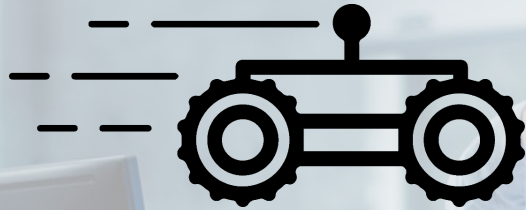


American-Made Challenges

E-ROBOT Prize



Envelope Retrofit Opportunities for
Building Optimization Technologies

Energizing Innovation in Retrofit Technology

December 9, 2020



U.S. DEPARTMENT OF ENERGY

Agenda



U.S. DEPARTMENT OF ENERGY

1 American Made Challenges and Network Overview

2 E-ROBOT Prize Overview

3 Eligibility

4 Phase 1 Contest Submission Elements

5 Using HeroX

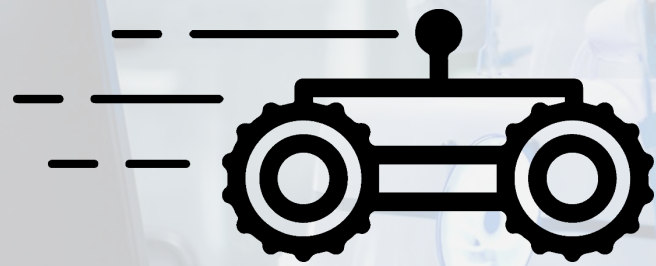
6 Q&A

Housekeeping

- This webinar is being recorded and will be made available later
- There will be a Q&A session at the end of the presentation
 - To submit a question, type it into the “Chat”
- If you experience technical issues, please check your audio settings under the “Audio” tab
 - If you continue experiencing issues, contact Zoom support: +1 (888)799.9666.



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American-Made Challenges and Network Overview

American-Made Challenges

P U R P O S E



Energize American ingenuity

*in American
innovation and
manufacturing*



Empower innovators

*with knowledge, resources,
and access to rapidly
transform ideas into
prototypes*



Provides Network- powered pathway to disruptive innovation

*so ideas can become
real products in
months, not years*



American-Made Challenges

Accelerator for U.S. Domestic Energy and Global Business Opportunities

The American-Made Challenges incentivize the nation's entrepreneurs to strengthen American leadership in energy innovation and domestic manufacturing. These new challenges seek to lower the barriers U.S.-based innovators face in reaching manufacturing scale by accelerating the cycles of learning from years to weeks, while helping to create partnerships that connect entrepreneurs to the private sector and the network of DOE's National Laboratories across the nation.



