



U.S. DEPARTMENT OF ENERGY  
**SOLAR DECATHLON**

# **RULES**

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## SECTION I: DEFINITIONS

### **Assembly**

The period of time between the arrival of trucks and the beginning of the [contests](#) on the [competition](#) site

### **Communications manager**

The [organizer](#) responsible for the [project's](#) public outreach and communications activities

### **Communications materials**

All printed or electronic publications designed to convey information to the public

### **Competition**

All aspects of the Solar Decathlon related to the [contests](#) and the scoring of those [contests](#)

### **Competition manager**

The [organizer](#) responsible for writing and enforcing the [rules](#) and conducting a fair and compelling [competition](#)

### **Competition prototype**

The complete assembly of physical components installed within the [solar envelope](#)

### **Competition site**

The area provided by the organizers containing all [solar envelopes](#), pedestrian walkways, and associated organizer equipment, structures, and infrastructure

### **Contest**

The Solar Decathlon [competition](#) consists of 10 separately scored contests, each containing one or more [subcontests](#)

### **Contest official**

An individual selected by the [competition manager](#) to officiate one or more of the [contests](#); a contest official is only authorized to interpret the [rules](#) of the [contest\(s\)](#) to which he or she is assigned

### **Contest week**

The 9-day period on the [competition](#) site when some or all [contests](#) are in progress

### **Decathlete**

A [team member](#) who meets the decathlete eligibility rules outlined in the file posted in the "/Files/Rules" folder on the [Yahoo Group](#)

### **Decision**

The [rules officials'](#) interpretation or clarification of a [rule](#)

### **Decisions on the Solar Decathlon Rules**

The compilation of all [decisions](#) made by the [rules officials](#) during the [project](#)

### **Director**

The [organizer](#) representing the U.S. Department of Energy with final decision-making authority regarding all aspects of the [project](#)

### **Disassembly**

The period of time between the closing of the public exhibit and the completion of [competition](#) site cleanup; Rule 8-2 does not apply during disassembly

### **Event**

The activities that take place on the [competition](#) site including, but not limited to, registration, [assembly](#), inspections, [contests](#), special events, public exhibits, and [disassembly](#)

**Event production manager**

The [organizer](#) responsible for the [project's](#) special events and volunteer activities

**Event sponsor**

An entity selected by the [director](#) to support the Solar Decathlon—a project of the U.S. Department of Energy (DOE), which partners with other institutions, such as its National Renewable Energy Laboratory (NREL), to help ensure the success of the [project](#)

**Faculty advisor**

A [team member](#) who is the lead faculty member and primary representative of a participating school in the [project](#); also provides guidance to the team on an as-needed basis throughout the [project](#)

**Grid-tie assembly**

The period of time during [assembly](#) after the house has been connected to the village grid (interconnected); Rule 8-2 applies during grid-tie assembly

**Interconnection application**

Submitted in the project manual by the team's [electrical engineer](#), this form provides the technical details needed to determine the suitability of the team's electrical system for interconnection to the [village grid](#)

**Juried subcontest**

A [subcontest](#) based on a [jury](#) evaluation

**Juror**

An individual selected by the [organizers](#) to make subjective evaluations of the [projects](#)

**Jury**

A group of [jurors](#) evaluating a specific aspect of each team's [competition prototype](#)

**Measured subcontest**

A [subcontest](#) based on task completion or monitored performance

**Observer**

Assigned by the [competition manager](#) to observe team activities during [contest week](#), an [observer](#) reports observed [rules](#) infractions to the [rules officials](#) and records the results of specific [contest](#) tasks, but does not provide interpretations of the Solar Decathlon Rules

**Organizer**

A DOE or NREL employee, subcontractor, or [observer](#) working on the [project](#) and having the authority described in Rule 1-4

**Project**

All activities related to the U.S. Department of Energy Solar Decathlon 2013—from the issuance of the request for proposals through the closing of subcontracts

**Protest resolution committee**

A group of individuals selected by the [organizers](#) to resolve team protests during the [competition](#)

**Public exhibit**

Areas of the competition site open to the public during designated hours

**Rule**

A principle or regulation governing conduct, action, procedure, arrangement, etc., for the duration of the [project](#)

**Rules official**

An [organizer](#) authorized to interpret the [rules](#); the [competition manager](#) is the lead rules official



**Safety officer**

An organizer whose primary responsibilities are to evaluate the teams' construction documents and the teams' competition site activities for compliance with Rule 3-3

**Scored period**

Any 15-minute period beginning at 0, 15, 30, or 45 minutes after the hour, during which a particular monitored [contest](#) is in progress

**Scorekeeper**

The individual selected by the [organizers](#) to operate the [scoring server](#) during the [competition](#)

**Scoring server**

A server that collects data from the central datalogger server; includes forms for manually entering juried and task-based measured [contest](#) results, and calculates composite scores

**Site operations manager**

The [organizer](#) responsible for all [event](#) site operations except those listed as responsibilities of the [competition manager](#) and [event production manager](#)

**Solar Decathlon Building Code**

A set of design and construction standards set forth and enforced by the [Solar Decathlon building official](#) for the protection of public health and safety during the [event](#)

**Solar Decathlon building official**

The [rules official](#) responsible for writing, interpreting, and enforcing the [Solar Decathlon Building Code](#)

**Solar envelope**

The area, as defined by [Rule 5](#), containing the [competition prototype](#)

**Stand-alone assembly**

The period of time during [assembly](#) before the house has been interconnected to the village grid; Rule 8-2 does not apply during stand-alone assembly

**Staff**

Individuals working for the [organizers](#) on the [project](#), including volunteers

**Subcontest**

An individually scored element within a [contest](#)

**Team**

The combination of [team members](#), including [team crew](#) and [decathletes](#), representing a single entry to the [competition](#)

**Team crew**

A person who is integrally involved with a team's [project](#) but is unaffiliated with a participating school; contractors, volunteers, team media, and sponsors represent team crew examples

**Team member**

An enrolled student, recent graduate, faculty member, or other person who is affiliated with one of the participating schools and is integrally involved with a team's [project](#) activities; [decathletes](#), [faculty advisors](#), and involved staff from a participating school are all considered team members

**Village grid**

The bi-directional, AC electrical network on the [competition](#) site to which each house has an individually metered connection

**Yahoo Group**

A community website that includes official communications suitable for viewing by all [teams](#) and [organizers](#)



## SECTION II: GENERAL RULES

### *Rule 1. Authority*

#### **1-1. Director**

The director represents the U.S. Department of Energy and has the final decision-making authority in all aspects of the project.

#### **1-2. Competition Manager**

The competition manager is the only rules official authorized to write and modify the rules.

#### **1-3. Rules Officials**

The rules officials are the only organizers authorized to interpret the rules.

- a. If there is any doubt or ambiguity as to the wording or intent of these rules, the decision of the rules officials shall prevail.
- b. Printed, electronic, and verbal communications from the rules officials shall be considered part of, and shall have the same validity as, these rules.

#### **1-4. Organizers**

Occasionally, a rules official may not be immediately available to make an extremely time-sensitive decision. In these rare cases, organizers are authorized to revise the project schedule, change a team's score, or enforce the rules in any manner that is, in their sole judgment, required for the fair and efficient operation or safety of the competition.

#### **1-5. Staff**

Solar Decathlon staff are not authorized to revise the project schedule, change a team's score, or enforce the rules under any circumstances.

### *Rule 2. Administration*

#### **2-1. Precedence**

If there is a conflict between two or more rules, the rule having the later date takes precedence.

#### **2-2. Violations of Intent**

A violation of the intent of a rule is considered a violation of the rule itself.

#### **2-3. Effective Date**

The latest version of the Rules posted in the "/Files/Rules" folder on the Yahoo Group<sup>1</sup> and dated for the year of the event represents the Rules in effect.

#### **2-4. Official Communications**

It is the team's responsibility to stay current with official project communications. Official communications between the teams and the organizers occur through, but are not limited to, one or more of the following:

- a. **Yahoo Group** (<http://groups.yahoo.com/group/SD2013>): Official communications suitable for viewing by all teams and organizers are posted on the Yahoo Group message board. The Yahoo Group includes a section

<sup>1</sup> Members of the public without access to the Yahoo Group who are interested in receiving this information may email a request to the competition manager at [sdrules@nrel.gov](mailto:sdrules@nrel.gov).

for posting files. If files are too large for the Yahoo Group, they are posted on the FTP site or in the dropbox, and the teams are notified of the exact location of file(s) via the Yahoo Group. Other Yahoo Group features are used for various purposes. Instructions for joining the Yahoo Group are provided to each team immediately following the selection of teams.

- b. **Competition manager's email** ([sdrules@nrel.gov](mailto:sdrules@nrel.gov)): For confidential communications or the transfer of small (<5 MB), confidential files, teams may email the competition manager. The content of communications sent to this email address remains confidential, unless the team grants permission to the competition manager to divulge the content of these communications to the other teams. See the exception in Rule 2-5 for more information about confidentiality.
- c. **Dropbox** (<http://dropbox.yousendit.com/SolarDecathlon>): The dropbox is used by the organizers and teams to transfer large or confidential files. Notification of or requests for file transfers are made via the Yahoo Group or email.
- d. **Conference calls**: Teams are strongly encouraged to participate in regularly scheduled conference calls with the organizers. Invitations and instructions for participation in conference calls are provided via the Yahoo Group.
- e. **Meetings**: Before the event, the teams and organizers have one or more in-person meetings. Notification of the date(s) and agenda(s) for these meetings is made via the Yahoo Group. A meeting is held the day before assembly begins. Meetings are also held on a daily basis throughout the event.
- f. **Email**: For expediency and to protect confidentiality, the organizers may choose to communicate with teams via team members' email addresses listed in the Yahoo Group database. However, most official communication occurs via the Yahoo Group message board.

## 2-5. Decisions on the Rules

The Decisions on the Rules offers interpretations of the rules contained in this document, the Solar Decathlon Rules.

After the rules officials make a decision that may, in their opinion, directly or indirectly affect the strategies of all teams, the rules officials add the decision to the Decisions on the Rules and notify the teams of the addition via the Yahoo Group.

**Exception:** If such a notification would unfairly reveal the strategies of one or more individual teams, the organizers may, depending on the circumstances, refrain from notifying all teams of the decision.

## 2-6. Self-Reporting

Teams shall self-report obvious or suspected rules infractions that have occurred or may occur.

- a. The Solar Decathlon Rules do not address every possible scenario that may arise during the competition. Therefore, a team considering an action that is not explicitly permitted by the rules should ask the rules officials for a decision before proceeding with the action. If the team does not ask for an official decision, it puts itself at risk of incurring a penalty.
- b. The rules officials and director exercise discretion when determining the penalty for a rules infraction. Rules infractions observed by rules officials, organizers, or other teams, i.e., not self-reported by the team committing the infraction, may be subject to more severe penalties than self-reported rules infractions.

## 2-7. Penalties

Teams committing rules infractions are subject to one or more of the following penalties, depending on the severity of the infraction: 1) point penalty applied to one or more contests; 2) disqualification from part, or all, of one or more subcontests; or 3) disqualification from the competition.

- a. The rules officials shall determine the severity of rules infractions and classify them as **minor** or **major**.
- b. The rules officials are authorized to apply point penalties and disqualify a team from part, or all, of one or more subcontests as a consequence of **minor** rules infractions.

- c. The rules officials shall report to the director all **major** rules infractions. The director is solely authorized to apply point penalties or disqualify a team from the competition or from part, or all, of one or more subcontests for **major** rules infractions.
- d. Disqualification from the competition requires prior notice to the team and an opportunity for the team to make an oral or written statement on its behalf.
- e. The competition manager shall notify all teams via the scoring server when a penalty has been assessed against any team. The notification shall include the identity of the team receiving the penalty; a brief description of the infraction, including its severity, i.e., minor or major; and a brief description of the penalty.

## 2-8. Protests

Official written protests may be filed by a team for any reason during the contest week. A filing fee of up to 10 points may be assessed to the team filing the protest if the protest is deemed by the protest resolution committee to be frivolous.

- a. Teams are encouraged to communicate with the rules officials to resolve issues and complaints before resorting to the protest process. Protests should be filed only if a) the team and the rules officials are unable to resolve the dispute themselves; or b) the team or the rules officials are too busy to engage in discussions that may result in resolution of the dispute without a protest.
- b. Protests shall be submitted between 8 a.m. and 6 p.m., and within 24 hours of the action being protested. The final opportunity to file a protest is 5 minutes following the conclusion of the final subcontest on the final day of contest week.

**Exception:** The results of one or more subcontests may be announced during the final awards ceremony. The results of contests or subcontests announced during the final awards ceremony may not be protested.

- c. The protest shall be submitted to the competition manager in a sealed envelope. It shall include the name and signature of a decathlete, the date of the protest submission, an acknowledgment that a 10-point filing fee may be assessed, and a clear description of the action being protested.
- d. Following the receipt of a protest, the protest resolution procedure will occur as follows:
  - (i). The competition manager convenes the protest resolution committee.
  - (ii). The competition manager submits the sealed envelope containing the team's written protest to the committee. Unless the competition manager is called by the committee to testify, the competition manager is not permitted to read the protest until after the protest resolution committee has submitted its written decision.
  - (iii). The committee opens the envelope and reads the protest in private. No appearance by organizers or team members is authorized during the committee's private deliberations. No right to counsel by organizers or team members is authorized.
  - (iv). The committee notifies the competition manager if it would like to call any individuals for testimony. The competition manager notifies individuals called for testimony. The committee may call the competition manager for testimony.
  - (v). Testimony is provided by individuals called by the committee.
  - (vi). The committee notifies the competition manager of its decision in writing and indicates how many points shall be assessed as a filing fee. The decision of the committee is final and no further appeals are allowed.
  - (vii). If the decision involves changes to a team's score or the assessment of a filing fee, the competition manager notifies the scorekeeper of the changes, and the scorekeeper applies the changes to the scoring server.
  - (viii). The competition manager posts a copy of the written protest and decision on the Yahoo Group.

## **Rule 3. Participation**

### **3-1. Entry**

The project is open to colleges, universities, and other post-secondary educational institutions. Entry is determined through a proposal process. All proposals are reviewed, scored, and ranked. Subject to the quantity and quality of proposals, a limited number of teams will be selected for entry.

### **3-2. Contact Information**

Each team shall provide contact information for the team officers listed in Table 1 and shall keep the contact information current for the duration of the project.

- a. If a team’s internal officer titles do not exactly match those listed in Table 1, each team shall still provide the contact information for the person fulfilling each of the areas of responsibility described in the second column.
- b. Teams shall provide the contact information for one and only one person in each officer position; these individuals are responsible for forwarding information to any “co-officers,” as necessary.
- c. An individual may have multiple officer titles, however the same individual may not fulfill the project manager, construction manager, or health and safety officer roles.
- d. Teams shall enter required contact information into the “Team Officer Contact Info” Yahoo Group database.
- e. Faculty members are only eligible to fill the “faculty advisor” team officer position. Eligible decathletes must fill all other team officer positions.

