Lithium-Ion Battery Recycling Prize

PHASE II OFFICIAL RULES

Modification 2

The Lithium-Ion Battery Recycling Prize is designed to address critical material supply issues for lithium-ion batteries by accelerating U.S. lithium-ion battery recycling innovation through a series of prize competitions.
OFFICIAL RULES: MODIFICATIONS SUMMARY

Modifications made to the rules are summarized below and highlighted in the text.

<table>
<thead>
<tr>
<th>Modification 1</th>
<th>Date</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3/4/2020</td>
<td>• Corrected the “Submission Rights” and “Copyright” section on pages 18–20 to outline the intellectual property rights of participants.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Added the date for Demo Day: June 3, 2020.</td>
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<tr>
<td></td>
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<td>• Removed the “Cover Page” requirement for the Concept Update.</td>
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<table>
<thead>
<tr>
<th>Modification 2</th>
<th>Date</th>
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<tbody>
<tr>
<td></td>
<td>3/25/2020</td>
<td>• Updated the timeline of Phase II with dates pushed out by 4 weeks, on pages 10-11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Location of Demo Day on page 11 changed to TBD</td>
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</tbody>
</table>
TABLE OF CONTENTS

1. BACKGROUND ............................................................................................................................. 4
2. PRIZES .......................................................................................................................................... 7
3. VOUCHERS ................................................................................................................................... 7

PHASE II: PROTOTYPE AND PARTNERING ...................................................................................... 9
1. GOAL .......................................................................................................................................... 9
2. PHASE II CONTEST STRUCTURE ................................................................................................. 10
3. IMPORTANT DATES .................................................................................................................. 11
4. WHAT TO SUBMIT .................................................................................................................... 12
5. SCORING CRITERIA .................................................................................................................. 15
6. HOW TO ENTER ....................................................................................................................... 16
7. WHO CAN WIN (Eligibility Requirements) ................................................................................ 16
8. GENERAL SUBMISSION REQUIREMENTS ............................................................................. 17

ADDITIONAL TERMS AND CONDITIONS ......................................................................................... 17
1. UNIVERSAL CONTEST REQUIREMENTS ................................................................................... 17
2. VERIFICATION FOR PAYMENTS ............................................................................................. 18
3. TEAMS AND SINGLE ENTITY AWARDS .................................................................................... 18
4. SUBMISSION RIGHTS ................................................................................................................ 18
5. COPYRIGHT .............................................................................................................................. 20
6. CONTEST SUBJECT TO APPLICABLE LAW ............................................................................. 20
7. RESOLUTION OF DISPUTES ..................................................................................................... 20
8. PUBLICITY ................................................................................................................................. 20
9. LIABILITY .................................................................................................................................... 20
10. RECORDS RETENTION AND FOIA ....................................................................................... 21
11. PRIVACY .................................................................................................................................. 22
12. GENERAL CONDITIONS ......................................................................................................... 22
13. PROGRAM POLICY FACTORS ............................................................................................... 22
14. DEFINITIONS ........................................................................................................................... 23

APPENDIX: Supplementary Information and Assumptions for Impact Modeling ........................... 24
1. CONSUMER ELECTRONICS ...................................................................................................... 24
2. ELECTRIC VEHICLES ............................................................................................................... 26
3. STATIONARY STORAGE AND LARGE INDUSTRIAL USES .................................................... 27
INTRODUCTION

This document contains the rules for Phase II of the Department of Energy (DOE) $5.5 million dollar Lithium-Ion Battery Recycling Prize (Prize). Phase I is complete and the official rules for Phase I have been published and released separately. For information about Phase I, please click here for the rules and a summary of the results and list of winners. The primary objective of Phase II, the Prototype and Partnering portion of the Prize, is to develop the Phase I Track concepts into end-to-end solutions that demonstrate a viable business model that can be scaled. Phase III official rules will also be released separately.

Up to 10 winners in Phase II will be awarded up to $2,500,000 distributed equally among each winner. In addition to the cash prizes, winners will also receive a non-cash prize of up to $100,000 in vouchers that may be redeemed at national labs and qualified members of the American-Made Network.\(^1\) Voucher funds can be used to validate or support the demonstration of a full end-to-end solution during the Phase III contest.

An end-to-end solution, for the purposes of this contest, collects lithium-ion batteries at the end of their useful life and delivers them to a facility where they can be recycled. The proposed solution may or may not include an intermediate step for secondary use. Phase II submissions should include all four Phase I tracks (Collection, Separating and Sorting, Safe Storage and Transportation, and Reverse Logistics) in a single solution.

1. BACKGROUND

There is a growing demand for lithium-ion batteries (LIBs) in a variety of commercial uses. For purposes of this prize, “commercial uses” of LIBs are divided into the following categories:

- Consumer electronics
- Electric vehicles (EVs)
- Stationary storage and/or other large industrial uses

The cathode is the most expensive portion of LIBs. Current LIB cathodes contain a substantial amount of cobalt, a critical material that is both expensive and dependent on foreign sources for production. The Democratic Republic of the Congo supplies over half of the world’s cobalt, and China is the world’s leading producer of refined cobalt and a leading supplier of cobalt imports to the United States.\(^2\) Other valuable materials in the battery include lithium, nickel, manganese, graphite, and electrolyte.

