



AMERICAN  
**MADE**  
U.S. DEPARTMENT OF ENERGY

**Building Envelope Innovation Prize**  
Secondary Glazing Systems

# Building Envelope Innovation Prize

## Secondary Glazing System

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

OFFICIAL PRIZE RULES

February 2024

# Preface

The U.S. Department of Energy’s (DOE) Building Envelope Innovation Prize 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.

Date	Modification

# List of Abbreviations

- AERC** Attachments Energy Rating Council
- DOE** U.S. Department of Energy
- LBNL** Lawrence Berkeley National Laboratory
- NEPA** National Environmental Policy Act
- NREL** National Renewable Energy Laboratory
- SGS** secondary glazing system
- SHGC** solar heat gain coefficient

# Table of Contents

<b>1 Executive Summary</b> .....	<b>7</b>
<b>2 Background</b> .....	<b>7</b>
2.1 Prize Background .....	7
2.2 Prize Goals.....	8
2.3 Prize Phases .....	9
2.4 Key Dates.....	10
2.5 Eligibility Requirements .....	10
2.6 Eligible SGS Technologies .....	12
2.7 Program Goal Requirements .....	13
2.8 Additional Requirements .....	13
<b>3 Phase 1—Design Concept</b> .....	<b>13</b>
3.1 Goal .....	13
3.2 Prizes.....	14
3.3 How To Enter .....	14
3.4 Important Dates .....	14
3.5 Design Concept Process.....	14
3.6 What To Submit .....	15
3.6.1 Cover Page Content .....	15
3.6.2 Submission Summary Slide (Will Be Made Public).....	15
3.6.3 Engineering Drawings .....	16
3.6.4 Design Concept Narrative.....	16
3.6.5 Letters of Support or Commitment (Optional).....	19
3.7 How We Determine and Award Winners.....	19
3.7.1 Reviewer Panel Scoring.....	19
3.7.2 Final Determination .....	19
3.7.3 Announcement .....	19
3.8 Additional Terms and Conditions .....	19
<b>4 Phase 2—Prototype</b> .....	<b>20</b>
4.1 Goal .....	20
4.2 Prizes.....	20
4.3 How To Enter .....	20
4.4 Important Dates .....	20
4.5 Prototype Phase Process.....	21
4.6 Equity-Focused Pilot: Building Eligibility .....	22
4.7 What To Submit .....	25
4.8 Physical Prototype Submission .....	25
4.8.1 Phase 2 Prototype Evaluation .....	27
4.8.2 Other Prototype Information.....	29
4.9 Phase 2 Submission Package.....	29
4.9.1 Online Public Video (Will Be Made Public) .....	30
4.9.2 Cover Page Content .....	30
4.9.3 Submission Summary Slide (Will Be Made Public).....	30
4.9.4 Engineering Drawings .....	30
4.9.5 Technical Narrative .....	31
4.9.6 Letters of Committed Partnership .....	35
4.10 How We Determine and Award Winners .....	35
4.10.1 How Phase 2 Is Scored .....	36
4.10.2 Interviews .....	36

4.10.3 Final Determination.....	36
4.10.4 Announcement.....	37
4.11 Additional Terms and Conditions.....	37
<b>5 Phase 3—Commercialization .....</b>	<b>37</b>
5.1 Goal.....	37
5.2 Prizes.....	37
5.3 How To Enter .....	37
5.4 Important Dates .....	37
5.5 Commercialization Phase Process.....	37
5.6 What To Submit.....	38
5.6.1 Online Public Video (Will Be Made Public) .....	39
5.6.2 Cover Page Content .....	39
5.6.3 Submission Summary Slide (Will Be Made Public).....	39
5.6.4 AERC Rating Certification .....	40
5.6.5 Technical Narrative.....	40
5.7 How We Determine and Award Winners.....	42
5.7.1 How Phase 3 Is Scored.....	42
5.7.2 Interviews .....	45
5.7.3 Site Visits .....	45
5.7.4 Final Determination .....	45
5.7.5 Announcement.....	45
5.8 Additional Terms and Conditions.....	45
<b>Appendix A: Baseline Window .....</b>	<b>46</b>
<b>Appendix B: Prototype Testing Checklist .....</b>	<b>47</b>
<b>Appendix C: Additional Terms and Conditions.....</b>	<b>47</b>
C.1 Requirements.....	47
C.2 Verification for Payments.....	48
C.3 Teams and Single-Entity Awards .....	49
C.4 Submission Rights.....	49
C.5 Copyright.....	50
C.6 Contest Subject to Applicable Law.....	50
C.7 Resolution of Disputes.....	50
C.8 Publicity.....	50
C.9 Liability.....	50
C.10 Records Retention and Freedom of Information Act.....	51
C.11 Privacy .....	51
C.12 General Conditions .....	51
C.13 Program Policy Factors.....	52
C.14 National Environmental Policy Act Compliance.....	52
C.15 Return of Funds .....	53

# List of Figures

Figure 1. Goals of the Building Envelope Innovation Prize—Secondary Glazing Systems competition.....9  
Figure 2. Timeline of the Building Envelope Innovation Prize competition ..... 10  
Figure A-1. Baseline window ..... 46

# List of Tables

Table 1. Minimum Required and Goal for SGS Window Performance Installed in an Interior Overlap Mount Configuration Over a Single-Pane Clear Aluminum Window..... 12  
Table 2. Phase 1—Engineering Drawings Scoring..... 16  
Table 3. Phase 1—Narrative Scoring..... 17  
Table 4. Phase 2—Prototype Scoring ..... 28  
Table 5. Phase 2—Video Submission Scoring ..... 30  
Table 6. Phase 2—Engineering Drawings Scoring..... 31  
Table 7. Phase 2—Narrative Scoring..... 32  
Table 8. Phase 3—Video Submission Scoring ..... 39  
Table 9. Phase 3—Narrative Scoring ..... 40  
Table 10. Phase 3—Prototype Scoring ..... 44

# 1 Executive Summary

The U.S. Department of Energy's (DOE) Building Technologies Office is launching the American-Made Building Envelope Innovation Prize: Secondary Glazing Systems to advance novel solutions for upgrading inefficient windows in commercial buildings to enable decarbonization retrofits and optimize building envelopes for building electrification. The prize will offer up to \$2 million across three phases to incentivize the development and production of new Secondary Glazing System (SGS) designs. The prize will help establish, support, and expand innovation in window systems and catalyze teams to rapidly develop and deploy cost-effective solutions in the SGS market. Through the combination of improved performance and lower costs, these solutions will enable SGS investments for commercial buildings to become a key first market solution in the path for decarbonization. Finalists will secure equity-focused pilot(s) in low-income multifamily or underserved public sector buildings as a component of their commercialization plans.

## 2 Background

### 2.1 Prize Background

Windows are essential elements of nearly all commercial buildings but are prone to significant energy waste through infiltration or low insulating characteristics. Although windows compose only 8% of building surface area, they represent 45% of thermal energy transmission through the building envelope.<sup>1</sup> An SGS is a window attachment for building retrofits that can be installed without replacing the existing glass, frames, or altering the exterior appearance of the building envelope. The primary focus of this prize is to increase adoption of innovative SGS technologies in the commercial market. This prize challenges industry leaders to bring thermal performance of SGS products to the R-4 or R-5 level and provide a cost-effective, scalable, high-performing product that will meet the Biden Administration's [decarbonization goals](#) and [Justice40](#) commitments.

The U.S. building stock—consisting of more than 123 million homes and 5.9 million commercial buildings—consumes 75% of the nation's electricity, 40% of the nation's total energy, and accounts for 35% of the country's carbon dioxide emissions. Many of these buildings were constructed before 1980, prior to the existence of today's energy-efficient products and most equipment standards and building codes. These buildings represent a significant opportunity to foster U.S. innovation and unlock additional energy and carbon savings through efficiency improvements—including through building envelopes. Highly insulating and dynamic solar control technology solutions have the potential to save more than 1.6 quads of energy by tailoring window characteristics to align with ambient conditions and occupant needs, thus offsetting significant energy use associated with windows.<sup>2</sup>

Historically, big breakthroughs in window innovation have occurred primarily in the residential space, and windows have come a long way from the single-pane metal frame (R-0.8) designs in the 1960s and double-pane designs (R-2) in the 1970s. The transition to double-pane windows allowed for the introduction of low-emissivity coatings to glass surfaces in the 1980s, which further reduced heat radiation transfer and increased window thermal performance (R-3). As an alternative to double-pane windows, residential window companies introduced the concept of a clear storm window, a form of SGS,

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<sup>1</sup> Harris, Chioke. 2022. *Pathway to Zero Energy Windows: Advancing Technologies and Market Adoption*. Washington, D.C.: DOE. DOE/GO-102022-5586. <https://www.nrel.gov/docs/fy22osti/80171.pdf>.

<sup>2</sup> Ibid

to the residential market. These single-paned SGS windows provided an additional unsealed buffering layer against thermal heat loss and were adopted broadly in the residential market as a low-cost alternative to window replacement. SGS window improvements can bring an R-0.8 window up to the R-2 to R-3 range. This prize aims to increase that to the R-4 to R-5 range.

In commercial buildings, energy-efficient, high-performance windows are critical to low-energy building envelopes that enable improved overall building energy efficiency and occupant comfort. Highly insulating and dynamic solar control technology solutions can help address energy use, occupant comfort, and thermal heat transmission, regardless of climate.<sup>3</sup> However, these innovative technology solutions can present challenges for durability, and thus, this prize places an important focus on durability through testing.

Meeting the Biden Administration's ambitious [decarbonization goals](#) and [Justice40](#) commitments will require upgrading the energy efficiency of existing buildings rapidly and equitably across a wide variety of uses, sizes, vintages, and climates. This prize supports these commitments by reducing product and installation costs of SGS technologies and by requiring competitors to secure at least one pilot demonstration partner in low-income multifamily or underserved public sector buildings to implement their novel SGS innovation. Scalable and innovative solutions for window retrofits in buildings will help accelerate building envelope improvements and advance the goal of decarbonizing all U.S. buildings by 2050. Scaling building decarbonization upgrades will support the deployment of Inflation Reduction Act and Bipartisan Infrastructure Law programs and incentives, particularly for the tax incentives and rebates for commercial buildings.

The Building Envelope Innovation Prize is part of the American-Made Challenges program, which is your fast track to the clean energy revolution. Funded by DOE, we incentivize innovation through prizes, training, teaming, and mentoring, connecting the nation's entrepreneurs and innovators to America's national labs and the private sector. DOE has partnered with the National Renewable Energy Laboratory (NREL) to administer the American-Made Building Envelope Innovation Prize and with Lawrence Berkeley National Laboratory (LBNL) to provide key technical considerations and guidance for prize development.

## 2.2 Prize Goals

The overall objective of the Building Envelope Innovation Prize is to enable the electrification of large commercial buildings by increasing envelope insulation values, particularly in cold and mixed climates.

The goals of the Prize are to produce high-performance SGS to improve inefficient windows, cut product and installation costs for retrofitting, and to increase comfort and resilience for buildings. Figure 1 shows the prize goals for the Building Envelope Innovation Prize—Secondary Glazing Systems. Successful submissions will meet all the goals outlined in this section.

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<sup>3</sup> Ibid





Figure 1. Goals of the Building Envelope Innovation Prize—Secondary Glazing Systems competition

## 2.3 Prize Phases

The Building Envelope Innovation Prize will offer up to **\$2 million** in cash prizes across three phases to incentivize the development and production of new SGS designs to decarbonize commercial buildings: Phase 1—Design Concept, Phase 2—Prototype, and Phase 3—Commercialization.

- Phase 1—Design Concept:** Competitors will submit a design concept of their SGS innovation and share early data on performance metrics. Construction quality and installation details will be submitted to demonstrate durable, operational products. Up to five winning teams will receive \$50,000 each in cash prizes and will be eligible to compete in Phase 2.
- Phase 2—Prototype:** Semifinalists selected from Phase 1 will be eligible to submit a high-performance prototype product for testing at DOE national laboratories. The prototypes will be judged on SGS thermal and optical performance and embodied carbon modeling. Semifinalists will also submit a technical narrative outlining product credibility, durability, and early plans for commercialization, including details to determine the cost-effectiveness of the installed product. Additionally, semifinalists will secure an equity-focused pilot and submit a Letter of Committed Pilot. At the end of Phase 2, up to three winning teams will receive \$200,000 each in cash prizes and be eligible to compete in Phase 3.
- Phase 3—Commercialization:** Finalists selected from Phase 2 will submit a technical and equity-focused pilot project narrative outlining their plans for a successful integration of their SGS design in the commercial window industry. The submission for Phase 3 will be judged on the following metrics: sales volume, number of demonstrations, payback period for customers, and a field demonstration that includes energy performance metrics. Additionally, durability testing will take place on Phase 2 finalists' prototypes, and scores from the prototype testing will be compiled with the submission package scores. At the end of Phase 3, up to two winning teams will be awarded prize funding. The first-place winner will receive a \$750,000 cash prize, and the second-place winner will receive a \$400,000 cash prize.

