



U.S. DEPARTMENT OF ENERGY

Solar Decathlon

Design Challenge

2025 Design Challenge Rules

July 2024

List of Acronyms

AI	artificial intelligence
ANSI	American National Standards Institute
Btu	British thermal unit
DOE	U.S. Department of Energy
EB	education building
EDT	Eastern Daylight Time
EST	Eastern Standard Time
EUI	energy use intensity
ERI	Energy Rating Index
HVAC	heating, ventilating, and air conditioning
kBtu	kilo-British thermal unit
MB	multifamily building
NREL	National Renewable Energy Laboratory
OC	open commercial
pv	photovoltaic
RESNET	Residential Energy Services Network
SF	single-family housing
USCS	United States Customary System
ZERH	Zero Energy Ready Home program

Foreword—Why Solar Decathlon Design Challenge?

Buildings account for 40% of total energy consumption in the United States, and 20% of global energy consumption.¹ Today, most buildings consume large amounts of energy and cause significant climate pollution to meet our basic needs.² People spend 90% of their time in buildings and expend substantial sums of money on building energy costs.²

Shifting the paradigm from resource-intensive to zero energy buildings requires a skilled workforce of design professionals with interdisciplinary skills and diverse experiences to apply high-performance strategies to both deep energy retrofits and new construction. This demands whole-building design for existing and new buildings that leverages comprehensive building science and addresses energy and water efficiency, occupant experience, human health, mechanical systems, embodied and operational carbon, affordability, resilience, and grid interactivity. However, professional curricula and degree programs across the United States and around the world are inconsistent, with many lacking the resources needed to adequately address these complex issues.

To help address this gap, the U.S. Department of Energy (DOE) Solar Decathlon® Design Challenge focuses on two critical goals: to incorporate high-performance building design strategies into curricula, and to inspire students to pursue sustainable building careers. Designed to support educational programs in training the next generation of building design professionals, the Solar Decathlon's 10 Contests aim to transform the building industry by challenging student teams to design zero energy buildings and address complex real-world issues related to carbon emissions, energy justice, affordability, and community resilience through whole-building design.

Design Challenge outcomes demonstrate substantial success toward these goals, including:

- Participation by more than 9,000 students from 273 collegiate institutions across 48 U.S. states and 38 countries since 2014
- 836 Participant Teams from around the world since program inception
- A network of more than 1,000 industry partners
- 38% of 2024 Design Challenge projects focused on retrofit or renovation to address climate impacts and opportunities in the existing building stock.

A movement has started. The Solar Decathlon Design Challenge is equipping the next-generation buildings workforce with the skills and passion to create future-ready buildings.

¹ U.S. Energy Information Administration. April 2021. "Monthly Energy Review," Table 2.1. <https://www.eia.gov/totalenergy/data/monthly/>.

² U.S. Department of Energy. April 2024. "Decarbonizing the U.S. Economy by 2050: A National Blueprint for the Buildings Sector." <https://www.energy.gov/eere/articles/decarbonizing-us-economy-2050>.

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1 Challenge Overview

This document outlines the Rules and evaluation criteria for teams competing in the Solar Decathlon Design Challenge, a collegiate competition with 10 Contests that challenges student teams to design innovative, high-performance, low-carbon buildings powered by renewable energy.

Over one to two semesters, Design Challenge participants prepare creative solutions that address real-world issues in the zero energy building industry. The experience offers students a unique opportunity to:

- Experience zero energy building design firsthand.
- Collaborate with an interdisciplinary team.
- Develop strategies to decarbonize the building industry, including the need to address the 130 million existing buildings in the United States.²
- Exchange ideas with other teams around the world.
- Network with industry experts.
- Learn from national thought leaders and collegiate peers.
- Engage with organizations about sustainable building careers.

All registered teams are invited to present their initial designs to industry expert Jurors at a virtual Semifinal Competition Event, during which up to 40 Finalist Teams will be selected. Finalists are invited to compete in person at the Solar Decathlon Competition Event, where Division Winners and Grand Winners are announced. Project materials from winning teams are published on the [Solar Decathlon website](#). The competition and winners are promoted through a variety of outreach efforts, which provide participants and their collegiate institutions with opportunities to share their work. Select winners may receive further invitations to present at industry conferences following the Solar Decathlon Competition Event. Collegiate institutions that participate in the Design Challenge are recognized as leaders who are preparing career-ready professionals with cutting-edge skills. Sponsors gain national and local recognition, and industry partners who collaborate with teams interact with promising future design and construction professionals.

1.1 Summary Timeline

The following are key dates for the 2025 Design Challenge:

- **July 2024:** 2025 Design Challenge Rules are released and Team Registration opens on the [Submission Site](#).
- **October 23, 2024, 5 p.m. EDT:** Team Registration is due on the [Submission Site](#).
- **December 3, 2024, 5 p.m. EST:** Teams submit an *optional* Project Summary via the [Submission Site](#).
- **January 2025:** An updated version of the Design Challenge Rules is released with any needed adjustments and minor clarifications.
- **February 11, 2025, 5 p.m. EST:** Teams sign up to present during the Semifinal Competition Event.
- **February 18, 2025, 5 p.m. EST:** Semifinal Submission deliverables are due on the [Submission Site](#). See Section 6.2 for details.
- **February 21–22, 2025:** Virtual Solar Decathlon Semifinal Competition Event is held.
 - All Participant Teams present virtually to industry expert Jurors and are evaluated against criteria outlined in Section 5.4. Up to 10 Finalist Teams per Division are selected by Jurors to advance and compete in the Competition Event. Teams not selected as Finalists are invited to continue participation as an Exhibition Team; see Section 5.6.2 for details.
- **February 27, 2025, 5 p.m. EST:** Exhibition Team Letter of Intent is due via the Box links indicated in Section 6.
- **April 8, 2025, 5 p.m. EDT:** Final Submission deliverables are due on the [Submission Site](#). See Section 6.4 for details.
- **April 22, 2025, 5 p.m. EDT:** Division Presentation Slides and Grand Jury Presentation Slides are due via the Box links indicated in Section 6.
- **April 25–27, 2025:** Hybrid Solar Decathlon Competition Event is held virtually and on-site at the National Renewable Energy Laboratory (NREL) in Golden, Colorado, USA.
 - Finalist Teams present to industry expert Jurors for Division Winner selection. Exhibition Teams present to industry expert reviewers for feedback and are invited to participate in event activities. Design Challenge winners are announced.

2 Building a Team

2.1 Team Registration

To complete the registration process, teams must use the [Submission Site](#), the online competition website for teams to submit deliverables, access resources, and receive competition updates from the organizers.

Teams can follow the instructions below to submit a Team Registration:

1. Go to the Design Challenge [Submission Site](#).
2. Complete user registration and start a team if you are the first member of your team to access the site.
 - a. If a member of your team has already completed user registration and started a team, they will invite all other team members to the existing team on the site.
3. One or more members of the team can complete the Team Registration details shown on the *Applications* tab of the [Submission Site](#).
 - a. The team must indicate which Division they intend to enter. The team may change their Division selection up until the Semifinal Submission.
4. **Press “Submit” on the *Applications* tab before October 23, 2024, and receive an email confirmation that your team registration has been submitted.**
 - a. If the team member who submitted the Team Registration did not receive an email confirmation, contact the organizers prior to the deadline on October 23.

Once a team completes the registration process, they are officially a Participant Team in the Design Challenge. All teams are accepted into the competition. Teams can begin work on their design at any time.

Resources are provided on the [Submission Site](#) to support Participant Teams throughout the competition, including an on-demand Building Science Education course, technical analysis software, and deliverable templates.

2.2 Team Requirements

The competition is open to U.S.-based and international collegiate institutions. “Collegiate institution” refers to any school of postsecondary or higher education, including two-year schools, such as community colleges; technical colleges; four-year colleges and universities; and graduate schools. Teams should abide by the following criteria:

- Each team must be associated with a collegiate institution and include at least one Faculty Advisor.
 - Multiple collegiate institutions may combine to form a team.
- Each collegiate institution may submit up to four Team Registrations but may **not** have more than one team in any Division.
- Each team must have at least three students (see Section 2.2 for student qualifications).
 - One student must be designated as the Student Team Lead.
 - There is no maximum number of student team members.

2.3 Student Qualifications

Designing a building requires interdisciplinary skills and stakeholders. The strongest teams are interdisciplinary, with a variety of degree programs and backgrounds. Student team members can be from any discipline and any level of collegiate schooling, including undergraduate, graduate, and Ph.D. students. Teams may also include students from more than one collegiate institution. Previous successful teams have included students who majored in fields such as architecture, building science, business, construction management, economics, engineering, interior design, physics, policy, public health, sociology, and sustainability. In addition, students must meet the following criteria:

- Students are limited to participating in one team for the Design Challenge.
- Each student must be pursuing a degree and enrolled in at least one class between the Team Registration deadline and the Competition Event. Students who meet this qualification and graduate in December 2024 are still eligible to compete.

2.4 Faculty Advisor Role

The Faculty Advisor can be a full-time, part-time, or adjunct faculty member associated with a collegiate institution. A team may have more than one Faculty Advisor for their project; one Faculty Advisor may counsel multiple teams.

At least one Faculty Advisor must be designated to support student teams by:

- Providing overall competition guidance and adhering to the Design Challenge Rules.
- Ensuring all student team members complete the Building Science Education course, or providing an equivalency waiver if the core curriculum includes comparable building science training. The Faculty Advisor should encourage students to access relevant training materials.
- Providing necessary information to team members participating in the Competition Event.

2.5 Industry Engagement

Engagement with industry professionals can provide real-world perspective that helps inform teams' design decisions. Successful teams often engage with several industry professionals who have a wide range of expertise, such as architects, builders, city officials, contractors, energy auditors, building performance modelers, engineers, financial analysts, manufacturers, community advocates/organizers, and tradespeople in areas such as site development, codes, construction, building materials, mechanical systems, lighting systems, financing, and sales.

Teams are encouraged to engage with industry professionals who can provide support or professional guidance. These industry professionals are not permitted to complete any project work on a team's behalf; students remain responsible for design, detailing, documentation, and all other competition activities.