Unlike lead-acid batteries, which are collected and recycled at a rate of 99%, LIBs are only collected and recycled at a rate of less than 5%. DOE’s goal is to enable the industry to reach a 90% recycling rate of LIBs.

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\(^1\) As part of the overall American-Made Challenges: Lithium-Ion Battery Recycling Prize in conjunction with NREL is bringing parties interested in supporting participants in this competition together under the American-Made Network. Included in the Network are entities that want to connect participants to the support they need to succeed, as well as entities that can offer services to participants to support their efforts. To learn more about the American-Made Network please visit [https://americanmadechallenges.org/connect.html](https://americanmadechallenges.org/connect.html).

With this 90% recovery rate, recycled material could potentially provide one-third of United States cathode material needs for LIBs by 2030.³

The Prize is designed to motivate American innovators to develop and demonstrate profitable business and technology strategies to achieve a LIBs recovery rate of 90%. This might be accomplished by:

- Increasing collection
- Implementing cost-effective, automated methods or technologies for separation and sorting of various collected battery types and sizes
- Developing cost-effective methods or technologies that will render LIBs safe or inert during storage and transport
- Optimizing the efficiency of logistics
- Designing an entirely unanticipated solution

Regardless of the starting point, the ultimate aim is to incentivize a diversity of problem solvers to create several end-to-end solutions that focus on one or more commercial uses. It is DOE’s hope that together, these solutions will result in the collection of 90% of all LIBs. Participants in this prize program will help establish the infrastructure that moves spent LIBs from consumers to recyclers across all commercial uses. Individual submissions should focus on at least one of the commercial uses listed above but may address multiple commercial uses of batteries.

³ Vehicle Technologies Office’s Research Plan to Reduce, Recycle, and Recover Critical Materials in LIBs
Figure 1. Lithium-ion Battery Recycling Prize

The Phase I contest, Concept Development and Incubation, was the first of the three contests that make up the Prize. In Phase I, participants were asked to submit their innovative concept, business model, and technology plan to profitably overcome barriers associated with recycling spent LIBs in a selected submission track of Collection, Separating and Sorting, Safe Storage and Transportation, and Reverse Logistics; or submit Other Ideas outside of these designated tracks with the potential to profitably recover spent LIBs. Phase I of the contest is now complete.

To learn more about Phase I Winners, opportunities to partner and the Prize, go to https://www.herox.com/BatteryRecyclingPrize. Only eligible winning teams from the Phase I contest can provide submissions in the Phase II contest. Interested parties, including teams that did not win Phase I and potential partners, may join teams led by Phase I winners to compete in Phase II. The emphasis during Phase II is on developing conceptual proposals into tangible solutions and, if necessary, leveraging partnerships to help iterate, solidify design, simulate, or demonstrate the validity of their proposed business and technology strategies. Phase I winners should either work with other Phase I winners to combine their concepts into an end-to-end solution, bring in additional resources, or develop an end-to-end solution internally.
### 2. PRIZES

<table>
<thead>
<tr>
<th>Contest</th>
<th>Winners</th>
<th>Prizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase II: Prototyping and Partnering</td>
<td>Up to 10</td>
<td>Up to $2,500,000 distributed equally among the winners in cash prizes (minimum of $250,000; maximum of $500,000 per winner) in addition to non-cash prizes of $100,000 in vouchers per team³</td>
</tr>
<tr>
<td>Phase III: Pilot Validation</td>
<td>Up to 4</td>
<td>Prize is expected to be up to $2,000,000 distributed equally among the winners in cash prizes (minimum of $500,000; maximum of $1,000,000 per winner)</td>
</tr>
</tbody>
</table>

**Figure 2. Prizes for Phase II and Phase III**

The Phase III contest, Pilot Validation, is the final phase in this three-contest series and offers participants the opportunity to conduct a full end-to-end pilot-scale demonstration of their proposed solution. Only eligible winning teams from the Phase II contest can provide submissions in the Phase III contest.

Phase III participants will be able to use the non-cash prize, Phase II vouchers (up to $100,000 per team), at national labs and qualified members of the American-Made Network to validate or support the demonstration of the full end-to-end solution. Phase III winners will be awarded up to $2,000,000 distributed equally among the winners in cash prizes.

### 3. VOUCHERS

The provided vouchers will allow winners of Phase II to access tools, equipment, and expertise at national labs and approved organizations and facilities within the American-Made Network to develop, test, and validate their proposed solutions. The DOE’s 17 national labs, together with the approved organizations and facilities, are referred to as Voucher Service Providers (VSPs).