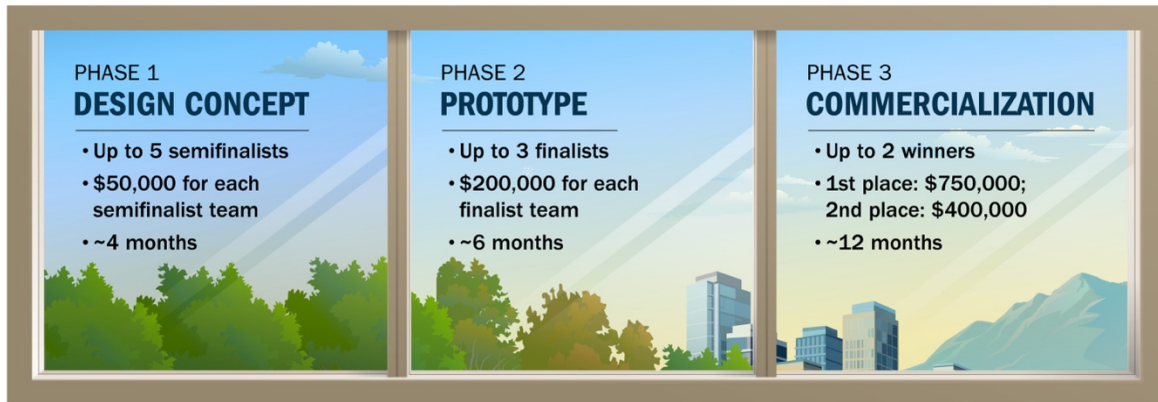


Figure 2. Timeline of the Building Envelope Innovation Prize competition

## 2.4 Key Dates

- **Phase 1 Submission Opens:** February 14, 2024
- **Phase 1 Submission Closes:** June 13, 2024, 5 p.m. ET
- **Phase 1 Semifinalist Announcement:** September 2024 (anticipated)
- **Phase 2 Opens:** September 2024 (anticipated)
- **Phase 2 Submission Closes:** March 2025 (anticipated)
- **Phase 2 Finalist Announcement:** May 2025 (anticipated)
- **Phase 3 Opens:** May 2025 (anticipated)
- **Phase 3 Submission Closes:** May 2026 (anticipated)
- **Phase 3 Winner Announcement:** July 2026 (anticipated).

## 2.5 Eligibility Requirements

**All Phase eligibility:** This competition is only open to relevant submissions of the design concepts of eligible SGS technologies outlined in Section 2.6 Eligible SGS Technologies. The Prize Administrator has the right to refuse any submission for incompleteness or unresponsiveness to the technical topic area.

**Teams are only eligible to enter the competition during Phase 1.** No new teams will be admitted in Phases 2 and 3, as these phases are down-select processes only.

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

- 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.
- An individual prize competitor or group of competitors who are not competing as part of an incorporated private entity must all be United States citizens or legal permanent residents.
- Individuals competing as part of an incorporated private entity may participate if they are legally allowed to work 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 6 months prior to the submission deadline of any contest are not eligible to participate in any prize contests in this program.
- Federal entities and federal employees are not eligible to participate in any portion of the prize.
- DOE national laboratory employees cannot compete in the prize.
- Entities and individuals publicly banned from doing business with the U.S. government such as entities and individuals debarred, suspended, or otherwise excluded from or ineligible for participating in Federal programs are not eligible to compete.
- Individuals participating in a foreign government talent recruitment program<sup>4</sup> sponsored by a country of risk<sup>5</sup> 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.

A single competitor or team may submit a maximum of one (1) submission. If more than one submission is received from a single competitor or team, the most recently submitted deliverable will be considered.

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<sup>4</sup> 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.

<sup>5</sup> DOE has designated the following countries as foreign countries of risk: China, Iran, North Korea, and Russia. This list is subject to change.

## 2.6 Eligible SGS Technologies

Commercial SGS products are defined as one or more pane glazing units designed for insertion into existing commercial, punched openings, ribbon windows, storefront, or curtain wall systems with monolithic glazing.<sup>6</sup> SGS products designed for installation over fixed and/or operable baseline windows are eligible for the Building Envelope Innovation Prize. Only commercial SGS products are eligible for this prize. Competitors will be asked to confirm their SGS technology meets this specific eligibility requirement in their HeroX submission.

Commercial scale is defined as all buildings other than low-rise residential buildings, including multifamily high-rise residential buildings over three stories in height above grade.<sup>7</sup> Only SGS products that target commercial scale are eligible for this prize. Competitors will be asked to confirm their SGS technology meets this specific eligibility requirement in their HeroX submission.

Static SGS products have fixed solar control properties, while dynamic solar control SGS can change optical characteristics to modulate solar energy flows, glare, and provide visual comfort from a broad range of simplistic to sophisticated approaches. Both static and dynamic SGS products are eligible for the Building Envelope Innovation Prize.

Below are the guidelines and minimum requirements for performance levels. SGS technologies must meet the minimum required performance levels, described in Table 1 below, to be eligible for this prize. Competitors will be asked to confirm their SGS technology meets this specific eligibility requirement in their HeroX submission. If your product’s performance levels differ, describe the difference and the reasoning:

**Table 1. Minimum Requirement and Goal for SGS Window Performance Installed in an Interior Overlap Mount Configuration Over a Single-Pane Clear Aluminum Window**

SGS Description	U (BTU/hr-ft <sup>2</sup> -°F)	Target Solar Heat Gain Coefficient (SHGC)
Static	Required: Equal to or less than 0.35 Goal: Equal to or <u>less</u> than 0.22	Not Applicable
Dynamic (High Transmission)	Required: Equal to or less than 0.35 Goal: Equal to or <u>less</u> than 0.22	Required: Not Applicable Goal: Equal to or <u>greater</u> than 0.35
Dynamic (Low Transmission)	Required: Equal to or less than 0.35 Goal: Equal to or <u>less</u> than 0.22	Required: Not Applicable Goal: Equal to or <u>less</u> than 0.19

Note: All final products will be required to have AERC ratings.

<sup>6</sup> NEEA. “Secondary Glazing System (SGS) Thermal, Moisture, and Solar Performance Analysis and Validation.” <https://neea.org/resources/secondary-glazing-system-sgs-thermal-moisture-and-solar-performance-analysis-and-validation>.

<sup>7</sup> EERE. “Codes 101.” [https://www.energycodes.gov/codes-101#:~:text=Commercial%20\(or%20non%2Dresidential\),stories%20in%20height%20above%20grade](https://www.energycodes.gov/codes-101#:~:text=Commercial%20(or%20non%2Dresidential),stories%20in%20height%20above%20grade).

## 2.7 Program Goal Requirements

Only submissions relevant to the goals of this program are eligible to compete. These goals are responsive to Section 2.6 Eligible SGS Technologies. The Prize Administrator must conclude that all the following statements are true when applied to your submission prior to award:

- The proposed solution is related to the building performance and windows industry.
- The majority of activities that are described in and support the submission package are performed in the United States and have the potential to benefit the U.S. market.
- The proposed solution represents an innovation that will move the industry beyond its current state.
- 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 does not involve the lobbying of any federal, state, or local government office.
- The proposed solution is based on fundamental technical principles and is consistent with a basic understanding of the U.S. market economy.
- The submission content sufficiently confirms the competitor's intent to commercialize early-stage technology and establish a viable U.S.-based business in the near future with revenues that do not solely depend on licensing fees of intellectual property.

## 2.8 Additional Requirements

Read and comply with additional requirements in Appendix C: Additional Terms and Conditions.

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

## 3 Phase 1—Design Concept

**Note: Phase 1 provides official prize rules, whereas Phases 2 and 3 provide draft prize rules for stakeholder review and comments. Following a public comment period, the Building Technologies Office and NREL may revise the rules for Phases 2 and 3.**

The Design Concept Phase is the first in this three-phase series and has a total of up to \$250,000 in cash prizes. Any competitor meeting the eligibility requirements can compete in the Design Concept Phase, but only semifinalists selected in Phase 1 can compete in the subsequent Prototype Phase. **The following rules are for competitors in the Design Concept Phase. “You” and “your” reference competitors in the contest.**

### 3.1 Goal

The goal of the Design Concept Phase is to develop novel SGS design concepts that meet the goals of innovating the commercial buildings industry and increase adoption of the SGS technologies for commercial retrofits. The key outcome is to have products with improved value propositions, leading to higher returns on investment.

## 3.2 Prizes

Up to five winners will be chosen, each receiving \$50,000 cash and basic prototype performance testing services at an approved DOE testing laboratory.

## 3.3 How to Enter

Go to [HeroX](#) and follow the instructions for registering and submitting all required materials before the phase deadline.

## 3.4 Important Dates

Refer to the timeline on [HeroX](#) for relevant dates and deadlines.

## 3.5 Design Concept Process

Phase 1 consists of the following steps:

- 1. Preparation, Activation, and Submission:** Competitors identify an opportunity for innovative SGS technologies and make a plan to build and test a prototype of their SGS design concept. One-person teams can compete, but building a diverse, multidisciplinary team may help strengthen capacities and team competencies. Competitors must develop and mature their SGS design concepts prior to manufacturing. Competitors must complete their submission packages and submit online via HeroX before the phase submission deadline.
- 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 reviewer criteria assess the following competitor attributes:
  - **Team Capabilities:** Form an exceptional and committed team to accomplish prototyping, testing, and commercializing the submitted design concept.
  - **Innovative, Credible Design Concept:**
    - Develop a credible design concept to improve poorly performing windows in the least-disruptive manner. Perform substantive due diligence and validate that the proposed SGS solution is technically feasible and meets the needs of the commercial windows market.
    - Develop a credible SGS design concept that is innovative and can be integrated into a real-world commercial window or system to improve performance, safety, or cost-effectiveness in an impactful way.
    - Perform substantive due diligence to gather feedback and validate that the proposed design is technically feasible and can be produced with today's commercial-scale window manufacturing processes.
  - **Market Characterization:**
    - Understand the early barriers to commercialization and deployment, estimate anticipated installations, and calculate energy economics.
    - Value innovation beyond current commercial performance as well as potential real-world impacts (i.e., human, or environmental health, industrial productivity, reduced carbon emissions, etc.), which will then be balanced with feasibility of performance, integration, and adoption.

3. **Announcement:** After the semifinalists are publicly announced by DOE, the Prize Administrator notifies them and requests the necessary information to distribute cash prizes. After selection as a semifinalist from the Design Concept Phase, competitors develop their solutions in accordance with the plan to compete in Phase 2—Prototype. Only semifinalists from Phase 1 will be eligible to compete in Phase 2.

## 3.6 What to Submit

A complete submission package for Phase 1—Design Concept should include the following items:

- Cover page
- Submission summary slide (will be made public)
- Engineering drawings of SGS prototype
- Design concept narrative
- Letters of commitment or support (optional).

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

The following details provide more guidance on what information to provide and how reviewers evaluate and score your submission. All items in the submission package, except the cover page and submission summary slide, will be considered when scoring each submission. After reviewing all elements of the submission package, reviewers will assign a score between 0 and 6 for each of the judging criteria statements, taking into account the entirety of the submission package. Each criterion is weighed equally. See Section 3.7 How We Determine and Award Winners for additional information about how Phase 1 is scored.

0	1	2	3	4	5	6
No response	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

### 3.6.1 Cover Page Content

List basic information about your submission on a one-page PDF, including:

- Project title
- Team name
- Short description
- Key project members (names, contacts, and links to their professional online profiles)
- Other partners (if any)
- Your city, state, and nine-digit zip code.

### 3.6.2 Submission Summary Slide (Will Be Made Public)

Make a public-facing, one-slide submission summary that introduces your team and/or organization and your mission. There is no template, so competitors are free to present the information in any format and submit a final summary slide as a PDF. Any text must be readable on a standard printed page and a conference room projection and should be in at least 14-pt font.



### 3.6.3 Engineering Drawings

Develop drawings of the SGS prototype. Competitors must submit the design drawings in PDF format. Competitors are recommended to also include THERM<sup>8</sup> (.THM) and WINDOW<sup>9</sup> (.MDB) files, but this is optional. Additionally, .DWF and .DWG files will be accepted. All files, besides the PDF format, must be zipped into one folder (file size limit 50 MB) to be submitted.

Provide a visual representation of your prototype design. The prototype design schematic can be a labeled photo, a diagram, or other visual that demonstrates the physical dimensions and all major components of your team’s design, including how the frame details and how the SGS system will connect with the frame into which it is integrated. This will not be public and will only be viewed by the reviewers, Prize Administrators, and DOE. Not to exceed five pages.