2.5.1 Design Partners

Design Partners represent a specific type of industry engagement. Design Partners are individuals or organizations that have a planned major retrofit or new construction project in their building portfolio and serve as a client to a student team, working with them to develop a

zero energy design option for the project. For example, a school district that is planning a major retrofit to an existing school could be a Design Partner and work with a team to receive a zero energy design and cost analysis for the retrofit. Teams also benefit from working on a project with real programmatic and budget constraints. Teams are encouraged to secure their own Design Partner, in addition to other types of industry engagement. The Design Partner is expected to:

- Provide teams with building program and plan, including basic project information and requirements.
- Engage with the team over the course of the competition for design programming, iterative schematics, and feedback.

2.6 Mentor Program

The Mentor Program pairs Solar Decathlon alumni from any previous competition year with current Design Challenge Participant Teams to share best practices learned through their experiences.

- All teams may request a mentor through the Team Registration and will be paired with mentors based on availability; teams are not guaranteed a mentor.
- Mentors provide support to student teams during the competition period, which may include review and feedback on project direction, deliverables, and presentations.
- Mentors are not permitted to complete any project work on a team's behalf.
- Student teams are responsible for leading the relationship with their mentor and are expected to keep mentors updated on project progress and outcomes.

3 Project Requirements

Design submissions are required to meet the following specifications:

- The team must select a specific location or site, with an assessment of local characteristics including geography, geology, and planning and zoning considerations to provide context for the building design and its relationship to the surrounding community.
- Projects must be substantially different from any submitted to DOE competitions in the past.
- The design must comply with zero energy building requirements, outlined in Section 3.1.
- The design must comply with Division requirements, outlined in Section 3.2.
- The team must address criteria for all 10 Solar Decathlon Contests, outlined in Section 4.
- Teams should identify and adhere to applicable codes for the building's expected jurisdiction.
 - These include local, state, and national codes and standards governing topics such as minimum bedroom size, fire protection requirements, classroom size, and restroom locations and quantities, along with other specific requirements.
 - If there are conflicts between the Design Challenge requirements and local regulations, the local regulations supersede, and teams should clearly document these local regulations in their project submissions. If there are multiple governing codes applicable to the project, one code path must be selected and justified.
- United States Customary System (USCS) units of measurement are required.
 - A submission with both metric units and USCS units is acceptable.
 - If metric units are used, state USCS units first, followed by metric equivalents in parentheses—example: 125 feet (ft) (38.1 meters [m]).
 - Heating and cooling units should be provided in Btu or Btu/ft² depending on the context. Electricity units may be given in kWh; however, if describing the whole-building performance or mixing heating with electricity, Btu should be used.

3.1 Zero Energy Building Requirements

Reducing and offsetting building energy consumption with renewable sources is integral to decreasing the environmental impacts of carbon. As a central project requirement, a design project submission must be a zero energy building. For the Design Challenge, a zero energy building is defined as a high-performance building with a renewable energy system that offsets the building's total annual non-renewable source energy consumption. The method for

calculating zero energy takes source energy factors into account, and off-site renewable energy discount factors when necessary.³

Building energy use can be assessed as site energy or source energy. Site energy is measured within the boundary of the site, often by electric or natural gas meters.⁴ Source energy accounts for all the upstream amounts associated with converting and transporting energy to the building site.⁴ In the case of electricity, it is based on a fuel mix and the mining/extraction of those resources, the power plant losses, and the losses with transmission and distribution of electricity. Source energy is calculated by taking the site energy and applying a site-to-source multiplier for each energy source⁴:

$$Energy_{source} = Energy_{site} * Conversion\ factor_{site\ to\ source}$$

The pathway to a zero energy building begins by reducing the energy needs of the building such that renewable energy can meet the remaining load. Renewable energy must be integrated into the Design Challenge project. After maximizing on-site renewable energy generation, off-site renewable energy options, such as participating in a community-scale renewable energy project or specifying utility-provided renewable power, can be used.

Evaluating Building Energy Performance

Energy analysis is invaluable for predicting energy performance and evaluating trade-offs in the design process to achieve energy goals. Energy analysis can be conducted using a variety of software programs. Free tools and resources for these calculations are offered on the [Submission Site](#).

The residential and commercial Divisions of the Design Challenge differ in their energy performance analysis approach to reflect industry norms, as described below. The residential Divisions use an Energy Rating Index (ERI) system to evaluate energy performance, while the commercial Divisions use energy use intensity (EUI) measures.

Energy Rating Index System

The residential building industry commonly uses an ERI to indicate energy efficiency. A lower score signifies a more energy-efficient home. To determine the score, homes are compared to a benchmark based on a designed model home of the same size and type as the rated home. An ERI score can be calculated using any Residential Energy Services Network (RESNET)-accredited software.

Rating software calculates heating, cooling, hot water, lighting, and appliance energy loads; consumption; and costs for new and existing single-family and multifamily homes. Software licenses for RESNET-accredited programs are provided to teams to establish a comparison to the

³ For more details on source energy factors and off-site renewable energy discount factors, refer to ASHRAE Standard 228, available at <https://www.ashrae.org/technical-resources/bookstore/ansi-ashrae-standard-228-standard-method-of-evaluating-zero-net-energy-and-zero-net-carbon-building-performance>.

⁴ U.S. Department of Energy. September 2015. "A Common Definition for Zero Energy Buildings." https://www.energy.gov/sites/default/files/2015/09/f26/bto_common_definition_zero_energy_buildings_093015.pdf

target reference home benchmark. This software will be required to make a target reference home comparison, as outlined in the [DOE Zero Energy Ready Home program requirements](#).

Energy Use Intensity

Commercial building energy consumption is often evaluated based on the EUI, which is measured as the total energy consumed annually divided by the gross floor area (kilo-British thermal unit [kBtu]/ft² or kilowatt-hours/m²).

Target EUIs based on site energy for the Education Building and Open Commercial Divisions can be found in the [ENERGY STAR Portfolio Manager “U.S. Energy Use Intensity by Property Type” technical reference](#). The target EUIs represent national median reference values for site and source energy corresponding to various property types, including K–12 schools (from kindergarten to 12th grade), higher education, retail, offices, and healthcare. The national median reference values are designed to help compare your design’s energy use to the measured national median, or midpoint, energy use of similar properties.⁵ Teams competing in the commercial Divisions are expected to adhere to a minimum 35% reduction against the national median reference values for site EUI for the applicable property type.⁶

3.2 Project Selection for Retrofits

Across all Divisions, teams may develop either a retrofit or new construction building design. There are nearly 130 million existing buildings in the United States, with 75% of the current residential building stock and 51% of the current commercial building stock expected to remain in 2050.² To achieve decarbonization goals and reduce EUI and greenhouse gas emissions, it is critical to accelerate deployment of low-carbon solutions in both new and existing buildings. Upgrades to existing buildings can also improve lives by increasing high-quality jobs, economic security, equity, health, and community resilience.² Students in the Design Challenge are strongly encouraged to explore zero energy solutions for existing buildings.

Addressing existing buildings requires creativity and collaboration from many disciplines and stakeholders, including architects, engineers, and builders. For example, architecture can play a crucial role in promoting retrofit projects by making existing buildings more appealing through the integration of conservation, historic preservation, and adaptive reuse strategies.⁷ By valuing older buildings as “climate assets,”⁷ the industry can reduce embodied carbon emissions and showcase sustainable and aesthetic design solutions.

A building’s carbon impact can be examined through the lens of both embodied and operational carbon. Embodied carbon refers to the emissions associated with the sourcing, processing,

⁵ See the ENERGY STAR Portfolio Manager “U.S. Energy Use Intensity by Property Type” technical reference for more details: <https://portfoliomanager.energystar.gov/pdf/reference/US%20National%20Median%20Table.pdf>.

⁶ As referenced in the U.S. Department of Energy’s “[Decarbonizing the U.S. Economy by 2050: A National Blueprint for the Buildings Sector](#)” and the “[National Definition of a Zero Emissions Building](#),” rapid decarbonization in the buildings sector will require a reduction in on-site energy use intensity in buildings of 35% by 2035 and 50% by 2050.

⁷ Columbia Books on Architecture and the City. December 2021. “Avoiding Carbon: Mitigating Climate Change Through Preservation and Reuse.” <https://www.arch.columbia.edu/books/reader/826-preservation-sustainability-and-equity#reader-anchor-4>.

manufacturing, transporting, assembling, maintaining, and disposing of materials.⁸ Operational carbon refers to the emissions from a building’s energy consumption through its operations.⁹ Retrofits can significantly reduce embodied carbon compared with new construction, while increasing the building’s energy efficiency, reducing operational costs, and improving the occupant experience. New construction can minimize operational carbon by optimizing the building design and meeting specific client or community needs. In both cases, building material selections are crucial to minimizing overall carbon impact.

Evaluating Building Carbon Impact

To holistically address the carbon impact of their building, teams are expected to:

- 1) Provide a defensible rationale for selection of a retrofit or new construction project to meet their stated goals, and
- 2) Quantify the carbon impact of their design through the Life-Cycle Contest, which can be expressed as lbsCO_{2e}/ft² (or show conversion from kgCO_{2e}/m²), an output from life cycle assessment (LCA) tools.

More details on Life-Cycle Contest criteria are included in Section 4.6. More details on evaluation criteria can also be found in the rubrics included in Sections 5.4.1 and 5.5.1.

3.3 Project Selection for Community Impact

To achieve decarbonization goals, creative solutions for buildings in different communities must be explored. Applying zero energy solutions to buildings that benefit underserved populations is critical to equitably transform the built environment. Students in the Design Challenge are strongly encouraged to explore zero energy solutions for “equity-eligible buildings.”¹⁰ The [Equity-Eligible Buildings Mapping Tool](#)¹¹ can be used to help teams identify specific buildings or census tracts that meet the criteria below.