VSPs may provide competitors with:

- Access to hardware and development tools
- Access to national laboratories, universities, and private laboratories
- Specialized facilities with additive, reductive, and manufacturing support
- Testing and validation capabilities
- Other expert services that may be negotiated between the winners and the lab, organization, or facility

³The voucher guidelines can be found on HeroX at [https://www.herox.com/BatteryRecyclingPrize/resource/399](https://www.herox.com/BatteryRecyclingPrize/resource/399).
Winners may also use vouchers at approved organizations and/or facilities (e.g., fabrication, prototyping, manufacturing) provided that such organizations are on the approved list on the American-Made Challenges website. Any interested organization can apply to be added to the list of approved organizations at https://americanmadechallenges.org/connect.html. Details on how applications will be reviewed and approved are discussed in the voucher guidelines at https://www.herox.com/BatteryRecyclingPrize/resource/399.
PHASE II: PROTOTYPE AND PARTNERING

1. GOAL

The primary objective of Phase II: Prototype and Partnering is to develop and combine Phase I concepts into tangible end-to-end solutions and leverage partnerships to design, simulate, or demonstrate the solutions described in Phase I. Participants are expected to create prototypes and refine their business models based on the concepts proposed in Phase I.

At the end of Phase II, competitors are expected to provide the following in their submission package:

- Prototype of any technology proposed in Phase I (if applicable)\(^5\)
  - Technical description of the prototype
  - Performance data of tests of the prototype
- A detailed plan for how the proposed solution would be demonstrated at a pilot scale in Phase III of the contest
- Show that the plan, when scaled, will yield a viable business model

Submissions for Phase II should significantly build on the novel concepts submitted in Phase I. By the end of Phase II, all critical technical assumptions required for your solution should have been physically validated and that the proposed solution is technically viable. Submissions should address the complete recycling process of spent LIBs, from the original commercial use to delivery at a recycling facility. Regardless of whether the submission includes hardware or software in the business model, participants will be expected to demonstrate functionality, verify feasibility, and describe how the pilot-scale end-to-end solution will be tested and deployed.

As part of Phase II, DOE has included opportunities to provide participants with feedback on their prototypes, proposed pilot demonstrations, and business models before final submission (see “Phase II Contest Structure”). Likewise, the additional goal of the Prize is to enable community building across diverse participants, stakeholders, and other experts. Phase II will include a series of voluntary, DOE-sponsored events such as webinars, partnering opportunities, and a demo day.

\(^5\) For submissions that do not incorporate a novel technology driven solution, no technology prototype is required.
2. PHASE II CONTEST STRUCTURE

The Phase II contest consists of six steps:

1. **Partnering Event – Voluntary:** All Phase II participants will be provided an opportunity to interact with other industry experts and potential stakeholders to develop partnerships that will be crucial to competing for Phase II prizes.

   The event will provide teams the opportunity to discuss their concepts with an industry audience and receive feedback. Attendance at this event is voluntary. If Phase II participants wish to attend, they are asked to provide a brief (5-minute) introduction of themselves using a PowerPoint presentation. No content or results from the event will impact Phase II scoring.

2. **Phase II Registration – Mandatory:** All eligible Phase II participants intending to participate in Phase II, must register on HeroX in order to submit a concept update.

3. **Concept Update – Mandatory:** All Phase II participants must provide a concept status update (See “What to Submit”). Participants will receive feedback from the Prize Administrators on their concept update to inform their development and prototype validation plans and the overall end-to-end solution concept.

4. **Demo Day – Voluntary:** All Phase II participants will also be invited to participate in a Demo Day in Washington, D.C. during the Vehicle Technologies Office Annual Merit Review in July 2020. This will be a second opportunity for teams to receive industry, university, and national lab feedback on their concepts. Guidance will be provided to participants on the presentation format, and participants are expected to present in front of an Advisory Panel. Demo Day will also be an opportunity for Phase II Prize participants to meet with other Prize teams, industry stakeholders and National Laboratory VSPs.
5. **Online Submission – Mandatory**: Online submission requirements are defined in “What to Submit” and will be scored according to “Scoring Criteria.”

6. **Participants Day – Mandatory**: In addition to online submissions, Phase II Prize participants will provide a live presentation to the Prize Administrator demonstrating their prototype and their proof of concept of an end-to-end solution.

Phase II participants will be allocated a total of 30 minutes (15-minute presentation followed by 15 minutes for questions) for their presentation and questions from judges on their designated presentation day. See “What to Submit” and “Scoring Criteria” for more details.