**Table 1: Team officers**

<b>Title</b>	<b>Responsibilities</b>
Primary student contact	Ensures that official communications from the organizers are routed to the appropriate team member(s)
Project manager	Responsible for planning and executing the project and ultimately responsible for the overall health and safety of the project
Public relations contact	Works in conjunction with DOE’s Public Affairs office to coordinate the team’s interactions with the media
Construction manager	Responsible for planning and executing the construction, transport, assembly, and disassembly of the house, including providing the necessary oversight on construction activities to ensure that construction work is performed in compliance with the Health and Safety Plan
Architecture project manager	Responsible for the architectural design effort; license not required
Project engineer	Responsible for the engineering design effort; license not required
Measured contest captain	Serves as the primary strategist and coordinator of tasks in Contests 6 through 10; is responsible for demonstrating the compliance of appliances with the Rules
Health and safety officer	Responsible for developing the team’s Health and Safety Plan, for providing health and safety oversight to the project and advising the project manager and construction manager, as necessary, on project health and safety issues
Life safety captain	Responsible for the team’s life safety during the event, including the fire watch, public safety within the team’s solar envelope, and evacuation procedures
Instrumentation contact	Collaborates with the organizers’ instrumentation team and the team’s construction manager to accommodate the organizer’s equipment
Electrical engineer	Completes the Interconnection Application and works in conjunction with the site operations manager to interconnect the house to the micro-grid on the competition site; license not required
Faculty advisor	Serves as the lead faculty member and primary representative of a participating school in the project; also provides guidance to the team throughout the project
Sponsorship manager	Responsible for recruiting team sponsors and for team compliance with Rule 10-3

### 3-3. Safety

Each team is responsible for the safety of its operations.

- a. Each team member and team crew member shall work in a safe manner at all times during the project in accordance with the requirements identified in the rules and approved team Health and Safety Plan.
- b. Each team shall supply all necessary personal protective equipment (PPE) and safety equipment for all of the team's workers during the project.
- c. During assembly and disassembly, a minimum level of PPE—hard hat (ANSI Z89.1 or equivalent, Type I, Class G or better), safety glasses with side shields (ANSI Z87.1 or equivalent), shirt with sleeves at least 3 in. (7.6 cm) long, long pants (the bottoms of the pant legs shall, at a minimum, touch the top of the boots when standing), and safety boots (ANSI Z41 PT99 or equivalent) with ankle support—shall be used by each team member and team crew member. Additional PPE or safety equipment shall be used if required for the task being performed.
- d. Children under the age of 18 are not permitted to be on the competition site during assembly and disassembly.
- e. Smoking is not permitted within the competition site at any time during assembly or disassembly.
- f. Pets and other animals are not permitted on the competition site during assembly or disassembly with the exception of registered service animals.
- g. Organizers may issue a stop work order at any time during the project if a hazardous condition is identified.
- h. Failure to follow the procedures and requirements outlined in each team's Health and Safety Plan is considered a rule violation subject to Rule 2-7. All electrical work on the competition site shall meet electrical lockout/tagout requirements indicated in each team's approved Health and Safety Plan.

### 3-4. Conduct

Improper conduct or the use of alcohol or illegal substances will not be tolerated. Improper conduct may include, but is not limited to, improper language, unsportsmanlike conduct, unsafe behavior, distribution of inappropriate media, or cheating.

### 3-5. Use of Likeness, Content, and Images

Team members and crew agree to the use of their names, likenesses, content, graphics, and photos in any communications materials issued by the organizers and event sponsors.

- a. Content and images (graphics and photos), and any publications in which the content and images appear, may be viewable and made available to the general public via DOE's, NREL's, and the event sponsors' websites with unrestricted use.
- b. The organizers and event sponsors will make all reasonable efforts to credit the sources of content and images, although they may be published without credit. To ensure proper usage of and credit for images, teams should submit photos and graphics by following the instructions for submitting images located in Appendix F.

**Exception:** The deliverable status sheet posted in the "/Files/Deliverable Status Sheet" folder on the Yahoo Group indicates which deliverables will remain confidential through the completion of the project. All other competition and contract deliverables may be made publicly available any time after their receipt by the organizers.

### 3-6. Withdrawals

Any team wishing to withdraw from the project must notify the competition manager in writing. All written withdrawals signed by a faculty advisor are final.

## ***Rule 4. Site Operations***

### 4-1. Damage Liability

Each team is financially responsible for any damage it causes to the competition site.

## **4-2. Construction Equipment**

- a. Truck-mounted cranes, trailers, semi-trailer trucks, etc., are limited to the paved surfaces of the competition site.
- b. Track-mounted equipment, such as vehicles, cranes, and forklifts, are prohibited at all times.
- c. Teams shall not permit the use of any equipment or tools on the competition site that are not safe and/or do not comply with applicable requirements of the Occupational Safety and Health Administration (OSHA) and/or other related regulatory standards.

## **4-3. Ground Penetration**

Ground penetration is permitted only for the installation of tie-downs needed to meet wind loading and seismic requirements and for the installation of grounding means for the house's electrical system. Ground penetrations should be minimized and must be approved by the organizers prior to arrival at the competition site.

- a. Prior to assembly, a qualified utilities locator will identify any locations near each house where grounding means shall be installed. Grounding means shall be installed in accordance with the Solar Decathlon Building Code.

## **4-4. Impact on the Competition Site**

Low-impact footings shall be used to support all house and site components.

- a. Properly designed footings comply with the bearing pressure criteria specified in the Solar Decathlon Building Code.

## **4-5. Generators**

Generators are permitted to power tools and construction lights during stand-alone assembly and stand-alone disassembly.

- a. Engine generators shall not exceed 60 dB (A) at 50 ft (15 m) under full load per the manufacturer's listed sound rating. Operation and refueling of generators are limited to times approved by the organizers.

## **4-6. Spill Containment**

- a. Generators must be equipped with secondary containment systems that can accommodate all of the oil, fuel, and coolant that the generator contains at maximum capacities.
- b. The release of water or other liquids onto the competition site or into nearby storm drains is prohibited.

## **4-7. Lot Conditions**

Up to 12 in. (30.48 cm) of vertical elevation change may exist across a lot. Design and plan accordingly.

## **4-8. Electric Vehicles**

Teams are permitted, but not required, to locate an electric vehicle on the competition site during contest week.

- a. The vehicle must be electric. Hybrid vehicles and non-electric vehicles are not permitted.
- b. Movement of the vehicle on and off the competition site is prohibited one hour prior, one hour after, and throughout all public exhibit periods.
- c. If a vehicle is demonstrated, the competition prototype must include the infrastructure required to charge the vehicle.
- d. The vehicle is not permitted to be connected to the competition prototype's electrical system at any time.
- e. Any vehicle displayed must be commercially available to all teams at the beginning of contest week.



## Rule 5. The Solar Envelope

### 5-1. Lot Size

Lots are 78 ft (23.8 m) east to west by 60 ft (18.3 m) north to south.

### 5-2. Solar Envelope Dimensions

The house and all site components on a team's lot must stay within the 18-foot-high (5.486 m) solar envelope shown in Figure 1. The north and south planes of the solar envelope are vertical, i.e., slope of 90 degrees from horizontal. The east and west planes of the solar envelope have slopes of about 52 degrees from horizontal as defined by the dimensions provided in Figure 1.

- The official height of a site component or set of contiguous site components is the vertical distance from the point of highest grade along the outside perimeter of the site component(s) to the highest point of the site component(s).
- Small weather stations, antennas, air vents, and other similar components may be specifically exempted from Rule 5-2 if all of the following conditions are met:
  - The team makes a request to the competition manager for an exemption.
  - The team can prove to the competition manager's satisfaction that the component is not significantly restricting a neighbor's right to the sun.
  - The competition manager determines that the component is sufficiently unique in function and small in size to warrant an exemption.
- Moveable or convertible house or site components shall not extend beyond the solar envelope during live demonstrations or in printed or electronic media presented by the team during jury visits, public exhibit hours, or contests.
- Any vehicle presented on the competition site shall not extend beyond the solar envelope during live demonstrations or in printed or electronic media presented by the team during jury visits, public exhibit hours, or contests.

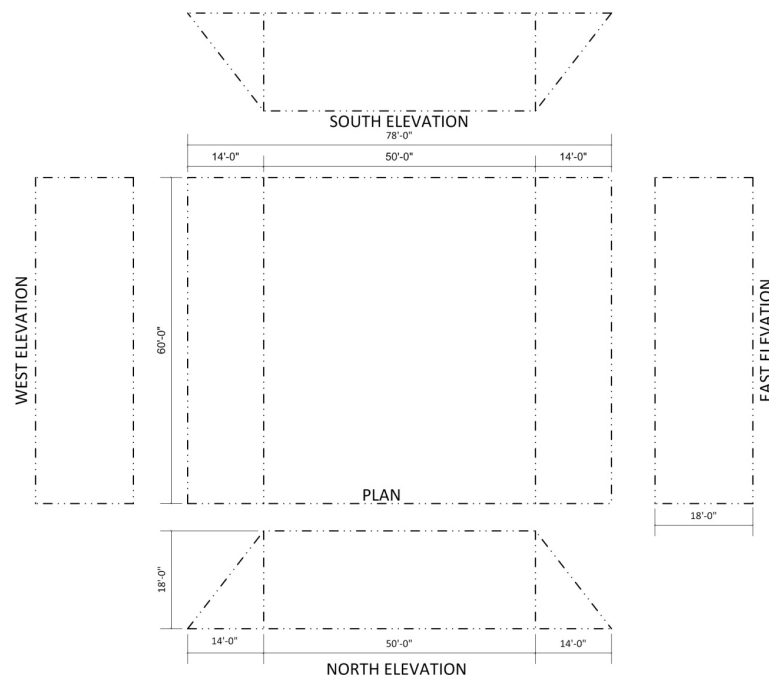


Figure 1: Solar envelope dimensions

## Rule 6. The House

### 6-1. Structural Design Approval

Each team shall submit structural drawings and calculations that have been stamped by a qualified, licensed design professional registered in the State of California or be eligible for California registration reciprocity.

- a. By stamping the structural drawings and calculations, the licensed professional certifies that the structural provisions of the Solar Decathlon Building Code have been met by the design, and that the structure is safe for the public to enter if it has been built as designed.
- b. The licensed professional shall stamp the structural drawings and calculations of the house and all site components that might pose a threat to public safety if they fail.

### 6-2. Finished Square Footage

The finished square footage, as defined by ANSI Z765-2003, “Square Footage—Method for Calculating,” shall be at least 600 ft<sup>2</sup> (55.7 m<sup>2</sup>), but shall not exceed 1000 ft<sup>2</sup> (92.9 m<sup>2</sup>).

- a. If the building has convertible or moveable components, the maximum and minimum square footages observed during live demonstrations or shown in printed or electronic media presented by the team during jury visits, public exhibit hours, or contests count as the maximum and minimum square footages of record, respectively.

### 6-3. Entrance and Exit Routes

- a. The main house entrance may be placed on any side of the house. However, an accessible route leading from the main street of the solar village to the main house entrance shall be provided.
- b. The house exit route shall lead from the main house exit to the main street of the solar village or to the east/west side of the solar envelope accessible to the public.
- c. Teams shall clearly illustrate and label the entrance and exit routes between solar envelope “property lines” and house entrance/exit in the construction drawings.

### 6-4. Competition Prototype Alternates

Alternates to the competition prototype shall not be proposed in materials intended for consideration by the Architecture, Market Appeal, and Engineering juries. Team websites and public exhibit communications materials, including signage, handouts and public display information, are not subject to this rule.

- a. Renderings and other graphical representations may only show the competition prototype house and the associated competition prototype site components on a featureless 78 ft (23.8 m) east to west by 60 ft (18.3 m) north to south lot. The featureless lot has a flat, uniform ground covering to be specified by the team.
- b. Natural and man-made features, including adjacent competition prototypes, located near the target client's site may be depicted, as long as the depicted features are located outside of the solar envelope.
- c. Teams shall not propose alternates to address local building code provisions and site restrictions at the target client's site. The juries will be instructed to assume that the Solar Decathlon Rules and Building Code also apply at the target client's site.
- d. Public exhibit communications materials are not considered part of the competition prototype and, therefore, shall not be shown in renderings and other graphical representations.

**Exception:** The cost estimator and juries will disregard all containers and associated equipment, such as pressure pumps, that would be unnecessary if city water and sewer services were available on the competition site. Therefore, these components shall be noted as “Temporary for Competition Purposes” in drawings and other graphical representations. Note that all structures and surfaces that surround the containers will be evaluated by the cost estimator and juries.

The cost estimator and juries will disregard any vehicle on display on the competition site. Note that any infrastructure provided to support the vehicle will be evaluated by the cost estimator and juries.

## *Rule 7. Vegetation*

The use of potted vegetation is permitted. All potted vegetation shall comply with Rules 4-4 and 4-6.

### **7-1. Placement**

Vegetation may be moved around the solar envelope until the beginning of contest week, after which it shall remain stationary until the conclusion of contest week unless the drawings clearly show how some or all vegetation is designed to be moved as part of an integrated system.

### **7-2. Watering Restrictions**

Greywater that may possibly contain organisms that could go septic shall not be used to water vegetation.

## *Rule 8. Energy*

### **8-1. PV Technology Limitations**

- a. Bare photovoltaic cells and encapsulated photovoltaic modules must be commercially available to all teams by the beginning of the event.
- b. Substantial modification of the crystal structure, junction, or metallization constitutes manufacture of a new cell and is not allowed.

### **8-2. Energy Sources**

After the conclusion of stand-alone assembly (see Rule 8-5c for details) and until the conclusion of the Energy Balance Contest (see Appendix A for the detailed event schedule), global solar radiation incident upon the lot and the energy in small primary batteries (see Rule 8-3 for limitations) are the only sources of energy that may be consumed in the operation of the house without the requirement of subsequent energy offsets.

**Exception:** Teams may use organizer-supplied microgrid power that is exempt from the Energy Balance Contest during grid-tie assembly for construction equipment, site lighting, and task lighting located outside the finished square footage only. Teams may use generators during grid-tie assembly for nighttime construction lighting only.

- a. All other energy sources, such as AC grid energy, consumed in the operation of the house must be offset by an equal or greater amount of energy produced, or “regenerated,” by the house.
- b. Fireplaces, fire pits, candles, and other devices using non-solar fuels are not permitted in the designs.

**Exception:** The limited use of batteries is permitted by Rule 8-3.

### **8-3. Batteries**

Hard-wired battery banks and large plug-in uninterruptable power supplies (UPS) are not permitted.

- a. The use of primary (non-rechargeable) batteries (no larger than “9V” size) is limited to smoke detectors, remote controls, thermostats, alarm clock backups, and other small devices that typically use small primary batteries.
- b. “Plug-in” (non-hard-wired) devices with small secondary (rechargeable) batteries that are designed to be recharged by the house’s electrical system (e.g., a laptop computer), shall be connected, or “plugged into,” the house’s electrical system whenever the devices are located in the house or within the solar envelope.

**Exception:** If not used in the operation of the house at any time during contest week, portable electronic devices used for mobile communications, such as cell phones and PDAs, are permitted within the solar envelope without having to be plugged into the house’s electrical system.

Electric vehicles with integrated batteries are permitted to be located within the solar envelope, but may not be connected to the competition prototype’s electrical system at any time.

- c. Stand-alone, PV-powered devices with small secondary batteries are permitted, but the aggregate battery capacity of these devices may not exceed 100 Wh.

- d. Batteries include most commercially available energy storage devices, such as electrochemical batteries and capacitors.

#### 8-4. Desiccant Systems

If a desiccant system is used, it must be regenerative.

- a. To ensure that the desiccant has been fully regenerated by the conclusion of the Energy Balance Contest, the desiccant material or device must be easily measurable.
- b. In most cases, the material or device will be measured prior to and at the conclusion of the Energy Balance Contest. In some cases, a measurement at the conclusion of the Energy Balance Contest may not be necessary.
- c. At the conclusion of the Energy Balance Contest, the weight of the desiccant material or device shall be less than or equal to its initial weight.
- d. Some desiccant systems with very low moisture storage capacities may be exempt from this requirement. Exemptions will be granted on a case-by-case basis by the competition manager.

#### 8-5. Village Grid

The organizers shall provide the village with an electric power grid that provides AC power to and accepts AC power from the houses.