Our Prize Challenges



E-ROBOT Prize

up to \$5 million in prizes

enter now
enter by 05/12/2021



ITEAM Prize

\$75,000 in prizes

open
enter by 05/15/2020



Water Resource Recovery Prize

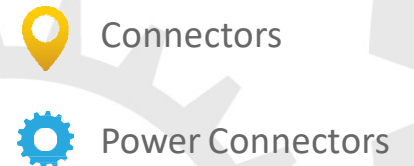
\$1 million in prizes

open
enter by 05/28/2020

American-Made NETWORK



132 Network partners
from 31 states plus
17 national laboratories



Grants vs. Prizes

Financial Award

Process

Write and submit
concept papers

Concept paper review

Applicants write and
submit full applications

Full applications review

Selections and
negotiations

Begin performing

Prepare and submit
reimbursement request

Request reviewed and
reimbursement issued

Prize Award

Process

Begin performing

Achieve predefined goal

Complete submission
package

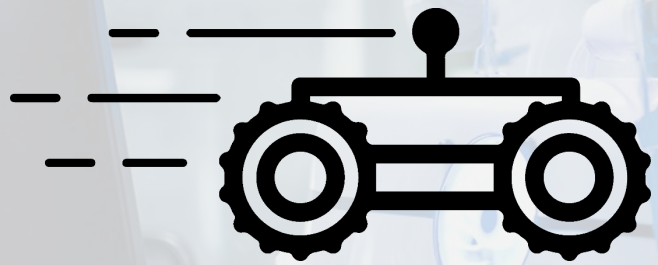
Judges score submissions

Winners receive
payment



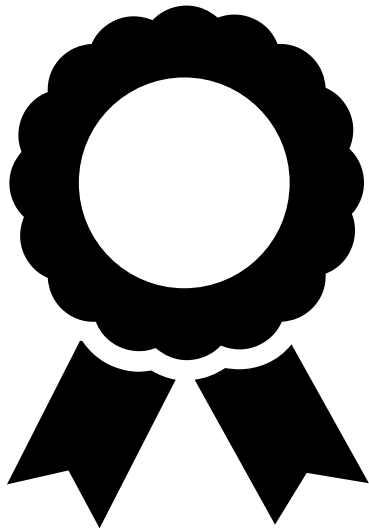


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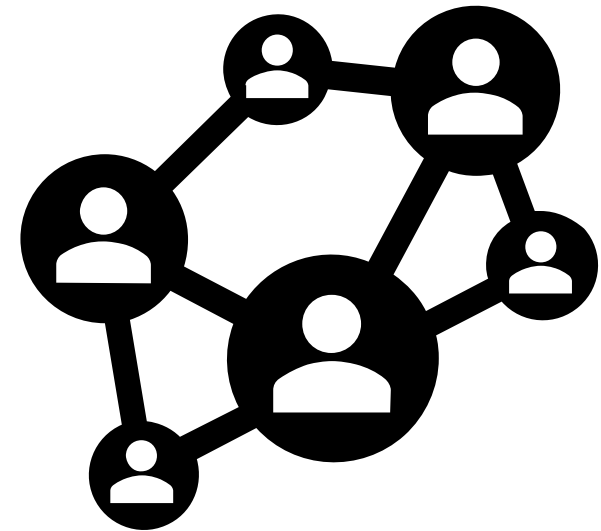
E-ROBOT Prize Overview and Eligibility

What is the E-ROBOT Prize?



**\$5 million prize
competition**

Phase 1 and Phase 2 Contests



**National Network of
support organizations**

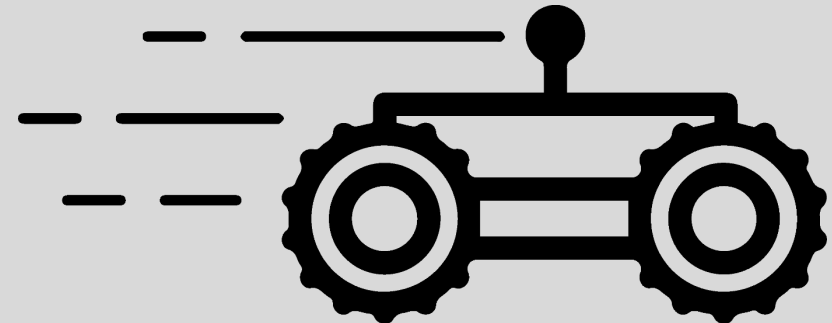
American-Made Network

Envelope Retrofit Opportunities for Building Optimization Technologies

Goal

E-ROBOT Prize

Catalyze the development of minimally invasive, low-cost, and holistic building envelope retrofit solutions that make retrofits easier, faster, and more accessible for workers.



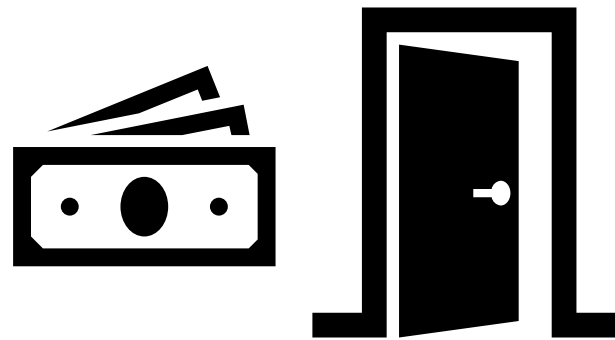
Why Robotic Building Envelope Retrofits?