- Buildings located within [Climate and Environmental Justice Screening Tool](#) (CEJST)-designated disadvantaged communities, federally recognized tribal lands, and U.S. territories.
- Affordable housing and housing occupied by low-income residents.¹²

⁸ National Renewable Energy Laboratory. August 2022. “Integrating Embodied Carbon Knowledge for Design Decisions.” <https://www.nrel.gov/docs/fy22osti/83204.pdf>.

⁹ Carbon Leadership Forum. December 2020. “Embodied Carbon 101.” <https://carbonleadershipforum.org/embodied-carbon-101/>.

¹⁰ A full definition of equity-eligible buildings can be found in the U.S. Department of Energy’s Buildings Upgrade Prize Rules: <https://www.herox.com/protected/91/1152/attachment:8QUFLfKk2WVj1dCDq9iaF4yAAJjQ8cDPoPeepoVTWc>.

¹¹ See more information on the BTO Equity-Eligible Buildings Mapping Tool at <https://energyjustice-buildings.egs.anl.gov/>.

¹² HUD defines affordable housing as “housing on which the occupant is paying no more than 30 percent of gross income for housing costs, including utilities.” See <https://archives.hud.gov/local/nv/goodstories/2006-04-06glos.cfm>.

- This can include subsidized affordable housing, naturally occurring affordable rental housing, and homes occupied by low-income households.
- Underserved commercial, nonprofit, and public buildings.
 - Possible types of commercial buildings that could fit within this equity-eligible buildings category include: buildings used by businesses that serve disadvantaged communities; buildings used by nonprofit organizations that provide localized or critical community services; Title I schools; or buildings designated for use as resilience hubs or disaster shelters.

Teams are expected to assess how the building supports and aligns with the priorities of the occupants and their local communities, including addressing the need for affordability, through the Community Contest; detailed Contest criteria are included in Section 4.9.

3.4 Divisions

Design Challenge Divisions represent different residential and commercial building types. Teams must specify a single Division in which they will participate.

Please note: The Single-Family Housing Division tends to be popular among teams, potentially making it more competitive than other Divisions. The organizers will release a breakdown of teams by Division following the Team Registration deadline and Project Summary Submission; teams are encouraged to be strategic with their Division selection.

RESIDENTIAL DIVISIONS

Single-Family Housing

The Single-Family Housing (SF) Division is defined as one to two dwelling units within a single building.

- Retrofit of existing building or new construction allowed.
- Independent, detached structure.
- Building size: 300–4,500 ft² (28–418 m²) per dwelling unit.
- Retrofit energy performance requirements:
 - Meets [DOE Zero Energy Ready Home National Program Requirements \(Single Family, Version 2\)](#)¹³ with exceptions defined by¹⁴:

¹³ If Energy Rating Index (ERI) target requirements for the project cannot be met, an alternative compliance method must be provided and is subject to review by the jury at the time of deliverable submission.

¹⁴ Retrofits are currently not covered under the DOE Zero Energy Ready Home National Program Requirements. To qualify a retrofit as zero energy ready, the target reference home benchmark shall be the same as the target used for new construction.

- [ENERGY STAR® Guidance for Homes and Buildings Undergoing Gut Rehabilitation.](#)
- New construction energy performance requirements:
 - Meets [DOE Zero Energy Ready Home National Program Requirements \(Single Family, Version 2\)](#).¹³

Multifamily Building

The Multifamily Building (MB) Division is defined as a structure that contains multiple dwelling units.

- Minimum of 3 dwelling units.
- Retrofit of existing building or new construction allowed.
- Building size: 300–2,000 ft² (33–186 m²) per dwelling unit.
- Up to 50% of total area may be devoted to commercial use, such as retail, office, and industrial.
- Retrofit energy performance requirements:
 - Meets [DOE Zero Energy Ready Home National Program Requirements \(Multifamily, Version 2\)](#)¹³ with exceptions defined by¹⁴:
 - [ENERGY STAR Guidance for Homes and Buildings Undergoing Gut Rehabilitation.](#)
- New construction energy performance requirements:
 - Meets [DOE Zero Energy Ready Home National Program Requirements \(Multifamily, Version 2\)](#).¹³

COMMERCIAL DIVISIONS

Education Building

The Education Building (EB) Division is defined as an educational facility serving preschool, K–12, or higher education students. These facilities may include permanent provisions such as food service, recreation, offices, classrooms, and other support functions such as mechanical spaces, circulation, and restrooms.

- Retrofit of existing building or new construction allowed.
- Any combination of grade levels in the range of prekindergarten to 12th grade or higher education.
- Energy performance requirements:
 - Based on the [ENERGY STAR Portfolio Manager “U.S. Energy Use Intensity by Property Type” technical reference](#), teams are required to adhere to a minimum

35% reduction¹⁵ against the national median reference values for site EUI for the applicable property type, such as Preschool, K–12 School, or College/University.¹⁶

Open Commercial

Through the Open Commercial (OC) Division, teams can select a specific commercial building project. Examples of commercial building types for this Division include public and civic buildings, hospitality, healthcare, retail, food service, and commercial real estate.^{17, 18}

- Retrofit of existing building or new construction allowed.
- Building size: Minimum target of 2,000 ft² (185 m²).
- Building space could be devoted to a mix of commercial uses.
- Energy performance requirements:
 - Most commercial building type are included within the [ENERGY STAR Portfolio Manager “U.S. Energy Use Intensity by Property Type” technical reference](#). Teams are required to adhere to a minimum 35% reduction¹⁵ against the national median reference values for site EUI for the applicable property type.¹⁶

¹⁵ U.S. Department of Energy. June 2024. “National Definition of a Zero Emissions Building.” <https://www.energy.gov/sites/default/files/2024-06/bto-national-definition-060524.pdf>.

¹⁶ If necessary, teams may outline an alternative EUI target compliance method instead of referencing ENERGY STAR national median reference values for site EUI. For example, if the project’s climate zone necessitates increased site EUI compared to a 35% reduction against national median reference values, the team may select a different, industry-recognized benchmark for their EUI target, such as ASHRAE’s Advanced Energy Design Guides: <https://www.ashrae.org/technical-resources/aedgs/zero-energy-aedg-free-download>. This is expected to be referenced in the Design Narrative deliverable; details are included in Section 6.4.2.

¹⁷ Manufacturing buildings are not allowed within this Division.

¹⁸ Projects that align with requirements for the Single-Family Housing, Multifamily Building, or Education Building Divisions will be expected to compete within those Divisions. Organizers will monitor team compliance with Divisions throughout the competition.

4 Contests

Solutions developed by Solar Decathlon teams innovate across all 10 Contest areas, demonstrate mastery of building science fundamentals, and highlight creative approaches to whole-building design. All Contests are equally weighted and should be addressed through a seamless, integrated building solution that can transform the built environment.

The 10 Contests are outlined in Table 1. Jurors evaluate how well teams meet or exceed criteria for each Contest using provided design and technical documentation, project plans, reports for required analyses, and the quality and content of their presentations. Detailed evaluation criteria for each Contest are provided in the following sections (Sections 4.1–4.10).

Teams are expected to address all 10 Contests through their building solutions. However, unique considerations exist for new construction and retrofit designs; teams are expected to explore these considerations in greater detail through the Solar Decathlon Building Science Education series.¹⁹

Table 1. Contests

Solar Decathlon Contests
1. Architecture
2. Engineering
3. Envelope
4. Efficiency
5. Grid-Interactivity
6. Life-Cycle
7. Health
8. Market
9. Community
10. Presentation

¹⁹ See “Module 9: Building Energy Retrofits” of the Solar Decathlon Building Science Education series: <https://www.solardecathlon.gov/building-science.html>.

Architecture

Contest Intent

This Contest evaluates the building architecture for creativity in matching form with function, overall integration of systems, and ability to deliver outstanding aesthetics and functionality both inside and outside the structure.

Design Challenge Criteria

Criteria	Juror Evaluation Statement
<p>Teams should address the following in their project:</p>	<p>The evaluation statement is scored on a 1–5 scale. <i>The evaluation rating scale is included in Section 5.2.</i></p>
<ul style="list-style-type: none"> • Careful consideration of specified site, including views, drainage, regionally appropriate materials, and preservation of architectural styles • Integration of building form and function, including exterior and interior architecture with respect to the target market, climate, and zero energy building goals • Quality of the design and appearance, including floor plan and interior details for flow, furnishings, storage, linkages to outdoors, and efficient use of space. 	<p>The team successfully addressed the Architecture Contest intent and criteria.</p>

Engineering

Contest Intent

This Contest evaluates the design and effective integration of the innovative, high-performance systems needed for a zero energy building, including mechanical, electrical, plumbing, and structural engineering systems.

Design Challenge Criteria

Criteria	Juror Evaluation Statement
<p>Teams should address the following in their project:</p>	<p>The evaluation statement is scored on a 1–5 scale. <i>The evaluation rating scale is included in Section 5.2.</i></p>
<ul style="list-style-type: none"> • Approach to engineering design of active building systems, including structural, mechanical, electrical, and plumbing, that optimize long-term performance to satisfy occupant needs • Justification of engineering system choices to meet project goals • Detailed documentation and load calculations that clearly outline the techniques used and convey the design intent • Demonstration of innovation through the application of unique technologies or engineering solutions that improve on the status quo. This may include design measures addressing future climate change challenges, such as extreme heat, flooding, and wildfires. 	<p>The team successfully addressed the Engineering Contest intent and criteria.</p>

Envelope

Contest Intent

This Contest evaluates the envelope design strategies, including air tightness, thermal performance, and durability, as well as balancing comfort with optimized system performance.

Design Challenge Criteria

Criteria	Juror Evaluation Statement
Teams should address the following in their project:	The evaluation statement is scored on a 1–5 scale. <i>The evaluation rating scale is included in Section 5.2.</i>
<ul style="list-style-type: none">• Building enclosure integration of all four building science control layers (e.g., thermal, air, bulk moisture, and moisture vapor), including foundation, walls, roof, and penetrations, that is appropriate to site-specific conditions and executed in the design details• Analysis and responsiveness of design to current and future climatic risks, including weather and other natural events• Balanced exploration of performance, durability, and carbon impacts of materials selected in envelope design• Effective use of passive design strategies to reduce active system capacity requirements and meet heating, cooling, ventilating, and lighting needs.	The team successfully addressed the Envelope Contest intent and criteria.