- a. The organizers shall provide the necessary service conductors and connect the conductors at the utility intertie point.
- b. A team shall notify the organizers if its house operates with an AC service other than 60 Hz, 120/240V split-phase with neutral.
- c. At a date and time specified in Appendix A, teams have the option to switch from stand-alone assembly to grid-tie assembly if all relevant inspections have been passed and the village grid is available. Teams shall not switch back to stand-alone assembly after switching to grid-tie assembly. At a later date and time specified in Appendix A, all teams shall have switched to grid-tie assembly.

#### 8-6. Net Metering Rules

- a. When a team switches from stand-alone assembly to grid-tie assembly, its bidirectional meter resets to zero.
- b. If the meter reading indicates net energy production at the start of the Energy Balance Contest, the meter is reset to zero. If the meter reading indicates net energy consumption at the start of the Energy Balance Contest, the meter is not reset and the team begins the Energy Balance Contest with an energy deficit.

### *Rule 9. Liquids*

#### 9-1. Container Locations

- a. Primary supply water and greywater containers shall be located outside of the finished square footage as defined by Rule 6-2. These containers may not be located below the finished square footage.  
**Exception:** Teams may utilize one or more small tanks to accept wastewater discharge in preparation for delivery to the main wastewater tank(s) up to a maximum aggregate volume of 20 gallons.
- b. Solar storage, hot water, or other thermal storage containers may be located within the finished square footage.
- c. The primary supply water tank(s) shall be fully shaded from direct solar radiation between 9 a.m. and 5 p.m. Pacific Daylight Time (PDT) or between 8 a.m. and 4 p.m. solar time on October 1.

#### 9-2. Team-Provided Liquids

A team may provide its own liquids for the following purposes:

- a. Personal hydration
- b. Irrigation [one-time delivery before water delivery day, 50 gallon (189 L) limit, water only]

- c. Thermal mass (quantity limited by bearing pressure limit and Rule 4-4; see Rule 9-6 for restrictions)
- d. Food preparation
- e. Hydronic system pressure testing<sup>2</sup>
- f. Small volumes of glycol, deionized water, or other working fluids for thermodynamic systems using working fluids other than non-potable water
- g. Assembly (e.g., hydraulic fluid), finishing (e.g., paint), and cleaning (e.g., mineral spirits).

### **9-3. Greywater Reuse**

A team may reuse greywater for irrigation only.

- a. Greywater reuse systems shall comply with Rule 7-2.

### **9-4. Rainwater Collection**

A team may collect rainwater that falls on its site and use it in, or as, any of the following:

- a. Irrigation source
- b. Water feature
- c. Heat sink or heat source

### **9-5. Evaporation**

Water may be used for evaporation purposes.

### **9-6. Thermal Mass**

Teams may use liquids as thermal mass.

- a. The thermal storage containers shall be filled and sealed before their arrival on the competition site and shall remain sealed until they are removed from the competition site by the teams.
- b. The thermal storage containers shall be isolated, i.e., the contained liquid shall not circulate to other containers or systems.

### **9-7. Greywater Heat Recovery**

Heat may be recovered from greywater as it flows from the drain to the waste tank.

- a. “Batch”-type greywater heat recovery is prohibited.

### **9-8. Water Delivery**

A team may request up to 1500 gallons of water from the organizers in its detailed water budget.<sup>3</sup>

The procedure and associated requirements for water delivery follow.

- a. On water delivery day, two water trucks begin at the southeast and northwest corners of the competition site in the morning and proceed to service each house. Each truck will be equipped with a pump to aid in water supply.
- b. Teams shall provide a minimum of six people, on command, to help move the water hose to their house from the previously serviced house.
- c. After the two trucks have serviced all houses once, they will circle the village again to service any house needing additional water.
- d. Teams that delay the water supply process or request additional water after the trucks complete their second circle around the village are subject to a penalty and a delay in receiving their water. Instead of or in addition to a penalty, these teams may be required to pay for their own water. Teams required to pay for their own water supply shall use a company approved by the organizers.

<sup>2</sup> The water may only fill isolated loops; it shall not enter tanks.

<sup>3</sup> The detailed water budget shall be included in the Project Manual (see *Content Requirements* in Appendix D-5).

- e. The design deliverables shall clearly indicate the fill location(s), quantity of water requested at each fill location, container dimensions, diameter of the opening(s) (minimum 4 in., or 10 cm), and clearance above the container(s) fill location(s) (minimum 12 in., or 30.48 cm). All openings shall be easily accessible.
- f. Teams are responsible for distributing water within their houses. This includes all necessary pumps, containers, lines, valves, etc. All pumping power to distribute water must be delivered by an AC circuit.

## 9-9. Water Removal

The procedure and associated requirements for water removal follow.

- a. On water removal day, two water trucks begin at the middle of the village and proceed toward the northwest and southeast to service each house. Each truck will be equipped with a pump to aid in water removal.
- b. Teams shall supply a minimum of six people, on command, to help move the water hose to their house from the previously serviced house.
- c. After the two trucks have serviced all houses once, they will circle the village again to service any house needing remaining water removed.
- d. Teams that delay the water removal process may be required to pay for their own water removal. Teams required to pay for their own water removal shall use a company approved by the organizers.
- e. The design deliverables shall clearly indicate the removal location(s), quantity of water to be removed from each removal location, container dimensions, diameter of the opening(s) (minimum 4 in., or 10 cm), and clearance above the container(s) fill location(s) (minimum 12 in., or 30.48 cm). All openings shall be easily accessible.
- f. Teams are responsible for either removing remaining water from the site or moving remaining water to the designated removal locations.

## *Rule 10. The Event*

### 10-1. Registration

All Solar Decathlon event participants must register either through the online registration site, which will be available closer to the event, or on the competition site.

- a. The following rules apply to **all registrants**:
  - (i). Each event participant must register individually. Group registrations are not allowed.
  - (ii). Online registration is encouraged for all event participants, because on-site registration could cause delays in gaining event access.
  - (iii). When registering, event participants must complete all required information and forms before access to the event is allowed.
- b. **Organizers, team members, jurors, and staff** are required to provide a photo that will be kept on file and used for security purposes. Participants should use the online registration site to submit completed forms, information, and photos prior to the event. Once all information, forms, and photos are received, the organizers will issue an event security ID that must be visible at all times while on the competition site.
- c. **Team crew** members are not required to submit a photo. Due to safety concerns, site access for team crew members may be restricted.
- d. **Visiting media** will not be required to submit forms or photos, but must check in at event headquarters. Due to safety concerns, site access for visiting media may be restricted.

### 10-2. Event Sponsor Recognition

All communications materials produced by the teams concerning or referring to the project (including team websites) shall refer prominently to the project as the “U.S. Department of Energy Solar Decathlon.”

- a. Teams are required to use the Solar Decathlon logo, the DOE wordmark, and the NREL logo on all communications materials visible at the Orange County Great Park. The DOE wordmark and NREL logo

shall be a maximum of one-third the size of the Solar Decathlon logo as outlined in the Solar Decathlon identity guidelines<sup>4</sup>.

- b. The Solar Decathlon logo, the DOE wordmark, and NREL logo are the only required graphic elements teams must use.
- c. Team websites shall comply with Rule 10-2 with the exception of the one-third size rule for team sponsor text and logos.
- d. Team uniforms are exempt from Rule 10-2. See Rule 11-5 for specifics.

### **10-3. Team Sponsor Recognition**

Team sponsors may be recognized with text, logos, or both, but the text and logos must appear in conjunction with the Solar Decathlon text and logo and be a maximum of one-third of the size of the Solar Decathlon text and logo, as outlined in the Solar Decathlon identity guidelines.

- a. Team websites shall comply with Rules 10-2 and 10-3, with the exception of the one-third size rule for team sponsor text and logos.
- b. Rule 10-3 applies but is not limited to all communications materials that will be on display or distributed on the competition site.
- c. Communications materials or other products that exist largely for the recognition of sponsors are limited to 10 square feet (0.93 square meters), in aggregate within the solar envelope. “Other products” include but are not limited to signs, exhibits, posters, plaques, photos, wall art, and furnishings.
- d. For multimedia or audio presentations shown on the competition site, no more than 20% of the total time, 1 minute, or whichever is less may be dedicated to recognition of team sponsors.
- e. Off-the-shelf components that feature a built-in manufacturer’s logo are acceptable and need not be accompanied by the Solar Decathlon text and logo.
- f. Team uniforms are exempt from Rule 10-3. See Rule 11-5 for specifics.

### **10-4. Logistics**

- a. Each team is responsible for the transport of its house, the house’s contents, and all necessary tools and equipment, and shall be responsible for any damage to or loss of such items.
- b. Each team is responsible for procuring all necessary equipment, tools, and supplies.
- c. Each team is responsible for transportation, accommodations, lodging, food, and beverages
  - (i). The organizers will make drinking water available on the competition site to all team members for the duration of the event.
- d. Each team is responsible for making its own reservations and arrangements and for covering all necessary costs.

### **10-5. Inspections**

Each project shall be inspected for compliance with the Solar Decathlon Rules and the Solar Decathlon Building Code.

- a. A team shall notify the appropriate inspector when it is ready for an inspection. When two or more teams request an inspection simultaneously, the order of inspections shall be determined in a drawing.
- b. Additional random inspections for compliance shall take place throughout contest week.
- c. The competition manager shall check each team’s inspection status, as indicated on the team’s official inspection card, to determine which houses are eligible to participate in the contests. All final inspections shall be passed by the conclusion of last-chance final inspections. Failure to pass inspections by the required deadline will be considered a rules violation. A team must have passed inspections by the conclusion of the inspector’s work day for a team to be eligible to participate in the following day’s contests, which officially start at midnight.

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<sup>4</sup> Solar Decathlon identity guidelines are available at: <http://www.solardecathlon.gov/commstandards>.

**Exception:** Jury visits will proceed as scheduled regardless of a team's inspection status. However, jurors will be made aware of the team's inspection status and may consider it in their evaluations.

- d. Because open, partially functioning houses are preferable to closed, fully functioning houses, the organizers will direct the inspectors to require that an unsafe condition be corrected so that public visits can occur—even if, as a consequence, the house is ineligible for participation in one or more contests.

## **10-6. Communications Materials**

All communications materials shall support the goal of Contest 4: Communications, which is to educate consumers about the project and topics relevant to the project.

# ***Rule 11. Contest Week***

## **11-1. House Occupancy**

Under normal circumstances, no more than six people may be located in the house at any one time.

- a. Toward the end of each day of contest week, the competition manager shall post a message on the Yahoo Group message board indicating the hours during which rule 11-1 is in effect the following day.
- b. Rule 11-1 is automatically suspended whenever the Comfort Zone Contest measurements are suspended. See Appendix A-3 for the Comfort Zone Contest schedule.
- c. Jurors, observers, official organizer-provided competition photographers, media, writers, and others with authority to enter a house as an organizer are not counted toward the number of house occupants.
- d. Up to 10 people may be located in the house during dinner parties. At least six of the people in the house during dinner parties shall be the two decathletes from each of the three guest teams. No more than two of the remaining people in the house may be VIP guests.

## **11-2. House Operators**

Only decathletes are permitted to operate the house and participate in the contests during contest week.

- a. All competition-related communications on the competition site shall be between the organizers and decathletes. Non-decathlete team members and team crew are not permitted to participate in or listen to competition-related communications.

## **11-3. Late Design Changes**

The final project assembled on the competition site shall be consistent with the design and specifications presented in the as-built drawings and project manual.

- a. If there are known inconsistencies between the final project and the as-built drawings and project manual, the team shall document these inconsistencies and submit the documentation to the competition manager as soon as possible after the inconsistency is known. The competition manager will then submit this documentation or a summary of the documented inconsistencies to the respective juries and inspectors at the appropriate time.
- b. The competition manager will compile a summary of all undocumented inconsistencies discovered during the inspections process and submit the summary to the respective juries at the appropriate time.

## **11-4. Public Exhibit**

- a. Teams are required to provide an accessible route to all areas of the house and site that are available to the public during exhibit hours.
- b. Teams are permitted to produce and distribute only one informational brochure or handout on the competition site.
- c. Teams shall develop signage that complements public exhibit tours by informing visitors about the team project and engaging visitors waiting in line.
- d. Teams are prohibited from selling items to the general public on the competition site.



- e. Only organizer-approved vendors may provide food and beverage to the general public on the competition site.

### **11-5. Team Uniforms**

- a. During contest week and special events specified by the organizers, all team members present on the competition site or the site of a special event shall wear uniforms representing their team.
- b. Team uniforms are exempt from Rules 10-2 and 10-3.
- c. Team sponsor logos are approved to be visible ONLY on the back of the team uniform (jacket, shirt, hat, or other wearable item).
- d. The only information or graphics that are approved to be visible from the front of the team uniform (jacket, shirt, hat, or other wearable item) shall be the institution and its logo, the team name and logo, the Solar Decathlon logo, and event sponsor logos.
- e. A built-in clothing manufacturer logo may be visible on the front or back of the team uniform, or both.

### **11-6. Impound**

Each house shall be impounded on specified nights as indicated in Appendix A under the direct supervision of the organizers or staff. Team members and team crew shall not occupy the competition site during impound hours. There is a 10-minute impound grace period.



## SECTION III: CONTEST CRITERIA

The Solar Decathlon competition consists of 10 separately scored contests. Each contest contains one or more subcontests. For example, Contest 8: Appliances consists of five separately scored subcontests. The team with the highest total points at the end of the competition wins. Table 2 shows the competition structure.

**Table 2: Competition structure**

Contest Number	Subcontest Number	Contest Name	Available Points	Subcontest Name	Available Points	Subcontest Type	Brief Description
1	n/a	Architecture <sup>5</sup>	100	n/a	n/a	Juried	Architecture Jury reviews and evaluates the drawings, construction specifications, audiovisual presentation, architecture narrative, and final constructed project
2	n/a	Market Appeal	100	n/a	n/a	Juried	Market Appeal Jury reviews and evaluates the drawings, construction specifications, audiovisual presentation, market appeal narrative, and final constructed project
3	n/a	Engineering	100	n/a	n/a	Juried	Engineering Jury reviews and evaluates the drawings, construction specs, energy analysis results and discussion, audiovisual presentation, engineering narrative and final constructed project
4	n/a	Communications	100	n/a	n/a	Juried	Communications Jury reviews and evaluates the team website, audiovisual presentation, communications narrative, onsite public exhibit, and public exhibit materials
5	n/a	Affordability	100	n/a	n/a	Juried	Cost estimator reviews the drawings, construction specifications, and final constructed project to estimate construction costs
6	6-1	Comfort Zone	100	Temperature	75	Measured   Monitored	Keep zone temperature in 71°F – 76°F (22°C – 24°C) range
	6-2			Humidity	25	Measured   Monitored	Keep zone relative humidity below 60%
7	n/a	Hot Water	100	n/a	n/a	Measured   Task	Deliver 15 gallons of water at average 110°F (43°C) temperature within 10 minutes; 16 water draws during contest week
8	8-1	Appliances	100	Refrigerator	10	Measured   Monitored	Keep refrigerator temperature in 34°F – 40°F (1°C - 4°C) range
	8-2			Freezer	10	Measured   Monitored	Keep freezer temperature in -20°F – 5°F (-29°C to -15°C) range
	8-3			Clothes Washer	20	Measured   Task	Successfully wash 8 loads of laundry (one load = six bath towels) during contest week
	8-4			Clothes Dryer	40	Measured   Task	Return 8 loads of laundry to their original weight (one load = six bath towels) during contest week
	8-5			Dishwasher	20	Measured   Task	Successfully wash five loads of dishes (one load = eight place settings) during contest week
9	9-1	Home Entertainment	100	Lighting	40	Measured   Task	All interior and exterior lights on at full levels at night
	9-2			Cooking	20	Measured   Task	Successfully perform six cooking tasks (one task = vaporize 5 lb of water in less than 2 hours) during contest week
	9-3			Dinner Party	10	Juried	Host two dinner parties for up 8 guests; teams score each other
	9-4			Home Electronics	25	Measured   Task	Operate a TV and computer during specified hours
	9-5			Movie Night	5	Juried	Invite neighbors to watch a movie on the home theater system; teams score each other
10	n/a	Energy Balance	100	n/a	100	Measured   Monitored	Produce at least as much electrical energy (kWh) as is consumed during contest week
<b>TOTALS</b>			<b>1,000</b>	<b>515 total juried points and 485 total measured points from 19 individually scored contest elements</b>			

<sup>5</sup> Lighting quality and lighting control evaluations are conducted by the Architecture, Market Appeal, and Engineering juries.

