3. **Reviewer Comments:** Expert reviewers also provide comments on the submissions they review. The Prize Administrator intends to provide comments to teams after the winners are announced for each phase. These comments are intended to help teams continue to improve and iterate on their work. The comments are the opinions of the expert reviewers and do not represent the opinions of DOE.

4. **Interviews**: The Prize Administrator may decide to hold a short virtual or in-person interview with a subset of the teams. Interviews would be held prior to the announcement of winners and would serve to help clarify questions the Prize Administrator may have. Attending interviews is not required, and interviews are not an indication of winning.

The final determination of winners takes reviewer scores, discussions with reviewers (if applicable), interview findings (if applicable), and the program policy factors listed in Appendix 1 into account. DOE is the judge and final decision maker and may elect to award all, none, or some of the submissions accepted at each submission deadline.

4.8 Additional Requirements

Please read and comply with additional requirements in Appendix 1.

COMPETITORS WHO DO NOT COMPLY WITH THESE REQUIREMENTS MAY BE DISQUALIFIED.

25 Reviewers may not have personal or financial interests in, or be an employee, officer, director, or agent of, any entity that is a registered participant in this contest or have a familial or financial relationship with an individual who is a registered competitor.

Appendix 1: Additional Terms and Conditions

A.1 Universal Contest Requirements

Your submission for the Identify, Prepare, and Develop Contests is subject to following terms and conditions:

- If any team member is actively receiving funding from AMMTO at the Incubate submission deadline, AMMTO will review any potential prize awards, as well as other DOE funding, and make a decision as to whether awarding a prize to individuals or entities already receiving funding is in line with the program policy factors (Section A.14).
- You must post the final content of your submission or upload the submission form online at www.herox.com/ESCRAP-Prize before the Incubate, Prototype, and Demonstrate Contests close. Late submissions or any other form of submission do not qualify.
- The video submission, summary slide, and technical assistance request will be made public.
- The cover page, narrative, and letters of commitment/support are not intended to be made public; however, see Section A.11 regarding the Freedom of Information Act (FOIA).
- You agree to release your submission video under a Creative Commons Attribution 4.0 International License (see http://creativecommons.org/licenses/by/4.0/).
- You must include all the required submission elements. The Prize Administrator may disqualify your submission after an initial screening if you fail to provide all required submission elements. Competitors may be given an opportunity to rectify submission errors due to technical challenges.
- Your submission must be in English and in a readable and searchable PDF format. Scanned handwritten submissions will be disqualified.
- Competitors will be disqualified if, during any engagement with the Prize, including but not limited to the submission, the online forum, emails to the Prize Administrator, or other forms of communication, contain any matter that, in the discretion of DOE, is indecent, lacking in professionalism, or demonstrates a lack of respect for people or life on this planet.
- If you click "Accept" on the HeroX platform and proceed to register for any of the contests described in this document, these rules will form a valid and binding agreement between you and DOE, 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 contests described here and no other contests on the HeroX platform or anywhere else.
- The Prize Administrator, when feasible, may give competitors an opportunity to fix non-substantive mistakes or errors in their submission packages.
- As part of your submission to this prize, 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 the information contained in this submission will be relied on by the federal government to determine whether to issue a prize to the named competitor. 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 and § 287, and 31 U.S.C. §§ 3729-3733 and 3801-3812.

A.2 National Lab Analysis Pairing System

The Prize Administrator will assign resources from Argonne, INL, LBL, NREL, ORNL, and PNNL to provide consulting and perform analysis. Phase 1 contest winners will receive analysis consulting during the Phase 2 contest. National laboratory scientists will perform analysis for the Phase 2 contest winners during the Phase 3 contest period.

A.3 Verification for Payments

The Prize Administrator will verify the identity and the role of a participant potentially qualified to receive the prizes. Receiving a prize payment is contingent upon fulfilling all requirements contained herein. The Prize Administrator will notify winning competitors using the provided email contact information after the date that the results are announced. Each competitor (or parent/guardian if under 18 years of age) will be required to sign and return to the Prize Administrator, within 30 days of the date the notice is sent, a completed National Renewable Energy Laboratory Request for ACH Banking Information form and a completed W9 form (https://www.irs.gov/pub/irs-pdf/fw4.pdf). At the sole discretion of the Prize Administrator, a winning competitor will be disqualified from the competition and receive no prize funds if: (i) the person/entity cannot be contacted; (ii) the person/entity fails to sign and return the required documentation within the required time period; (iii) the notification is returned as undeliverable; or (iv) the submission or person/entity is disqualified for any other reason.