Efficiency

Contest Intent

This Contest evaluates the whole-building operational efficiency from successful modeling to application of active and passive systems.

Design Challenge Criteria

Criteria	Juror Evaluation Statement
Teams should address the following in their project:	The evaluation statement is scored on a 1–5 scale. <i>The evaluation rating scale is included in Section 5.2.</i>
<ul style="list-style-type: none">• Exploration of whole-building energy performance relative to a target, focusing on optimal efficiency of active and passive systems• Realistic models and calculations, including projected operational savings, that inform design decisions related to energy and water usage• Maintenance and operability assessments of building systems to verify long-term energy savings and building function, and consider occupant needs• Evaluation of operational carbon emissions that examines the building’s energy sources.	The team successfully addressed the Efficiency Contest intent and criteria.

Grid-Interactivity

Contest Intent

This Contest evaluates the building’s ability to adapt to a dynamic grid edge and minimize operational carbon with interactive control, demonstrating resiliency during disruptions, and aligning with the supply, demand, and fuel mix constraints of the local utility.

Design Challenge Criteria

Criteria	Juror Evaluation Statement
<p>Teams should address the following in their project:</p>	<p>The evaluation statement is scored on a 1–5 scale. <i>The evaluation rating scale is included in Section 5.2.</i></p>
<ul style="list-style-type: none"> • Analysis of utility rates and location-based emissions data from the regional power grid to align energy demand with the cleanest available energy supply. • Innovative solutions to improve load management at the grid edge, including smart controls and wireless sensing networks, and their integration with distributed energy resources and communication protocols. • Integration of building energy system strategies to withstand and recover from identified resilience risks, including grid disruptions. 	<p>The team successfully addressed the Grid-Interactivity Contest intent and criteria.</p>

Life-Cycle

Contest Intent

This Contest evaluates the building’s ability to minimize embodied carbon emissions from the entire building life cycle including in building materials, construction, operation, and end of life.

Design Challenge Criteria

Criteria	Juror Evaluation Statement
Teams should address the following in their project:	The evaluation statement is scored on a 1–5 scale. <i>The evaluation rating scale is included in Section 5.2.</i>
<ul style="list-style-type: none">• Life-cycle assessment performed within a consistent framework that demonstrates realistic inputs and assumptions (e.g., intended service life, functional requirements) and measures the building’s embodied environmental impacts• Reduction of embodied emissions from building materials and construction, including analysis and iteration influencing material selections and design decisions.• Discussion of trade-offs among upfront, operational, and end-of-life environmental impacts (e.g., energy, greenhouse gas emissions).	The team successfully addressed the Life-Cycle Contest intent and criteria.

Health

Contest Intent

This Contest evaluates the building's capability to safeguard occupant health and quality of life through system and space designs that optimize comfort, safety, and indoor air quality.

Design Challenge Criteria

Criteria	Juror Evaluation Statement
Teams should address the following in their project:	The evaluation statement is scored on a 1–5 scale. <i>The evaluation rating scale is included in Section 5.2.</i>
<ul style="list-style-type: none">• Comprehensive material and appliance selection, operational details, and construction practices that optimize occupants' quality of life, health, and well-being, and minimize the introduction of toxins into air and water.• Advanced building control technologies for appliances, equipment, security, and lighting systems that provide comfort, convenience, and safety• Complete indoor environmental quality strategy that prioritizes indoor air quality and whole-building ventilation, and identifies strategies for spot ventilation and filtration• Acoustical design strategies for controlling unwanted interior and exterior noise.	The team successfully addressed the Health Contest intent and criteria.

Market

Contest Intent

This Contest evaluates the project’s potential to transform the built environment and serve as a catalyst for change in future projects through scalability and likelihood of adoption by the target market and industry.

Design Challenge Criteria

Criteria	Juror Evaluation Statement
Teams should address the following in their project:	The evaluation statement is scored on a 1–5 scale. <i>The evaluation rating scale is included in Section 5.2.</i>
<ul style="list-style-type: none">• Thorough market analysis and realistic cost estimates, including operational and maintenance, that optimize appeal to target market and financial feasibility, and leverage relevant financial assistance mechanisms including grants, tax incentives, and other subsidies• Potential commercial impact of the proposed design including considerations of scalability, replicability, and buildability, and any barriers to large-scale adoption• Engagement of industry, such as Design Partners, to ground project in real-world perspectives and constraints• Responsiveness and marketability of applied technologies and solutions to occupant and market needs.	The team successfully addressed the Market Contest intent and criteria.

Community

Contest Intent

This Contest evaluates how the building supports and aligns with the priorities of the occupants and their local communities, including addressing the need for equity, affordability, and resilience.

Design Challenge Criteria

Criteria	Juror Evaluation Statement
<p>Teams should address the following in their project:</p>	<p>The evaluation statement is scored on a 1–5 scale. <i>The evaluation rating scale is included in Section 5.2.</i></p>
<ul style="list-style-type: none"> • Community and stakeholder engagement²⁰ to identify and respond to needs and goals of community and occupants • Innovative approaches that promote equity in the built environment, support affordability, reduce energy burden,²¹ and contribute to economic development • Interactions that benefit intended occupant and community, including considerations of neighborhood conditions, land-use patterns, cultural preservation, and access to transportation systems • Consideration of potential risks, including displacement, due to project implementation • Increased ability of communities to withstand and recover from stresses. 	<p>The team successfully addressed the Community Contest intent and criteria.</p>

²⁰ See Buildings UP Prize Rules for more information on community versus stakeholder engagement. <https://americanmadechallenges.org/challenges/buildings-up/docs/BuildingsUp-Rules.pdf>.

²¹ Energy burden can be described as the portion of income spent on home energy costs (e.g., electricity, natural gas, and other home heating fuels). Low-income households tend to experience higher energy burden. https://www.energy.gov/sites/prod/files/2019/01/f58/WIP-Energy-Burden_final.pdf.

Presentation

Contest Intent

This Contest evaluates the team’s ability to educate, inspire, and motivate when communicating their real-world solutions to Jurors, project stakeholders, and the public.

Design Challenge Criteria

Criteria	Juror Evaluation Statement
<p>Teams should address the following in their project:</p>	<p>The evaluation statement is scored on a 1–5 scale. <i>The evaluation rating scale is included in Section 5.2.</i></p>
<ul style="list-style-type: none"> • Clarity and coherence of project submissions, including written and multimedia materials • Engaging and professional presentation to Jurors that conveys key points of design and demonstrates command of design solution • Ability to build interest in project approach by effectively communicating the value proposition and impact to different audiences across all deliverables and presentations. 	<p>The team successfully addressed the Presentation Contest intent and criteria.</p>

5 Evaluation Process

Teams are evaluated across multiple competition stages. These stages include the evaluation of deliverables and presentations to industry expert Jurors.

5.1 Evaluation Process Summary

The evaluation process for the competition is summarized in Table 2. Detailed descriptions of each competition stage are outlined in later subsections.

Table 2. Competition Evaluation Process Summary

Competition Stage	Timeline	Evaluation Process Summary
Project Summary (optional)	December 3, 2024	Evaluation of initial Project Summary deliverable to gain preliminary feedback.
Semifinal Competition	February 18, 2025 <i>(Semifinal Submission deadline)</i> February 21–22, 2025 <i>(Semifinal Competition Event)</i>	Evaluation of Semifinal Submission deliverable and 10-minute presentation to Jurors. Up to 10 Finalist Teams are selected in each Division.
Final Submission	April 8, 2025 <i>(Final Submission deadline)</i> April 22, 2025 <i>(Division Presentation and Grand Jury Presentation slides deadline)</i>	Evaluation of Final Submission deliverable.
Competition Event	April 25–27, 2025	Evaluation of 15-minute presentation to Jurors. Winning teams are selected in each Division. Division winners present to Grand Jury to determine Grand Winner.

5.2 Evaluation Rating Scale

The following scale is used to evaluate team submissions and presentations to juries. The scale will be used by Jurors to complete the evaluation rubrics included in Sections 5.4 and 5.5. Evaluation rubrics are intended to provide additional guidance around the competition evaluation process and do not represent an exhaustive list of all considerations for teams or Jurors; for example, compliance with zero energy building and Division requirements is considered across all competition stages.

Table 3. Evaluation Scale

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

5.3 Project Summary

Evaluation Process

The first competition stage is the Project Summary, which consists of an optional deliverable. The Project Summary provides an opportunity to submit preliminary information about a team's project. Though optional, it is highly recommended that teams submit the Project Summary to gain preliminary feedback to improve and iterate upon their design. It also familiarizes teams with the submission process and how to comply with Rules requirements.

It is understood that the first iteration of the Project Summary might be based on considerations and aspirations or be otherwise tentative and subject to change in future submissions. The organizers will provide feedback on compliance with Rules requirements and Division definition, submission formatting compliance, and preliminary technical concepts.

Deliverables

See Section 6.1 for a full description of deliverable submission requirements.

- Project Summary submitted via the [Submission Site](#) by December 3, 2024.

5.4 Semifinal Competition

Evaluation Process

The second competition stage is the Semifinal Competition, which consists of a deliverable and presentation to Jurors. The Semifinal Competition Event is a virtual event during which all Participant Teams present to panels of industry expert Jurors to compete for selection as Finalist Teams that advance to the final stage of the competition.

Through the Semifinal Submission deliverable and Semifinal Competition Event presentation, teams are not expected to convey a fully completed design; as such, evaluation criteria differ between the Semifinal Competition and Final Submission stages. However, teams are expected to demonstrate their project's potential, as well as substantial progress and a plan toward design completion.

Teams are evaluated based on the following process:

- Teams submit the Semifinal Submission deliverables via the [Submission Site](#) by February 18, 2025, at 5 p.m. EST.
- Each Participant Team will present a live, virtual 10-minute presentation to a panel of Division Jurors, each with 2–3 industry experts.
 - There will be an 8-minute Question and Answer (Q&A) period with Division Jurors following each team's presentation.
- Up to 10 Finalist Teams per Division are selected by Jurors to compete in the Competition Event based on evaluation of their deliverable and presentation.