There are three ways to earn points:

- Task completion
- Monitored performance
- Jury evaluation.

Subcontests based on task completion or monitored performance are called measured subcontests; subcontests based on a jury evaluation are called juried subcontests.

Points for task completion are awarded as a function of “closeness to completion.” Points for measured performance are either awarded at the end of each scored period throughout contest week or at the conclusion of contest week when performance requirements are met or partially met.

The scoring of the juried subcontests is more flexible than the scoring of the measured subcontests described above. However, for the sake of fairness, consistency is important. To increase the consistency of the scoring in juried subcontests, the jurors shall use the evaluation method described in Appendix B-1.

## ***Contest 1. Architecture***

A jury of architects shall assign an overall score for the design’s architectural merit and implementation by reviewing the team’s drawings, construction specifications, audiovisual presentation, and architecture narrative (see Appendix D), and by performing an on-site evaluation of the competition prototype (see Appendix B).

The jury shall consider the following specific criteria in its evaluation:

### ***Design and implementation***

- Was the team effective in its use of architectural elements including, but not limited to: scale and proportion of room and facade features, indoor/outdoor connections, composition, and linking of various house elements?
- Did the team create a holistic design that will be comfortable for occupants and compatible with the surrounding environment?
- Are the lighted spaces rich and varied? Do they have adequate light for tasks? Do they have good color rendition? Do the luminaires properly distribute light? Is the admission of direct and diffuse sunlight effectively controlled?
- Will the overall architectural design offer a sense of inspiration and delight to Solar Decathlon visitors?
- Did the competition prototype demonstrate quality design, detailing, and architectural implementation?

### ***Documentation***

- Did the drawings, construction specifications, audiovisual presentation, and architecture narrative enable the jury to conduct a preliminary evaluation of the design prior to its arrival at the competition site?
- Did the drawings, construction specifications, and audiovisual presentation accurately reflect the constructed project as assembled on the competition site?

## ***Contest 2. Market Appeal***

A jury of professionals from the homebuilding industry shall assign an overall score for the house’s market appeal by reviewing the team’s drawings, construction specifications, audiovisual presentation, and market appeal narrative (see Appendix D), and by performing an on-site evaluation of the competition prototype (see Appendix B).

The jury shall consider the following specific criteria in its evaluation of the responsiveness of the design to the characteristics and requirements of a team-defined target client (see Table 3 for examples of target client characteristics and requirements, which shall be included in the project manual).

### ***Livability***

- Does the design offer the occupant(s) a safe, functional, convenient, comfortable, and enjoyable place to live?

- Is the operation of the house’s lighting, entertainment, and other controls intuitive?
- Are the unique needs and desires of the target client met by the design?

**Marketability**

- Does the house demonstrate curb appeal, interior appeal, and quality craftsmanship?
- Do the house’s sustainability features and strategies make a positive contribution to its marketability?
- Does the house offer a good value to potential homebuyers?

**Buildability**

- Are the drawings and construction specifications of sufficient quality and detail to enable a contractor to generate an accurate, detailed construction cost estimate?
- Are the drawings and construction specifications of sufficient quality and detail to enable a contractor to construct the building as the design team intended it to be built?
- Are all the house’s materials and equipment commercially available, such that the house can be immediately built in the private sector?

**Table 3: Examples of target client characteristics and requirements**

Characteristic or Requirement	Example #1	Example #2	Example #3
Location of permanent site	New Orleans, LA	Folsom, CA	Boston, MA
Housing type	Emergency relief	Single family	Investment property in an urban college setting
# of occupants	2	3	1
Client demographic	Middle-aged married couple	Mid-30s married couple with infant	Graduate student
Client annual income	\$35,000	\$100,000	\$75,000
# of bedrooms	1	2	1

Notes:

1. These examples show the *minimum* required level of detail for the target client characteristics and requirements.
2. The target client characteristics and requirements shall be included in the project manual and market appeal narrative (see Appendix D).
3. Other examples of housing types include, but are not limited to, the following: retirement cottage, vacation retreat, university housing, home office/studio, studio apartment, mobile home, barracks, penthouse, and loft.

**Contest 3. Engineering**

A jury of engineers shall assign an overall score for the design’s engineering merit and implementation by reviewing the team’s drawings, construction specifications, energy analysis results and discussion, audiovisual presentation, and engineering narrative (see Appendix D), and by performing an on-site evaluation of the competition prototype (see Appendix B).

The jury shall consider the following specific criteria in its evaluation:

**Functionality**

- Do the house systems function as intended?
- Does the HVAC system maintain indoor air quality via contaminant control, fresh air ventilation, or both?
- Does the HVAC system maintain uniform thermal comfort conditions via temperature control, humidity control, air movement, and a successful distribution system design?

**Efficiency**

- Relative to conventional systems, how much energy will the systems save over the course of an entire year?
- Do house controls facilitate a reduction in energy consumption during an entire year of operation?
- Is the design effective, efficient and practical in its engineering approach?

### ***Innovation***

- Were any unique approaches used to solve engineering design challenges?
- Do the proposed innovations have true market potential?

### ***Reliability***

- How long are the systems expected to operate at a high level of performance?
- How much maintenance is required to keep them operating at a high level?

### ***Documentation***

- Did the drawings, construction specifications, energy analysis results and discussion, and audiovisual engineering presentation enable the jury to conduct a preliminary evaluation of the design prior to its arrival at the competition site?
- Did the drawings, construction specifications, energy analysis results and discussion, and audiovisual engineering presentation accurately reflect the constructed project as assembled on the competition site?

## ***Contest 4. Communications***

A jury of communications professionals will evaluate and assign an overall score for the team's communications by reviewing the team's final website, public exhibit materials, communications narrative, audiovisual presentations (see Appendix D), and by evaluating the public exhibit presentations and communications summary presentation onsite (see Appendix B).

For each product evaluated, the jury will consider the following specific criteria:

### ***Final website***

- Was the website submitted by the deadline?
- Is the design appealing (graphics, photos, colors, and typography)?
- Is the information architecture easy to use, consistent, and comprehensible? Does it present a logical hierarchy of information?
- Are graphical elements easy to use, consistent, and well integrated with content and design?
- Does the website meet minimum coding requirements?
- Is the website usable by people of all abilities?
- Does the team communicate its messages appropriately to online audiences?
- Does the team employ original and creative methods to capture users' interests and engage online visitors?
- Does the website comply with Rules 10-2 and 10-3?
- Does the team employ a comprehensive and successful social media strategy?

### ***Public exhibit materials***

- Does the on-site signage comply with Rules 10-2 and 10-3?
- Does the team handout comply with Rules 10-2 and 10-3?
- Do the on-site communications materials follow the team's communications strategy?
- Are messages communicated successfully?
- Do materials use correct spelling and grammar?
- Does the handout demonstrate originality?
- Does the signage demonstrate originality?
- Are the materials educational?

### ***Public exhibit presentation***

- Did the team present a 10-minute comprehensive, personalized "tour" appropriate for times when visitors are sparse?

- Did the team present a 5-minute fast-yet-informative “tour” that accommodates large crowds and long lines successfully?
- Did the team present a 5-minute summary of all communications strategies, impacts, approaches, and goals for the project?
- Are both onsite presentations for the public informative? Interesting? Accessible by people of all abilities?
- Has the team planned original and creative methods to control lines and wait times and to engage visitors waiting in line during public hours? Are these methods effective?
- Are the team messages appropriate for the public?

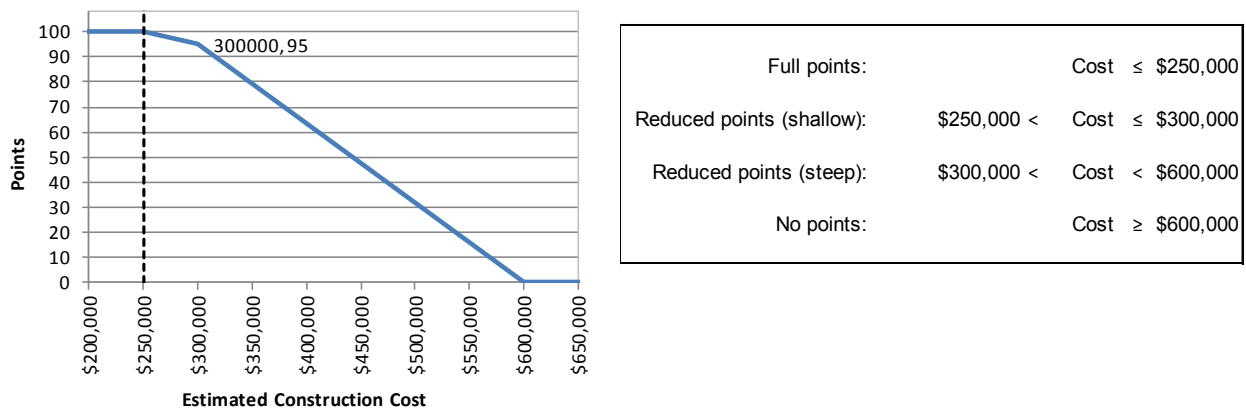
***Audiovisual presentation***

- Does the audiovisual presentation provide viewers with interesting and informative video of the team’s house?
- Does the audiovisual presentation include an audio narrative that explains to viewers what they’re seeing and describes the philosophy behind the design?
- Does the audio narrative correspond appropriately with the visual presentation?
- Is the audio quality good?
- Does the audiovisual presentation showcase the completed as-built house to be presented on the competition site?
- Did the team follow formatting requirements?
- Did the team provide a verbatim transcript to meet Section 508 Accessibility standards?

***Contest 5. Affordability***

A professional cost estimator shall assign an estimated construction cost to each project. All available points are earned for achieving an estimated construction cost of \$250,000 or less.

- Reduced points are earned for an estimated construction cost between \$250,000 and \$600,000. No points are earned for an estimated construction cost at or above \$600,000. Reduced points are scaled linearly, as shown in Figure 2.
- When information necessary for completing a thorough, accurate estimate is missing, the estimators will err on the high side to accommodate for uncertainty.
- Each team is required to declare the target construction cost of its design by a specified deadline. The team’s target construction cost shall be within  $\pm 20\%$  of the professional cost estimator’s final estimated construction cost.
- A file describing the methodology is posted in the “/Files/Rules/Affordability Contest” folder on the Yahoo Group.



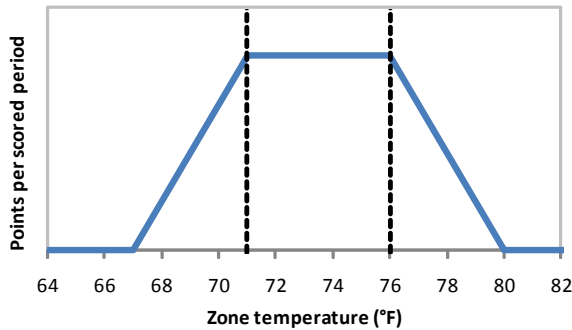
**Figure 2: Scoring function for the Affordability Contest**

## Contest 6. Comfort Zone

### 6-1. Temperature

All available points are earned at the conclusion of each scored period by keeping the time-averaged interior dry-bulb temperature between 71.0°F (21.7°C) and 76.0°F (24.4°C) during the scored period. See Appendix A-3 for the schedule of scored periods and for the number of available points per scored period.

- a. Reduced points are earned if the time-averaged interior dry-bulb temperature is between 67.0°F (19.4°C) and 71.0°F (21.7°C) or between 76.0°F (24.4°C) and 80.0°F (26.7°C). Reduced point values are scaled linearly, as shown in Figure 3.
- b. The zone temperature deviating farthest from the target temperature range is the zone temperature of record. The organizers will identify at least two thermal zones in each house and measure the temperature of each zone.



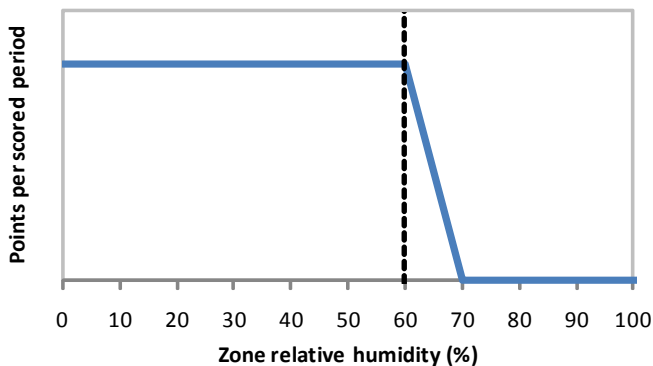
Full points:	$71\text{ °F (22 °C)} \leq \text{Temperature} \leq 76\text{ °F (24 °C)}$
Reduced points:	$67\text{ °F (19 °C)} < \text{Temperature} < 71\text{ °F (22 °C)}$
	or $76\text{ °F (24 °C)} < \text{Temperature} < 80\text{ °F (27 °C)}$
No points:	$\text{Temperature} \leq 67\text{ °F (19 °C)}$
	or $\text{Temperature} \geq 80\text{ °F (27 °C)}$

**Figure 3: Scoring function for the Temperature Subcontest**

### 6-2. Humidity

All available points are earned at the conclusion of each scored period by keeping the time-averaged interior relative humidity below 60.0% during the scored period. See Appendix A-3 for the schedule of scored periods and for the number of available points per scored period.

- a. Reduced points are earned if the time-averaged interior relative humidity is between 60.0% and 70.0%. Reduced point values are scaled linearly, as shown in Figure 4.
- b. In multi-zone houses, the zone humidity deviating farthest from the target humidity range is the zone humidity of record.



Full points:	Relative humidity $\leq 60\%$
Reduced points:	$60\% < \text{Relative humidity} < 70\%$
No points:	Relative humidity $\geq 70\%$

**Figure 4: Scoring function for the Humidity Subcontest**

## Contest 7. Hot Water

Hot water draws will occur at the approximate times specified in Appendix A-3. For each draw, at least 15 gal (56.8 L) of hot water shall be delivered in no more than 10 minutes to qualify for points. All available points are earned by delivering an average temperature of at least 110°F (43.3°C). An average temperature below 100°F



(37.8°C) earns no points. For temperatures between 100°F (37.8°C) and 110°F (43.3°C), points are scaled linearly, as shown in Figure 5.

- These hot water draws are designed to simulate most of the washing and bathing tasks that would take place in a typical day. *Note: The dishwashing task is not simulated by these hot water draws because it belongs to a different contest.*
- The schedule for hot water draws will most likely vary from one day to the next, just as it does in a typical home.
- The maximum number of hot water draws for one day will not exceed three, but they may occur consecutively.
- For fairness, all teams will be drawing hot water on nearly identical schedules.
- Hot water will be drawn from the shower. Teams shall replace their showerhead with an organizer-supplied fitting prior to the start of the contest. If a house has multiple showers, the shower expected to be used most frequently by the occupants will be used for the hot water draws.
- Teams shall provide a male ½” National Pipe Thread Tapered Thread (NPT) to accept the Organizer equipment.