**Table 2. Phase 1—Engineering Drawings Scoring**

Design Concept Engineering Drawings (18 points possible)	
<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• Visual representation and labeling of all relevant components and active materials that make up the SGS design</li> <li>• Label of the dimensions (length, width, height, etc.) of window, sill, and attachments, including dimensions of key design features</li> <li>• Labels of relevant interface between original window and SGS concept</li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• The design concept drawing is well-labeled and all components are present.</li> <li>• The physical scale of all components included and how they work together in the schematic are technically feasible and would be reasonably expected to meet the performance goals described in the narrative.</li> <li>• The overall size and features of the prototype as shown in the schematic meets the criteria for this prize competition (as defined in Section 2.6 Eligible SGS Technologies).</li> </ul>

### 3.6.4 Design Concept Narrative

Submit a narrative description of the problem you are aiming to address, your technical solution, your team, and why you are well-positioned to succeed in turning your proposed solution into a reality. You should answer each of the four questions outlined in Table 3. The content bullet points below each question are only suggestions to guide your responses; you can 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 questions must not exceed five pages**, including captions, figures/graphs, or references. The reviewers will score the questions based on the content you have provided.

<sup>8</sup> LBNL. “THERM Software Downloads.” <https://windows.lbl.gov/therm-software-downloads>.

<sup>9</sup> LBNL. “WINDOW Software Downloads.” <https://windows.lbl.gov/window-software-downloads>.



**Table 3. Phase 1—Narrative Scoring**

<p><b>Design Concept Narrative (138 total points possible)</b> Maximum five pages (PDF)</p>	
<p><b>Question 1: Who is on the team? (12 points possible)</b></p>	
<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• A short description of each team member’s qualifications and expertise. Include all currently known team members. Note: submissions do not need to have a full team committed for a successful Phase 1 submission.</li> <li>• An outline of team member contributions and definition of roles and responsibilities for team’s future successes.</li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• The team demonstrates notable entrepreneurial and team-building qualities and has a high likelihood of achieving commercial success.</li> <li>• The team does not have any major gaps in expertise or missing partners that may limit the success of the technology.</li> </ul>
<p><b>Question 2: What is your SGS design concept and how does it address window retrofit needs? (42 points possible)</b></p>	
<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• Describe the SGS product and its innovations</li> <li>• State the qualities of the SGS product: <ul style="list-style-type: none"> <li>○ Static vs. dynamic SGS selection</li> <li>○ U-factor (Btu/hr-ft<sup>2</sup>-F)</li> <li>○ Minimum and maximum SHGC</li> <li>○ Minimum and maximum visible transmittance</li> <li>○ Maximum size of panels</li> <li>○ Weight of panels.</li> </ul> </li> <li>• Explain how the SGS product improves accessibility to the technology and cuts costs for both the product and installation</li> <li>• Describe how the window technology increases comfort and resilience</li> <li>• Explain how characteristics improve equitable access to SGS technology</li> <li>• Discuss product applicability to a range of building types, including buildings designated as historic</li> <li>• Describe how the product limits visual impact of the windows.</li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• The SGS product described is innovative.</li> <li>• The qualities of the SGS product meet or exceeds the window criteria in Table 1.</li> <li>• Window technology presented increases the value proposition for SGS and will lead to increased returns on investment.</li> <li>• Solution provides more than one benefit and increases comfort and resilience when installed.</li> <li>• SGS improves access to affordable retrofit technologies for windows.</li> <li>• SGS product can be applied to multiple building types, including buildings designated as historic.</li> <li>• The visual effects of the windows are minimized both on the exterior and interior.</li> </ul>

**Question 3: What are the unique technical specifications that make this product capable of meeting the outlined prize goals? (42 points possible)**

**Suggested content competitor provides:**

- Provide an estimate (in dollars) of the value of any energy savings and reduced climate impacts
- Identify how the product addresses equity and affordability
- Include a bill of materials used in the proposed design
- Explain how the SGS design solution meets industry requirements for temperature and condensation, including moisture control
- Outline installation instructions, assuming use with an Attachments Energy Rating Council (AERC) Baseline Window D, including personnel required for installation
- Outline worker safety during installation and maintenance
- Describe the disruption process and time requirement to occupants during installation.

**A score on a scale of 0–6 is provided, per judging criteria statement:**

- The claimed energy savings and reduced climate impacts of the window are credible.
- The proposed solution reduces the energy burden of disadvantaged communities (e.g., by reducing operating costs associated with utility bills and maintenance).
- Explanation of the materials used in the SGS design is appropriate.
- SGS solution meets industry requirements for temperature and condensation, including moisture control.
- Products are designed such that installation and maintenance limits risk and personnel associated with the SGS product.
- Worker safety during installation is a priority.
- Limiting occupant disruption is a priority during installation.

**Question 4: What are the characteristics of the product market? (42 points possible)**

**Suggested content competitor provides:**

- Summarize how the SGS design meets the market need technically.
- Calculate the installed cost of the product for a typical medium office building (350 windows at 4' x 5', or 20 square feet each). Include a breakdown of all assumptions including labor costs and installation time.
- Estimate the market potential of the SGS solution.
- Discuss geographic considerations, affordability, and scalability.
- Describe the plan to move the product to the commercial market and overall plan to complete the prize.
- Discuss application of SGS product to diverse community types including equity-focused communities (Section 4.6 Equity-Focused Pilot: Building Eligibility).

**A score on a scale of 0–6 is provided, per judging criteria statement:**

- SGS design meets the current and future market needs of the windows retrofit industry.
- Purchase and installation costs are less than current, business-as-usual solutions.
- The solution has the ability to truly move the market to increase adoption of SGS products.
- The product takes into account geographic considerations, affordability, and scalability.
- Prize completion plan and commercialization plan are realistic.
- SGS product retail prices are credible.
- SGS product retail prices are accessible to equity-focused communities.

## 3.6.5 Letters of Commitment or Support (Optional)

Competitors may attach one-page letters (of support, intent, or commitment) from relevant entities to provide context. Letters of support from partners or others that are critical to the success of your proposed SGS solution will likely increase your score. General letters of support from parties that are not critical to the execution of your solution will likely not factor into your score. Do not submit multipage letters—upload one PDF for each letter and combine multiple pages into a single PDF document.

## 3.7 How We Determine and Award Winners

The Prize Administrator screens all completed submissions and ensures that the teams are eligible. Then the Prize Administrator, in consultation with DOE, assigns subject matter expert reviewers who independently score the content of each submission. The reviewers will be composed of federal and nonfederal subject matter experts and representatives with expertise in areas relevant to the competition. They will review the competitor's submission package according to the criteria above.

### 3.7.1 Reviewer Panel Scoring

The scoring of submissions will proceed as follows:

- Experts will review each submission individually and assess the response from the competitor to each scored statement in the judging criteria listed per section.
- Reviewers will score each judging criteria statement on a scale of 0–6 per section, depending on the degree to which the reviewer agrees that the submission reflects the statements for consideration. Each bulleted criteria statement has equal weight. The final score from an individual reviewer for a submission package equals the total of the scores for all the bullets (26 bullets × 6 max score = 156). Each section score will be added together to generate a total score for the submission.
- The total scores from each reviewer will be averaged to produce a final score for the competing team/organization. This score will inform the judge's decisions on prize awards.
- Reviewers will also provide comments on the submissions they review. The Prize Administrator intends to provide comments to competitors after the winners are announced. These comments are intended to help competitors continue to improve and iterate on their submissions. The comments are the opinions of the reviewers and do not represent the opinions of DOE.

### 3.7.2 Final Determination

DOE will designate a federal employee as the judge before the final determination of the winners. Final determination of the winners by the judge will take into account the reviewers' feedback and scores and application of program policy factors.

### 3.7.3 Announcement

Approximately 60 days after the contest closes, the Prize Administrator will publicly announce the semifinalists. Then, the Prize Administrator will notify the semifinalists and request the necessary information to distribute the prizes.

## 3.8 Additional Terms and Conditions

See Appendix C: Additional Terms and Conditions for additional requirements.

**COMPETITORS THAT DO NOT COMPLY WITH THE ADDITIONAL REQUIREMENTS IN APPENDIX C MAY BE DISQUALIFIED.**

**STOP: Only Phase 1 rules are official prize rules. The following prize rules for Phases 2 and 3 are draft prize rules for public comment ([submit comments here](#)). They may be altered following the completion of Phase 1. DOE encourages feedback from stakeholders across the building industry and general public.**

## 4 Phase 2—Prototype

The Prototype Phase is the second phase in this three-phase series and has a total of up to \$600,000 in cash prizes. Only semifinalists selected in the Design Concept Phase can compete in the Prototype Phase. **The following rules are for competitors in the Prototype Phase. “You” and “your” reference competitors in the contest.**

### 4.1 Goal

The goal of Phase 2—Prototype is to transform semifinalists’ design concepts from Phase 1 into a commercially viable prototype. This includes testing data to validate performance and build pathways to commercialization and manufacturing scale-up. Competitors are also required to secure an equity-focused pilot in preparation for Phase 3.

### 4.2 Prizes

Up to three winners will be chosen, each receiving \$200,000 in cash.

### 4.3 How To Enter

Go to [HeroX](#) and follow the instructions for registering and submitting all required materials before the phase deadline.

- a. Complete the “Intent to Submit Prototypes for Testing” registration form online via HeroX no later than October 17, 2024 (anticipated) at 5 p.m. ET. All registered, eligible Phase 2 competitors will be eligible for Phase 2 prototype testing. **Early registration is encouraged to receive important updates.**
- b. Send prototypes to LBNL for testing.. All prototypes must be postmarked by the Prototype Phase 2 submission deadline. Refer to Section 4.8 Physical Prototype Submission for more details. **Early prototype submittal to the testing laboratories is strongly encouraged.**
- c. Complete a final submission package (see Section 4.9 Phase 2 Submission Package) online via [HeroX](#) by March 13, 2025 (anticipated) at 5 p.m. ET.

### 4.4 Important Dates

Refer to the timeline on [HeroX](#) for relevant dates and deadlines.

DATE (anticipated)	EVENT
September 13, 2024	Phase 2—Prototype submissions open
October 17, 2024, by 5 p.m. ET	“Intent to Submit Prototypes for Testing” registration form deadline
March 13, 2025, by 5 p.m. ET	Phase 2—Submission deadline

	<ul style="list-style-type: none"> <li>• All prototypes must be postmarked by this date and sent to LBNL.</li> <li>• Competitors must email the Prize Administrator (<a href="mailto:envelope.prize@nrel.gov">envelope.prize@nrel.gov</a>) with shipping confirmation and tracking information by this date.</li> <li>• Competitors must upload their Phase 2 submission documents to HeroX by 5 p.m. ET.</li> </ul>
May 2025 (tentative)	Phase 2—Prototype finalist announcement

## 4.5 Prototype Phase Process

The Prototype Phase consists of the following steps:

1. **Progress and Submission:** Competitors develop prototypes and pathways to commercialization of their SGS design concept submitted in Phase 1. Competitors will also submit a technical narrative, updated SGS prototype engineering drawings, and identify an equity-focused pilot building. Competitors must make meaningful progress in understanding cost and pricing, developing a business model, and creating a commercialization and manufacturing plan. Competitors complete their submission packages and submit online via HeroX before the phase closes.
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 reviewer criteria assess the following competitor activities:
  - **Prototype Performance:** Develop a credible SGS prototype addressing a real-world problem facing the industry. Testing results will validate whether the prototype meets performance goals self-reported by competitor and, in comparison, to the baseline window (see Appendix A: Baseline Window).
  - **Commercialization and Manufacturing Readiness:** Demonstrate due diligence, market assessment by talking to customers, and manufacturing readiness assessment the competitor has done and what plans and concrete steps the competitor has taken to create a solid pathway to commercialization.
  - **Proof of Equity-Focused Pilot:** Demonstrate the commercial viability of the SGS product through a committed pilot, as evidenced by a letter of commitment. Pilots must meet the requirements of Section 4.6 Equity-Focused Pilot: Building Eligibility.
  - **Team Capabilities:** Finalize an exceptional and committed team to accomplish prototyping, testing, and commercialization of the submitted SGS product. Update goals for the Prototype Phase and discuss your team’s readiness to meet your goals.
3. **Announcement:** After the winners are publicly announced by DOE, the Prize Administrator notifies them and requests the necessary information to distribute cash prizes. If selected as a finalist

from Phase 2—Prototype, competitors will develop their solutions in accordance with their plan to compete in Phase 3—Commercialization.

## 4.6 Equity-Focused Pilot: Building Eligibility

Competitors are required to secure an equity-focused pilot building during Phase 2 to implement in Phase 3. The following defines the requirements for an equity-focused pilot:

The Building Envelope Innovation Prize is committed to meeting the goals of the Justice40 Initiative,<sup>10</sup> which directs 40% of the overall benefits of certain federal investments to flow to disadvantaged communities. The Office of Management and Budget’s interim Justice40 implementation guidance<sup>11</sup> defines a *community* as either:

1. A group of individuals living in geographic proximity (such as a census tract) or
2. A geographically dispersed set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions.

The Building Envelope Innovation Prize allows for teams to use both approaches in directing the benefits of their SGS product innovation to disadvantaged communities, which can be defined by geography (such as buildings within a low-income neighborhood) or by characteristics of building occupants or users (such as low-income households or small disadvantaged business).