Significant Energy &
Cost-Savings Potential



Buildings consume 39% of all US energy and 74% of all electricity, at an annual cost of more than \$400B/yr.

Current Solutions Are
Invasive and Costly



Only ~2% of homes and buildings undergo deep energy-efficiency retrofits each year.

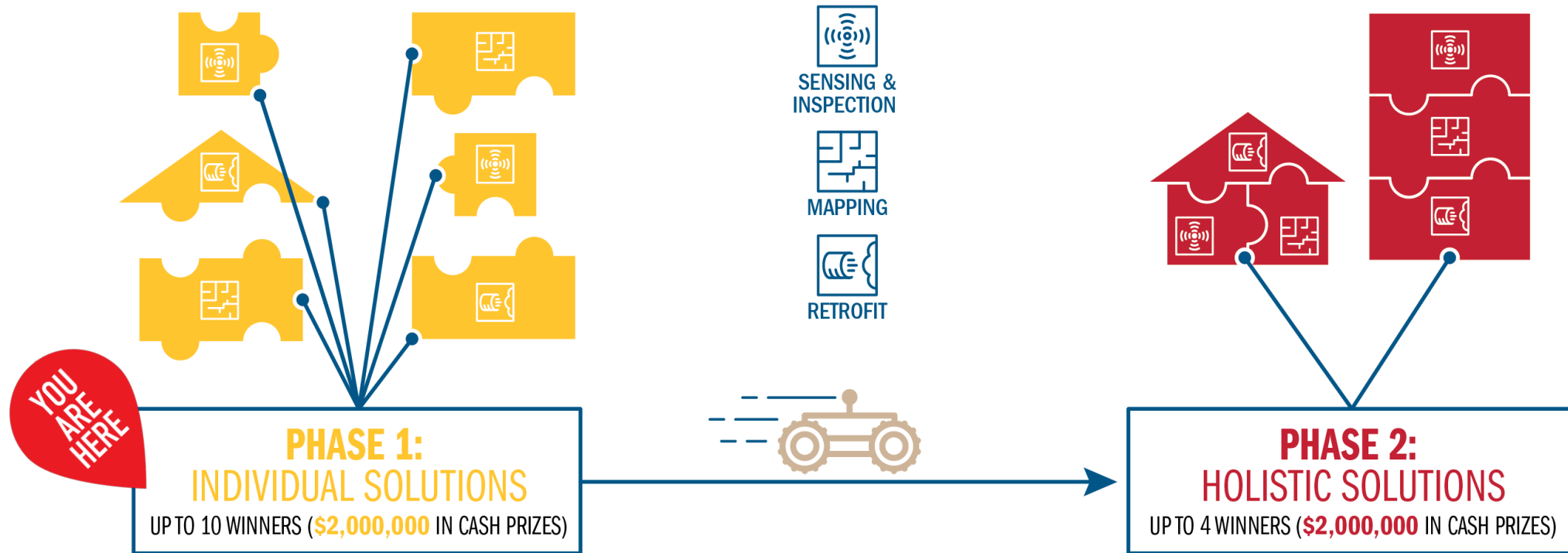
Difficult or Dangerous Spaces
for Workers to Access



Collaborative robotics enable workforce safety, productivity, and installation quality.