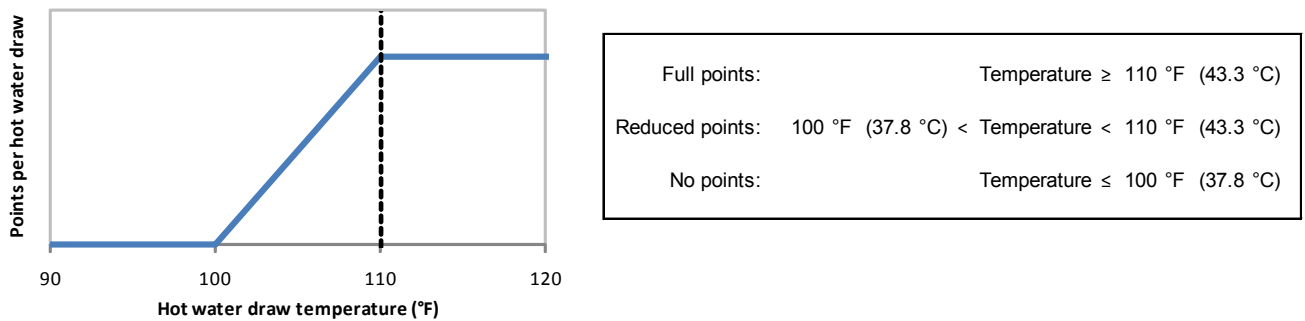


Figure 5: Scoring function for the Hot Water Contest

## Contest 8. Appliances

### 8-1. Refrigerator

All available points are earned at the conclusion of each scored period by keeping the time-averaged interior temperature of a refrigerator between 34.0°F (1.11°C) and 40.0°F (4.44°C) during the scored period. See Appendix A-3 for the schedule of scored periods and for the number of available points per scored period.

- Reduced points are earned if the time-averaged interior refrigerator temperature is between 32.0°F (0.00°C) and 34.0°F (1.11°C) or between 40.0°F (4.44°C) and 42.0°F (5.56°C). Reduced point values are scaled linearly, as shown in Figure 6.
- The refrigerator volume published in the manufacturer’s specifications shall be a minimum of 6.0 ft<sup>3</sup> (170 L).
- The refrigerator may be used to store food and beverages.

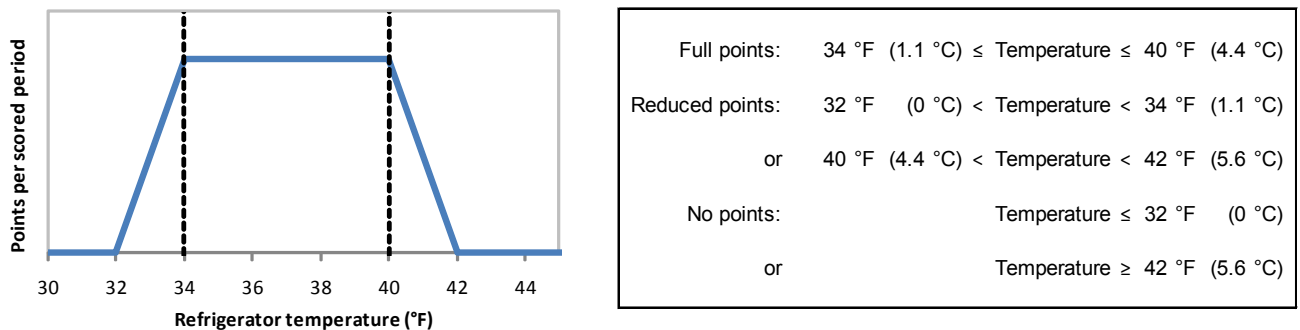


Figure 6: Scoring function for the Refrigerator Subcontest

## 8-2. Freezer

All available points are earned at the conclusion of each scored period by keeping the time-averaged interior temperature of a freezer between  $-20.0^{\circ}\text{F}$  ( $-28.9^{\circ}\text{C}$ ) and  $5.0^{\circ}\text{F}$  ( $-15.0^{\circ}\text{C}$ ) during the scored period. See Appendix A-3 for the schedule of scored periods and for the number of available points per scored period.

- Reduced points are earned if the time-averaged interior freezer temperature is between  $-30.0^{\circ}\text{F}$  ( $-34.4^{\circ}\text{C}$ ) and  $-20.0^{\circ}\text{F}$  ( $-28.9^{\circ}\text{C}$ ) or between  $5.0^{\circ}\text{F}$  ( $-15.0^{\circ}\text{C}$ ) and  $15.0^{\circ}\text{F}$  ( $-9.44^{\circ}\text{C}$ ). Reduced points are scaled linearly, as shown in Figure 7.
- The freezer volume published in the manufacturer's specifications shall be a minimum of  $2.0\text{ ft}^3$  (57 L).
- The automatic defrost function may be disabled.
- The freezer may be used to store food and only enough ice to fill the freezer's ice bin (or equivalent).

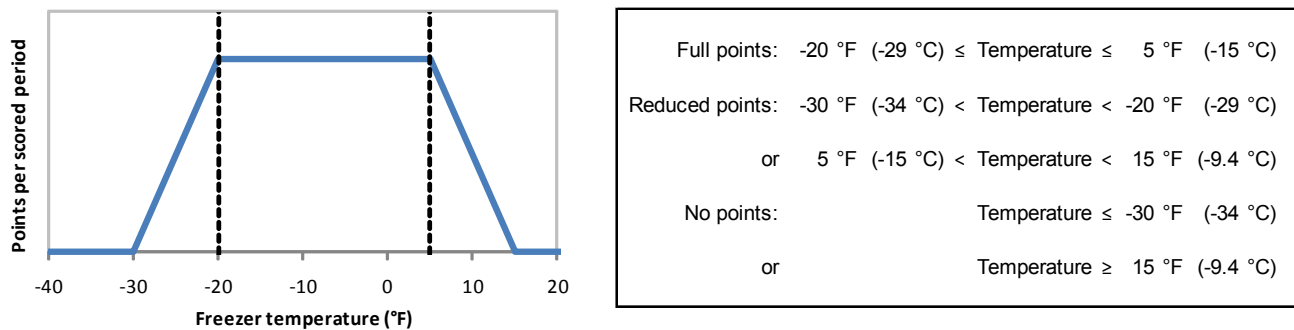


Figure 7: Scoring function for the Freezer Subcontest

## 8-3. Clothes Washer

All available points are earned for washing laundry by running a clothes washer through one or more complete, uninterrupted, “normal” (or equivalent) cycle(s) within a specified period of time. See Appendix A-3 for specific details regarding the number of points per clothes-washing task and the time periods designated for clothes-washing tasks.

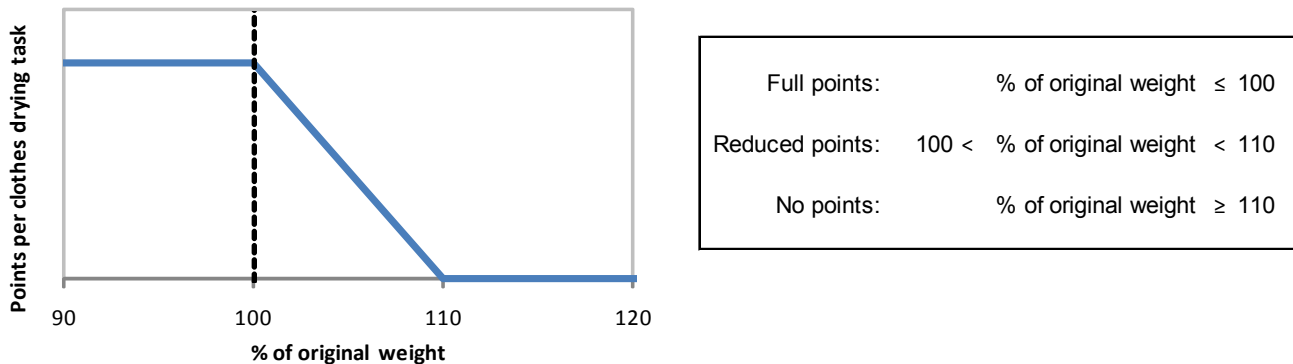
- A load of laundry is defined as six organizer-supplied bath towels.
- The clothes washer shall operate automatically and have at least one wash and rinse cycle.
- One or more complete, uninterrupted, “normal” (or equivalent) cycle(s) in an automatic clothes washer shall be used to wash the laundry.
- On several days during contest week, two loads of laundry are required to be washed. Teams have the option to combine double loads and wash them in one clothes washer cycle.
- The drying function in a combination washer/dryer shall be disabled until the observer can verify that the laundry is wet after the completion of the wash and rinse cycle.
- Cycle “interruption” includes the adjustment of supply temperature or flow in a manner not anticipated by the manufacturer or addressed in its operation manual.
- Cycle completion shall be confirmed by the observance of an audible or visible signal.
- The organizers will consult the operation manual to identify appropriate cycle settings. “Normal” or “regular” settings shall be selected, if available. Otherwise, settings most closely resembling typical “normal” or “regular” settings shall be selected.

## 8-4. Clothes Dryer

All available points are earned by returning a load of laundry (defined as six organizer-supplied bath towels) to a total weight less than or equal to the towels' total weight before washing. Clothes drying shall be completed within a specified period of time. See Appendix A-3 for specific details regarding the number of points per clothes drying task and the time periods designated for laundry tasks.

- Reduced points are earned if the “dry” towel weight is between 100.0% and 110.0% of the original towel weight. Reduced point values are scaled linearly, as shown in Figure 8.

- b. A load of laundry is eligible for clothes-drying points only if the load experienced a complete, uninterrupted cycle (see Contest 8-3h for required cycle settings) in an automatic clothes washer.
- c. The drying method may include active drying (e.g., machine drying), passive drying, (e.g., on a clothes line), or any combination of active and passive drying. All drying methods that require the towels to be visible (such as on a clothes line) must be demonstrated to the architecture and market appeal juries as they visit the houses.
- d. On several days during contest week, two loads of laundry are required to be dried. Teams have the option to combine double loads and dry them in one clothes-drying cycle, but each load will be scored separately.



**Figure 8: Scoring function for the Clothes Dryer Subcontest**

## 8-5. Dishwasher

All available points are earned by running a dishwasher through a complete, uninterrupted, “normal” (or equivalent) cycle within a specified period of time, during which a temperature sensor placed in the dishwasher must reach 120°F (48.9°C) at some point during the cycle. See Appendix A-3 for specific details regarding the number of points per dishwashing task and the time periods designated for dishwashing tasks.

- a. Half of the available points are earned if the temperature sensor reaches 115°F (46.1°C), but does not reach 120°F (48.9°C).
- b. For redundancy, two temperature sensors shall be placed in the dishwasher for each test. The higher of the two readings is the temperature of record, unless it is determined that the sensor with the higher reading is defective, in which case the lower of the two readings is the temperature of record.
- c. The dishwasher shall operate automatically, have at least one wash and rinse cycle, and have a minimum capacity of eight place settings according to the manufacturer’s specifications.
- d. If the dishwasher has a heated drying option, this option shall be disabled.
- e. Cycle “interruption” includes the adjustment of supply temperature or flow in a manner not anticipated by the manufacturer or addressed in its operation manual, including the disruption of an ordinary cycle due to user interaction.
- f. Cycle completion shall be confirmed by the observance of an audible or visible signal.
- g. The organizers will consult the operation manual to identify appropriate cycle settings. “Normal” or “regular” settings shall be selected, if available. Otherwise, settings most closely resembling typical “normal” or “regular” settings shall be selected.
- h. The dishwasher may be run empty, partially loaded, or fully loaded; the load may be soiled or clean.

## **Contest 9. Home Entertainment**

### 9-1. Lighting

All available points are earned for keeping all interior and exterior house lights on during specified periods of time. See Appendix A-3 for specific details regarding the number of points per lighting task and the time periods designated for lighting tasks.

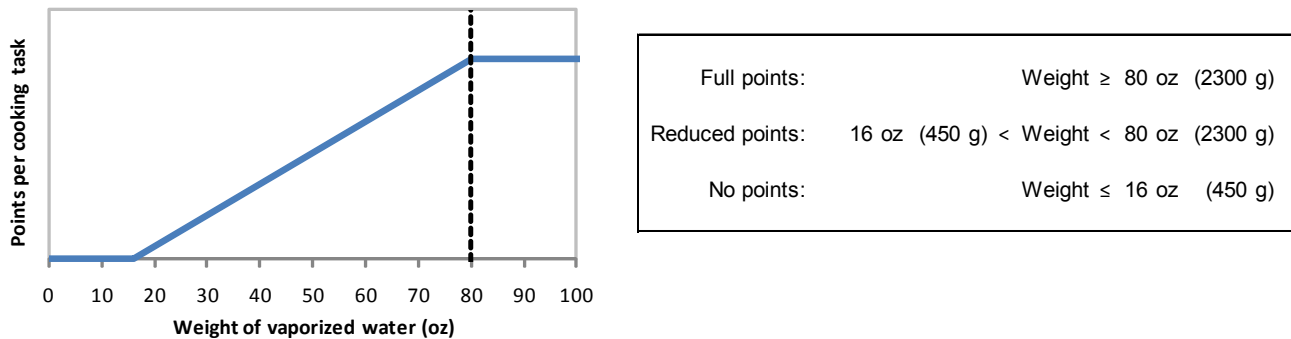
**Exception:** Lights located within manufactured residential appliances such as a refrigerator, clothes dryer, microwave, and oven that are intended to illuminate the interior of the appliance are not required to be illuminated. Lights that are not designed to be connected to the house electrical system are not required to be illuminated.

- a. All dimmers shall be adjusted to their highest positions and all other lighting control equipment shall be disabled or overridden so that the controlled lamps are fully and continuously on during the specified periods.
- b. Partial credit will be awarded for partial compliance.

## 9-2. Cooking

All available points are earned by using a kitchen appliance to vaporize 5.000 lb (80.00 oz or 2.268 kg) of water within a specified period of time. See Appendix A-3 for specific details regarding the number of points per cooking task and the time periods designated for cooking tasks.

- a. Reduced points are earned if between 1.000 lb (16.00 oz or 0.454 kg) and 5.000 lb (80.00 oz or 2.268 kg) are vaporized. Reduced point values are scaled linearly, as shown in Figure 9.
- b. Any kitchen appliance may be used, but it must operate in its normal configuration as it is vaporizing the water.
- c. The water shall be vaporized in a single container and the starting water weight shall be at least 96.00 oz (2.721 kg).



**Figure 9: Scoring function for the Cooking Subcontest**

## 9-3. Dinner Party

Each team shall host two dinner parties for its neighbors during contest week. See Appendix A-3 for the dinner party schedule and the number of available points per dinner party. Dinner parties will feature a pair of guest decathletes from each of three competing teams, and each pair of guest decathletes shall assign a score to the host team after each dinner party. The quality of the meal, ambiance, and overall experience shall be considered in the evaluation.

- a. To maintain consistency among the juried contests and subcontests, guest teams shall use the scoring methodology described in the “Phase 3: Deliberation” section of Appendix B-1. Each of the three pairs of guest decathletes shall submit three percentage integer scores, i.e., one score for quality of the meal, one score for ambiance, and one score for overall experience, to the contest officials by 11 p.m. These nine scores will be averaged and multiplied by the maximum available points in the scoring server to generate a final score for each dinner party. Percentage integer scores may range from 0% (lowest possible score) to 100% (highest possible score).
- b. The village will be organized into five small “neighborhoods.” Each neighborhood consists of four neighboring houses. The guest list for the dinner party shall be limited to eight people—two people from each of the three neighboring houses and up to two VIP guests. VIP guests may include organizers, media, government employees, family members, or other individuals approved by the organizers to attend the dinner parties.
- c. See Rule 11-1d for house occupancy rules during the dinner party.