**For the purpose of this prize, the following building types will meet the requirements of an equity-focused pilot building. Competitors must secure an equity-focused pilot building that meets at least one of the following requirements:**

1. **Buildings located within Climate and Environmental Justice Screening Tool-designated and/or DOE-designated Justice40 census tracts, federally recognized Tribal lands, and U.S. territories.**<sup>12</sup>

Teams that use this approach to defining their equity-focused pilot building(s) should reference the specific census tracts they plan to focus on to implement their SGS product as part of their participation in the prize. Teams should also explain which building types (low-income housing, underserved commercial, schools, etc.) they plan to implement their SGS product in within the specific DOE-designated Justice40 census tracts.

2. **Affordable housing and housing occupied by low-income residents.** Low-income households face a disproportionately higher energy burden, defined as the percentage of gross household income spent on energy cost.<sup>13</sup> According to DOE’s [Low-Income Energy Affordability Data \(LEAD\) Tool](#),<sup>14</sup> the national average energy burden for low-income households is 8.6%, nearly three times higher than for non-low-income households, which is estimated at 3%.

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<sup>10</sup> The White House. “Justice40.” <https://www.whitehouse.gov/environmentaljustice/justice40/>.

<sup>11</sup> Executive Office of the President. 2021. “Interim Implementation Guidance for the Justice40 Initiative.” July 20, 2021. <https://www.whitehouse.gov/wp-content/uploads/2021/07/M-21-28.pdf>.

<sup>12</sup> Climate and Economic Justice Screening Tool. “About.” <https://screeningtool.geoplatform.gov/en/about>.

<sup>13</sup> Office of State and Community Energy Programs. “Low-Income Community Energy Solutions.” <https://www.energy.gov/eere/slsc/low-income-community-energy-solutions>.

<sup>14</sup> Office of State and Community Energy Programs. “LEAD Tool.” <https://www.energy.gov/eere/slsc/maps/lead-tool>.

The following building types fit within this buildings category:

- a. **Subsidized affordable housing**, such as public housing, Project-Based Section 8 housing, housing subsidized by the Low-Income Housing Tax Credit, rural housing subsidized by U.S. Department of Agriculture programs, and affordable housing subsidized by other federal, state, or local funding.
- b. **Naturally occurring affordable rental housing**, or non-subsidized housing that provide affordable rents for households at the 80% level of area median income.<sup>15</sup> Teams can consider any multifamily building located in a U.S. Department of Housing and Urban Development-designated low-income housing tax credit “qualified census tract” as meeting these criteria.<sup>16</sup>
- c. **Homes occupied by low-income households**, or households whose total income falls below a certain threshold. These homes can include all housing types, including single-family, multifamily, and manufactured housing. For this prize, teams may use the Weatherization Assistance Program eligibility definition of low income, which is 200% of the poverty level or 60% of state median income. Teams may also choose to use the definition of 80% of area median income, the income level that qualifies households for full low-income rebates through the Inflation Reduction Act Home Rebate program.

Teams that use this approach to defining their equity-focused pilot buildings should specify which of these affordable and low-income housing options they plan to address and how they will identify the specific housing units for SGS envelope updates during the later stages of the prize. For purposes of this prize, teams can consider an entire multifamily building as an equity-focused pilot building if greater than 50% of resident households are at 80% or less of area median income.

3. **Underserved commercial, nonprofit, and public buildings.** The underserved commercial and nonprofit sector includes many organizations and building types that provide vital services to communities and can experience high energy and building maintenance costs. These high costs can inhibit wealth-building and economic development on the commercial side and direct crucial resources away from services to the community on the nonprofit side. The following building types provide a framework for possible types of commercial buildings that could fit within this equity-focused buildings category:
  - a. **Buildings used by small, disadvantaged businesses**,<sup>17</sup> which include small businesses that are majority minority-owned, women-owned, or veteran-owned. These businesses can own or lease their operating space.
  - b. **Buildings used by businesses that serve disadvantaged communities**, especially businesses whose benefits or service offerings remain within the community.
  - c. **Title I schools**,<sup>18</sup> or schools with high percentages of students qualifying for free and reduced-cost lunch, high percentages of students from low-income families, or located in

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<sup>15</sup> U.S. Department of Housing and Urban Development. “Glossary of Terms to Affordable Housing.” <https://archives.hud.gov/local/nv/goodstories/2006-04-06glos.cfm>.

<sup>16</sup> Office of Policy Development and Research. “Qualified Census Tracts and Difficult Development Areas.” <https://www.huduser.gov/portal/datasets/qct.html>. “A building owned, operated, or leased by an organization that is described in section 501(c)(3) of the Internal Revenue Code of 1986 and exempt from tax under section 501(a) of such Code.”

<sup>17</sup> The federal definition of a “small, disadvantaged business” is available here:

<https://www.sba.gov/federal-contracting/contracting-assistance-programs/small-disadvantaged-business>.

<sup>18</sup> Title I, Part A (Title I) of the Elementary and Secondary Education Act provides financial assistance to local educational agencies and schools with high numbers or high percentages of children from low-income families. More information on the program is available at: <https://www2.ed.gov/programs/titleiparta/index.html>.



rural or remote areas. Applicants can use this DOE mapping tool to identify Title I schools: <https://energyjustice-schools.egs.anl.gov/>.

- d. **Buildings used by nonprofit organizations**<sup>17</sup> that provide localized community services, such as emergency shelters, meal service centers, arts and culture organizations, and environmental, economic, and housing justice organizations. These nonprofits can own or lease their operating space.
- e. **Buildings that provide critical community services**, such as public community centers, libraries, emergency service providers, and childcare centers.
- f. **Buildings designated or planned to be designated for use as resilience hubs or disaster shelters**. These buildings are community-serving facilities augmented to support residents, coordinate communication, distribute resources, and provide temporary shelter during emergency and disaster relief situations. Resilient hubs aim to provide healthy buildings and energy security through efficient building design and operation, integration of renewables, and low-carbon backup power (such as batteries).
- g. **Other commercial or nonprofit buildings defined as equity-eligible through community input**. See details below on how a team can make this determination.

Teams that use this approach to defining their equity-focused pilot buildings should specify which underserved commercial, nonprofit, and public building types they plan to focus on and how they will identify the specific buildings or units for SGS upgrades during later stages of the prize. The Building Envelope Innovation Prize recognizes that addressing underserved commercial, nonprofit, or public buildings is complex.

4. **Locally defined equity-eligible buildings** as defined or identified by the local community of the prize applicant team. DOE recognizes that community-based organizations, local governments, community leaders, and other local stakeholders have on-the-ground knowledge of underserved communities and disadvantaged areas not necessarily captured by national datasets or the categories above. The Office of Management and Budget Memo M-21-28: Interim Implementation Guidance for the Justice40 Initiative<sup>19</sup> includes factors that can help a team create its own local definition of equity-focused buildings. The memo lists the following variables for consideration:

- Low income, high and/or persistent poverty
- High unemployment and underemployment
- Racial and ethnic residential segregation, particularly where the segregation stems from discrimination by government entities
- Linguistic isolation
- High housing cost burden and substandard housing
- Distressed neighborhoods
- High transportation cost burden and/or low transportation access
- Disproportionate environmental stressor burden and high cumulative impacts
- Limited water and sanitation access and affordability
- Disproportionate impacts from climate change
- High energy cost burden and low energy access
- Jobs lost through the energy transition
- Access to health care

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<sup>19</sup> Executive Office of the President. 2021. "Interim Implementation Guidance for the Justice40 Initiative." July 20, 2021. <https://www.whitehouse.gov/wp-content/uploads/2021/07/M-21-28.pdf>.



Although not included in the memo, buildings on non-federally recognized Tribal lands may also be eligible as locally defined equity-focused buildings.

Teams that use this approach to defining their equity-focused buildings should specify which criteria they are using to define their equity-focused buildings, which can come from the categories listed above or from a team's local knowledge. Teams using this approach should also specify which neighborhoods and/or specific building types they implement their SGS product in and how they fit within the overall goals of the Justice40 Initiative. Finally, teams should share how they will approach implementing their SGS product during later stages of the prize.

## 4.7 What To Submit

A complete submission for Phase 2 should include the following items:

1. **Physical prototype submission (Section 4.8 Physical Prototype Submission):**
  - a. Three identical SGS prototypes provided to LBNL for Phase 2 testing
  - b. Five identical SGS prototypes provided to NREL for Phase 3 testing.
2. **Phase 2 submission package via HeroX (Section 4.9 Phase 2 Submission Package)**
  - 90-second video (will be made public)
  - Cover page
  - Submission summary slide (will be made public)
  - Updated engineering design drawings
  - Technical narrative
  - Letters of Committed Pilot.

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

## 4.8 Physical Prototype Submission

*Both Phase 2 and Phase 3 prototypes must be postmarked by the Phase 2 submission deadline (March 13, 2025 [anticipated]).*

This section provides prototype testing requirements for Phase 2 and Phase 3, in which all competitors are required to submit prototypes of their SGS product to the approved testing laboratories for thermal, air leakage, and durability testing. The configuration of submitted prototypes must be consistent with the requirements of the intended pilot installation site including any relevant safety requirements.

The approved testing laboratory for Phase 2 thermal and air leakage testing is LBNL. The approved testing laboratory for Phase 3 durability testing is NREL. These testing laboratories have been chosen to ensure fairness and comparability across all submissions. **Prototypes for Phase 2 will be shipped to each respective testing laboratory by the Phase 2 submission deadline.** Phase 3 prototypes will be dependent upon notification as a finalist in Phase 3.

The Building Envelope Innovation Prize will provide testing to all eligible Phase 2 competitors and all eligible Phase 2 finalists. The testing will cover:

- For Phase 2 competitors, thermal and air leakage testing of three prototypes at LBNL.
- For Phase 2 finalists entering Phase 3, durability testing of five prototypes at NREL.

Phase 2 Prototype	Phase 3 Prototype
<ul style="list-style-type: none"> <li>• <b>Number of prototypes required:</b> Three (3) prototypes.</li> <li>• <b>Testing laboratory:</b> LBNL</li> <li>• <b>Performance testing:</b> Optical, thermal, and air leakage.</li> <li>• <b>Date prototypes must be postmarked by:</b> March 13, 2025 (anticipated)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Number of prototypes required:</b> Five (5) prototypes.</li> <li>• <b>Testing laboratory:</b> NREL</li> <li>• <b>Performance testing:</b> Durability</li> <li>• <b>Date prototypes must be postmarked by:</b> March 13, 2025 (anticipated)</li> </ul>

**Due to the timeline of Phase 3 prototype testing, NREL will only conduct Phase 3 durability testing on Phase 2 finalist prototypes (up to three winners from Phase 2).** NREL will return prototypes to competitors that did not become Phase 2 finalists to the mailing information competitors provide below.

Teams who wish to compete in Phase 2 and Phase 3 must submit an “Intent to Submit for Prototype Testing” form on HeroX no later than October 17, 2024, at 5 p.m. ET (anticipated). Competitors who do not submit an “Intent to Submit for Prototype Testing” form by the deadline may NOT compete further.

It is the responsibility of the respective testing laboratories to examine the prototype upon receipt to determine if it is noticeably untestable (e.g., broken, too small, too large, etc.). It is the responsibility of the competitor to confirm that the laboratory received the prototype. If the prototype is NOT received or is noticeably untestable, it is the competitor’s responsibility to send a new set of prototypes with expedited shipping.

Early submission of prototypes is highly encouraged, as prototype submissions postmarked after the Phase 2 submission deadline, March 13, 2025 (anticipated), will not be accepted. The Building Envelope Innovation Prize will cover testing of three prototypes per registered, eligible (i.e., met the HeroX registration deadline and overall prize eligibility; refer to Section 2.5 Eligibility Requirements.) Phase 2 competitor, and five prototypes per registered, eligible Phase 2 finalist. Results of the Phase 2 prototype testing will be sent directly to the Prize Administrator, who will share individual results privately with each competitor following the Phase 2 submission deadline.

Competitors are responsible for the cost of shipping their prototypes to the testing laboratories; however, the Prize Administrator will pay for the return shipping of untested Phase 3 prototypes from NREL to non-finalist Phase 2 competitors. The Prize Administrator and testing laboratories will NOT be returning prototypes to Phase 2 finalists or Phase 3 winners.

**Each competitor shall submit eight (8) total prototypes (three prototypes for Phase 2 testing and five prototypes for Phase 3 testing that meet the requirements in the following subsections by the Phase 2 submission deadline.** The testing laboratories cannot test prototypes that fall outside of these parameters.

**Phase 2 prototype size requirements:**

Interior Overlap Mount		Interior Recessed Mount		Daylight Opening	
W [mm]	h [mm]	W [mm]	h [mm]	W [mm]	h [mm]
<b>762</b>	<b>1016</b>	<b>673</b>	<b>924</b>	<b>656</b>	<b>907</b>

### Phase 3 prototype size requirements:

The size of the insulated glass unit, independent of the frame, will be 14 inches by 20 inches (355 mm by 508 mm).

### Mailing instructions:

Competitors should package prototypes appropriately to shield against damage during shipping. Once shipped, competitors must email the Prize Administrator ([envelope.prize@nrel.gov](mailto:envelope.prize@nrel.gov)) with confirmation of shipment, team name, submission title, team captain name and contact, and tracking number. Contact and shipping information for the testing laboratories will be provided to registered, eligible Phase 2 competitors after the “Intent to Submit for Prototype Testing” form deadline (October 17, 2024; anticipated). In the event of a non-finalist Phase 2 submission, competitors should also provide their return mailing information to have their Phase 3 prototypes returned to them, including:

- Name
- Company
- Address
- State
- Zip code
- Phone number.