Phase 1 + Phase 2

BUILDINGS PRIZE **E-ROBOT: Envelope Retrofit Opportunities for Building Optimization Technologies**



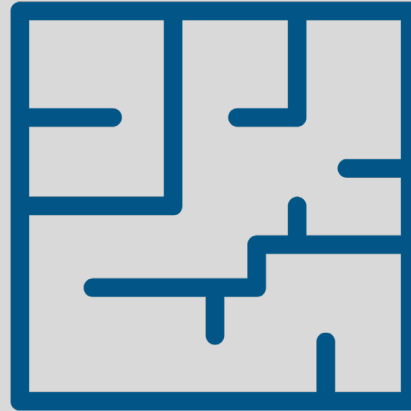
\$4M in Cash Prizes + \$1M in Network Support

E-ROBOT Solutions



Sensing and Inspection Tools

Non-destructive and fast inspection techniques to assess and identify envelope defects (e.g., excessive air infiltration, missing insulation, etc.) for pinpointed retrofit, and to verify the results post retrofit.



Mapping Tools

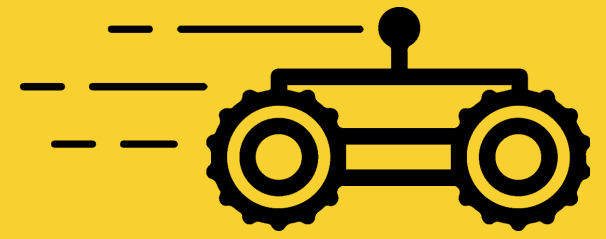
Mapping of building envelope geometry and envelope defects to be retrofitted with spatial relationships to support the retrofit process is needed.



Retrofit Tools

Semi or fully autonomous robotic deposition tool to apply minimally invasive techniques to rapidly retrofit building envelopes including, but not limited to, air sealing areas identified by the sensing and inspection tools.

Proposed E-ROBOT Solutions Should Be:



Holistic

Low Cost

**Minimally
Invasive**

**Utilizes Smart
Materials**

**Completes
Time Efficient,
High Quality
Installations**

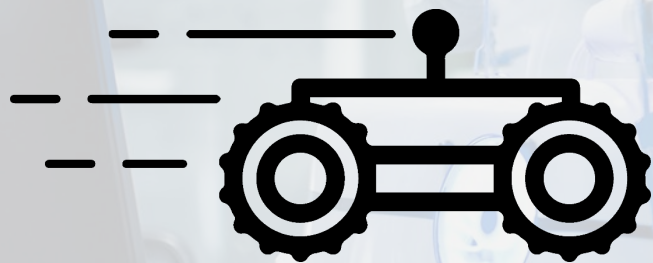
**Provides
Opportunities
to Workers**

Prizes

Phase	Winners	Duration
Phase 1 - Concept and Design	Up to 10 Winners: \$200,000 each	6 months
Phase 2 – Build and Validate	Up to 4 Winners: \$2M prize pool	6 months



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Connector Recognition Awards

Connectors are Rewarded

PHASE 1 CONNECTOR AWARDS			
Award Name	Prize Pool	Number of Awards	Details
Connector Recruitment Event Award	\$25,000	Up to 25; at \$1,000 each	Payment of \$1,000 per event that includes a minimum of 30 attendees likely to participate in this Prize. Must be registered as a Connector before the event takes place. Payments made on a first-come, first-serve basis.
Team Support to Winning Teams	\$100,000	Up to 10; at \$10,000 each	Each winning team may list 1 Connector to receive an award. Must be registered as a Connector before Phase 1 closes to receive an award.
Team Support to Non-Winning Teams	\$250,000	Split evenly; up to \$5,000 per submission*	This award goes to Connectors who helped teams that submit eligible applications but did not win. Each team may list 1 Connector to receive an award. Must be registered as a Connector before Phase 1 closes to receive an award.

Connectors earn Recognition Rewards for validated contribution to innovators' success

Attention Competitors – Remember to List your Network Connector



- Remember to list the American-Made Network Connectors who helped you in the Phase 1 Contest.
- Connectors are eligible to cash awards for supporting winning and non-winning competitors!