- d. Each host team shall prepare dinner for exactly eight people—six decathlete guests and two host team members or VIP guests. Guest decathletes are encouraged to deduct points if too much or too little food is prepared. Teams are not permitted to serve the same meal at each dinner party.
- e. Host team decathletes in the house during the dinner party must be performing one or more of the following three functions: 1) eating the meal; 2) cooking/preparing the food; 3) operating the house during scheduled Contest 7, 8, or 9 activities.
- f. Non-decathletes are prohibited from preparing the meal or instructing decathletes in any way on the competition site.
- g. Teams shall prepare and cook all food and beverages in the house during the period of time indicated in Appendix A-3. A file describing eligible and ineligible ingredients is posted in the “/Files/Rules/Dinner Party” folder on the Yahoo Group.
- h. The meal shall be served and eaten in the finished square footage at the eating area designated in the drawings.
- i. Before and after the dinner portion of the party, the host team is permitted, but not required, to serve hors d’oeuvres and/or beverages, which may be served outside.
- j. Teams are required to submit detailed dinner party menus, recipes, and ingredient lists to the organizers.
  - (i). Guest decathletes are encouraged to deduct points for inconsistencies between the meal served for each dinner party and the dinner party information submitted prior to contest week.
- k. Teams hosting dinner parties shall comply with the following safety requirements:
  - (i). The use of flames, including candle flames, is prohibited during contest week (see Rule 8-2b).
  - (ii). No alcoholic beverages may be stored in the house, used in meal preparation, served, or part of a meal in any way.
  - (iii). All water used for cooking and drinking shall be drinking water purchased in sealed containers.
  - (iv). All dishes and cookware shall be washed with hot water and soap and rinsed prior to use.
  - (v). Normal domestic wastewater may go into the wastewater tank.
  - (vi). All beverages and food must be stored properly and according to the instructions on the packaging, e.g., beverages and foods marked “refrigerate after opening” must be refrigerated appropriately after opening.
  - (vii). To help prevent allergic reactions among dinner party guests, teams shall create a list of ingredients for each of the items being served at each meal. Common food allergies include milk/dairy products, eggs, peanuts, tree nuts (walnuts, cashews, pecans), fish, shellfish, soy, and wheat.
  - (viii). Outdoor cooking and grilling equipment may be incorporated into the competition prototype, but the use of such equipment is prohibited on the competition site.
  - (ix). The use of coolers to store food, beverages, or ice associated with the dinner party on site is not permitted. Coolers may be used for transporting food to the competition site only.

#### **9-4. Home Electronics**

All available points are earned for operating a television (TV) and computer during specified periods of time. See Appendix A-3 for specific details regarding the number of points per home electronics task and the time periods designated for home electronics tasks.

- a. The TV display shall be a minimum of 27 in. (68.6 cm) according to the manufacturer’s stated display size. The computer display shall be a minimum of 15 in. (38.1 cm) according to the manufacturer’s stated display size. The computer may be a laptop or desktop computer. The TV and computer displays shall be able to be operated simultaneously and controlled independently of each other.
- b. The organizers will supply content that must be shown on the TV display during the home electronics tasks. There is no required volume setting, but the brightness of the display shall be set to at least 75% of maximum. Observers will conduct spot checks to verify that the TV is showing the supplied content and that the brightness is at the required level.
- c. The organizers will supply content that must be shown on the computer display during the scored periods. A decathlete may temporarily suspend the supplied content to use the computer for other practical purposes, but

the display of supplied content shall be resumed whenever the computer is not being used for other practical purposes. The brightness of the display shall be set to at least 75% of maximum. Observers will conduct spot checks to verify that the computer is either showing the supplied content or is being used by a decathlete, and that the brightness is at the required level.

## 9-5. Movie Night

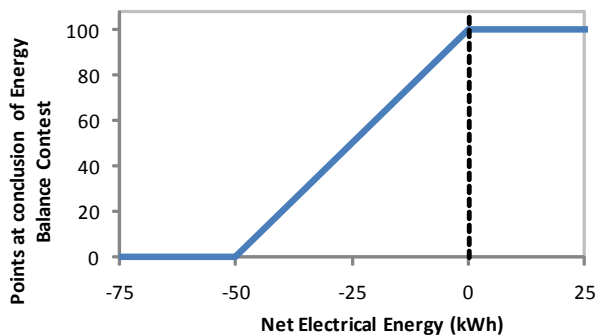
Each team shall host a movie night for its neighbors during contest week. See Appendix A-3 for the movie night schedule and the number of available points for movie night. Each guest team shall assign a score to each host team. The quality and design of the home theater system, ambiance, and overall experience shall be considered in the evaluation.

- To maintain consistency among the juried contests and subcontests, guest teams shall use the scoring methodology described in the “Phase 3: Deliberation” section of Appendix B-1. Each of the three guest teams shall submit three percentage integer scores, i.e., one score for the quality and design of the home theater system, one score for ambiance, and one score for overall experience, to the contest officials by 10:30 p.m. These nine scores will be averaged and multiplied by the maximum available points in the scoring server to generate a final score for movie night. Percentage integer scores may range from 0% (lowest possible score) to 100% (highest possible score).
- The village will be organized into five small “neighborhoods.” Each neighborhood consists of four neighboring houses. One or more decathletes from each neighboring house shall spend at least 15 minutes during the movie in each of their neighbors’ houses.
- The Comfort Zone Contest is suspended during movie night. Therefore, the occupancy rule, Rule 11-1, is not in effect on movie night.
- Prior to the event, team members signed up for the Yahoo Group will have the option to vote for one of three movies selected by the organizers. The movie receiving the most votes shall be provided by the organizers on the day of movie night and shall be the movie shown in all houses on movie night. The selected movie shall be available in several of the most popular video formats, so that each team may request the format most suitable for its home theater system.
- The audio/visual equipment settings to be used on movie night shall be declared to a designated organizer prior to movie night. Observers or a small team of organizers, or both, will verify that these settings are maintained on movie night. Guests are encouraged to evaluate the usability of the home theater system and its controls, but the host team is responsible for returning the equipment back to the declared settings after the guests have finished their evaluation(s).

## Contest 10. Energy Balance

All available points are earned at the conclusion of the specified energy balance period (see Appendix A-3 for the energy balance schedule) for a net electrical energy balance of at least 0 kWh. A positive net electrical energy balance indicates net production; a negative net electrical energy balance indicates net consumption.

- Reduced points are earned for a net electrical energy balance between -50 kWh and 0 kWh. Reduced points are scaled linearly, as shown in Figure 10.



Full points:	Net electrical energy $\geq$ 0 kWh
Reduced points:	-50 kWh < Net electrical energy < 0 kWh
No points:	Net electrical energy $\leq$ -50 kWh

Figure 10: Scoring function for the Energy Balance Contest

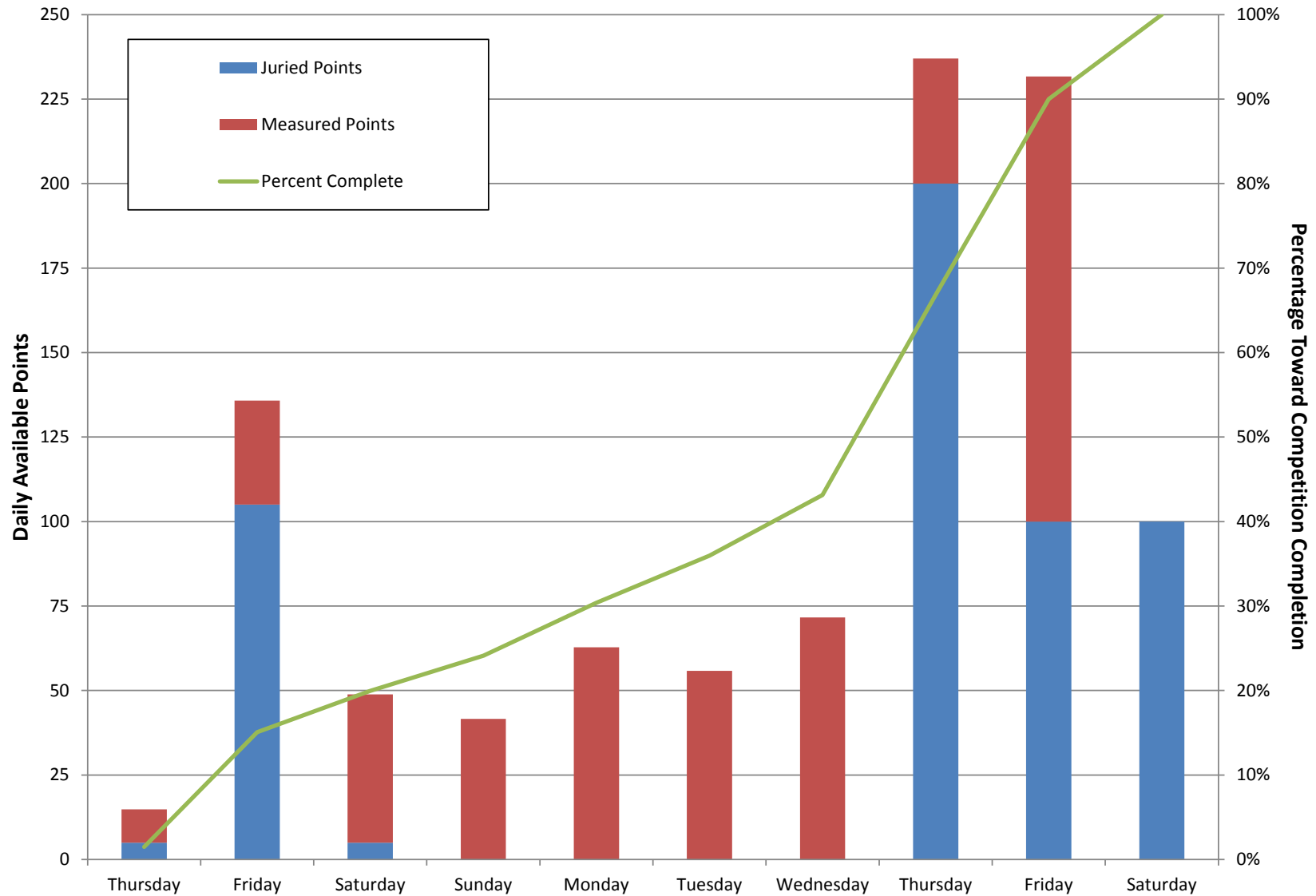
## Appendix A Event Schedules

### A-1. Overview Event Calendar

This calendar provides an overview of daily activities. Refer to the Detailed Event Schedule (Appendix A-3) for a complete list and schedule of daily activities.

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
DAY 0 - September 22, 2013	DAY 1 - September 23, 2013	DAY 2 - September 24, 2013	DAY 3 - September 25, 2013	DAY 4 - September 26, 2013	DAY 5 - September 27, 2013	DAY 6 - September 28, 2013
<b>REGISTRATION</b> (12 p.m. - 2 p.m.; 4 p.m. on)	<b>STAND-ALONE ASSEMBLY</b>  (Begins at 7 a.m.)	<b>IMPOUND</b> (2 a.m. - 7 a.m.)	<b>IMPOUND</b> (2 a.m. - 7 a.m.)	<b>IMPOUND</b> (2 a.m. - 7 a.m.)	<b>IMPOUND</b> (2 a.m. - 7 a.m.)	<b>IMPOUND</b> (2 a.m. - 7 a.m.)
<b>ALL-TEAM MEETING</b> (2 p.m. - 4 p.m.)		<b>STAND-ALONE ASSEMBLY</b>	<b>STAND-ALONE ASSEMBLY</b>	<b>STAND-ALONE ASSEMBLY</b>	<b>STAND-ALONE ASSEMBLY</b>	<b>STAND-ALONE or GRID-TIE ASSEMBLY</b> (Grid available at 12:00 p.m.)
<b>VEHICLE STAGING</b> (Begins at 7 p.m.)						<b>GRID-TIE ASSEMBLY</b> (Grid available at 12:00 p.m.)
DAY 7 - September 29, 2013	DAY 8 - September 30, 2013	DAY 9 - October 1, 2013	DAY 10 - October 2, 2013	DAY 11 - October 3, 2013	DAY 12 - October 4, 2013	DAY 13 - October 5, 2013
<b>IMPOUND</b> (2 a.m. - 7 a.m.)	<b>IMPOUND</b> (2 a.m. - 7 a.m.)	<b>IMPOUND</b> (2 a.m. - 7 a.m.)	<b>IMPOUND</b> (12 a.m. - 7 a.m. & 11 p.m. - 12 a.m.)	<b>IMPOUND</b> (12 a.m. - 7 a.m. & 11 p.m. - 12 a.m.)	<b>IMPOUND</b> (12 a.m. - 7 a.m. & 11 p.m. - 12 a.m.)	<b>IMPOUND</b> (12 a.m. - 7 a.m. & 11 p.m. - 12 a.m.)
<b>STAND-ALONE or GRID-TIE ASSEMBLY</b>	<b>STAND-ALONE or GRID-TIE ASSEMBLY</b> (Until 12 p.m.)	<b>GRID-TIE ASSEMBLY</b>	<b>REST DAY</b>	<b>CONTESTS</b> (11:00 a.m. - Midnight)	<b>CONTESTS</b> (24 hours)	<b>CONTESTS</b> (24 hours)
<b>WATER DELIVERY</b> (8 a.m. - 5 p.m.)	<b>GRID-TIE ASSEMBLY</b> (After 12 p.m.)	<b>STOP WORK FOR LAST-CHANCE FINAL INSPECTIONS*</b> (12 p.m.)	<b>HOUSE PHOTOGRAPHY</b> (8 a.m. - 6 p.m.)	<b>OPENING CEREMONY</b> (10 a.m. - 11 a.m.)	<b>AFFORDABILITY RESULTS</b> (10:30 a.m. - 11 a.m.)	
			<b>OPENING RECEPTION</b> (6 p.m. - 8:30 p.m.)	<b>PUBLIC EXHIBIT</b> (11 a.m. - 7 p.m.)	<b>PUBLIC EXHIBIT</b> (11 a.m. - 7 p.m.)	<b>PUBLIC EXHIBIT</b> (11 a.m. - 7 p.m.)
			<b>TEAM OPEN HOUSE</b> (8:30 p.m. - 11 p.m.)			
DAY 14 - October 6, 2013	DAY 15 - October 7, 2013	DAY 16 - October 8, 2013	DAY 17 - October 9, 2013	DAY 18 - October 10, 2013	DAY 19 - October 11, 2013	DAY 20 - October 12, 2013
<b>IMPOUND</b> (12 a.m. - 7 a.m. & 11 p.m. - 12 a.m.)	<b>IMPOUND</b> (12 a.m. - 7 a.m. & 11 p.m. - 12 a.m.)	<b>IMPOUND</b> (12 a.m. - 7 a.m. & 11 p.m. - 12 a.m.)	<b>IMPOUND</b> (12 a.m. - 7 a.m. & 11 p.m. - 12 a.m.)	<b>IMPOUND</b> (12 a.m. - 7 a.m. & 11 p.m. - 12 a.m.)	<b>IMPOUND</b> (12 a.m. - 7 a.m. & 11 p.m. - 12 a.m.)	<b>IMPOUND</b> (12 a.m. - 7 a.m. & 11 p.m. - 12 a.m.)
<b>CONTESTS</b> (24 hours)	<b>CONTESTS</b> (24 hours)	<b>CONTESTS</b> (24 hours)	<b>CONTESTS</b> (24 hours)	<b>CONTESTS</b> (24 hours)	<b>CONTESTS</b> (Midnight - 11a.m.)	<b>ENGINEERING RESULTS &amp; AWARDS CEREMONY</b> (10:00 a.m. - 11 a.m.)
<b>PUBLIC EXHIBIT</b> (11 a.m. - 7 p.m.)	<b>JURY WALKTHROUGHS</b> (7:30 a.m. - 12:30 p.m.) and ( 7:30 p.m. - 9:30 p.m.)	<b>JURY WALKTHROUGHS</b> (7:30 a.m. - 12:30 p.m.) and ( 7:30 p.m. - 9:30 p.m.)	<b>JURY WALKTHROUGHS</b> (7:30 a.m. - 10:00 a.m.) and (7:30 p.m. to 8:30 p.m.)	<b>COMMUNICATIONS &amp; MARKET APPEAL RESULTS</b> (10:30 a.m. - 11 a.m.)	<b>ARCHITECTURE RESULTS</b> (10:30 a.m. - 11 a.m.)	<b>PUBLIC EXHIBIT</b> (11 a.m. - 7 p.m.)
				<b>PUBLIC EXHIBIT</b> (11 a.m. - 7 p.m.)	<b>TEAM OPEN HOUSE</b> (7:30 p.m. - 11 p.m.)	<b>VICTORY CELEBRATION</b> (7:30 p.m. - 11 p.m.)
DAY 21 - October 13, 2013	DAY 22 - October 14, 2013	DAY 23 - October 15, 2013	DAY 24 - October 16, 2013	DAY 25 - October 17, 2013	DAY 26 - October 18, 2013	<b>Last Updated On:</b> <b>09-24-2012</b>  * Significant precipitation or the occurrence of an unforeseen circumstance that equally affects all teams' progress during the assembly phase may result in a postponement of the last-chance final inspections. The remainder of the schedule will remain unchanged.
<b>IMPOUND</b> (12 a.m. - 7 a.m.)	<b>IMPOUND</b> (2 a.m. - 7 a.m.)	<b>IMPOUND</b> (2 a.m. - 7 a.m.)	<b>IMPOUND</b> (2 a.m. - 7 a.m.)	<b>IMPOUND</b> (2 a.m. - 7 a.m.)	<b>IMPOUND</b> (2 a.m. - 7 a.m.)	
<b>PUBLIC EXHIBIT</b> (11 a.m. - 7 p.m.)	<b>DISASSEMBLY</b>	<b>DISASSEMBLY</b>	<b>DISASSEMBLY</b>	<b>DISASSEMBLY</b>	<b>DISASSEMBLY</b>	
<b>DISASSEMBLY</b> (Begins at 7 p.m.)					<b>FINAL DISASSEMBLY INSPECTIONS</b> (7 p.m.)	
					<b>ALL TEAMS OFF SITE</b> (9 p.m.)	