Note that DOE and NREL are not responsible for any damage to the prototypes, nor are they responsible should the prototype be unable to be tested for any reason.

## 4.8.1 Phase 2 Prototype Evaluation

The following details provide more guidance on how your prototype is evaluated and scored. See Section 4.10 How We Determine and Award Winners for additional information on how Phase 2 is scored. Reviewers will evaluate your submissions by assigning a score for each scored section, per judging criteria statement, based on their overall agreement or disagreement with a series of statements.

0	1	2	3	4	5	6
No response	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

## Testing Simulation Details and Methodology

Energy savings will be determined with annual energy simulations conducted with the latest version of EnergyPlus®, on the medium and large office building DOE commercial building reference models. Thermal performance, air leakage, and operation schedule of dynamic products will be incorporated into this modeling. Thermal performance will be evaluated in the Berkeley Lab Thermal Properties Laboratory with the Quantitative Infrared Thermography Chamber. Measured heat transfer through the system will be compared to simulations in WINDOW/THERM.

Carbon savings will be determined utilizing hourly results from the annual energy simulations and carbon emission rates from the U.S. Environmental Protection Agency Emissions & Generation Resource Integrated Database.

EnergyPlus Prototype model files will be provided in advance to the semifinalists:

- Weather files<sup>20</sup> for simulation will include the following:
  - Rochester International Airport, MN (Climate Zone 6A)
  - John F. Kennedy International Airport, Queens, NY (Climate Zone 4A).
- For dynamic products with automated control, participants can specify a control algorithm either through a written description (e.g., containing statements like “when exterior vertical irradiance is higher than X W/m<sup>2</sup>, the system does Y”) or through a time series of values including time stamp, façade orientation, and window system state.
  - If the time series method is chosen, time series would preferably be submitted for each building model and weather file.
  - If participants do not choose to submit control algorithm information, the evaluation will proceed using one or more default control algorithms, depending on the particular design and stated capabilities of the submitted dynamic system (e.g., the system could be switched to its highest SHGC state whenever the building’s heating, ventilation, and air conditioning system is in heating mode and lowest SHGC state whenever the building’s heating ventilation, and air conditioning system is in cooling mode).
  - For dynamic products without automation (ex. thermochromics) details sufficient for the accurate modeling of the control in EnergyPlus must be provided.
  - For dynamic products with manual control (ex., manually operated shades) the product will be operated according to AERC 2.<sup>21</sup> The controls details will be provided.

The prototype will be evaluated on the following criteria:

**Table 4. Phase 2–Prototype Scoring**

<p><b>Phase 2 Prototype Evaluation (144 points possible)</b></p> <p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <p><i>Each judging criteria statement score will be doubled.</i></p>
<p><b>Construction Quality (48 points possible)</b></p>
<ul style="list-style-type: none"> <li>• The overall quality of the product received demonstrates structural integrity.</li> <li>• The material quality and workmanship of the SGS product reflects a product that will endure.</li> <li>• The quality of the seal and adhesives of the window demonstrate a high-quality product.</li> <li>• The dimensions of the window are accurate.</li> </ul>
<p><b>Ease and Quality of Installation (48 points possible)</b></p>
<ul style="list-style-type: none"> <li>• Following the manufacturer-provided installation instructions, the SGS product was easy to install.</li> <li>• The installation limits the use of specialized knowledge and tools.</li> <li>• The product demonstrates quality installation during installation of the prototype testing systems.</li> <li>• The weight of the panel was appropriate for installation size.</li> </ul>
<p><b>Energy and Carbon Savings Over Baseline Window (48 points possible)</b></p>
<ul style="list-style-type: none"> <li>• Energy savings demonstrated significant savings over the baseline building.</li> </ul>

<sup>20</sup> Office of Energy Efficiency and Renewable Energy. “Prototype Building Models.”

<https://www.energycodes.gov/prototype-building-models>.

<sup>21</sup> <https://www.herox.com/envelopeprize/resource/1665>

- Hourly simulations show peak load reductions that results in cost savings for the building.
- Air leakage, according to the procedures in *AERC 1.2 Physical Test Methods for Measuring Energy Performance Properties of Fenestration Attachments*, was significantly reduced over the baseline window (see Appendix A: Baseline Window).
- Carbon savings demonstrated significant savings over the baseline building (embodied carbon will not be considered here).

## 4.8.2 Other Prototype Information

By submitting prototypes, competitors agree to have their prototypes tested by LBNL and NREL. The testing vendor may need to manipulate prototypes to achieve the most accurate thermal, optical, and durability data; neither are DOE, NREL, or LBNL responsible for any damage to the prototype, nor are they responsible should the prototype be unable to be tested for any reason. Competitors can pay for return shipping or the lab will dispose of prototypes. It is agreed to and understood by the competitors that the prototypes may be destroyed and/or become unusable in the process of the testing, shipping, or handling. Therefore, competitors agree that DOE, NREL, LBNL, American-Made Challenges, or any DOE or national lab employee is not at fault if the provided prototypes are returned in broken, damaged, or unusable condition. It is up to the competitor to ensure that enough time is available to mail additional prototypes to the testing laboratories before the submission deadline in the event of a lost or otherwise untestable prototype. The Prize Administrator may, at their sole discretion, allow late prototypes to be submitted due to laboratory testing failure.

Competitors are allowed to request nondisclosure agreements between themselves and the testing laboratories; however, these agreements must be finalized no later than the Phase 2 submission deadline. Nondisclosure agreements between the competitor and the testing laboratory are the sole responsibility of the competitor.

## 4.9 Phase 2 Submission Package

The Phase 2 Submission Package should be submitted on HeroX no later than March 13, 2025, by 5 p.m. ET (anticipated) and include the following items:

- 90-second video (will be made public)
- Cover page
- Submission summary slide (will be made public)
- Updated engineering design drawings
- Technical narrative
- Letters of Committed Pilot.

The following details provide more guidance on what information to provide and how reviewers evaluate and score your submission. All items in the submission package, except the cover page and submission summary slide, will be considered when scoring each submission. After reviewing all elements of the submission package, reviewers will assign a score between 0 and 6 for each of the judging criteria statements, taking into account the entirety of the submission package. Each criterion is weighed equally. See Section 4.10.1 How Phase 2 Is Scored for additional information about how Phase 2 is scored.

0	1	2	3	4	5	6
No response	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

## 4.9.1 Online Public Video (Will Be Made Public)

Table 5. Phase 2—Video Submission Scoring

Online Public Video—What is your team and solution in 90 seconds? (6 points possible)	
<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• The real-world problem you are solving</li> <li>• Your SGS solution and why it is transformational</li> <li>• How the SGS product meets the building requirements both during installation and operation</li> <li>• Who you are (your organization and key team members) and why you have a competitive edge.</li> </ul>	<p><b>A single score on a scale of 0–6 is provided, taking the following statements into consideration:</b></p> <ul style="list-style-type: none"> <li>• The video explains a compelling real-world problem.</li> <li>• The video describes a unique innovation.</li> <li>• The video describes the SGS product meeting building needs.</li> <li>• The video shows a knowledgeable and skillful team.</li> </ul>

Post your publicly accessible video online (e.g., YouTube, Vimeo). 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.

## 4.9.2 Cover Page Content

List basic information about your submission, including:

- Project title
- Team name
- Short description
- Key project members (names, contacts, and links to their professional online profiles)
- Other partners (if any)
- Your city, state, and nine-digit zip code.

## 4.9.3 Submission Summary Slide (Will Be Made Public)

Make a public-facing, one-slide submission summary that introduces your team and/or organization and your mission. There is no template, so competitors are free to present the information in any format and submit a final summary slide in PDF format. Any text must be readable on a standard printed page and a conference room projection and should be in at least 14-pt font.

## 4.9.4 Engineering Drawings

Develop drawings of the updated SGS prototype. Competitors must submit the updated design in PDF format. Competitors are recommended to also include THERM<sup>22</sup> (.THM) and WINDOW<sup>23</sup> (.MDB) files, but

<sup>22</sup> LBNL. “THERM Software Downloads.” <https://windows.lbl.gov/therm-software-downloads>.

<sup>23</sup> LBNL. “WINDOW Software Downloads.” <https://windows.lbl.gov/window-software-downloads>.

this is optional. Additionally, .DWF and .DWG files will be accepted. All files, besides the PDF format, must be zipped into one folder (file size limit 50 MB) to be submitted.

Provide a visual representation of your updated prototype design. The prototype design schematic can be a labeled photo, a diagram, or other visual that demonstrates the physical dimensions and all major components of your team’s design, including how the frame details and how the SGS system will connect with the frame into which it is integrated. This will not be public and will only be viewed by the reviewers, Prize Administrators, and DOE. Not to exceed 10 pages and must be uploaded as a PDF.

**Table 6. Phase 2—Engineering Drawings Scoring**

<b>Prototype Engineering Drawings (24 points possible)</b>	
<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• Visual representation and labeling of all relevant components and active materials that make up the SGS prototype design.</li> <li>• Label of the dimensions (length, width, height, etc.) of window, sill, and attachments, including dimensions of key design features</li> <li>• Labels of relevant interface between original window and SGS concept.</li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• The design drawing is well-labeled and all components are present.</li> <li>• The physical scale of all components included and how they work together in the schematic are technically feasible and would be reasonably expected to meet the performance goals described in the narrative.</li> <li>• The prototype engineering drawings demonstrate reception of feedback from Phase 1 on designs.</li> <li>• The overall size and features of the prototype as shown in the schematic meet the criteria for this prize competition (as defined in Section 4.8 Physical Prototype Submission).</li> </ul>

### 4.9.5 Technical Narrative

You should answer each of the following five questions listed in Table 7. The content bullet points are only suggestions to guide your responses; you can 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 15 pages**, including captions, figures/graphs, or references. The reviewers will score the questions based on the content you have provided.



Table 7. Phase 2—Narrative Scoring

<b>Technical Narrative (180 total points possible)</b> Max 15 pages (PDF)	
<b>Question 1—How is the team evolving in the competition to be successful? (18 points possible)</b>	
<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• (Re)introduce your team and highlight the diversity, knowledge, and skills that make the team uniquely capable of achieving success.</li> <li>• Describe the core network of partners you are working with to advance the proposed solution. This network can include national labs, funders, labor groups such as unions, and private partners.</li> <li>• Describe your team’s readiness to meet your goals and the need for additional talent and/or resources. If applicable, describe how your team has evolved during the competition, including any strategic hires or partnerships.</li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• The team’s drive, diversity, knowledge, and complementary skill presents the ability to bring a price-competitive product to market in the next 1 to 3 years.</li> <li>• The team has a support network to successfully bring about change in the SGS market.</li> <li>• The team identified a multidisciplinary team to meet the prize goals.</li> </ul>
<b>Question 2—What are the unique technical advances from your Phase 1 submission that make this product capable of meeting the outlined prize goals? (36 points possible)</b>	
<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• Provide a brief explanation about the prototype, including its current state of development, technical specifications, unique features, and the intended environment for which it will be integrated. What assumptions have you made in your prototype design and use-case analysis? Include any additional information needed to assess the validity and effectiveness of the performance claims.</li> <li>• Provide evidence that the SGS product is a durable, high-performance window.</li> <li>• Highlight any environmental considerations, such as improved energy savings or carbon-reduction features, incorporated into the prototype design.</li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• The prototype is grounded in real-world specifications and analysis.</li> <li>• The submission describes valid and effective performance claims over the long lifetime of the window.</li> <li>• The solution is free of any major technical flaws that would compromise the prototype’s performance.</li> <li>• The competitor shares the impact of their efforts by showcasing tangible results and outcomes.</li> <li>• The competitor exhibits adaptability and problem-solving skills by effectively identifying the critical technical risks and challenges and is implementing appropriate strategies and solutions to overcome them.</li> </ul>



<ul style="list-style-type: none"> <li>• Describe the progress made in advancing your prototype’s design and/or functionality during the Phase 2—Prototype contest period and highlight any changes, key achievements, breakthroughs, and/or advancements.</li> <li>• Explain the specific challenges encountered in the development of your prototype and detail the innovative approaches and solutions employed to overcome them.</li> <li>• Explain why becoming a Phase 2 finalist will substantively change the likelihood of your success.</li> </ul>	<ul style="list-style-type: none"> <li>• Becoming a Phase 2 finalist will significantly increase the team’s chances of a viable business based on this solution.</li> </ul>
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**Question 3—How does this product meet installation and manufacturability goals?  
(54 points possible)**