Connector Recognition Award Nomination

If you win the Phase 1 contest, you may nominate one Connector for a recognition cash prize award. Eligible Connectors must be approved and listed in the Network by submission day and must be listed here. You can find the complete list of Connectors here: <https://americanmadechallenges.org/network.html>.

WHO?

Any U.S.-based individual or team
with a desire to transform ideas
into impactful new solutions

CAN COMPETE



Scientists



**Students &
Faculty**



Entrepreneurs



**Anyone with a
BIG! idea**

Eligibility

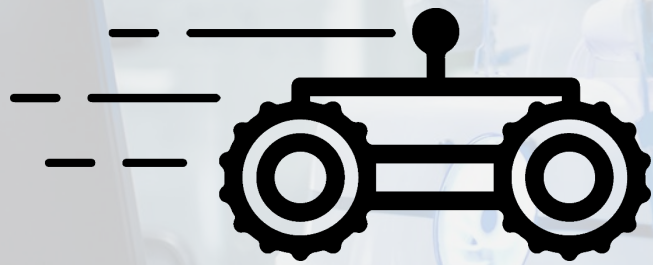
Individuals can compete alone or as a group. A representative of a private entity can also register the entity to compete.

- An individual prize competitor (who is not competing as a member of a group), must be a U.S. citizen or a permanent resident.
- A group of individuals, competing as one competitor, may win, provided that the online account holder of the submission is a U.S. citizen or a permanent resident.
- Private entities must be incorporated in and maintain a primary place of business in the United States with majority domestic ownership and control.
- If an entity seeking to compete does not have domestic ownership and control, but otherwise meets the eligibility requirements, EERE may consider issuing a waiver of that eligibility requirement where the entity submits a compelling justification.

You are strongly encouraged to review the eligibility requirements in the rules document.



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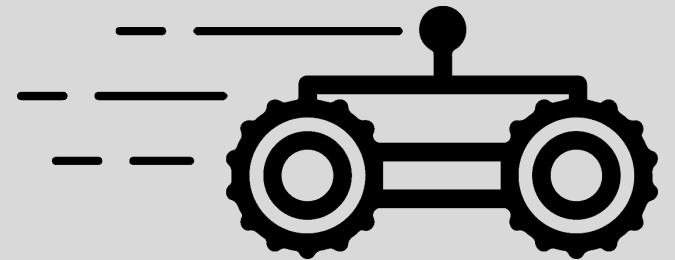


E-ROBOT Phase 1

Phase 1 Goal

E-ROBOT Prize

Rapidly develop an innovative building envelope retrofit concept that integrates robotics and a robust team to develop it to completion in Phase 2.

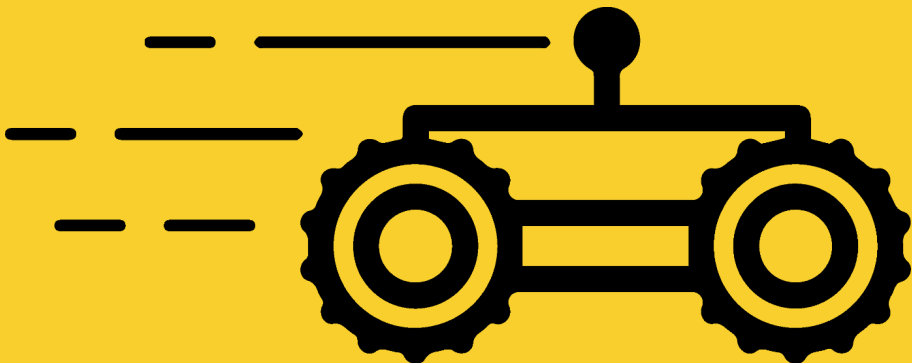


Phase 1 Process

**Preparation,
Activation, and
Submission**

Assessment

Announcement



Read the Rules



American-Made Buildings Prize Rules for the Envelope Retrofit Opportunities for Building Optimization Technologies (E-ROBOT) Prize

OFFICIAL RULES

These rules are effective from November 2020 onwards.