A.4 Teams and Single-Entity Awards

The Prize Administrator will award a single dollar amount to the designated primary submitter, whether the submitter consists of a single or multiple entities. The primary submitter is solely responsible for allocating any prize funds among its member competitors as they deem appropriate.

A.5 Submission Rights

The public videos in this contest must be submitted and released to the public under a Creative Commons Attribution 4.0 International License (see http://creativecommons.org/licenses/by/4.0/).

By making a submission and consenting to the rules of the contest, a competitor is granting to DOE, the Prize Administrator, and any other third parties supporting DOE in the contest, a license to display publicly and use the parts of the submission that are designated as “public” for government purposes. This license includes posting or linking to the public portions of the submission on the Prize Administrator’s or HeroX’s applications, on the contest website, on DOE websites, and on 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 for purposes of the contests, including but not limited to screening and evaluation purposes. The Prize Administrator and any third parties acting on their behalf will also have the right to publicize the competitors’ names and, as applicable, the names of competitors’ team members and organizations that participated in the submission, on the contest website indefinitely.

By entering, Competitor represents and warrants that:

The competitor is the sole, original author and copyright owner of the submission or that the applicant has acquired sufficient rights to use and to authorize others, including DOE, to use the submission as specified throughout the rules; that the submission does not infringe upon any copyright, trade secret, trademark, nondisclosure agreement, patent, or any other third-party rights; and that the submission is free of malware.

A.6 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 applicant, or that the applicant has acquired sufficient rights to use and to authorize others, including DOE, to use the submission, as specified throughout the rules; that the submission does not infringe upon any copyright or upon any other third-party rights of which the applicant is aware; and that the submission is free of malware.

A.7 Contest Subject to Applicable Law

All contests are subject to all applicable federal laws and regulations. Participation constitutes each participant's full and unconditional agreement to these Official Contest 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 awards are contingent upon the availability of appropriations.

A.8 Resolution of Disputes

DOE is solely responsible for administrative decisions, which are final and binding in all matters related to the contest.

In the event of a dispute, 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. Competitors and potential winners may be required to show proof of being the authorized account holder.

The Prize Administrator will not arbitrate, intervene, advise on, or resolve any matters between team members or any disputes between teams.

A.9 Publicity

The winners of these prizes (collectively, "winners") will be featured on 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.10 Liability

Upon registration, all participants agree to assume and, thereby, have assumed any and all risks of injury or loss in connection with or in any way arising from participation in this contest or development of any submission. 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.

In accordance with the delegation of authority to run this contest delegated to the Director of AMMTO, the Director has determined that no liability insurance will be required of competitors to compete in this competition, per 15 USC 3719(i)(2).

A.11 Records of Retention and Freedom of Information Act (FOIA)

All materials submitted to DOE as part of a submission become DOE records. Any confidential commercial information contained in a submission should be designated at the time of submission.

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

- The cover sheet of the submission must be marked as follows and must identify the specific pages containing trade secrets or commercial or financial information that is privileged or confidential:
  Notice of Restriction on Disclosure and Use of Data:
  Pages [list applicable pages] of this document may contain trade secrets or commercial or financial information that is privileged or confidential and is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source. [End of Notice]
- The header and footer of every page that contains trade secrets or privileged commercial or financial information must be marked as follows: “May contain trade secrets or commercial or financial information that is privileged or confidential and exempt from public disclosure.”
- In addition, each line or paragraph containing trade secrets or commercial or financial information that is privileged or confidential must be enclosed in brackets.

Competitors will be notified of any FOIA requests for their submissions in accordance with 29 C.F.R. § 70.26. Competitors may then have the opportunity to review materials and work with a FOIA representative prior to the release of materials.

A.12 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.13 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 failures, or any other factors beyond DOE's reasonable control impair the integrity or proper functioning of the contests, as determined by DOE in its sole discretion, DOE may cancel the contest.

Although DOE indicates in the Identify, Prepare, and Develop Contests that it will select up to several winners for each contest, DOE reserves the right to only select competitors that 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.

DOE may conduct a risk review, using Government resources, of the competitor and project personnel for potential risks of foreign interference. The outcomes of the risk review may result in the submission being eliminated from the prize competition. This risk review, and potential elimination, can occur at any time during the prize competition. An elimination based on a risk review is not appealable.