- Teams receive written feedback from Division Jurors via the [Submission Site](#) within two weeks of the Semifinal Event. Teams may request scores following the event by emailing the organizers.
- Regardless of finalist selection, all Participant Teams are encouraged to complete Final Submission deliverables, with non-finalist teams continuing as Exhibition Teams. See Section 5.6.2 for more details on Exhibition Teams.

5.4.1 Evaluation Rubric

Jurors individually evaluate each team’s deliverable and presentation within their Division according to the evaluation rubric in Table 4. The criteria included in Table 4 differ from those included in the rubric shown in Section 5.5 for the Final Submission deliverable and Competition Event presentation.

Possible scores correspond to the Evaluation Rating Scale included in Section 5.2. Selection of Finalist Teams is informed by the review and scoring of deliverables and presentations; final decisions are determined at the sole discretion of the Jurors. Teams may request scores following the event by emailing the organizers.

Table 4. Evaluation Rubric: Semifinal Submission and Semifinal Competition Presentation

Criteria	Juror Evaluation Statement
Design Goals	The project successfully addressed the design goals and impact on design strategies.
Target Market	The project successfully addressed the target market, building occupant characteristics, and impact on design strategies.
Local Climate	The project successfully addressed the local climate, and related building science considerations and impact on design strategies.
Building Codes and Standards	The project successfully addressed the relevant building codes or standards and impact on design strategies.
Building Science	The project demonstrated a strong understanding and application of building science in the design.
Project Selection for Retrofits	The project demonstrated a strong preliminary exploration of the embodied and operational carbon impacts of the design and provided strong justification for a retrofit or new construction design. <i>See Section 3.2 for details.</i>
Project Selection for Community Impact	The project demonstrated a strong preliminary exploration of the community impact of the design. <i>See Section 3.3 for details.</i>
Plan for Final Submission	The team successfully addressed a specific plan toward project completion.

Deliverables

See Section 6.2 for a full description of deliverable submission requirements.

- Project Summary
- 10-Minute Semifinal Presentation Slides.

Presentation Format

- Each Participant Team will present to a panel of Division Jurors in the following format:
 - A 10-minute virtual presentation is given live. No recorded presentations will be permitted.
 - An 8-minute Q&A period with Division Jurors will follow each team's presentation.
- There is no limit to the number of student presenters during the 10-minute presentation and Q&A.
- Presentation slides will be submitted before the event. Teams are expected to share and advance their own slides during the 10-minute presentation.

5.5 Final Submission

Evaluation Process

The third competition stage is the Final Submission, which consists of a deliverable. The Final Submission deliverable fully documents the final design.

Teams are evaluated based on the following process:

- Teams submit the Final Submission deliverable via the [Submission Site](#) by April 8, 2025.
- Jurors individually review all Final Submission deliverables within their assigned Division and determine preliminary scores for each team.
 - Preliminary scores are modified by the Jurors based on the live Division presentations and associated Q&A period during the Competition Event.

5.5.1 Evaluation Rubric

The evaluation rubric below will be used by Jurors to evaluate the Final Submission deliverable and Competition Event presentation. Detailed criteria and Juror evaluation statements are included across each Contest in Section 4.1–4.10; Table 5 represents a summary of the criteria and evaluation statements. Scores correspond to the Evaluation Rating Scale included in Section 5.2. Selection of winning teams is informed by the review and scoring of deliverables and presentations; final decisions are determined at the sole discretion of the Jurors. Teams may request scores following the event by emailing the organizers.

Table 5. Evaluation Rubric: Final Submission and Competition Event Presentation

Criteria	Juror Evaluation Statement
Contest Alignment (80% weight)	
Architecture Contest	The project successfully addressed the Architecture Contest intent and criteria. See <i>Section 4.1 for details.</i>
Engineering Contest	The project successfully addressed the Engineering Contest intent and criteria. See <i>Section 4.2 for details.</i>
Envelope Contest	The project successfully addressed the Envelope Contest intent and criteria. See <i>Section 4.3 for details.</i>
Efficiency Contest	The project successfully addressed the Efficiency Contest intent and criteria. See <i>Section 4.4 for details.</i>
Grid-Interactivity Contest	The project successfully addressed the Grid-Interactivity Contest intent and criteria. See <i>Section 4.5 for details.</i>
Life-Cycle Contest	The project successfully addressed the Life-Cycle Contest intent and criteria. See <i>Section 4.6 for details.</i>
Health Contest	The project successfully addressed the Health Contest intent and criteria. See <i>Section 4.7 for details.</i>
Market Contest	The project successfully addressed the Market Contest intent and criteria. See <i>Section 4.8 for details.</i>
Community Contest	The project successfully addressed the Community Contest intent and criteria. See <i>Section 4.9 for details.</i>
Presentation Contest	The project successfully addressed the Presentation Contest intent and criteria. See <i>Section 4.10 for details.</i>
Competition Focus Areas (20% weight)	
Building Science	The project demonstrated a strong understanding and application of building science principles throughout their design.
Project Selection for Retrofits	The project demonstrated a strong understanding of the embodied and operational carbon impacts of the design and provided detailed justification for a retrofit or new construction design through the lbsCO ₂ e/ft ² metric. See <i>Section 3.2 for details.</i>
Project Selection for Community Impact	The project demonstrated a strong understanding of the community impact of the design. See <i>Section 3.3 for details.</i>

Deliverables

The Final Submission deliverables are outlined below.

- Due April 8, 2025:
 - Project Summary (updated)
 - Design Narrative
 - 3 Project Images.
- Due April 22, 2025:
 - Division Presentation Slides
 - Grand Jury Presentation Slides (*Finalist Teams only*).

See Section 6.4 for a full description of deliverable submission requirements.

5.6 Solar Decathlon Competition Event Presentation

Evaluation Process

The Solar Decathlon Competition Event, to be held April 25–27, 2025, is the culmination of the competition and consists of a presentation to Jurors. The Competition Event provides a rich experience for participants to present their final design projects to industry experts, engage in networking opportunities, listen to thought leader speakers, and connect with both peers and leading experts in the building industry. Finalist Teams compete for Division and Grand Winner Awards, and Exhibition Teams present to reviewers for feedback.

5.6.1 Finalist Teams

Based on performance in the Solar Decathlon Semifinal Competition Event, up to 10 Finalist Teams in each Division are invited to compete at the Competition Event.

The evaluation process for Finalist Teams is as follows:

- Finalist Teams present to a jury panel of 3–4 industry experts during the Competition Event.
- A maximum of 7 students and 1 Faculty Advisor are invited to attend the Competition Event in person at NREL. All team members are invited to participate virtually.
- Division Juror panels select first-place, second-place, and third-place award winners in each Division based on the criteria included in the evaluation rubric in Section 5.5 and compliance with Rules requirements.
- The first-place team for each Division delivers a live presentation at the Awards Ceremony for evaluation by the Grand Jury, which chooses a Grand Winner according to the process described in Section 5.8.
- Teams receive written feedback from Division Jurors via the [Submission Site](#) within two weeks of the Competition Event. Teams may request scores following the event by emailing the organizers.

Presentation Format

- Each Finalist Team will deliver a live 15-minute Division Presentation to a panel of 3–4 industry expert Jurors, with an additional 12 minutes for questions.

- No pre-recorded presentations will be permitted.
- Each Finalist Team may have a maximum of 7 student team members present.
 - Teams may have a combination of virtual and in-person student presenters, but no more than 7 students can present.
 - Additional team members may participate in the Division Presentation Q&A.
 - For teams attending the event in person, the 7 student presenters do not need to be the same students as those attending in person.
 - All team members may attend the Competition Event virtually.
 - One Faculty Advisor may attend the Competition Event in person but may not participate in the presentation or Q&A period.

Deliverables

See Section 6.4 for a full description of deliverable submission requirements.

- 15-Minute Division Presentation Slides
- 8-Minute Grand Jury Presentation Slides.

5.6.2 Exhibition Teams

Teams that are not selected as Finalist Teams at the Semifinal Competition are encouraged to complete their Final Submission deliverable as an Exhibition Team. Exhibition Teams will present and gain feedback on their project from a panel of industry experts at the Competition Event. Exhibition Teams are not eligible for Division Winner or Grand Winner Awards.

The evaluation process for Exhibition Teams is as follows:

- Following the Semifinal Competition, Exhibition Teams are required to submit a Letter of Intent according to the requirements outlined in Section 6.3. The Letter of Intent indicates the team's intent to continue competition participation as an Exhibition Team. Teams must submit their Letter of Intent by the deadline on February 27, 2025, at 5 p.m. EST.
 - All students are encouraged to finish their design projects, regardless of participation as an Exhibition Team.
- Exhibition Teams must submit complete Final Submission deliverables according to the requirements outlined in Section 6.4 by the deadline on April 8, 2025, at 5 p.m. EDT.
 - Deliverables submitted by Exhibition Teams are subject to organizer review for completion and clarity. If deliverables are incomplete according to competition requirements, Exhibition Teams will not be permitted to continue participation and will be notified by the organizers.
- A maximum of 2 students and 1 Faculty Advisor are invited to attend the Competition Event in person at NREL. All team members are invited to participate virtually.

- Exhibition Teams will present to a reviewer panel during the event. The reviewers will provide feedback based on the criteria included in the evaluation rubric in Section 5.5 and compliance with Rules requirements.

Presentation Format

- Each Exhibition Team will deliver a 15-minute presentation live to a panel of 2–3 industry expert reviewers, with an additional 12 minutes for questions.
 - Faculty Advisors may not participate in the team’s presentation or Q&A.
 - Each team may have a maximum of 5 student team members present to reviewers.
 - Teams may have a combination of virtual and in-person student presenters, but no more than 5 students can present.
- Two students and one Faculty Advisor from each Exhibition team are invited to attend the Competition Event in person; up to 3 other team members may present virtually.
 - Additional team members may participate virtually during the Q&A portion.