PROGRAM SUMMARY

1. INTRODUCTION: A TWO PRONGED APPROACH

The American-Made Envelope Retrofit Opportunities for Building Optimization Technologies (E-ROBOT) Prize, administered by the Building Technologies Office, under the authority of the America COMPETES Reauthorization Act of 2010, consists of two parallel and integrated features: The E-ROBOT Prize and the American-Made Network.

The E-ROBOT Prize is focused on developing advanced robotics for building envelope retrofits, in alignment with the Advanced Building Construction (ABC) Initiative. Advancements in robotics capabilities and controls allow for workers to reach places and perform activities that were previously difficult to access or were unsafe. For example, robots can safely enter small spaces and cavities, such as ductwork, to perform air-sealing or other efficiency activities. Robots can complement and support the

1

Official rules of the
E-ROBOT Prize
are available online

[https://americanmadechallenges.org/EROBOT/docs/E-ROBOT Prize Official Rules.pdf](https://americanmadechallenges.org/EROBOT/docs/E-ROBOT%20Prize%20Official%20Rules.pdf)

or

[E-ROBOT HeroX Page](#) > Resources Tab

Phase 1 Submission Elements

The following items constitute the submissions package and must be submitted through the HeroX platform:

- Cover Page (to be made public)
- Summary Slide (to be made public)
- 90-second – 2-minute Video (to be made public)
- Technical Narrative (up to 5 pages using a font that is at least 11 point)
- Design Specifications (up to 5 pages using a font that is at least 11 point)
- Optional: Letters of Commitment or Support



Required	<input checked="" type="checkbox"/>
Scored	<input checked="" type="checkbox"/>
Public	<input checked="" type="checkbox"/>

Cover Page

Cover Page: List basic information about your submission (will be made public)	
<ul style="list-style-type: none">• Title• Short description	<ul style="list-style-type: none">• Key project members (names, contact information, links to their professional profiles)• Your city and state• Other partners (if any)

Required ☒

Scored ☒

Public ☒

Summary Slide

Summary Slide (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. The recommended template for the slide includes:

- **Need/Challenge**
What is the critical envelope retrofit need being addressed? Why is that an important problem?
- **Proposed Solution**
Include a picture and/or graphic that best captures the solution, innovation, and/or approach with short description.
- **Partnering/Team**
Describe your team and why your team has a competitive edge.

Please make any text readable in a standard printout and conference room projection. Do not include any proprietary information, as this slide will be made public.

Required ☒

Scored ☒

Public ☒

Video

Online Public Video: (will be made public)

Suggested Content You Provide (2-minute max limit)

- What building envelope retrofit challenge will be addressed.
- Description of your solution and how it will work.
- How your solution will impact building envelope retrofits and advance the industry.
- Who you are and why your team has a competitive edge.

Required ☒

Scored ☒

Public ☐

Technical Narrative

Technical Narrative: You should answer each of the following questions with information that address the evaluation criteria outlined in Section 7.

Questions to Guide the Content You Provide


1. What building envelope retrofit challenge does your solution address and how will it work?
2. How will you validate the technical capabilities and demonstrate a path toward commercial viability of your solution in Phase 2?
3. How do you plan to distribute the product and work with service providers to use the new tool?
4. Materials: Please list the materials your solution includes along with a statement regarding their availability and durability. How are you sure that your materials will meet the 30+ year lifespan?
5. Cost: What is the current cost for this type of retrofit, and how will the proposed solution achieve a 50% cost reduction when compared to the current state of the art?
6. Invasiveness: Describe the occupant experience during the retrofit. How will your robot access the building and how will it impact building occupants?