<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• Outline the installation instructions for the SGS product, including limitations</li> <li>• Describe how the installation process limits occupant disruption</li> <li>• Describe how the SGS product manages egress and fire/rescue requirements</li> <li>• Describe regular maintenance of exposed glass area and the requirements/procedure for periodic maintenance between the existing window and SGS</li> <li>• Describe your manufacturing plan, including the processes, facilities, and resources required to produce your prototype at scale and any other relevant information</li> <li>• Describe the cost drivers of your manufacturing plan, your expected cost to produce the SGS at scale, and the risks associated with achieving your cost targets</li> <li>• To the extent possible, detail the key manufacturing stages, equipment, quality control measures, and any unique aspects of your production approach</li> <li>• Explain the steps and model that were used to create and validate your manufacturing plan</li> <li>• Explain the scale at which the SGS product is anticipated to be manufactured.</li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• The product installation will allow for increased uptake of SGS products and reduces costs for installation labor.</li> <li>• The installation process limits time and disruption to building occupants.</li> <li>• Egress is considered in the SGS product.</li> <li>• Maintenance and cleaning are not burdensome to building managers.</li> <li>• The manufacturing plan is based on reasonable assumptions and is thorough in its discussion of processes, facilities, and resources required to produce the prototype at scale.</li> <li>• The at-scale cost is realistic and achievable.</li> <li>• The manufacturing plan is realistic and achievable.</li> <li>• The steps and models that were used to create the manufacturing plan are grounded in real-world manufacturing efforts that lead to success.</li> <li>• The scale of manufacturing of the product is expected to help the market penetration of SGS to increase electrification efforts across the nation.</li> </ul>
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**Question 4—How will you commercialize your product for the retrofit market? (48 points possible)**

<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• Outline the product costs to property managers, including retail costs and installation</li> <li>• Develop a detailed 3-year road map toward market viability, enumerating key barriers to success and strategies for overcoming them, including regulatory or policy barriers</li> <li>• Identify key technical issues with the SGS product for future analysis</li> <li>• Incorporate analysis and characterization of any of the following: value proposition, market opportunity, manufacturing, intellectual property, next-stage resource factors, a cost-performance model, manufacturing/scalability analysis, and/or discovery of markets, customers, and stakeholders</li> <li>• Describe your commercialization business model, including your approach to generating revenue, marketing and distribution channels, intellectual property protection, customer input, regulatory compliance, and manufacturing partnerships, as well as any other relevant information</li> <li>• Describe approach to gain input from potential customers, especially those included in the equity-focused pilot category specified in Section 4.6 Equity-Focused Pilot: Building Eligibility.</li> <li>• Describe your expected demand, including market size, target customer segments, and potential applications</li> <li>• Explain the steps and model that were used to create and validate your commercialization plan</li> <li>• Explain the next steps that are needed to bring the SGS product to the market.</li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• Costs are realistic and the return on investment is appealing to property managers to retrofit existing buildings with SGS products.</li> <li>• The provided road map lays out a realistic plan that achieves significant market penetration and adoption of the SGS product.</li> <li>• Plan identifies barriers and lists solutions to both technological and administrative issues.</li> <li>• Relevant analysis shows successful understanding of the breadth of the market and necessary information to increase scalability of SGS product.</li> <li>• The commercialization plan is based on customers and is realistic, achievable, and competitive with current market conditions, customer needs, and industry trends.</li> <li>• The assumptions about the expected demand are based in reality, and the team has cited evidence (such as customer interviews) to support these claims.</li> <li>• The team is poised for market success of their prototype within the next 1 to 3 years.</li> <li>• The current state of the commercialization plan has been informed by actual customer contact.</li> </ul>
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**Question 5—How will your committed equity-focused pilot project go? (24 points possible)**

<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• Describe your committed pilot test partner(s), their interest in your solution, their level of commitment</li> <li>• Describe how the pilot meets the equity-focused eligibility requirements outlined in Section 4.6 Equity-Focused Pilot: Building Eligibility.</li> <li>• Explain how expected pilot testing outcomes are in line with the market</li> <li>• Provide minimum square footage of glass</li> <li>• Describe how the product will help the site comply with local code and regulations.</li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• The committed pilot test partner has the need for, and capability to, pilot test and utilize this innovation.</li> <li>• The equity-focused pilot requirements are met.</li> <li>• The pilot will successfully demonstrate to the market the application of SGS windows.</li> <li>• The pilot will improve the building energy use to assist with compliance of local code and regulations.</li> </ul>
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### 4.9.6 Letters of Committed Pilot

A committed pilot that demonstrates the commercial viability of the SGS product is required and must be part of the submission package. A committed pilot could be a signed contract, purchase order, signed letter from a pilot partner with a guaranteed commitment to pilot test without contingencies, or evidence of credible customers in the form of executed customer agreements or payment receipts. The committed partnership must be from an entity that is not represented by a team member on the submission package or anyone that has personal, familial, or social ties to the competitor. Competitors should submit the strongest possible documentation to meet this requirement. DOE will not provide a preliminary review. **A team will not be eligible to win the prize competition if this requirement is deemed unfulfilled.**

**Letters of Committed Pilot (18 points)**

<p><b>A single score on a scale of 0–6 is provided, taking the following statements into consideration:</b></p> <ul style="list-style-type: none"> <li>• The pilot demonstrates an appropriate project for SGS application with a minimum of 1,000 square feet of glass installed.</li> <li>• The pilot letter demonstrates commitment to execute the pilot project.</li> <li>• The pilot meets the requirements of the equity-focused pilot outlined in Section 4.6 Equity-Focused Pilot: Building Eligibility.</li> </ul>
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### 4.10 How We Determine and Award Winners

The Prize Administrator screens all completed submissions and ensures that the teams are eligible. Then the Prize Administrator, in consultation with DOE, assigns subject matter expert reviewers who independently score the content of each submission. The reviewers will be composed of federal and non-federal subject matter experts with expertise in areas relevant to the competition. They will review the competitor’s submission package according to the criteria above.

## 4.10.1 How Phase 2 Is Scored

The Prototype Phase will be scored based on two submission components:

- Phase 2 submission package (refer to Section 4.9 Phase 2 Submission Package) and
- Prototype testing results of the submitted Phase 2 prototype (more information below).

The maximum score for the Phase 2 contest is 372 points—228 points for the final submission package, and 144 for the prototype testing results.

### Scoring of Phase 2 Submission Package

Reviewers will score the HeroX submission judging criteria questions (see Section 4.9 Phase 2 Submission Package) based on the content provided in the technical narrative and other submission elements. The scoring of submissions will proceed as follows:

- Experts will review each submission individually and assess the response from the competitor to each statement in the five criteria described in the tables in Section 4.9.5 Technical Narrative).
- Reviewers will score each judging criteria statement on a scale 0–6 per section (except for the online video, which is scored with a single score of 0–6), depending on the degree to which the reviewer agrees that the submission reflects the statements for consideration. Each bulleted criteria statement for the Phase 2 submission package has equal weight. Each bulleted criteria statement for the Phase 2 Prototype evaluation will be doubled. The final score from an individual reviewer for a submission package equals the total of the scores for all the bullets ( $[34 \text{ bullets} \times 6 \text{ max score} = 204] + (\text{the online video max score } [6]) + ([\text{Letters of Committed Pilot max score } [18]] + (\text{Prototype } [144])) = 372$ ). Each section score will be added together to generate a total score for the submission.
- The total scores from each reviewer will be averaged to produce a final score for the competing team/organization. This score will inform the judge's decisions on prize awards.
- Reviewers will also provide comments on the submissions they review. The Prize Administrator intends to provide comments to competitors after the winners are announced. These comments are intended to help competitors continue to improve and iterate on their submissions. The comments are the opinions of the reviewers and do not represent the opinions of DOE.

### Scoring of Phase 2 Prototype Testing Results

LBNL will be performing whole-building energy simulations along with optical and thermal testing to develop prototype testing results. Testing is used to validate the simulation results. Prototypes will be compared against the baseline window characteristics outlined in Appendix A: Baseline Window.

## 4.10.2 Interviews

DOE may decide to interview a subset of competitors. The interviews would be held prior to the announcement of the winners and would serve to help clarify questions the reviewers may have. Participating in interviews is not required, and interviews are not an indication of a competitor's likelihood to win.

## 4.10.3 Final Determination

DOE will designate a federal employee as the judge before the final determination of the winners. Final determination of the winners by the judge will consider the reviewers' feedback and scores, application of program policy factors, and the interview findings (if applicable).

## 4.10.4 Announcement

Approximately 60 days after the contest closes, the Prize Administrator will notify the finalists and request the necessary information to distribute the prizes. The Prize Administrator will then publicly announce the finalists.

## 4.11 Additional Terms and Conditions

See C: Additional Terms and Conditions for additional requirements.

**COMPETITORS THAT DO NOT COMPLY WITH THE ADDITIONAL REQUIREMENTS IN C: Additional Terms and Conditions MAY BE DISQUALIFIED.**

# 5 Phase 3—Commercialization

The Commercialization Phase is the third phase in this three-phase series and has up to \$1,150,000 in cash prizes. Only finalists from the Prototype Phase can compete in the Commercialization Phase. The following rules are for competitors in the Commercialization Phase. **The words “you” and “your” reference competitors in the contest.**

## 5.1 Goal

The goal for Phase 3—Commercialization is to transform your Phase 2 prototype into a commercially viable, technically credible product that can be used in real-world applications. Competitors are required to submit their plans for commercialization in Phase 3. Competitors will submit a long-term plan for the ongoing success of the effort—specifically, a compelling case that there is, or will soon be, sufficient funding in place to keep the effort going beyond this prize contest. Additionally, competitors will work with their equity-focused committed pilot that demonstrate commercial viability and use continual customer and stakeholder feedback to substantially advance their solution from prototype to pilot scale.

## 5.2 Prizes

Up to two winners will be chosen. First place will receive \$750,000 in cash. Second place will receive \$400,000 in cash.

## 5.3 How To Enter

Go to [HeroX](#) and follow the instructions for registering and submitting all required materials before the phase deadline.

## 5.4 Important Dates

Refer to the timeline on [HeroX](#) for relevant dates and deadlines.

## 5.5 Commercialization Phase Process

The Commercialization Phase consists of the following steps:

- 1. Progress and Submission:** Competitors work to improve their SGS prototype from Phase 2 and implement their equity-focused pilot from Phase 2. Competitors create their Phase 3 submission packages and submit online via HeroX before the deadline.

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 reviewer criteria assess the following competitor activities:

- **Durability Prototype Testing:** Finalist’s prototypes that were submitted in Phase 2 to NREL will be tested for durability.
- **Production and Equity-Focused Pilot Project Demonstration:** Construct and test your integrated SGS prototype for a real-world problem facing the commercial window industry in an equity-focused community and/or building, incorporating lessons learned and feedback from potential users.
- **Commercialization Plan:** Craft an engineering, procurement, construction, and testing plan and a schedule to validate the SGS technology across relevant environmental conditions. How much due diligence, techno-economic analysis, market assessment, and manufacturing readiness assessment the competitor has done and what plans and concrete steps the competitor has taken to create a solid pathway to commercialization. Describe the specific functional improvements your integrated solution concept will demonstrate from the Prototype Phase. Discuss your team’s readiness to meet your goals, including any plans to acquire additional talent and resources. Provide a high-level budget and plan for meeting your goals and describe how you plan to leverage the Commercial Phase cash prize. Detail risks to the development plan and define mitigation strategies.

3. **Announcement:** After the winners are publicly announced, the Prize Administrator notifies them and requests the necessary information to distribute cash prizes. After receiving the Phase 3 Commercialization prize, winners can develop their solutions in accordance with the plan submitted as part of the Commercialization Phase plan.

## 5.6 What to Submit

A complete submission package for Phase 3 should include the following items:

- 120-second (2-minute) video (will be made public)
- Cover page
- Submission summary slide (will be made public)
- AERC Rating Certification
- Technical and pilot project narrative.

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

The following details provide more guidance on what information to provide and how reviewers evaluate and score your submission. All items in the submission package, except the cover page and submission summary slide, will be considered when scoring each submission. After reviewing all elements of the submission package, reviewers will assign a score between 0 and 6 for each of the judging criteria statements, taking into account the entirety of the submission package. Each criterion is weighed equally. See Section 5.7.1 How Phase 3 Is Scored for additional information about how Phase 3 is scored.

0	1	2	3	4	5	6
No response	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

### 5.6.1 Online Public Video (Will Be Made Public)

Table 8. Phase 3—Video Submission Scoring

Online Public Video: What’s your team and solution in 120 seconds (2 minutes)? (6 points possible)	
<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>Describe your SGS solution and why it is transformational compared to existing solutions.</li> <li>Explain the features of your SGS product and how it works. Demonstrate its functionality.</li> <li>What progress has been made over the competition period?</li> <li>What is the scale of the opportunity, and what is your target market?</li> <li>Who are you, and why do you have a competitive edge?</li> </ul>	<p><b>A single score on a scale of 0–6 is provided, taking the following statements into consideration:</b></p> <ul style="list-style-type: none"> <li>The video demonstrates an innovative, technically sound SGS concept.</li> <li>The video demonstrates a prototype for an exciting innovation.</li> <li>The prototype has addressed and reduced significant technical risk.</li> <li>The video identifies a reasonable target market and a path to making a significant impact on the commercial window industry.</li> <li>The video shows a knowledgeable and skillful team.</li> </ul>

Post your publicly accessible video online (e.g., YouTube, Vimeo). 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.