### 3. IMPORTANT DATES

<table>
<thead>
<tr>
<th>DATE</th>
<th>EVENT</th>
<th>DESCRIPTION</th>
<th>REQUIREMENT</th>
</tr>
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<tbody>
<tr>
<td>January 2020</td>
<td>Phase II Contest Begins</td>
<td>Official start of Phase II Contest</td>
<td></td>
</tr>
<tr>
<td>February 10-13, 2020</td>
<td>Phase II Partnering Event</td>
<td>Partnering opportunity for participants and industry stakeholders</td>
<td>Voluntary</td>
</tr>
<tr>
<td>April 22, 2020, 11:59 pm EST</td>
<td>Phase II Registration Deadline</td>
<td>Teams must register to compete in Phase II</td>
<td>Mandatory</td>
</tr>
<tr>
<td>May 6, 2020, 11:59 pm EST</td>
<td>Phase II Concept Update</td>
<td>Status update to the Prize Administrators for receipt of feedback</td>
<td>Mandatory</td>
</tr>
<tr>
<td>July 2020</td>
<td>Phase II Demo Day</td>
<td>Opportunity for teams to present concepts</td>
<td>Voluntary</td>
</tr>
<tr>
<td>October 13, 2020, 11:59 pm EST</td>
<td>Phase II Online Submission Deadline</td>
<td>Phase II online submission deadline</td>
<td>Mandatory</td>
</tr>
<tr>
<td>November 12 &amp; 13, 2020</td>
<td>Phase II Participants Day Presentations</td>
<td>Live presentation of proof of concept to a panel of judges</td>
<td>Mandatory</td>
</tr>
<tr>
<td>November 2020</td>
<td>Phase II Winner Expected Announcement</td>
<td>Public Announcement of Phase II winners</td>
<td></td>
</tr>
</tbody>
</table>
4. WHAT TO SUBMIT

1. **Phase II Registration** – Register online at HeroX in order to submit the contest requirements.

2. **Phase II Concept Update** – Provide a 12-page maximum online submission concept update via HeroX. (The cover sheet will not count toward page limits.) This submission should address all of the following topics:

   a. The end-to-end solution concept
   b. Prototype validation plans
   c. List of the team and resources that you have and plan to recruit to provide the capability to develop the end-to-end concept solution
   d. A plan to implement a pilot-scale demonstration
   e. Uses for voucher funds if your team is selected for Phase III
   f. As appropriate, address reviewer comments from Phase I submissions

   **Format Guidelines:**
   - Submit files in unlocked, searchable PDF form
   - Submit all files in the following format: Team-Name_BRP_Phase II Concept Update.pdf
   - Confidential Business Information (CBI) should not be included in publicly facing documents (Video, Cover Page, and Summary Slide); any CBI included in the Proposal is subject to and should follow instructions in “Additional Terms and Conditions”

3. **Final Submission** - A final submission for Phase II contest should include the below items.

   a. **Proof of Concept and Partnering Narrative**: Submit a 15-page maximum report that includes the components below. All assumptions used in documentation, analysis, modeling, and simulation must be explicitly stated. The cover sheet will not count toward page limits.

      i. **Cover page**: A template can be found at [https://www.herox.com/BatteryRecyclingPrize](https://www.herox.com/BatteryRecyclingPrize)
         - Team Name
         - Team Leader (point of contact) and Partners
         - Submission Title
         - <100-word abstract to be released publicly

      ii. **Executive Summary**: A high-level overview of your submission, including a summary of your concept approach, and how the end-to-end solution will contribute towards DOE’s goal of a 90% recovery rate from the recycling of LIBs.

      iii. **Team and Resources**: Provide individual member CVs and team experience and qualifications, external advisers (e.g., a board), or external sponsorship and established

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6 See [APPENDIX: Supplementary Information and Assumptions for Impact Modeling](https://www.herox.com/BatteryRecyclingPrize)
partnerships, and possible voucher service providers. Include the roles and responsibilities of each party. The team composition should demonstrate the capability to implement the proposed pilot-scale end-to-end solution successfully. If applicable, provide letters of commitment from established partnerships on official partner documentation (i.e., business letterhead) stating their role of partnership, agreed commitments, and contact information.

CVs and partner descriptions should be limited to one page per team member and will not count towards the page limit.

iv. **Detailed Technical Explanation of End-to-End Solution:** Describe your solution and approach for conducting a full end-to-end pilot-scale solution that includes the commercial use (e.g., consumer electronics, stationary storage, large industrial uses, and electric vehicles). Describe the proposed solution, including the stage of development at the time of submission, any relevant intellectual property, supporting analyses, or results that support any assertions made regarding the validity or functionality of your proposed solution. Please include:

- Schematics, drawings, or sketches if applicable
- Business plan, to include how concepts plan to scale their work to achieve profitability
  - Financial analysis should be provided to show how competitors will demonstrate a positive revenue stream
  - Evidence of market analysis, customer discovery, consumer interest and/or buy-in from potential partners of the proposed approach for an end-to-end scale solution should be provided
- Attachments (will not count toward the page limit)
  - Bibliography/citations
  - Proof of compliance with any permitting or environmental regulations or requirements

v. **Impact Modeling:** Show the projected recovery of LIBs that would result from the implementation of your proposed pilot-scale demonstration. Then, based on these numbers, please model the collection of batteries if your demonstration was scaled nationally. Submissions should elaborate on how their pilot demonstration could scale to reach across the nation. Submissions should address the challenges of scaling to rural, suburban, and urban localities.