Required	<input checked="" type="checkbox"/>
Scored	<input checked="" type="checkbox"/>
Public	<input type="checkbox"/>

Technical Narrative

7. Productivity: How long will it take for your robot to apply your solution to what area/square footage, and how easy is it to train users?
8. Energy Efficiency: What level of energy efficiency improvements are expected after applying your solution (e.g., air leakage reduction, insulation performance, and so on)? Please quantify these metrics.
9. Quality: Is the solution of sound quality, will it mitigate any underlying envelope deficiencies related to bulk moisture and vapor control, and will it ensure durable envelopes post-retrofit?
10. Worker Benefits: Does your solution offer benefits to workers such as improved safety, improved time efficiency, or increased access to areas previously unavailable?
11. What is your plan for commercialization, and what makes your team qualified to commercialize this solution?
12. Who will you partner with to develop and/or validate your solution?



Required	<input checked="" type="checkbox"/>
Scored	<input checked="" type="checkbox"/>
Public	<input type="checkbox"/>

Technical Narrative

13. Who is your target market, and how do you plan to work with your stakeholders (labor unions, trades, industry, building owners, and so on) to utilize your solution in the industry?
14. What roles will all your partners play (validation, testing, building, commercialization, business planning, and so on)?
15. What skills are on your team? Consider that having building science expertise paired with robotics expertise will be beneficial to achieving a holistic solution.
16. How do you plan to develop a holistic solution in Phase 2 that includes a single tool or suite of compatible tools that include sensing, inspection, mapping, and retrofit?

Required	<input checked="" type="checkbox"/>
Scored	<input checked="" type="checkbox"/>
Public	<input type="checkbox"/>

Design Specifications

Design Specifications

Provide graphics, digital drawings, and technical specifications that show the design of your solution and how it works. Hand drawings are specifically prohibited.

Material submitted beyond five pages will not be reviewed.

Required ☒

Scored ☒

Public ☒

Letters of Support

Letters of Commitment or Support (Optional)

Attach one-page letters (of support, intent, or commitment) from other relevant entities (e.g., potential users of the proposed innovation) to provide context. This could include letters of support from partners or others that you believe are critical to the success of your proposed solution. Please do not submit multipage letters.

How We Score and Determine Winners

All items in the submission package, except for the cover page, will be considered when scoring each submission.

After reviewing all elements of the submission package, expert reviewers will assign a score between 1 and 6 for each of the scoring criteria.

1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

Phase 1 Scoring Criteria

Four Categories

- Innovation and Impact
- Technical Feasibility
- Technical Validation and Commercial Viability
- Team and Partnering Strategy

Assessment & Announcement

1. Expert Reviewers will score submissions based on the judging criteria (Judges will sign an NDA).
2. The final score from an individual Expert Reviewers for a submission package equals the total sum of the scores for all the bullets.
3. All Expert Reviewers' scores will then be averaged for a final score for the submission package.
4. Approximately 60 days after the contest closes, the Prize Administrator notifies and announce winners
5. Compete in the Phase 2 Contest.

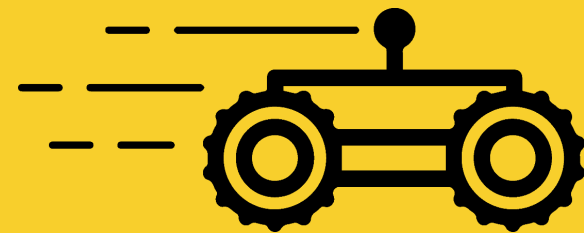


Important Deadlines – Phase 1

Phase 1 Contest submission opens
November 16, 2020

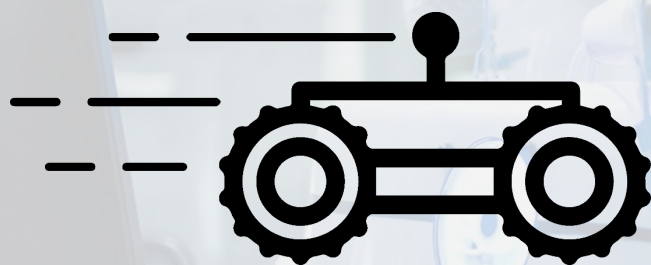
**Phase 1 Contest submission
deadline:**
May 12, 2021, 5 PM ET

**Phase 1 Contest winners
announced:**
July 2021 (Anticipated)






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Using HeroX

HeroX Live Demo




American-Made Challenges

1,333

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E-ROBOT Prize

Catalyze the development of building envelope retrofit solutions that make retrofits easier, faster, safer and more accessible for workers.