5.7 Innovative Retrofit Project and Innovative Equity Project Awards

In addition to selecting first-, second-, and third-place winners in each Division, the Jurors will nominate one team from each Division for the “Innovative Retrofit Project” award and one team from each Division for the “Innovative Equity Project” award. The Solar Decathlon Director from the U.S. Department of Energy will then select one team from the nominations for each award.

The Innovative Retrofit Project award is intended to recognize a team that demonstrates innovative approaches to tackling challenges in existing buildings, as outlined in Section 3.2. The recipient team is expected to incorporate cutting-edge technologies and strategies with significant market potential.

The Innovative Equity Project Award is intended to recognize a team that demonstrates innovative approaches to tackling challenges in buildings that benefit underserved communities, as outlined in Section 3.3. The recipient team is expected to incorporate strategies to equitably transform the built environment.

Trophies will be presented to the winning teams during the Competition Event Awards Ceremony. The recipient teams can be from any Division and do not need to be a first-, second-, or third-place winner to qualify for the Innovative Retrofit Project and Innovative Equity Project awards.

5.8 Grand Winner Award

The Grand Jury selects one Grand Winner from among the first-place teams in each Division based on the presentations given during the Awards Ceremony. Each first-place team delivers an 8-minute presentation to the Grand Jury during the Competition Event Awards Ceremony; there is no Q&A period during Grand Jury presentations.

The Grand Jury enters the review process with the understanding that all first-place winners demonstrated a design to the Division Jurors that excels in the criteria outlined in Table 5. The

Grand Jurors are tasked with evaluating excellence in delivering an impactful and thorough whole-building design against the criteria outlined in Table 6. The Grand Jury evaluates if the team successfully addressed each criterion according to the evaluation rating scale included in Section 5.2.

Table 6. Evaluation Rubric: Grand Jury Presentation

Criteria	Juror Evaluation Statement
Market Appeal	The project demonstrated a strong understanding of and appeal to its target market and effectively addresses the needs of the community and occupants.
Architectural Functionality	The project excelled in matching form with function and ability to deliver outstanding aesthetics and functionality.
Financial Feasibility & Constructability	The project demonstrated a realistic financial plan, scalability, and potential for successful implementation within the proposed budget.
Innovation	The project demonstrated innovation by utilizing novel approaches and technologies that push the boundaries of conventional building design.
Presentation Quality	The team delivered an engaging and professional presentation that conveys key points of design and demonstrates command of design solution.
Building Science	The project demonstrated a strong understanding and application of building science principles throughout the design.
Project Selection for Retrofits	The project demonstrated a strong understanding of the embodied and operational carbon impacts of their design. <i>See Section 3.2 for details.</i>
Project Selection for Community Impact	The project demonstrated a strong understanding of the community impact of the design. <i>See Section 3.3 for details.</i>

5.9 Bonus Awards

Bonus Awards are non-monetary certificates given to teams in addition to the Grand Winner Award and the Division Awards. These are intended to recognize the excellence, professionalism, hard work, and enthusiasm that teams demonstrate beyond the required deliverables, and are selected by the organizers during the Competition Event. These may recognize excellence in areas such as:

- Team Spirit
- Social Media Engagement
- First-Time Team
- Industry or Design Partner Engagement
- Engaging Poster or Exhibit
- First Complete Design Narrative Submitted
- Team Excellence in Completing the Building Science Education Series
- Solar Decathlon Director’s Award.

6 Deliverables

Throughout the Design Challenge, each team must submit scheduled deliverables for evaluation of its progress and design. The deliverables, file naming conventions, and due dates are below. Deliverable deadlines are firm; submissions will not be accepted after 5 p.m. EDT or EST on the dates mentioned below.

Table 7. Summary of Deliverables, File Naming Conventions, and Due Dates

Deliverable	File Name	File Size	File Type	Submit To
December 3, 2024				
Project Summary (2 pages)	25DC_[DIVISION]_[SHORT COLLEGIATE INSTITUTION NAME]_SUMMARY_2024-12-03.pdf	Less than 10 MB	Single, bookmarked PDF	Submission Site
February 18, 2025				
Updated Project Summary (2 pages)	25DC_[DIVISION]_[SHORT COLLEGIATE INSTITUTION NAME]_SUMMARY_2025-02-18.pdf	Less than 10 MB	Single, bookmarked PDF	Submission Site
10-Minute Presentation Slides	25DC_[DIVISION]_[SHORT COLLEGIATE INSTITUTION NAME]_SEMIPRES_2025-02-18.pdf	Less than 100 MB	PDF or PPTX	Submission Site
February 27, 2025 (Exhibition Teams only)				
Letter of Intent (Exhibition Teams only)	25DC_[DIVISION]_[SHORT COLLEGIATE INSTITUTION NAME]_LOI_2025-02-27.pdf	Less than 10 MB	PDF	Box
April 8, 2025				
Updated Project Summary (2 pages)	25DC_[DIVISION]_[SHORT COLLEGIATE INSTITUTION NAME]_SUMMARY_2025-04-08.pdf	Less than 10 MB	Single, bookmarked PDF	Submission Site
Design Narrative (Up to 50 pages)	25DC_[DIVISION]_[SHORT COLLEGIATE INSTITUTION NAME]_NARRATIVE_2025-04-08.pdf	Less than 150 MB	Single, bookmarked PDF	Submission Site
Project Images	PHOTO1, PHOTO2, TEAMPHOTO e.g. 25DC_[DIVISION]_[SHORT COLLEGIATE INSTITUTION NAME]_PHOTO1_2025-04-08.pdf	Minimum resolution: 1920 x 1080 pixels	.jpg, .tiff, or .png	Submission Site
April 22, 2025				
15-Minute Division Presentation Slides	25DC_[DIVISION]_[SHORT COLLEGIATE INSTITUTION NAME]_DIVPRES_2025-04-22.[EXTENSION]	Less than 100 MB	PDF or PPTX	Box
8-Minute Grand Jury Presentation Slides	25DC_[DIVISION]_[SHORT COLLEGIATE INSTITUTION NAME]_GRANDPRES_2025-04-22.[EXTENSION]	Less than 100 MB	PDF or PPTX	Box

Note that a “bookmarked” PDF means the file has each major header bookmarked for easy viewing. This makes it easier for the Jurors and reviewers to move around within lengthy and technical deliverables. As an example file, please see the bookmarks for this Rules document PDF. Guidance for creating a bookmarked PDF is provided on the [Submission Site](#).

See Sections 6.1–6.4 for the requirements for each Design Challenge deliverable, as well as submission instructions.

Naming Files for Submissions

Please use the approved file naming convention below for all submissions; to use the example below, replace each item in brackets [], including the brackets themselves, with the appropriate information for your team. For example, the Project Summary naming convention is:

25DC_[DIVISION]_[SHORT COLLEGIATE INSTITUTION NAME]_SUMMARY_2024-12-03.pdf

For the NREL team competing in the Multifamily Building Division, the file name should be: 25DC_MB_NREL_SUMMARY_2024-12-03.pdf

Use of Artificial Intelligence in Competition Deliverables

The following are requirements regarding the use of artificial intelligence in competition deliverables:

- Teams must indicate if generative artificial intelligence (AI) was used in any part of their deliverables, including which tool and prompts.
- Teams are not allowed to use verbatim text from a generative AI chatbot as part of their competition deliverables. Chatbots may reuse text from other sources, causing inadvertent plagiarism.
- All human authors of a deliverable are responsible for all of its content. ChatGPT and similar tools cannot be held accountable.
- Citations recommended by any generative AI chatbot must be verified with the original literature because chatbots are known to generate citations that are inaccurate and/or do not exist.
- AI-generated images and/or multimedia used in competition deliverables will not be accepted.
- The organizers may decline to move a deliverable forward in the competition if AI is used inappropriately according to the requirements outlined above.

6.1 Project Summary Submission Instructions

The Project Summary communicates key aspects of the design project through a high-level description of the project and its highlights. Teams submit the Project Summary as a stand-alone document, developed via the Project Summary template found on the [Submission Site](#). Past Project Summaries can be viewed on [past Design Challenges webpages](#), and an example is provided on the [Submission Site](#).

For each deliverable submission phase, the Project Summary should follow the formatting outlined below. It is understood that for the first iteration of the Project Summary, the details might be based on considerations and aspirations, or be otherwise tentative and subject to change in future submissions. The initial Project Summary will be revised for subsequent submissions.

Project Summary Format Requirements

<input type="checkbox"/> Paper size: Standard 8.5 inches (in.) × 11 in. (216 millimeters [mm] × 279 mm), ANSI A
<input type="checkbox"/> Formatting: Single-spaced, 11-point font for body text (diagrams may have smaller fonts)
<input type="checkbox"/> Borders: 0.5-in. (12.7-mm) minimum, except for tables, figures, and images
<input type="checkbox"/> Maximum length: 2 pages

Project Summary Content Requirements

Project Summary
<input type="checkbox"/> List the project name, team name, Division, and collegiate institution(s) in the header.
<input type="checkbox"/> Replace the logo in the upper right with the team or collegiate institution's logo.
<input type="checkbox"/> Replace the building image with one or two graphics that best represent the project.
<input type="checkbox"/> Provide a concise description of the project, including a brief identification of the target market.
<input type="checkbox"/> Describe the relevance of the project to the goals of the competition.
<input type="checkbox"/> Summarize the design strategy and relevant key points.
<input type="checkbox"/> List the relevant project data, including cost estimates.
<input type="checkbox"/> Provide technical specifications for the project.
<input type="checkbox"/> Provide project highlights. Briefly explain how the design meets or exceeds the criteria in each Contest: <ol style="list-style-type: none">1. Architecture2. Engineering3. Envelope4. Efficiency5. Grid-Interactivity6. Life-Cycle7. Health8. Market9. Community.

6.2 Semifinal Submission Instructions

Teams submit the Semifinal Submission deliverables via the [Submission Site](#). These deliverables provide an interim submission to demonstrate each team's progress and likelihood of completing the final design submission.

Semifinal Submission deliverables include:

- Sign-up for Semifinal Competition Event presentation slot.
- Updated Project Summary
- 10-Minute Semifinal Presentation Slides.