For modeling purposes, participants should assume that the number of batteries available for recycling in your nationally-scaled solution is equal to the 2018 sales data as described in the Appendix. Submissions should develop their own assumptions as to when their solution will scale nationally and include a budget estimate for a national rollout. Submissions should define the duration of time that the pilot will be run. For the purposes of your impact
modeling, a single battery is defined as a single saleable unit. For example, a single EV pack should be counted as 1 unit as opposed to the multitude of cells in that pack. In addition, a single laptop battery or cell phone battery will also count as 1 unit.

Please fill out and include the table below in your submission:

<table>
<thead>
<tr>
<th>Battery Use – please include only the commercial uses that you are targeting</th>
<th>Estimate the number of batteries to be delivered to recyclers by your pilot demonstration project</th>
<th>Projection of collected batteries delivered to recyclers when your solution is scaled nationally assuming 1 year of operation</th>
<th>Estimate for collected batteries delivered to recyclers as a percentage of the total using 2018 data in the appendix*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Electronics</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Electric Vehicles</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Stationary storage and/or other large industrial uses</td>
<td></td>
<td></td>
<td>%</td>
</tr>
</tbody>
</table>

* assume that the number of batteries available for recycling in your nationally-scaled solution is equal to the 2018 sales data as described in the Appendix

Format Guidelines:
- Submit files in unlocked, searchable PDF form
- Submit all files in the following format: Team-Name_BRP_Phase II.pdf
- Confidential Business Information (CBI) should not be included in publicly facing documents (Video, Cover Page, and Summary Slide); any CBI included in the Proposal is subject to and should follow instructions in “Additional Terms and Conditions”

b. Video: Provide a recorded video of concept validation, no longer than three minutes, through HeroX. Be creative and produce a video that conveys your 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). The video may include:
- Video of physical testing
- Video of any software or app that supports your proposed pilot-scale demonstration
- Presentation of business plan
- Proposed process and/or business model
- Interviews with potential customers, partners, or stakeholders
4. **Participants Day Presentation** – Phase II participants will have at least one team representative provide an in-person 15-minute presentation that includes the following:

   a. Illustration and explanation of concept and validation
   
   b. Summary of an end-to-end solution with potential impact
   
   c. Established partnership(s)

   The presentation will be followed by a 15-minute question and answer session. Please make any text readable in a standard printout and conference room projection.

Please read and comply with requirements in the “Additional Terms and Conditions” section. A cover sheet may be warranted if your submission contains CBI; any CBI included in the Proposal is subject to and should follow instructions in the “Additional Terms and Conditions” section. PARTICIPANTS THAT DO NOT COMPLY WITH THESE REQUIREMENTS MAY BE DISQUALIFIED.

5. **SCORING CRITERIA**

**Phase II Contest Submissions:**

Phase II participants’ online submissions and in-person presentations will be scored based on the metrics below. Each scoring category will receive a score between 0 and 6. The categories have defined weights. Scores will reflect both the review of the online submission and the in-person presentation.

Prize Administrators will evaluate the submissions and presentations by agreeing or disagreeing with the scoring category statements on a 0-6 scale as shown below. These statements are the scoring criteria.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Demonstrated</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Slightly Disagree</td>
<td>Slightly Agree</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

**Scoring Categories (Weights)**

1. **End-to-End Solution Approach (50%):**
   
   - Demonstrates a high level of functionality and feasibility for the proposed approach and is grounded in sound scientific or engineering principles, reasonable assumptions, and valid technical foundations.
   
   - Pilot-scale plan for demonstration of the end-to-end solution provides a robust, well-articulated approach to deploy and test a pilot-scale end-to-end solution successfully in Phase III.
   
   - Business plan demonstrates evidence of a likely profitable business solution.

2. **Impact (25%):**
   
   - Demonstrates a highly scalable solution that could be deployed across the United States.
   
   - The demonstrated recovery rate of the LIB commercial use significantly contributes to DOE’s
overall goal of a 90% recovery rate, as defined in the Appendix.
• Proposed recovery rate is supported by credible calculations and assumptions in the impact model.

3. Team and Partnering (25%):
• The project team has the required expertise, talent, or partners to deploy the proposed pilot-scale demonstration of the end-to-end solution successfully, and have provided a robust plan to use their voucher fund to strengthen their end-to-end solution.
• The team has access to adequate financial resources to carry out the proposed pilot-scale demonstration of the proposed end-to-end solution.

Final determination of winners will include the Prize Administrators’ final scores of the Phase II submission package and program policy factors listed in Program Policy Factors.

6. HOW TO ENTER

Register and complete a submission package online at https://www.herox.com/BatteryRecyclingPrize.

7. WHO CAN WIN (Eligibility Requirements)

Only the Phase I winners are eligible to enter Phase II and win cash awards. The Phase I eligibility requirements and those who are not eligible to win cash awards are defined in the Phase I rules.

To win the Phase II contest, participants must comply with the following eligibility requirements. By uploading a submission package, a participant certifies that they comply with the eligibility requirements below. As soon as the Prize Administrator becomes aware that a participant is not eligible to win the Phase II Contest, the participant may be disqualified.