[Energy, Environment & Resources](#)[Government](#)

Stage:
Enter

Prize:
\$5 Million Dollars in total
Cash Awards and
Network Support

SOLVE THIS CHALLENGE

Overview

Guidelines

Timeline

Forum 1

Community 44

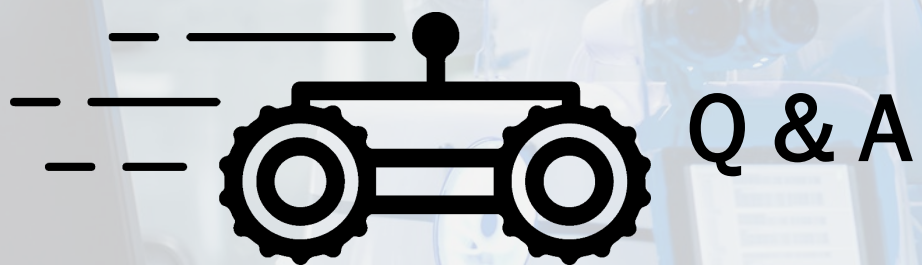
Entries

Resources

FAQ




U.S. DEPARTMENT OF ENERGY



GET STARTED

Visit our website to learn
more and apply!

E-ROBOT PrizeCompeteConnect

American-Made Challenges

E-ROBOT Prize

The American-Made Buildings Prize: Envelope Retrofit Opportunities for Building Optimization Technologies (E-ROBOT) is designed to catalyze the development of minimally invasive, low-cost, and holistic building envelope retrofit solutions that make retrofits easier, faster, safer, and more accessible for workers.

▶ [Learn more about this prize](#)

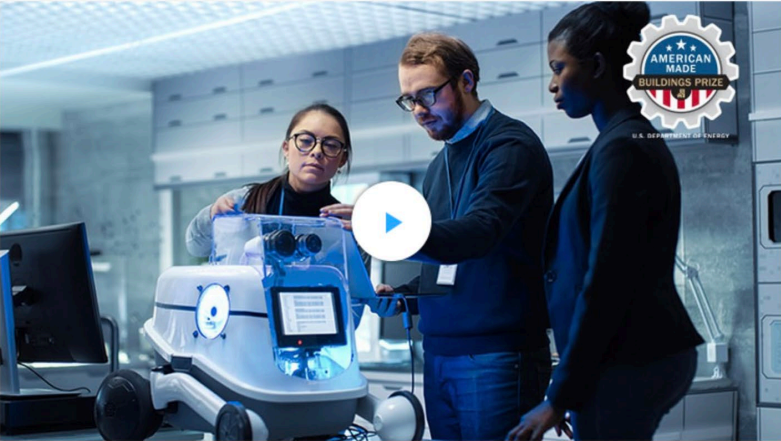


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American-Made Challenges

1,333ShareFollow (44)



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E-ROBOT Prize

Catalyze the development of building envelope retrofit solutions that make retrofits easier, faster, safer and more accessible for workers.

Energy, Environment & Resources Government

Stage:
Enter

Prize:
\$5 Million Dollars in total
Cash Awards and
Network Support

[SOLVE THIS CHALLENGE](#)

OverviewGuidelinesTimelineForum 1Community 44EntriesResourcesFAQ

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BUILDING TECHNOLOGIES OFFICE

www.energy.gov/eere/buildings/building-technologies-office