6.2.1 Semifinal Presentation Sign-Up

- All teams who intend to participate in the Semifinal Competition Event must sign up for a presentation slot by February 11, 2025, using sign-up instructions provided by the organizers via the [Submission Site](#).

6.2.2 Project Summary

Project Summary Format Requirements

<input type="checkbox"/> Paper size: Standard 8.5 in. × 11 in. (216 mm × 279 mm), ANSI A
<input type="checkbox"/> Formatting: Single-spaced, 11-point font for body text (diagrams may have smaller fonts)
<input type="checkbox"/> Borders: 0.5-in. (12.7-mm) minimum, except for tables, figures, and images
<input type="checkbox"/> Maximum length: 2 pages, including tables and figures

Project Summary Content Requirements

Project Summary
<input type="checkbox"/> List the project name, team name, Division, and collegiate institution(s) in the header.
<input type="checkbox"/> Replace the logo in the upper right with the team or collegiate institution's logo.
<input type="checkbox"/> Replace the building image with one or two graphics that best represent the project.
<input type="checkbox"/> Provide a concise description of the project, including a brief identification of the target market.
<input type="checkbox"/> Describe the relevance of the project to the goals of the competition.
<input type="checkbox"/> Summarize the design strategy and relevant key points.
<input type="checkbox"/> List the relevant project data, including cost estimates.
<input type="checkbox"/> Provide technical specifications for the project.
<input type="checkbox"/> Provide project highlights. Briefly explain how the design meets or exceeds the criteria in each of the following Contests: <ol style="list-style-type: none">1. Architecture2. Engineering3. Envelope4. Efficiency5. Grid-Interactivity6. Life-Cycle7. Health8. Market9. Community.

6.2.3 Semifinal Presentation Slides

Semifinal Presentation Slides Format Requirements

<input type="checkbox"/> File type: PDF and/or PPTX (Presentation Slides must have an aspect ratio of 16:9.)
<input type="checkbox"/> To ensure that all electronically submitted materials work with the organizers' presentation computers, teams should embed all videos in the team submission.

- | |
|---|
| <ul style="list-style-type: none">□ File name:<ul style="list-style-type: none">○ 25DC_[DIVISION]_[SHORT COLLEGIATE INSTITUTION NAME]_SEMIPRES_2025-02-18.pdf |
|---|

6.3 Letter of Intent for Exhibition Teams

The Letter of Intent is required for teams to continue competition participation as an Exhibition Team if they are not selected as Finalists during the Semifinal Competition Event. The Letter of Intent is a brief description of a team’s intent to continue participation as an Exhibition Team and plan for completion of the Final Submission deliverable.

Letter of Intent Format Requirements

- | |
|--|
| <ul style="list-style-type: none">□ Maximum length: 1 page |
|--|

Letter of Intent Content Requirements

- | |
|---|
| <ul style="list-style-type: none">□ List the project name, team name, Division, and collegiate institution(s). |
| <ul style="list-style-type: none">□ Indicate the team’s intent to continue competition participation as an Exhibition Team. |
| <ul style="list-style-type: none">□ Briefly outline the team’s plan for completing the Final Submission deliverable. |

6.4 Final Submission Instructions

The Final Submission demonstrates the culmination of each team’s design work and provides the final materials needed to evaluate the project. Final Submission deliverables will be reviewed by Jurors and used to determine preliminary scores prior to the Competition Event. Submission instructions are detailed below.

Final Submission deliverables include:

1. Project Summary (updated)
2. Design Narrative
3. 3 Project Images
4. 15-Minute Division Presentation Slides.
5. 8-Minute Grand Jury Presentation Slides.

6.4.1 Project Summary

Teams must submit the Project Summary via the [Submission Site](#). The Project Summary should be updated as needed to reflect the final parameters of the design. It must follow the requirements below:

Project Summary Format Requirements

<input type="checkbox"/> Paper size: Standard 8.5 inches (in.) × 11 in. (216 millimeters [mm] × 279 mm), ANSI A
<input type="checkbox"/> Formatting: Single-spaced, 11-point font for body text (diagrams may have smaller fonts)
<input type="checkbox"/> Borders: 0.5-in. (12.7-mm) minimum, except for tables, figures, and images
<input type="checkbox"/> Maximum length: 2 pages

Project Summary Content Requirements

Project Summary
<input type="checkbox"/> List the project name, team name, Division, and collegiate institution(s) in the header.
<input type="checkbox"/> Replace the logo in the upper right with the team or collegiate institution's logo.
<input type="checkbox"/> Replace the building image with one or two graphics that best represent the project.
<input type="checkbox"/> Provide a concise description of the project, including a brief identification of the target market.
<input type="checkbox"/> Describe the relevance of the project to the goals of the competition.
<input type="checkbox"/> Summarize the design strategy and relevant key points.
<input type="checkbox"/> List the relevant project data, including cost estimates.
<input type="checkbox"/> Provide technical specifications for the project.
<input type="checkbox"/> Provide project highlights. Briefly explain how the design meets or exceeds the criteria in each of the following Contests: <ol style="list-style-type: none">1. Architecture2. Engineering3. Envelope4. Efficiency5. Grid-Interactivity6. Life-Cycle7. Health8. Market9. Community.

6.4.2 Design Narrative

Teams must submit the Design Narrative via the [Submission Site](#). This deliverable fully documents the design project with narratives describing how the design addresses all Contest criteria, with supporting imagery and technical documentation, such as renderings, construction details, and energy analysis. The Design Narrative is limited to 50 pages, including appendices, and must contain all the information the team deems essential to effectively communicate its competition solution to the jury. A summary and discussion of analytical results should be provided in the Design Narrative. Supporting information—such as detailed calculations or equipment data sheets—should be relegated to Supplemental Documentation. Citations may be in the team's chosen format, but they should be consistent throughout the submission.

Design Narrative Format Requirements

<input type="checkbox"/> Paper size: Standard 8.5 in. × 11 in. (216 mm × 279 mm), ANSI A
<input type="checkbox"/> Formatting: Single-spaced, 11-point font for body text (Diagrams may have smaller fonts.)
<input type="checkbox"/> Borders: 0.5-in. (12.7-mm) minimum, except for tables, figures, and images
<input type="checkbox"/> Limit content to no more than 50 pages; the cover, back page, and table of contents are not included in this count.
<input type="checkbox"/> Number pages; front-matter page numbers can use Roman numerals (e.g., i, ii, iii)
<input type="checkbox"/> Construction drawings: 11 in. x 17 in. (279 mm x 432 mm), ANSI B

Design Narrative Content Requirements

Front Matter
<input type="checkbox"/> Cover (list collegiate institution, team name, and Division name)
<input type="checkbox"/> Table of Contents
<input type="checkbox"/> List of Tables and/or List of Figures (as applicable)
Section 1: Design Constraints and Goals (up to 4 pages)
<input type="checkbox"/> Design Constraints Description, including timeline, budget, community setting, climate, building science considerations, codes, occupant characteristics, etc. (1–3 pages)
<input type="checkbox"/> Design Goals, including rating systems, energy targets, occupant experience, operational cost, etc. (1 page)
Section 2: Contest Summaries, including relevant images and figures (up to 2 pages per Contest, or 18 pages total)
<input type="checkbox"/> 1. Architecture
<input type="checkbox"/> 2. Engineering
<input type="checkbox"/> 3. Envelope
<input type="checkbox"/> 4. Efficiency
<input type="checkbox"/> 5. Grid-Interactivity
<input type="checkbox"/> 6. Life-Cycle
<input type="checkbox"/> 7. Health
<input type="checkbox"/> 8. Market
<input type="checkbox"/> 9. Community.

Appendices	
<input type="checkbox"/>	A. Design renderings (up to 4 pages)
<input type="checkbox"/>	B. Construction documentation highlights (up to 20 pages)
<input type="checkbox"/>	a. Site plan
<input type="checkbox"/>	b. Representative floor plan(s) with dimensions
<input type="checkbox"/>	c. Building elevations
<input type="checkbox"/>	d. Building sections, including building science control layers
<input type="checkbox"/>	e. Interior details, including a rendered floor plan showing typical furniture layout and option details on finishes, cabinetry, and other fixtures
<input type="checkbox"/>	f. Wall, window, door, floor, and roof details, including building science control layers, schedule, and specifications
<input type="checkbox"/>	g. Mechanical plans and schedules, ²² indicating equipment locations and specifications, as well as load calculations and heating and cooling system capacity diagrams (Btu/hr·ft ² , tons/ft ² , or kilowatt/m ²)
<input type="checkbox"/>	h. Plumbing plans and schedules, ²² including fixture locations, piping system layout and design, and equipment location and specifications
<input type="checkbox"/>	i. Electrical and lighting plans and schedules, ²² including installed lighting (watt/ft ² or watt/m ²) levels, control systems, and renewable systems
<input type="checkbox"/>	C. Energy performance (ERI and/or EUI target) (up to 4 pages)
<input type="checkbox"/>	Zero energy design compliance
	1. Show summary calculations and methods used to satisfy zero energy definitions.
<input type="checkbox"/>	For Residential: ZERH Target Home - ERI Documentation Summary
<input type="checkbox"/>	1. Perform an Energy Rating Index analysis to include the home with and without the renewable energy system. <i>For teams pursuing an alternative ERI compliance path, include justification and discussion of method to measure energy performance that includes reference to the ERI index/ZERH target home.</i>
<input type="checkbox"/>	For Commercial: EUI Target Documentation Summary
<input type="checkbox"/>	1. Summarize major inputs for the energy model, including envelope characteristics, lighting power densities, plug load densities, HVAC sizing capacities, HVAC system efficiencies, and overview equipment schedules.
<input type="checkbox"/>	2. Demonstrate compliance with the Division definition. EUI should be provided in both site and source metrics. Show summary calculations of the potential for on-site or off-site renewable energy to offset the annual energy consumption of the building on a source basis.

²² Teams should indicate system type, size, and quantity; however, full system layout and specifications are not required.

6.4.3 Project Images

Each team must submit 3 project images: 2 images that best represent the project, such as renderings, drawings, photographs of scale models, or other team-generated content, and at least one image of your team. These images must be submitted via the [Submission Site](#). Organizers use images to recognize individual team performance, to integrate into event materials, or for outreach, as appropriate. Images must be able to be used without copyright constraints.