• Phase II participants must be a team that is led by a legal business entity formed under state law or the laws of the United States, such as a corporation or other organization and maintains a primary place of business in the United States. Phase I winners are encouraged to establish themselves as a business entity as soon as possible.
• At least one Phase I Battery Recycling Prize winner must be a listed team member on each team. However, a Phase I winner does not have to lead the team. A Phase I winner is defined as a listed team member on a winning Phase I submission.
• DOE employees and DOE support service contractors, individuals who have been employed by DOE, or working for DOE as a support service contractor within six months prior to the submission deadline of the Phase I contest are not eligible to participate in any prize contests in this program.
• National Renewable Energy Laboratory (NREL) employees directly involved in the administration of the Prize are not eligible to participate in any prize contest in this program. Receipt of voucher funds is not considered to be participation in this prize program.
• 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.
• Non-DOE Federal entities and Federal employees are also not eligible to win any prize contests in this program.
• Federal grantees may not use federal funds to develop submissions.
• Federal contractors may not use federal funds from a contract to develop prize competition submissions or to fund efforts in support of a prize competition submission.
• A participating entity shall not be deemed ineligible because the entity used Federal facilities or consulted with Federal employees during a competition if the facilities and employees are made available to all entities participating in the competition on an equitable basis.

8. GENERAL SUBMISSION REQUIREMENTS

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

• The proposed solution is related to LIBs recycling.
• Activities that are described in and support the submission package are performed in the United States.
• The proposed solution represents an innovation that will move the LIBs recycling industry beyond its current state.
• The proposed solution does not involve the lobbying of any federal, state, or local government office.
• The proposed solution is not dependent on new, pending, or proposed Federal, state, or local government legislation, resolutions, appropriations, measures, or policies.
• The proposed solution is based on fundamental technical principles and is consistent with a basic understanding of the U.S. market economy.

ADDITIONAL TERMS AND CONDITIONS

1. UNIVERSAL CONTEST REQUIREMENTS

PARTICIPANTS THAT DO NOT COMPLY WITH THE REQUIREMENTS IN THIS SECTION MAY BE DISQUALIFIED.

Your submission for the Phase I, Phase II, and Phase III contest is subject to the following terms and conditions:

• You must complete registration at https://www.herox.com/BatteryRecyclingPrize to participate in the Prize by the registration deadline.
• You must post the final content of your submission or upload the submission form online at https://www.herox.com/BatteryRecyclingPrize before the Phase I, Phase II, and Phase III contests close. Late submissions or any other form of submission may not qualify.
• The cover page, video, and summary slide will be made public.
• The submission, except for the cover page, video, and summary slide, is not intended to be made public; however, see the “Records Retention and FOIA” section.
• 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. Participants may be given an opportunity to rectify submission errors due to technical challenges.
• Your submission must be in English as an unlocked, searchable PDF. Scanned hand-written submissions will be disqualified.
• Submissions will be disqualified if they contain any matter that, in the sole discretion of the Prize Administrator, is indecent, obscene, defamatory, libelous, lacking in professionalism, or 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 the U.S. Department of Energy and is in addition to the existing HeroX Terms of Use for all purposes relating to these contests. You should print and keep a copy of these rules. These provisions only apply to the contests described here and no other contests on the HeroX platform or anywhere else.
• The Prize Administrator, when feasible, may give participants an opportunity to fix non-substantive mistakes or errors in their submission packages.

2. VERIFICATION FOR PAYMENTS

The Prize Administrator will verify the identity and the role of a participant potentially qualified to receive the prize payment. Receiving a prize payment is contingent upon fulfilling all requirements contained herein. The Prize Administrator will notify the winning participants using provided email contact information after the date that results are announced. Each participant will be required to sign and return to the Prize Administrator, within 30 days of the date the notice is sent, a completed NREL Request for ACH Banking Information form (to be shared via email), and a completed W9 form (https://www.irs.gov/pub/irs-pdf/fw9.pdf). At the sole discretion of the Prize Administrator, a winning participant 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; (iv) the submission or person/entity is disqualified for any other reason.

3. TEAMS AND SINGLE ENTITY AWARDS

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

4. SUBMISSION RIGHTS

By submitting materials for Phase II of the Prize, submitters agree to allow DOE and the Prize Administrator to release their submissions, i.e., video submission, summary slide, and cover page, to the public under

18 | Battery Recycling Prize Phase II Official Rules
a Creative Commons Attribution 4.0 International License (see http://creativecommons.org/licenses/by/4.0/). The remaining portions of the submission, however, will not be made public.\(^8\)

Other than the licenses granted above, DOE and the Prize Administrator take no interest in any intellectual property associated with the submissions.