## A-2. Scoring Chronology









## Thurs (Day 11)

Rules Section	Contest Type	Total Pts Available	Total # of tasks or periods	Daily # of tasks or periods	Daily Points Available	Time Slot																																																
Energy Balance Contest begins						12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM	11:30 AM	12:00 PM	12:30 PM	1:00 PM	1:30 PM	2:00 PM	2:30 PM	3:00 PM	3:30 PM	4:00 PM	4:30 PM	5:00 PM	5:30 PM	6:00 PM	6:30 PM	7:00 PM	7:30 PM	8:00 PM	8:30 PM	9:00 PM	9:30 PM	10:00 PM	10:30 PM	11:00 PM	11:30 PM	12:00 AM
Refrigerator	C8-1	MEAS	10,000	766	52	[Public exhibit hours]																																																
Freezer	C8-2	MEAS	10,000	766	52	[Public exhibit hours]																																																
Temperature	C6-1	MEAS	75,000	576	18	[Public exhibit hours]																																																
Humidity	C6-2	MEAS	25,000	576	18	[Public exhibit hours]																																																
Lighting	C9-1	TASK	40,000	52	7	[Task Period]																																																
Dinner Parties	C9-3	SUBJ	10,000	2	1	[Event/Activity]																																																
<b>DAILY AVAILABLE POINTS</b>					<b>14,867</b>					[Public exhibit hours]																																												
<b>CUMULATIVE AVAILABLE POINTS</b>					<b>14,867</b>					[Public exhibit hours]																																												
House Photography						[Event/Activity]																																																
Opening Ceremony Dress Rehearsal						[Event/Activity]																																																
Opening ceremony line-up and all-team photo						[Event/Activity]																																																
Opening ceremony						[Event/Activity]																																																

## Fri (Day 12)

Rules Section	Contest Type	Total Pts Available	Total # of tasks or periods	Daily # of tasks or periods	Daily Points Available	Time Slot																																																
Energy Balance Contest begins						12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM	11:30 AM	12:00 PM	12:30 PM	1:00 PM	1:30 PM	2:00 PM	2:30 PM	3:00 PM	3:30 PM	4:00 PM	4:30 PM	5:00 PM	5:30 PM	6:00 PM	6:30 PM	7:00 PM	7:30 PM	8:00 PM	8:30 PM	9:00 PM	9:30 PM	10:00 PM	10:30 PM	11:00 PM	11:30 PM	12:00 AM
Temperature	C6-1	MEAS	75,000	576	48	[Public exhibit hours]																																																
Humidity	C6-2	MEAS	25,000	576	48	[Public exhibit hours]																																																
Refrigerator	C8-1	MEAS	10,000	766	96	[Public exhibit hours]																																																
Freezer	C8-2	MEAS	10,000	766	96	[Public exhibit hours]																																																
Clothes Washer	C8-3	TASK	20,000	8	1	[Task Period]																																																
Clothes Dryer	C8-4	TASK	40,000	8	1	[Task Period]																																																
Home Electronics	C9-4	TASK	25,000	34	3	[Task Period]																																																
Dishwasher	C8-5	TASK	20,000	5	1	[Task Period]																																																
Hot Water	C7	TASK	100,000	16	1	[Task Period]																																																
Affordability	C5	SUBJ	100,000	n/a	n/a	[Event/Activity]																																																
Movie Night	C9-5	SUBJ	5,000	1	1	[Event/Activity]																																																
<b>DAILY AVAILABLE POINTS</b>					<b>135,796</b>					[Public exhibit hours]																																												
<b>CUMULATIVE AVAILABLE POINTS</b>					<b>150,663</b>					[Public exhibit hours]																																												
Team/organizer meeting						[Event/Activity]																																																
Affordability contest awards						[Event/Activity]																																																

## Sat (Day 13)

Rules Section	Contest Type	Total Pts Available	Total # of tasks or periods	Daily # of tasks or periods	Daily Points Available	Time Slot																																																
Energy Balance Contest begins						12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM	11:30 AM	12:00 PM	12:30 PM	1:00 PM	1:30 PM	2:00 PM	2:30 PM	3:00 PM	3:30 PM	4:00 PM	4:30 PM	5:00 PM	5:30 PM	6:00 PM	6:30 PM	7:00 PM	7:30 PM	8:00 PM	8:30 PM	9:00 PM	9:30 PM	10:00 PM	10:30 PM	11:00 PM	11:30 PM	12:00 AM
Temperature	C6-1	MEAS	75,000	576	60	[Public exhibit hours]																																																
Humidity	C6-2	MEAS	25,000	576	60	[Public exhibit hours]																																																
Refrigerator	C8-1	MEAS	10,000	766	96	[Public exhibit hours]																																																
Freezer	C8-2	MEAS	10,000	766	96	[Public exhibit hours]																																																
Clothes Washer	C8-3	TASK	20,000	8	1	[Task Period]																																																
Clothes Dryer	C8-4	TASK	40,000	8	1	[Task Period]																																																
Home Electronics	C9-4	TASK	25,000	34	3	[Task Period]																																																
Cooking	C9-2	TASK	20,000	6	1	[Task Period]																																																
Hot Water	C7	TASK	100,000	16	2	[Task Period]																																																
Lighting	C9-1	TASK	40,000	52	7	[Task Period]																																																
Dinner Parties	C9-3	SUBJ	10,000	2	1	[Event/Activity]																																																
<b>DAILY AVAILABLE POINTS</b>					<b>48,847</b>					[Public exhibit hours]																																												
<b>CUMULATIVE AVAILABLE POINTS</b>					<b>199,510</b>					[Public exhibit hours]																																												
Team/organizer meeting						[Event/Activity]																																																

Impound period
  Task Period
  Event/Activity
  Public exhibit hours
  Juried contest results
  Tasks requiring observer
  Food preparation and cooking
  Jury w walkthroughs

## Sun (Day 14)

Rules Section	Contest Type	Total Pts Available	Total # of tasks or periods	Daily # of tasks or periods	Daily Points Available	12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM	11:30 AM	12:00 AM							
Temperature	C6-1	MEAS	75,000	576	60	7,813																															
Humidity	C6-2	MEAS	25,000	576	60	2,604																															
Refrigerator	C8-1	MEAS	10,000	766	96	1,253																															
Freezer	C8-2	MEAS	10,000	766	96	1,253																															
Clothes Washer	C8-3	TASK	20,000	8	1	2,500																															
Clothes Dryer	C8-4	TASK	40,000	8	1	5,000																															
Home Electronics	C9-4	TASK	25,000	34	3	2,206																															
Dishwasher	C8-5	TASK	20,000	5	1	4,000																															
Cooking	C9-2	TASK	20,000	6	1	3,333																															
Hot Water	C7	TASK	100,000	16	1	6,250																															
Lighting	C9-1	TASK	40,000	52	7	5,385																															
<b>DAILY AVAILABLE POINTS</b>					<b>41,597</b>																																
<b>CUMULATIVE AVAILABLE POINTS</b>					<b>241,107</b>																																
Team/organizer meeting																																					

## Mon (Day 15)

Rules Section	Contest Type	Total Pts Available	Total # of tasks or periods	Daily # of tasks or periods	Daily Points Available	12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM	11:30 AM	12:00 AM							
Temperature	C6-1	MEAS	75,000	576	96	12,500																															
Humidity	C6-2	MEAS	25,000	576	96	4,167																															
Refrigerator	C8-1	MEAS	10,000	766	96	1,253																															
Freezer	C8-2	MEAS	10,000	766	96	1,253																															
Jury Walkthroughs	C1,2,3,4	JURIED	-	-	-	-																															
Clothes Washer	C8-3	TASK	20,000	8	2	5,000																															
Clothes Dryer	C8-4	TASK	40,000	8	2	10,000																															
Home Electronics	C9-4	TASK	25,000	34	5	3,676																															
Hot Water	C7	TASK	100,000	16	3	18,750																															
Lighting	C9-1	TASK	40,000	52	8	6,154																															
<b>DAILY AVAILABLE POINTS</b>					<b>62,754</b>																																
<b>CUMULATIVE AVAILABLE POINTS</b>					<b>303,861</b>																																
Team/organizer meeting																																					

## Tues (Day 16)

Rules Section	Contest Type	Total Pts Available	Total # of tasks or periods	Daily # of tasks or periods	Daily Points Available	12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM	11:30 AM	12:00 AM							
Temperature	C6-1	MEAS	75,000	576	96	12,500																															
Humidity	C6-2	MEAS	25,000	576	96	4,167																															
Refrigerator	C8-1	MEAS	10,000	766	96	1,253																															
Freezer	C8-2	MEAS	10,000	766	96	1,253																															
Jury Walkthroughs	C1,2,3,4	JURIED	-	-	-	-																															
Home Electronics	C9-4	TASK	25,000	34	6	4,412																															
Dishwasher	C8-5	TASK	20,000	5	1	4,000																															
Hot Water	C7	TASK	100,000	16	3	18,750																															
Cooking	C9-2	TASK	20,000	6	1	3,333																															
Lighting	C9-1	TASK	40,000	52	8	6,154																															
<b>DAILY AVAILABLE POINTS</b>					<b>55,822</b>																																
<b>CUMULATIVE AVAILABLE POINTS</b>					<b>359,683</b>																																
Team/organizer meeting																																					

Impound period
  Task Period
  Event/Activity
  Public exhibit hours
  Juried contest results
  Tasks requiring observer
  Food preparation and cooking
  Jury w alkthroughs



## Sat (Day 20)

Rules Section	Contest Type	Total Pts Available	Total # of tasks or periods	Daily # of tasks or periods	Daily Points Available	12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM	11:30 AM	12:00 AM				
Engineering Contest Awards	C3	SUBJ	100,000	n/a	n/a	100,000																												
<b>DAILY AVAILABLE POINTS</b>						<b>100,000</b>																												
<b>CUMULATIVE AVAILABLE POINTS</b>						<b>1000,000</b>																												
[Sub]contest 6-1, 6-2, 8-1, 8-2, and 10 sensors and datalogger removal																																		
Engineering contest and overall competition awards ceremony																																		
Team/organizer meeting																																		
Victory celebration																																		

## Sunday (Day 21)

12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM	11:30 AM	12:00 AM
[Sub]contest 6-1, 6-2, 8-1, 8-2, and 10 sensors and datalogger removal																								
Team/organizer meeting																								
Stand-alone house disassembly																								

## Monday (Day 22)

12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM	11:30 AM	12:00 AM
Stand-alone house disassembly																								
[Sub]contest 6-1, 6-2, 8-1, 8-2, and 10 sensors and datalogger removal																								
Microgrid, network, and village infrastructure removal																								
Water removal																								
Team/organizer meeting																								

## Tuesday (Day 23) - Thursday (Day 25)

12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM	11:30 AM	12:00 AM
Stand-alone house disassembly																								
[Sub]contest 6-1, 6-2, 8-1, 8-2, and 10 sensors and datalogger removal																								
Microgrid, network, and village infrastructure removal																								
Team/organizer meeting																								

## Friday (Day 26)

12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM	11:30 AM	12:00 AM
Stand-alone house disassembly																								
Microgrid, network, and village infrastructure removal																								
Team/organizer meeting																								
Final disassembly inspections																								

Impound period    
  Task Period    
  Event/Activity    
  Public exhibit hours    
  Juried contest results    
  Tasks requiring observer    
  Food preparation and cooking    
  Jury walkthroughs

## Appendix B Juried Subcontest Guidelines

### B-1. Juror Guidelines

A jury's evaluation of each team's project consists of the following three phases:

1. Deliverables review
2. On-site walkthroughs
3. Deliberation

**Table 4: Juror time commitments for deliverables review and on-site walkthroughs**

Jury	Time Commitment for Deliverables Review (per team)	Relevant Deliverables for Review	Time Commitment for On-site Walkthrough (per team)
Architecture	30-45 minutes	<ol style="list-style-type: none"> <li>1. Drawings<sup>6</sup></li> <li>2. Construction specifications<sup>7</sup></li> <li>3. Audiovisual presentation<sup>8</sup></li> <li>4. Architecture narrative<sup>9</sup></li> </ol>	30 minutes
Market Appeal	1 to 2 hours	<ol style="list-style-type: none"> <li>1. Drawings<sup>6</sup></li> <li>2. Construction specifications<sup>7</sup></li> <li>3. Audiovisual presentation<sup>8</sup></li> <li>4. Market appeal narrative<sup>9</sup></li> </ol>	30 minutes
Engineering	1 to 2 hours	<ol style="list-style-type: none"> <li>1. Drawings<sup>6</sup></li> <li>2. Construction specifications<sup>7</sup></li> <li>3. Energy analysis results and discussion<sup>10</sup></li> <li>4. Audiovisual presentation<sup>8</sup></li> <li>5. Engineering narrative<sup>9</sup></li> </ol>	30 minutes
Communications	1 to 2 hours	<ol style="list-style-type: none"> <li>1. Website<sup>11</sup></li> <li>2. Audiovisual presentation<sup>8</sup></li> <li>3. Public exhibit presentation and materials<sup>12</sup></li> <li>4. Communications narrative<sup>9</sup></li> </ol>	30 minutes

#### ***Phase 1: Deliverables Review***

Each juror will review the deliverables outlined in Table 4 to explore the relevant details of each team's project. If questions arise during the deliverables review phase, jurors may address those questions to the appropriate contest official before or during the event.