### 5.6.2 Cover Page Content

List basic information about your submission, including:

- Project title
- Team name
- Short description
- Key project members (names, contacts, and links to their professional online profiles)
- Other partners or affiliates
- Your city, state, and nine-digit zip code.

### 5.6.3 Submission Summary Slide (Will Be Made Public)

Make a public-facing, one-slide submission summary that introduces your team and/or organization and your mission. There is no template, so competitors are free to present the information in any format. Any

text must be readable on a standard printed page and a conference room projection and should be in at least 14-pt font.

## 5.6.4 AERC Rating Certification

Achieve AERC Commercial Secondary Window rating and certification for the SGS product. Finalists will submit a PDF of the AERC Energy Improvement label.

## 5.6.5 Technical and Pilot Project Narrative

You should answer each of the following five questions in Table 9. The content bullet points are only suggestions to guide your responses. You decide where to focus your answers. The individual answers to the six questions do not have a word limit; however, **the aggregate response to these six questions must not exceed 20 pages**, including captions, figures/graphs, or references. The reviewers will score the questions based on the content you have provided.

*Table 9. Phase 3–Narrative Scoring*

<b>Technical and Pilot Project Narrative (150 points possible)</b> Max 20 pages (PDF)	
<b>Question 1: What progress have you made to prove your SGS product will be successful in a pilot demonstration? (30 points possible)</b>	
<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• Describe the current state of development of your prototype, its technical specifications, and sufficient underlying details on how it works to facilitate external evaluation of the performance claims made</li> <li>• Describe the progress made over the contest period and highlight key engagements, relationships, and milestones</li> <li>• Describe how you have validated your technical performance assumptions</li> <li>• Describe how you responded to feedback on your prototype, why it is important, and the changes you made as a result of that feedback</li> <li>• Describe your business model, cost model, and potential price points.</li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• Performance claims are grounded in appropriate data.</li> <li>• The prototype is grounded in real-world assumptions and resolves critical technical risks.</li> <li>• A considerable amount of high-quality effort was put into building a prototype and advancing the innovation of SGS product.</li> <li>• The testing feedback was effectively utilized to uncover key insights and provide relevant feedback on the prototype.</li> <li>• The assumptions around the business model and pricing are reasonable, leading to achievable, competitive pricing of the SGS product.</li> </ul>
<b>Question 2: What is your business plan to achieve your commercialization goals? (42 points possible)</b>	
<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• Explain the business plan for the SGS product</li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• The business plan demonstrates the product will be commercialized within the next 3 years.</li> </ul>



<ul style="list-style-type: none"> <li>• Describe the discrete improvements to and functionality of the SGS product you plan to implement over the next 90 to 180 days</li> <li>• Describe risks to the development plan and mitigation strategies (e.g., certification timelines or dependence on third parties, etc.), as well as discuss all regulatory and permitting requirements, responsible regulatory and permitting authorities, current status, and remaining issues</li> <li>• Commit publicly to your price point at the time of market introduction</li> <li>• Share the details of the techno-economic analysis conducted.</li> <li>• Explain why winning the Commercialization Phase will substantively change the likelihood of your success</li> </ul>	<ul style="list-style-type: none"> <li>• The stated 90-and 180-day goals are ambitious and reduce risk, and they show a commitment to deployment of SGS products.</li> <li>• Risks to the development plan have been identified, and reasonable risk mitigation strategies have been described.</li> <li>• The price point is committed to in a public way.</li> <li>• The techno-economic analysis was realistic in drawing conclusions.</li> <li>• The techno-economic analysis demonstrates a product that meets the prize goals.</li> <li>• Winning the Commercialization Phase significantly increases the team’s chances of creating a viable business based on this solution.</li> </ul>
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**Question 3: How does your SGS product impact the environment? (24 points possible)**

<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• Complete a life-cycle assessment (LCA) to measure the environmental impacts of the SGS product</li> <li>• Complete an environmental, health, and safety (EH&amp;S) analysis, which could include a discussion of air and water emissions, water consumption, solid waste streams, noise, and potential environmental impacts of the technology, including toxicological effects and hazards of emissions and waste streams.</li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• The LCA was comprehensive, covering cradle-to-grave impacts.</li> <li>• The LCA impacts have been minimized through careful product selection.</li> <li>• The EH&amp;S analysis was comprehensive covering emission, waste, and environmental impacts.</li> <li>• The EH&amp;S impacts have been reduced through manufacturing and installation processes.</li> </ul>
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**Question 4: How does your SGS product impact the community? (18 points possible)**

<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• A preliminary community benefits plan that advances the following goals: <ul style="list-style-type: none"> <li>○ Support meaningful community and labor engagement</li> <li>○ Invest in the American workforce</li> <li>○ Advance diversity, equity, inclusion, and accessibility</li> <li>○ Contribute to President Biden’s goal that 40% of the overall benefits from certain federal investments flow to</li> </ul> </li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• The community benefits plans advances the American workforce.</li> <li>• The community benefit plans demonstrates diversity, equity, inclusion, and accessibility, and federal investment in disadvantaged communities.</li> <li>• The SGS product will continue to impact communities like those of the equity-focused pilot in the next 3 years.</li> </ul>
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<p>disadvantaged communities (the Justice40 Initiative).</p> <ul style="list-style-type: none"> <li>• Share how the SGS product will continue to be marketed and installed in communities designated in the equity-focused pilot project requirements outlined in Section 4.6 Equity-Focused Pilot: Building Eligibility.</li> </ul>	
<p><b>Question 5: Was the equity-focused pilot successful in meeting the prize goals? (36 points)</b></p>	
<p><b>Suggested content competitor provides:</b></p> <ul style="list-style-type: none"> <li>• Describe how you identified your committed pilot(s) and discuss the rationale behind working with this pilot versus others</li> <li>• Describe the preexisting site conditions prior to the pilot, including window conditions and general building envelope performance</li> <li>• Calculate the baseline energy use of pilot project and post-installation energy use</li> <li>• Describe the installation of SGS at the pilot project with a minimum of 1,000 square feet of glass installed</li> <li>• Outline the installation timeline</li> <li>• Share project site photos</li> <li>• Calculate final installation and product costs</li> <li>• Share occupant feedback on installation process and post-installation comfort.</li> </ul>	<p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <ul style="list-style-type: none"> <li>• The pilot demonstrates commitment to completing the project.</li> <li>• The pilot project baseline and post-installation energy use demonstrate the success of the SGS product.</li> <li>• The installation was successful at the pilot project site with a minimum of 1,000 square feet of glass installed.</li> <li>• The installation timeline minimized impacts to occupants and demonstrated ease of product installation.</li> <li>• Final installation and product costs demonstrate a successful pilot that meets prize goals.</li> <li>• Occupant feedback indicates strong customer satisfaction and comfort.</li> </ul>

## 5.7 How We Determine and Award Winners

The Prize Administrator screens all completed submissions and ensures that the teams are eligible. Then the Prize Administrator, in consultation with DOE, assigns subject matter expert reviewers who independently score the content of each submission. The reviewers will be composed of federal and nonfederal subject matter experts and representatives from the utility partners with expertise in areas relevant to the competition. They will review the competitor’s submission package according to the criteria above.

### 5.7.1 How Phase 3 Is Scored

The Commercialization Phase will be scored based on two submission components:

- Phase 3 submission package (refer to Section 5.6 What to Submit) and
- Prototype durability testing results of the submitted Phase 3 prototype (see below).

#### Scoring of Phase 3 Submission Package

The expert reviewers will score the HeroX submission judging criteria questions based on the content provided in the technical narrative and other submission elements. The scoring of submissions will proceed as follows:

- Experts will review each submission individually and assess the response from the competitor to each statement in the criteria described in the tables in Section 5.6 What to Submit.
- Reviewers will score each judging criteria statement on a scale of 0–6 per section (except the online video, which is scored with a single score of 0–6), depending on the degree to which the reviewer agrees that the submission reflects the statements for consideration. Each bulleted criteria statement for the Phase 3 submission package has equal weight. Each bulleted criteria statement for the Phase 3 Prototype evaluation will be doubled. The final score from an individual reviewer for a submission package equals the total of the scores for all the bullets ([25 bullets × 6 max score = 150] + [the online video max score (6)] + (Prototype [84] = 240).
- Each section score will be added together to generate a total score for the submission.
- The total scores from each reviewer will be averaged to produce a final score for the competing team/organization. This score will inform the judge’s decisions on prize awards.
- Reviewers will also provide comments on the submissions they review. The Prize Administrator intends to provide comments to competitors after the winners are announced. These comments are intended to help competitors continue to improve and iterate on their submissions. The comments are the opinions of the reviewers and do not represent the opinions of DOE.

### Scoring of Phase 3 Prototype Durability Testing

NREL will work with the LBNL team to evaluate initial modeling results for the various proposed device configurations. Results from modeling studies based on WINDOW and THERM will be used to assess the potential durability risks of the varied approaches. Specific attention will be paid to modeling of the temperature of device components and the associated risk that they may pose. As an example, if a dark, absorptive glass pane heats above the melting point of edge sealing or gasketing materials, that would be raised as a point of concern for long term product viability. Proposed designs will be judged based on how well some of the concerns of secondary window installation are addressed and risk minimized. Primary risks of concern will be the potential for thermal damage to the unit, the ability to appropriately manage any heat loads induced by the product by means other than adding to the building HVAC load, and the potential for condensation-related failures.

#### Physical Evaluation of Prototypes:

Competitor SGS product designs will be evaluated using a modified version of the *NREL Guidelines and Specifications for Enhanced Durability Evaluation of Insulating Glass and Vacuum Insulating Glass*. These [NREL guidelines](#) were developed to be consistent with leading industry practices for the evaluation of durability of fenestration products as well as integration of metrics specifically focused on the long-term energy performance of the product. Climate zone is not taken into account in this testing.

Each competitor will receive their unique durability test plan based on the SGS product at the start of Phase 2.

Prototypes will be evaluated under differential thermal stress and simulated solar illuminance. Units will be installed in a prototype AERC Window Type D configuration with the unit being installed over single-pane, clear glass. The clear glass pane will be exposed to an external weather conditioning system while the prototype secondary window devices are under “room” conditions. Units will be exposed to simulated solar exposure while the temperature on the opposite side of the clear glass unit is cycled between 70 °C and -40 °C over the course of 3 hours. Cycling will be maintained up to ~500 temperature cycles over the course of 63 days.

Prototype samples will be evaluated as appropriate both before and after exposure to the enhanced weathering protocol. The evaluation criteria will be based on metrics specific to the relevant technology. Appropriate metrics may include gas content (for gas-filled units), frost point (for all gas gaps), optical properties, and thermal conductance, as some examples.

Durability testing includes the following:

- Accelerating weathering (consistent with <https://www.osti.gov/biblio/1887442>):
  - 63-day test
  - Full solar exposure
  - Thermal cycling between -40°C to 70°C
  - At 50% humidity.
- Metrics: Technology-specific, but may include:
  - Gas content (for gas-filled components; >85% retention after testing)
  - Frost point ( -40°C or colder)
  - Optical properties (change in %T <5%)
  - Conductance (change in conductivity <5%).

In addition, any obvious damage or degradation to the unit will count as a failed unit. Examples of “obvious” damage may include glass breakage under thermal stress, melting of sealant or gasketing materials, formation of haze or non-uniformity of the optical properties of the units, etc.

The prototype will be evaluated on the following two criteria:

**Table 10. Phase 3—Prototype Scoring**

<p><b>Durability Testing (84 points)</b></p> <p><b>A score on a scale of 0–6 is provided, per judging criteria statement:</b></p> <p><i>Each judging criteria statement score will be doubled.</i></p>
<p><b>Energy Performance (36 points possible)</b></p>
<ul style="list-style-type: none"> <li>• Energy performance was maintained through durability testing as evidenced by appropriate metrics, as discussed above (i.e., frost point, gas content, thermal conductance, etc.).</li> <li>• No observation of excessive condensation or evidence of moisture-based damage during evaluation.</li> <li>• No observation of defects due to corrosion/degradation of low-emissivity coatings.</li> </ul>
<p><b>Physical Performance (48 points possible)</b></p>
<ul style="list-style-type: none"> <li>• The prototype had no physical defects after durability testing.</li> <li>• The aesthetics of the SGS product were maintained and unit is intact after durability testing.</li> <li>• Visibility through product was maintained after durability testing.</li> <li>• Three samples passed all durability testing.</li> </ul>

## 5.7.2 Interviews

DOE may decide to interview a subset of competitors. The interviews would be held prior to the announcement of the winners and would serve to help clarify questions the reviewers may have. Participating in interviews is not required, and interviews are not an indication of a competitor's likelihood to win.

## 5.7.3 Site Visits

DOE may decide to visit equity-focused pilot projects of competitors to confirm validity of Phase 3 technical and pilot project narrative. The site visits would be held after the submission deadline and prior to announcement of winners. Prize Administrators would reach out to the finalists to arrange the visit.