By entering, participant represents and warrants that:

1. Participant’s entire submission is an original work by participant and participant has not included third-party content (such as writing, text, graphics, artwork, logos, photographs, dialogue from plays, likeness of any third party, musical recordings, clips of videos, television programs or motion pictures) in or in connection with the submission, unless (i) otherwise requested by the Prize Administrator and/or disclosed by participant in the submission and (ii) participant has either obtained the rights to use such third-party content, including providing for the licensing rights to the submission as required by the rules, or the content of the submission is considered in the public domain without any limitations on use.

2. Unless otherwise disclosed in the submission, the use thereof by DOE, Prize Administrator, and any other third parties supporting DOE in the contest, or the exercise by DOE, Prize Administrator, and any other third parties supporting DOE in the contest of any of the rights granted by participant under these rules, does not and will not infringe or violate any rights of any third party or entity, including, without limitation, patent, copyright, trademark, trade secret, defamation, privacy, publicity, false light, misappropriation, intentional or negligent infliction of emotional distress, confidentiality, or any contractual or other rights.

3. All persons who were engaged by the participant to work on the submission or who appear in the submission in any manner have:
   a. Given participant their express written consent to submit the submission for exhibition and other exploitation in any manner and in any and all media, whether now existing or hereafter discovered, throughout the world.
   b. Provided written permission to include their name, image, or pictures in or with the submission; participant may be asked by Prize Administrator to provide permission in writing.
   c. Not been and are not currently under any union or guild agreement that results in any ongoing obligations resulting from the use, exhibition, or other exploitation of the submission.

\(^8\) Subject to “Records Retention and FOIA” section.
5. COPYRIGHT

Each participant represents and warrants that the participant is the sole author and copyright owner of the submission; that the submission is an original work of the participant or that the participant has acquired sufficient rights to use and to authorize others, including DOE, the Prize Administrator, and any other third parties supporting DOE in the contest, 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 participant is aware, or should be aware; and that the submission is free of malware.

6. 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.

7. RESOLUTION OF DISPUTES

The U.S. Department of Energy is solely responsible for administrative decisions, which are final and binding in all matters related to the contest. The Prize Administrator will not arbitrate, intervene, advise on, or resolve any matters between teams. If a dispute arises between teams, teams should consider engaging in informal or formal dispute resolution or hiring legal counsel at their own expense to resolve their issues.

In the event of a dispute as to any registration, the authorized account holder of the email address used to register will be deemed to be the participant. 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. Participants and potential winners may be required to show proof of being the authorized account holder.

8. PUBLICITY

The winners of these prizes (collectively, "Winners") will be featured on the DOE and NREL websites.

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

9. 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 and 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.

Participants in Phase II and III shall be required to obtain liability insurance for $1,000,000 by the Department of Energy, for claims by—

- Third parties for death, bodily injury, or property damage, or loss resulting from an activity carried out in connection with participation in a prize competition, with the Federal Government and the Alliance for Sustainability, LLC named as an additional insured under the registered participant’s insurance policy and registered participants agreeing to indemnify the Federal Government and the Alliance for Sustainable Energy, LLC against third party claims for damages arising from or related to prize competition activities; and
- Federal Government for damage or loss to Government property resulting from such an activity.

10. RECORDS RETENTION AND FOIA

All materials submitted to DOE as part of a submission become DOE records, subject to the Freedom of Information Act (FOIA).

The purpose of the FOIA is to afford the public the right to request and receive agency records unless those agency records are protected from disclosure under one or more of the nine FOIA exemptions. Decisions to disclose or withhold information received from the participant are based upon the applicability of one or more of the nine FOIA exemptions, not on the existence or nonexistence of protective markings or designations. Only the agency’s designated FOIA Officer may determine if information received from the participant may be withheld pursuant to one of the nine FOIA exemptions. All FOIA requests received by DOE are processed in accordance with 10 C.F.R. Part 1004.

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

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

DOE intends to prevent the release of any information submitted that contains trade secrets or confidential commercial or financial information. If the submission contains trade secrets or confidential commercial or financial information, such Confidential Business Information (CBI), should be designated at the time of submission in the following manner:

- The cover sheet must identify the specific pages containing CBI and include the following language: “Notice of Restriction on Disclosure and Use of Data: Pages [list applicable pages] of this document may contain CBI – 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 commercial or financial information that is privileged must be marked as follows: “CBI”.
- In addition, each line or paragraph containing trade secrets or commercial or financial information that is privileged or confidential must be enclosed in brackets.

However, participants should be aware that the use of protective markings is not dispositive as to whether information will be publicly released pursuant to the Freedom of Information Act, 5 U.S.C. §552, et. seq., as amended by the OPEN Government Act of 2007, Pub. L. No. 110-175.

11. PRIVACY

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

12. GENERAL CONDITIONS

DOE reserves the right to cancel, suspend, and/or modify the contest, or any part of it, at any time. If any fraud, technical failures, or any other factor beyond DOE's reasonable control impairs the integrity or proper functioning of the contests, as determined by DOE in its sole discretion, DOE may cancel the contest.