A.14 Program Policy Factors

While the scores of the expert reviewers will be carefully considered, it is the role of the Prize Administrator to maximize the impact of contest funds. Some factors outside the control of competitors and beyond the independent expert reviewer scope of review may need to be considered to accomplish this goal. The following is a list of such factors. In addition to the 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 continues to be nonduplicative and compatible with the stated goals of this program and DOE's 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 efforts or projects, which, when taken together, will best achieve the research goals and objectives
- The degree to which the submission expands DOE's funding to new competitors and recipients that have not been supported by DOE in the past
- The degree to which the submission exhibits team member diversity and the inclusion of underrepresented groups, with participants including but not limited to graduates and students of historically Black colleges and universities (HBCUs) and other minority-serving institutions (MSIs), or members operating within HUBZones,[26] Justice 40 disadvantaged communities, and other underserved communities.
- 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.

A.15 Definitions

Prize Administrator means both the Alliance for Sustainable Energy operating in its capacity under the Management and Operating Contract for NREL and AMMTO. When the Prize Administrator is referenced in this document, it refers to staff from both the Alliance for Sustainable Energy and AMMTO staff. Ultimate decision-making authority regarding contest matters rests with the Director of AMMTO.

A.16 LCA/TEA Analysis

- Life Cycle Assessment (LCA) is a methodology for assessing the environmental impacts associated with the entire life cycle of a product or process. LCA should consider variables such as GHG emissions, water and chemical intensity, and energy footprint.
- Techno-Economic Analysis (TEA) is a method for evaluating the economic performance of a technology, allowing analysis to objectively weigh benefits against costs.[27] TEA should consider

[26] A historically underutilized business zone (HUBZone) is an economically distressed area as determined by the Small Business Administration (SBA), based on income and unemployment data.
[27] Life Cycle Assessment and Techno-Economic Analysis Training | Department of Energy

the economics of co-products (including non-critical materials), integration potential, material costs, impact of feedstock composition, and recovery rate. This type of analysis can give insights into recycling value chain optimization, such as where extra sorting pays off, where improved separation intensity pays off, etc. By performing such analysis early in the development process of an innovation, insights into how to maximize the environment benefits and economic viability can be gained.

A.17 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 PRIZE.

Appendix 2: Community Benefits

Community benefits should be specific to the proposed innovation and not a restatement of an organization's policies. Competitors should describe the future implications or a milestone-based plan for identifying future implications of their research on energy equity, including, but not limited to, benefits for the U.S. workforce. These impacts may be uncertain, occur over a long period of time, and/or have many factors within and outside the specific proposed research. Competitors are encouraged to describe the influencing factors and the most likely workforce and energy equity implications of the proposed research if the research is successful. Competitors are encouraged to leverage promising practices and develop a plan that is tailored for their innovation. The competitor's submission should consider the following community benefits aspects and must address at least one of the following topic areas as part of their community benefits plan.

Appendix 3: Metrics for Assessing Impact

A successful E-SCRAP competitor should demonstrate pathways by which their innovation will optimize and integrate critical material recovery technologies to establish or expand critical material production in the e-scrap recycling value chain. To achieve this, competitors will exhibit cost competitiveness, process flexibility and resiliency, and reduce environmental impacts of critical material production compared to raw sources. Competitors must identify and justify appropriate (e.g., material, energy, and emissions benefits) target metrics for their innovation and clearly indicate how the proposed innovation will satisfy the metrics. Metrics should be specific to illustrate the competitiveness, resilience, flexibility, and life cycle benefits of critical material production and should define appropriate baselines, minimum targets, and stretch targets. A nonexhaustive list of potential metrics includes:

Metric	Performance Target
Reduced Processing Cost	U.S. dollars ($) per unit
Increased processing rate	Kilograms (kg) per hour
Reduced carbon intensity of the product	Percent (%) carbon intensity change as measured by ton of carbon dioxide equivalent (CO2eq) per kg of product
Reduced water consumption of a product	Water volume used per kg product compared to status quo
Critical material recovery yield	% of recovered material output compared to feedstock input
Product purity	% concentration of critical material in given output material
Reduced cost of collection	$ per unit collected
Increased collection	Number of products components recovered at end-of-use
Product cost	$ per kg of material produced
Reduced process energy and emissions	Megajoules (MJ) per unit and kgCO2eq per unit
Increased feedstock concentration	% of value-added products present per unit of feedstock
Increased co-recovery	% of value-added products recovered per unit of feedstock
Community partnerships formed	Number
Jobs created	Number

This is the end of the Rules Document. Thank you for reading.