## 5.7.4 Final Determination

DOE will designate a federal employee as the judge before the final determination of the winners. Final determination of the winners by the judge will consider the reviewers' feedback and scores, application of program policy factors, and the interview findings (if applicable).

## 5.7.5 Announcement

Approximately 60 days after the contest closes, the Prize Administrator will notify the winners and request the necessary information to distribute the prizes. The Prize Administrator will then publicly announce the winners.

## 5.8 Additional Terms and Conditions

See Appendix C: Additional Terms and Conditions for additional requirements.

**COMPETITORS THAT DO NOT COMPLY WITH THE ADDITIONAL REQUIREMENTS IN APPENDIX C MAY BE DISQUALIFIED.**

# Appendix A: Baseline Window

The baseline window is the industry standard for competitors to compare as a reference. See the following for the specifications and sizing of a window that will be used throughout the Building Envelope Innovation Prize:

Baseline frame specification:

- The baseline glazing system is a 6-mm clear glass non-thermally broken mill finish aluminum Kawneer Trifab VG 350 front inside glazed screw-spline storefront frame. Frame height is 48 mm. There is no spacer, so overall glazing system width is 6 mm.

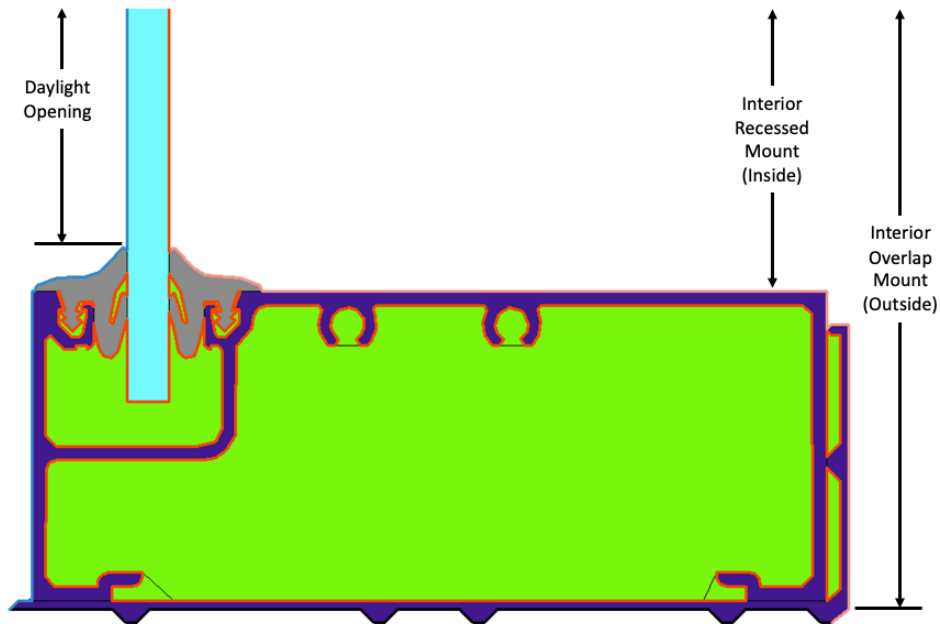


Figure A-1. Baseline window

Credit: Robert Hart, LBNL (2023)

Baseline frame size:

- For interior-mounted products, provide sizing for interior recessed mount if possible, based on product design; otherwise, provide interior overlap mount size. Exterior products shall size based on the daylight opening. Baseline frame dimensions are as follows:

Interior Overlap Mount		Interior Recessed Mount		Daylight Opening	
W [mm]	h [mm]	W [mm]	h [mm]	W [mm]	h [mm]
762	1,016	673	924	656	907

Thermal and optical performance for the baseline window<sup>24</sup>:

- SHGC center of glass: 0.82
- SHGC full frame: 0.72
- Visible transmittance (4' x 5' window) 0.75.

## Appendix B: Prototype Testing Checklist

Using the following (optional) checklist for sending prototypes for testing, competitors should:

- Confirm each prototype meets the following parameters:

### Phase 2 prototype size requirements

Interior Overlap Mount		Interior Recessed Mount		Daylight Opening	
W [mm]	h [mm]	W [mm]	h [mm]	W [mm]	h [mm]
762	1,016	673	924	656	907

### Phase 3 prototype size requirements:

The size of the insulated glass unit, independent of the frame, will be 14 inches by 20 inches (355 mm by 508 mm).

- Include eight (8) prototypes:
  - Include three (3) prototypes to LNBL
  - Include five (5) prototypes to NREL.
- If possible, affix the prototypes to the prototype packaging so that they do not move in transit.
- Address the package to LBNL or NREL addresses.
- Send the package and purchase tracking on the package.
- Email [envelope.prize@nrel.gov](mailto:envelope.prize@nrel.gov) and the testing laboratory with the estimated arrival date, tracking number, and return shipping information, which will serve as confirmation that prototypes have been submitted.

## Appendix C: Additional Terms and Conditions

### C.1 Requirements

Your submissions for the Building Envelope Innovation Prize are subject to the following terms and conditions:

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<sup>24</sup> NEEA. 2015. "Secondary Glazing System (SGS) Thermal, Moisture, and Solar Performance Analysis and Validation." <https://neea.org/resources/secondary-glazing-system-sgs-thermal-moisture-and-solar-performance-analysis-and-validation>.



- You must post the final content of your submission on [HeroX](#) before each phase submission period closes. Late submissions or any other form of submission may be rejected.
- All submissions that you wish to protect from public disclosure must be marked according to the instructions in Section 10 of Appendix C (Section C.10 Records Retention and Freedom of Information Act). Unmarked or improperly marked submissions will be deemed to have been provided with unlimited rights and may be used in any manner and for any purpose whatsoever.
- You must include all the required elements in your submission. The Prize Administrator 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 format readable by Microsoft Word or Adobe PDF. Scanned hand-written submissions will be disqualified.
- Submissions will be disqualified if they contain any matter that, in the sole discretion of DOE or NREL, is indecent, obscene, defamatory, libelous, and/or 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 prizes described in this document, these rules will form a valid and binding agreement between you and DOE, and are 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 prize described here and no other prize on the HeroX platform or anywhere else.
- The Prize Administrator, when feasible, may give competitors an opportunity to fix nonsubstantive 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 I am providing this submission to the Federal Government. I certify under penalty of perjury that the named competitor meets the eligibility requirements for this prize competition and complies with all other rules contained in the Official Rules document. I further represent that the information contained in the submission is true and contains no misrepresentations. I understand false statements or misrepresentations to the Federal Government may result in civil and/or criminal penalties under 18 U.S.C. § 1001 § 287 and 31 U.S.C. §§ 3729-3733 and 3801-3812.*

## C.2 Verification for Payments

The Prize Administrator will verify the identity and role of all competitors before distributing any prizes. Receiving a prize payment is contingent upon fulfilling all requirements contained herein. The Prize Administrator will notify winning competitors using provided email contact information for the individual or entity that was responsible for the submission. Each competitor will be required to sign and return to the Prize Administrator, within 30 days of the date on the notice, a completed NREL Request for ACH Banking Information form and a completed W9 form (<https://www.irs.gov/pub/irs-pdf/fw9.pdf>). In 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 does not respond to notifications; (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.

In the event of a dispute as to any registration, the authorized account holder of the email address used to register will be deemed to be the competitor. The "authorized account holder" is the natural person or

legal entity assigned an email address by an internet access provider, online service provider, or other organization responsible for assigning email addresses for the domain associated with the submitted address. All competitors may be required to show proof of being the authorized account holder.

## C.3 Teams and Single-Entity Awards

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

## C.4 Submission Rights

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 or HeroX applications, including the contest website, DOE websites, and partner websites, and the inclusion of the submission in any other media worldwide. The submission may be viewed by DOE, the Prize Administrator, and judges and reviewers for 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 competitors’ names and, as applicable, the names of competitors’ team members and organization, who participated in the submission on the contest website indefinitely.

By entering, the competitor represents and warrants that:

1. The competitor’s entire submission is an original work by the competitor and the competitor has not included third-party content (such as writing, text, graphics, artwork, logos, photographs, likenesses of any third party, musical recordings, clips of videos, television programs or motion pictures) in or in connection with the submission, unless (i) otherwise requested by the Prize Administrator and/or disclosed by the competitor in the submission, and (ii) the competitor has either obtained the rights to use such third-party content or the content of the submission is considered to be in the public domain without any limitations on use.
2. Unless otherwise disclosed in the submission, the use thereof by the Prize Administrator, or the exercise by the Prize Administrator of any of the rights granted by the competitor under these rules, does not and will not infringe or violate any rights of any third party or entity, including, without limitation, patent, copyright, trademark, trade secret, defamation, privacy, publicity, false light, misappropriation, intentional or negligent infliction of emotional distress, confidentiality, or any contractual or other rights.
3. All persons who were engaged by the competitor to work on the submission or who appear in the submission in any manner have:
  - a. Given the competitor 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 (or, if a minor who is not competitor’s child, competitor must have the permission of the minor’s parent or legal guardian) and the competitor may be asked by the Prize Administrator to provide permission in writing; and

- 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.

## C.5 Copyright

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

## C.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 Rules and administrative decisions, which are final and binding in all matters related to the contest. This notice is not an obligation of funds; the final award is contingent upon the availability of appropriations.

## C.7 Resolution of Disputes

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

Neither DOE nor the Prize Administrator will arbitrate, intervene, advise on, or resolve any matters between team members or among competitors.

## C.8 Publicity

The winners of these prizes (collectively, "winners") will be featured on DOE's and NREL's 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.

## C.9 Liability

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

In accordance with the delegation of authority to run this contest delegated to the judge responsible for this prize, the judge has determined that no liability insurance naming DOE as an insured will be required of competitors to compete in this competition, per 15 U.S.C. § 3719(i)(2). Competitors should assess the risks associated with their proposed activities and adequately insure themselves against possible losses.

## C.10 Records Retention and Freedom of Information Act

All materials submitted to DOE as part of a submission become DOE records and are subject to the Freedom of Information Act. The following applies only to portions of the submission not designated as public information in the instructions for submission. If a submission includes trade secrets or information that is commercial or financial, or information that is confidential or privileged, it is furnished to the Government in confidence with the understanding that the information shall be used or disclosed only for evaluation of the application. Such information will be withheld from public disclosure to the extent permitted by law, including the Freedom of Information Act. Without assuming any liability for inadvertent disclosure, DOE will seek to limit disclosure of such information to its employees and to outside reviewers when necessary for review of the application or as otherwise authorized by law. This restriction does not limit the Government's right to use the information if it is obtained from another source.

Submissions containing confidential, proprietary, or privileged information must be marked as described below. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under the Freedom of Information Act or otherwise. The U.S. government is not liable for the disclosure or use of unmarked information and may use or disclose such information for any purpose.

The submission must be marked as follows and must identify the specific pages containing trade secrets or confidential, proprietary, or privileged information: "Notice of Restriction on Disclosure and Use of Data: Pages [list applicable pages] of this document may contain trade secrets, confidential, proprietary, or privileged information that is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes. [End of Notice]"

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

Competitors will be notified of any Freedom of Information Act requests for their submissions in accordance with 29 C.F.R. § 70.26. Competitors may then have the opportunity to review materials and work with a Freedom of Information Act representative prior to the release of materials. DOE does intend to keep all submission materials private except for those materials designated as "will be made public."

## C.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.

## C.12 General Conditions

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

performance toward prize goals is conducted entirely at the risk of the competitor and DOE shall not compensate any competitors for any activities performed in furtherance of this prize.

Although DOE may indicate that it will select up to several winners for each prize, 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.

## C.13 Program Policy Factors

While the scores of the expert reviewers will be carefully considered, it is the role of the prize judge to maximize the impact of the prize funds. Some factors outside the control of competitors and beyond the independent expert reviewers' 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 are non-duplicative 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 degree to which the submission is likely to lead to increased employment 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-funded efforts or projects, which, when taken together, will best achieve the goals and objectives of DOE.
- The degree to which the submission expands DOE's funding to new competitors and recipients who have not been supported by DOE in the past.
- The degree to which the submission meets Justice40 requirements.
- The degree to which the submission enables new and expanding market segments.
- Whether the project promotes increased coordination with nongovernmental entities toward enabling a just and equitable clean energy economy in their region and/or community.

## C.14 National Environmental Policy Act Compliance

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

While NEPA compliance is a federal agency responsibility and the ultimate decisions remain with the federal agency, all participants in the Building Envelope Innovation Prize will be required to assist in the timely and effective completion of the NEPA process in the manner most pertinent to their participation in

the prize competition. If applicable, participants may be asked to provide DOE with information on fabrication and testing of their device such that DOE can conduct a meaningful evaluation of the potential environmental impacts.

## C.15 Return of Funds

As a condition of receiving a prize, competitors agree that if the award 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 non-cash prizes be returned to the government.

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



AMERICAN  
**MADE**  
U.S. DEPARTMENT OF ENERGY

**Building Envelope Innovation Prize**  
Secondary Glazing Systems

# Building Envelope Innovation Prize

## Secondary Glazing System

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

OFFICIAL PRIZE RULES

February 2024