Project Images Format Requirements

<input type="checkbox"/> Ensure all images have a minimum resolution of 1920 x 1080 pixels.
<input type="checkbox"/> Ensure the images have an aspect ratio of 16:9.
<input type="checkbox"/> Submit the images as files such as .jpg, .tiff, or .png.

6.4.4 Division Presentation Slides

Teams develop one set of slides for the Competition Event to be used for 15-minute Division presentations. The Presentation Slides are submitted via a Box link provided on the [Submission Site](#).

Division Presentation Slides Format Requirements

<input type="checkbox"/> File type: PDF and/or PPTX (Presentation Slides must have an aspect ratio of 16:9.)
<input type="checkbox"/> To ensure that all electronically submitted materials work with the organizers' presentation computers, teams should embed all videos in the team submission.
<input type="checkbox"/> Maximum file size: <ul style="list-style-type: none">○ 100 MB

6.4.5 Grand Jury Presentation Slides

Finalist Teams also develop one set of slides for the Competition Event, to be used for 8-minute Grand Jury presentations if the team is selected as the first-place Division winner. For Grand Jury presentation slides, it is recommended that teams simply include the most relevant content from their Division Presentation Slides. The Presentation Slides are submitted via a Box link provided on the [Submission Site](#).

Grand Jury Presentation Slides Format Requirements

<input type="checkbox"/> File type: PDF and/or PPTX (Presentation Slides must have an aspect ratio of 16:9.)
<input type="checkbox"/> To ensure that all electronically submitted materials work with the organizers' presentation computers, teams should embed all videos in the team submission.
<input type="checkbox"/> Maximum file size: <ul style="list-style-type: none">○ 100 MB

6.4.6 Optional Poster or Exhibit for the Competition Event

Teams are invited to optionally create a poster or physical exhibit that showcases their design project. Posters and exhibits will be displayed for all attendees to view at the Competition Event. These materials are entirely separate from the jury evaluation process and will not be considered in the selection of Division or Grand Winners. Teams are responsible for transporting materials.

Poster or Exhibit Guidelines

- | |
|--|
| <input type="checkbox"/> Materials may be posters or physical exhibits, such as full architectural scale models or models of key design features (e.g., wall sections). Teams must notify organizers if power supplies are needed for their exhibit; availability of supplies is not guaranteed. |
| <input type="checkbox"/> Materials must be self-standing and pose no hazards or safety concerns to surroundings or viewers. |

Glossary

Competition

All aspects of the Solar Decathlon related to the Challenges, the 10 Contests, and the scoring of those Contests within each Challenge

Competition Event

The hybrid event where teams present to juries for evaluation and feedback

Contest

Like the Olympic decathlon, the Contests evaluate a building's design for creativity, overall integration of systems, and ability to deliver outstanding aesthetics, efficiency, and functionality

Competition Manager

The head organizer responsible for writing and enforcing the Rules and conducting the competition

Design Narrative

A 50-page maximum deliverable that is part of the Final Submission deliverable; the Design Narrative provides a complete submission to be reviewed by Jurors in advance of the competition

Design Partner

An organization or client that has a planned construction, major retrofit project, or new construction project in their building portfolio and serves as a client to a student team, working with them to develop a zero energy design option for the project

Director

The organizer representing the U.S. Department of Energy who has final decision-making authority regarding all aspects of the Solar Decathlon

Division

A category based on building type in which a team competes

Division Jury

A group of Jurors evaluating a Division of the Design Challenge

Dwelling Unit

A dwelling unit is a single unit that provides complete independent living facilities for one or more people, including permanent provisions for living, sleeping, eating, cooking, and sanitation; see the [2021 International Energy Conservation Code \(IECC\)](#) for more information.

Education Building

An educational facility serving preschool, K-12, or higher education students that may include permanent provisions such as food service, recreation, offices, classrooms, and other support functions such as mechanical spaces, circulation, and restrooms.

Exhibition Team

A Participant Team that is not selected as a Finalist but submits a Final Submission deliverable and is invited to participate in the Competition Event; Exhibition Teams are not eligible for Division or Grand Winner Awards but will gain feedback from industry reviewers. Exhibition Teams must submit a Letter of Intent to continue participation following the Semifinal Competition Event.

Faculty Advisor

A faculty member who serves as a primary contact for a team and is responsible for communicating competition details from organizers to team members, as well as overseeing and closely engaging with the team

Finalist Teams

Participant Teams that are selected to present their final design to Division Jurors at the Competition Event

Floor Area

The sum of the floor areas of the spaces within the building, including basements²³; the floor area is measured from the exterior faces of the exterior walls or from the centerline of walls separating buildings. For more information, see [ANSI Z765-2003](#) and [ASHRAE 90.1-2019](#).

Grand Jury

A group of Jurors evaluating the first-place Division Winners of the Design Challenge

Industry Partner

Industry professional who offers their expertise and experience to the project

Interdisciplinary Team

An educationally diverse team that includes students from more than one field of study, including but not limited to engineering, architecture, construction, and interior design

Juror

An organizer selected by the Competition Manager to participate as a member of a specific Division jury

Multifamily Building

A structure that contains a blend of residential and commercial building areas

Open Commercial

A team-selected new construction or retrofit commercial building

Organizer

A DOE or NREL employee working on the competition

²³ Floor area is sometimes referred to as the finished floor area or gross floor area.

Participant Team

A team officially registered and participating in the Solar Decathlon Design Challenge

Project Summary

A two-page, high-level description of the project with key takeaways and introductions of the team and collegiate institution; a preliminary Project Summary is submitted early in the competition and is updated in later deliverables.

Resilience

The ability to anticipate, withstand, respond to, and recover from disruptions

Rules

All principles or regulations governing conduct, action, procedure, arrangement, etc., for the duration of the project; this document is the “Rules document.”

Single-Family Housing

A residential new construction or retrofit for one to two dwelling units

Sponsor

A business or organization that provides funds or in-kind services for the competition

Submission Site

An online site where teams submit competition deliverables and receive resources and communications from the organizers, accessible by all teams

Team

The combination of team members representing a single entry to the Design Challenge

Team member

An enrolled student, faculty member, or other person who is affiliated with one of the participating collegiate institutions and is integrally involved with a team’s project activities

Appendix A: Resources

This appendix lists key resources. Additional resources and software are available on the [Submission Site](#).

[U.S. Department of Energy](#)

The mission of DOE is to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions. DOE resources include:

- [Building America Solution Center](#)
The Building America Solution Center provides access to expert information on hundreds of high-performance construction topics, including air sealing and insulation, HVAC components, windows, indoor air quality, and more. [Program checklists](#) are provided to aid in construction of comfortable, healthy, durable, and efficient homes.
- [Retrofit Decision Tool](#)
This tool provides high-level recommendations for building energy improvements based on project-specific inputs.
- [Building Science Advisor](#)
The Building Science Advisor is a no-cost, web-based tool that provides expert guidance on the moisture durability and energy efficiency of new and retrofit wall assembly designs.
- [Zero Energy Ready Home Program Guidelines](#)
DOE Zero Energy Ready Homes are verified by a qualified third party and are at least 40%–50% more energy efficient than a typical new home. This generally corresponds to a Home Energy Rating System (HERS) Index Score in the low- to mid-50s, depending on the size of the home and region in which it is built.
- [Low-Income Energy Affordability Data Tool](#)
The DOE's Low-Income Energy Affordability Data (LEAD) tool is an online, interactive platform that provides estimated household energy data based on income, energy expenditures, fuel type, and housing type. Users can download visuals and data associated with different geographies, housing, and energy characteristics.
- [Inflation Reduction Act Financial Assistance](#)
DOE provides guidance around the [45L Tax Credits for Zero Energy Ready Homes](#) and the [179D Commercial Buildings Energy-Efficiency Tax Deduction](#).
- [Advanced Energy Retrofit Guide for K–12 Schools](#)
This tool estimates the energy production and cost of energy of grid-connected photovoltaic (PV) energy systems throughout the world. It allows homeowners, small building owners, installers, and manufacturers to easily develop estimates of the performance of potential PV installations.

- [A Guide to Zero Energy and Zero Energy Ready in K–12 Schools](#)
This guide provides information about the process of designing, constructing, and operating a zero energy/ready school building.
- [Low Carbon Technology Strategies Toolkit](#)
This toolkit provides guidance on retrofit and operational strategies to achieve deep carbon reductions in existing buildings.

[ASHRAE](#)

ASHRAE is dedicated to advancing the arts and sciences of HVAC and refrigeration to serve humanity and promote a sustainable world. ASHRAE resources include:

- [ASHRAE Advanced and Zero Energy Design Guides](#)
The Design Guides offer designers and contractors the tools needed to achieve significant energy savings compared to buildings that meet the minimum requirements of Standard 90.1-2004. Currently, Zero Energy Design Guides are available for all Commercial Divisions.

[National Institute of Building Sciences](#)

The National Institute of Building Sciences supports advances in building science and technology and brings together experts from throughout the building industry, design, architecture, construction, and government.

- [Whole Building Design Guide](#)
The Whole Building Design Guide presents the philosophy of the integrated design approach and design objectives for whole-building design, and includes guidance for building envelope design.

[PHIUS+](#)

PHIUS is a nonprofit organization dedicated to making high-performance passive buildings the mainstream standard. PHIUS provides training and certification programs for building professionals, conducts high-performance building research, certifies passive buildings, and offers [software and resources](#).

- [PHIUS CORE REVIVE](#)
PHIUS CORE REVIVE is an above code program for certification of retrofit building projects with special attention given to moisture considerations. Resources provide calculation methods for determining internal surface temperature to avoid critical surface humidity and condensation in walls, which is highly relevant for retrofit projects.

[Environmental Protection Agency](#)

The mission of the U.S. Environmental Protection Agency (EPA) is to protect human health and the environment.

- [EPA Power Profiler](#)
The Power Profiler helps users determine the specific air emissions impacts associated with their regional electrical grid.