Although DOE indicates in the Phase I, Phase II, and Phase III Contests that it will select up to several winners for each contest, DOE reserves the right to only select participants that are likely to achieve the goals of the program. If, in DOE’s determination, no participants are likely to achieve the goals of the program, DOE will select no participants to be winners and will award no prize money.

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

13. PROGRAM POLICY FACTORS

While the scores of the judges 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 participants and beyond the independent judge’s scope of review may need to be considered to accomplish this goal. The following is a list of such factors. In addition to the judge’s scores, the program policy factors below may be considered in determining winners:

- Geographic diversity and potential economic impact of projects in a variety of markets.
- Whether the use of additional DOE funds and provided resources continue to be non-duplicative and compatible with the stated goals of this program and the DOE mission generally.
• Entity diversity from individuals, to teams, to small businesses, to large corporations.
• The degree to which the submission exhibits technological or programmatic diversity when compared to the existing DOE project portfolio and other participants.
• 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, productivity, and manufacturing in the United States or provide other economic benefits 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 enables new and expanding market segments.
• Whether the project promotes increased coordination with nongovernmental entities for the demonstration of technologies and research submissions to facilitate technology transfer.

14. DEFINITIONS

Prize Administrator means both the Alliance for Sustainable Energy LLC operating in its capacity under the Management and Operating Contract for the National Renewable Energy Laboratory (NREL), and the U.S. Department of Energy Vehicle Technologies Office (VTO) and the Advanced Manufacturing Office (AMO). When the Prize Administrator is referenced in this document, it refers to staff from the Alliance for Sustainable Energy, VTO, and AMO. Ultimate decision-making authority regarding contest matters rests with the Director of the Vehicle Technologies Office.
APPENDIX: Supplementary Information and Assumptions for Impact Modeling

Although lead-acid batteries are collected and recycled at a rate of 99%, (LIBs) are only collected and recycled at a rate of less than 5%. DOE is targeting a LIB recovery rate of 90% in order to provide one-third of cathode material needs for LIBs by 2025. The Department of Energy LIBs Recycling Prize is designed to incentivize American innovators to develop and demonstrate profitable business and technology strategies to achieve the goal of an LIB recovery rate of 90% across all commercial uses. DOE is interested in individual participants’ contribution to the 90% recovery rate and does not expect any individual team to meet 90%.

Please use the info below as inputs to inform your projected battery recovery.

CONSUMER ELECTRONICS

As consumer electronics inventory are not tracked as comprehensively as electric vehicle and stationary-use LIBs, DOE is aware of the difficulty in quantifying the amount of spent LIBs available for recovery. To estimate the number of LIBs in consumer electronics, DOE is using annual sales numbers of devices into households. Phase II participants will utilize the selected LIBs sales data from 2018 depicted below in Figure 4 as the number of CE batteries available for recycling in 2024. Figure 5 shows the percentage of household consumer economic sales in 2018. When constructing the collection model of your proposed solution, either assume that the numbers below represent all CEs leaving the market in 2024 or include additional batteries and provide source info showing the 2018 CEs outside of households.

9 Vehicle Technologies Office’s Research Plan to Reduce, Recycle, and Recover Critical Materials in LIBs
Figure 4. Annual Consumer Electronics Sales to Households. Though many of these batteries will be available at a point in the future, for evaluation purposes we will be considering 2018 exclusively.


For simplification, please assume that consumer electronics encompasses all applications of cells that use the 18650 format or small pouch cells, as the collection, disassembly, logistics and safety considerations should be similar enough to be applied from solution to solution.

Successful proposals to create an end-to-end solution that impacts the 90% recovery rate of the defined household consumer electronics should address specific devices listed in Figure 5.
ELECTRIC VEHICLES

Proposed end-to-end solutions that include electric vehicles (EVs) will utilize the 2018 EV sales data provided in Figure 6 to quantify the amount of spent LIBs available for recovery in 2024.

Although model year 2018 EVs are not expected to reach their end of life until approximately 2028, for the purpose of the impact modeling in this prize, assume that 2018 sales data represents the EV batteries available for recycling in 2024. Phase II participants must provide a credible analysis showing that their concept will contribute towards the 90% recovery goal of the nationwide 2018 EV sales when scaled.

**STATIONARY STORAGE AND LARGE INDUSTRIAL USES**

Stationary Storage uses offer their own set of logistics challenges. The large installations (typically above 1MWh) are heavy and require unique handling and disassembly in order to get them to recyclers. In the case of stationary storage, collection should be less problematic since the large installations will remain until they are transported to recycling facilities. Submissions that are proposing solutions for stationary storage should focus on the disassembly and transportation to recycling facilities.

Large industrial LIBs can also be considered in this category, where the handling of these large batteries are too heavy to move by hand and are operated by business entities and not by consumers. These batteries, typically over 100Ah, are too heavy to move by hand and have similar logistics issues to the stationary storage batteries described above.

For purposes of the impact model, solutions that include stationary storage and large industrial uses should also include assumptions for the quantity of batteries that are available for recycling, the span of time covered by their model.