#### ***Phase 2: On-site Walkthroughs***

The on-site walkthroughs take place on the competition site and offer the jurors an opportunity to make visual verifications of information presented in the deliverables and to ask the decathletes for clarification of questions that may have arisen during the deliverables review. The logistical details of the on-site walkthroughs will be provided to each juror by the contest official prior to the juror's arrival on the competition site.

<sup>6</sup> See Appendix D-4 for drawings requirements.

<sup>7</sup> The construction specifications are located in the project manual. See Appendix D-5 for project manual requirements.

<sup>8</sup> See Appendix D-7 for audiovisual presentation requirements.

<sup>9</sup> See Appendix D-6 for jury narrative requirements.

<sup>10</sup> The energy analysis results and discussion is located in the project manual. See Appendix D-5 for project manual requirements.

<sup>11</sup> See Appendix D-8 for website requirements.

<sup>12</sup> See Appendix B-3 for public exhibit presentation requirements and Appendix D-10 for public exhibit materials requirements.

### ***Phase 3: Deliberation***

#### ***STEP #1***

During the deliberation phase, which takes place after the completion of on-site walkthroughs, the jury is encouraged to place each team into one of four classes based on each team's performance relative to the contest criteria. The four classes are:

Class #1: ECLIPSES contest criteria 91% – 100% of available points

Class #2: EXCEEDS contest criteria 81% – 90% of available points

Class #3: EQUALS contest criteria 61% – 80% of available points

Class #4: APPROACHES contest criteria 0% – 60% of available points

Juries are not required to place a uniform number of teams in all classes or to place at least one team in every class. For example, if a jury determines that no teams are worthy of Class #1, there would be no teams with scores greater than 90%. Note that placing teams into classes (as a first step toward assigning an eventual percentage integer) is encouraged to ease the process of evaluating so many teams at one time.

If it is possible to further separate teams within a particular class, assigning different percentage integers within the allowed range of the particular class is encouraged. The assigned percentage integer may fall anywhere within the range associated with the class. If it is not possible to further separate teams within a particular class, it may be appropriate to assign each team in a particular class the same percentage integer.

#### ***STEP #2***

After assigning each team a percentage integer from 0% to 100%, the jury shall submit its percentage integers to the contest official. The contest official will then submit the percentages to the competition manager, who will convert them into a score based on the total number of available points for the contest being judged. The competition manager will round off any noninteger percentage scores to the nearest integer. Prior to posting scores in the scoring server, the scorekeeper will apply any applicable penalties that may have been incurred.

#### ***STEP #3***

The three highest-scoring teams (plus ties) will be given awards during a scheduled media announcement during contest week (see Appendix A for announcement schedule). Pending the jurors' availability, the organizers will invite the jurors to make the announcement. The scores for all of the teams will be posted immediately following the announcement.

#### ***STEP #4***

The jury shall submit written or recorded scoring justifications for each team to the contest official. The jury's scoring justifications will be provided as feedback to each team so it might better understand why the jury evaluated the team as it did. The justifications may be posted on the Solar Decathlon website.

## **B-2. Team Guidelines**

- a. It is ultimately the team's responsibility to be ready for the arrival of juries at the times indicated in the jury walkthrough schedule, which is available in the "/Files/Rules/Rules Reference Documents" folder on the Yahoo Group. A Solar Decathlon organizer or staff person called a "runner" will deliver a warning 30 to 60 minutes prior to the arrival of the jury.
- b. Teams shall show all possible configurations of the house during the walkthroughs of the Architecture, Market Appeal, and Engineering juries. House configurations that could affect the outcome of contests and that were not demonstrated to the juries are prohibited during contest week. Some examples of reconfigurable features include:
  - A significant moveable component, such as a room, wall, or bed (safety plan must also be in place)
  - Significant shading devices, such as retractable awnings or operable shutters
  - Towel-drying locations
  - Window coverings that may obstruct views or reduce light levels.



If a team does not have time to do a live reconfiguration during the jury walkthroughs, the team must use some other method, such as photographs or video, to show all reconfigurable features in their various configurations. If a team is not planning to actually reconfigure qualifying features at any time during contest week and has not shown or described the reconfiguration in the drawings, project manual, audiovisual presentation, or video walkthrough, that team does not have to show the reconfiguration to the juries.

All plug-in or portable appliances that may be used during contest week must be in their fully deployed locations and configurations during the Architecture, Engineering, or Market Appeal jury walkthroughs. Also be aware that the Architecture, Engineering or Market Appeal juries may request plug-in, portable, or hard-wired appliances to be turned on so they can evaluate noise levels or other characteristics of the appliances that may not be apparent when the appliances are off.

- c. Rule 11-1, “House Occupancy,” applies during jury walkthroughs. Non-decathlete team members and team crew shall not be present during the walkthroughs.
- d. The jury walkthroughs will be held to a very strict schedule for each of the houses. The importance of following this schedule is twofold: 1) To ensure each team receives equal visitation time by the juries to maintain a sense of fairness among all the teams; and 2) Any deviation from the schedule will have an immediate effect on other events planned during the days the juries will be evaluating houses. A small deviation in the defined schedule for the juries could result in a very difficult situation to resolve in another component of the competition. If a team is not ready for a jury to begin its evaluation at the scheduled time, then the total time the jury spends in that team’s house will be reduced.
- e. During daytime jury walkthroughs, the jury will have 30 minutes to visit each house, followed by a 5-minute period to travel to the next house. During the 30-minute walkthrough, 20 minutes will be allocated for the team to lead the jury through the house and answer any questions the jury may have. After 20 minutes, the team shall leave the house so that the jury can hold a private, 10-minute discussion about the house it has just visited.
- f. The Architecture Jury will visit each house a second time at night. During the nighttime walkthrough, the Architecture Jury will have 10 minutes to visit each house followed by a 5-minute period to travel to the next house. During the 10-minute walkthrough, 5 minutes will be allocated for the team to answer any questions the jury may have. Teams are permitted to adjust the house lighting during the Architecture Jury visit without consequence on the score for the Lighting Subcontest. After 5 minutes, the team shall leave the house so that the jury can hold a private, 5-minute discussion about the house it has just visited.
- g. Presentation boards or other visual media summarizing information in the “Relevant Deliverables” (see the third column in Table 4) are permitted to be on display during jury walkthroughs. The team website, public exhibit handout, and public exhibit materials may only be viewed by the Communications Jury.
- h. One or more of the eligible house occupants (see Rule 11-1 and item c above) may audiotape or videotape the jury walkthrough as it is happening, but taping of the private jury discussion period is prohibited.
- i. Areas of the house excluded from the accessible exhibit route may be accessed by the juries and considered in their evaluations.
- j. The organizers will provide all juries with summaries of important rule and code violations for each team so that juries are aware of violations before giving credit for aspects of the project that are not in compliance.
- k. The organizers may provide juries with contents of the organizers’ reviews of relevant deliverables.

### **B-3. Public Exhibit Requirements**

The team shall present two versions of its public tour. Both versions will be evaluated by the Communications Jury.

#### ***Version #1: 10-Minute Personalized Tour***

- The personalized tour is a comprehensive tour that addresses individual visitors’ needs and questions and is appropriate for times when wait lines are short or nonexistent.
- Each team will be allowed 10 minutes to present the personalized tour to the Communications Jury.
- The version of the personalized tour presented to the Communications Jury must represent the personalized tour presented to the public throughout the competition week.

### ***Version #2: 5-Minute Fast Tour***

- The 5-minute fast tour is a fast-yet-informative tour that allows visitors to move through the house on their own and accommodates large crowds and long lines.
- Each team will be allowed 5 minutes to present the fast-yet-informative tour to the Communications Jury.
- The version of the fast tour presented to the Communications Jury must represent the fast tour presented to the public throughout the competition week.

### ***Common Requirements***

- Both versions of the public tours shall be informative, interesting, and accessible by people of all abilities.
- In addition to the two tours described above, teams will be allowed 5 minutes to present the team communications strategy to the Communications Jury.
- Teams are encouraged to employ effective and creative methods to control wait times and engage visitors waiting in line during public hours.
- Power-consuming devices, such as LCD displays, house lighting, mobile electronics, etc., shall not be used during the fast tour presented to the Communication Jury. Any power-consuming devices used during the personalized tour must be plugged into the house at all times when not in use.
- For additional information, see Rule 11-4.

## Appendix C Measured Subcontest Guidelines

### C-1. Monitored Performance Subcontests

Table 5 lists sensors used<sup>13</sup> in the “monitored performance” subcontests for which points are automatically awarded based on measurements made by each home’s datalogger. Purchasing information is provided for teams intending to practice the contests before the competition using the same equipment that will be used by the organizers.

**Table 5: Sensors used in “measured performance” subcontests**

Subcontest(s)	Sensor Type	Vendor	Model Number	Approx. Price
6-1. Temperature 6-2. Humidity	Temperature/humidity probe	Campbell Scientific (probe)	<a href="#">HMP50</a> probe	\$425
8-1. Refrigerator	Thermocouple wire	Omega Engineering	<a href="#">TT-T-24S-TWSH-SLE-100</a>	\$141
8-2. Freezer	Thermocouple wire	Omega Engineering	<a href="#">TT-T-24S-TWSH-SLE-100</a>	\$141
Contest 10. Energy Balance	Utility revenue-grade meter	GE	<a href="#">kV2c Encompass</a> electronic meter family with KYZ output	\$150

Table 6 lists the central data acquisition equipment and associated accessories that collect sensor readings and transmit the data to the scoring server. Please refer to the documents<sup>14</sup> in the “/Files/Rules/Rules Reference Documents” folder on the Yahoo Group for detailed policies and procedures for accommodating competition instruments.

**Table 6: Central data acquisition equipment**

Equipment Description	Vendor	Model Number	Approx. Price
Datalogger enclosure	Hubbell-Wiegmann	<a href="#">ENC12/14-DC-NM</a>	\$235
Datalogger	Campbell Scientific	<a href="#">CR1000</a>	\$1,400
Power supply	Campbell Scientific	<a href="#">PS100</a>	\$225
Transformer	Campbell Scientific	9591	\$50
Ethernet interface	Campbell Scientific	<a href="#">NL120</a>	\$220
Sensor wire and miscellaneous parts	Various	Various	\$125

<sup>13</sup> The sensors and equipment listed here represent the expected solution, but may change as procedures are further developed.

<sup>14</sup> These documents are expected to be posted to the Yahoo Group in fall 2012.

## C-2. Task Completion Subcontests

The “task completion” subcontests listed in Table 7 are classified as such because teams earn points by successfully completing a task that is observed by, and the results of which are recorded by, an observer in the “observer logs”:

**Table 7: Instruments and sensors used in “task completion” subcontests**

Subcontest(s)	Instrument or Sensor Type	Vendor	Model Number	Approx. Price
Contest 7. Hot Water	Multiple Components <sup>15</sup>	Constructed	None	\$600
8-3. Clothes Washer	Visual/audible inspection	n/a	n/a	n/a
8-4. Clothes Dryer	Scale	Acculab	<a href="#">SVI-50C</a>	\$350
8-5. Dishwasher	Nonreversible temperature label	Omega	<a href="#">TL-5-105-10</a>	\$10 (pkg of 10)
9-1. Lighting	Visual inspection	n/a	n/a	n/a
9-2. Cooking	Kitchen scale	Salton	1008	\$50
9-4. Home Electronics	Visual inspection	n/a	n/a	n/a

Please refer to the “Measured Contest Procedures” slideshow<sup>16</sup> in the “/Files/Rules/Rules Reference Documents” folder on the Yahoo Group for detailed task completion subcontest policies and procedures as well as examples of observer logs.

<sup>15</sup> A detailed component list is expected to be posted to the Yahoo Group in spring 2013.

<sup>16</sup> This slideshow is expected to be posted in spring 2013.

## Appendix D Competition Deliverables

The design deliverables consist of the schematic design summary, building information model, drawings, project manual, and audiovisual presentations. These design deliverables serve the following important functions:

- In its **schematic design summary**, the team shall disclose to the organizers all non-standard design features, communications strategies, site operations plans, and health and safety considerations that require further review prior to the continuation of the project into the design development phase.
- All the drawings shall be generated in an Autodesk Revit **building information model** compatible format.
- The **drawings and project manual** shall demonstrate compliance with the Solar Decathlon Building Code and the Solar Decathlon Rules so that the inspectors will be able to grant final on-site approval by verifying that the constructed project on the competition site was accurately represented by the approved drawings and project manual.
- The **drawings and project manual** shall clearly describe a team's proposed assembly and disassembly procedures. The site operations manager will review the teams' procedures to identify and address potential conflicts among the teams. Each team is encouraged to consult with the site operations manager as the relevant sections of the drawings and project manual are being developed.
- The **drawings and project manual** shall provide a residential contractor with all the information needed to generate an accurate, detailed cost estimate and to efficiently construct the building as the design team intended it to be built. The drawings and project manual must be comprehensive because the design team shall assume that the contractor has had no prior communication with the design team, has no prior knowledge of the design, and has little or no experience building high-performance residences.
- Because the juries have a very limited opportunity to evaluate the constructed projects on the competition site, the **drawings, project manual, audiovisual presentation, and jury narratives** provide the only means for a team to provide a detailed presentation of its project to the juries. In the weeks leading up to contest week, each juror shall evaluate the audiovisual presentation and sections of the teams' drawings and project manual relevant to the juror's respective area of expertise. The primary purpose of the juries' walkthroughs on the competition site is twofold: 1) to verify that the project, as assembled on the competition site, was accurately represented in the drawings, project manual, audiovisual presentations and narratives; and 2) to ask the decathletes any clarifying questions that arose during the evaluation of the design via the drawings, project manual, and audiovisual presentations.

Additional competition deliverables provided the information required to allow the organizers, juries, and public to develop a comprehensive understanding of each team's competition prototype.

### D-1. Schematic Design Summary

The schematic design proposal will be reviewed by the organizers and discussed in detail during the schematic design review. It will not be reviewed by any juries and will not be made publicly available until after the completion of the competition.

### ***Format Requirements***

<input type="checkbox"/> Packaged into a single, bookmarked PDF file (see Appendix F for PDF formatting and file-naming requirements)
<input type="checkbox"/> Intent of figures shouldn't be lost if printed in black & white
<input type="checkbox"/> ANSI "A" (8.5 in. X 11 in.) sheet size and ANSI "D" (22 in. X 34 in.) sheet size
<input type="checkbox"/> 20 to 30 pages, including figures and tables; cover sheet, table of contents, and appendices do not count toward page limit
<input type="checkbox"/> 11-point body text
<input type="checkbox"/> Maximum 14-point heading text
<input type="checkbox"/> One-inch margins on top, bottom, left, and right
<input type="checkbox"/> Include page numbers and numbered captions for figures and tables for easy navigation through document

### ***Content Requirements***

<input type="checkbox"/> Team mission statement (1 paragraph)
<input type="checkbox"/> Detailed strategy for winning the competition including a realistic contest-by-contest breakdown of points the team expects to earn (2 to 3 pages)
<input type="checkbox"/> Narrative describing the architectural and engineering design approaches (1 to 2 pages)
<input type="checkbox"/> Design drawings and written description of the following systems and components, with a focus on unique systems and components that may not be addressed by model building codes (12 to 17 pages): <ul style="list-style-type: none"><li>• Temporary foundations and anchors</li><li>• Exterior building structures, such as including decks, outbuildings, overhead structures, etc.</li><li>• Ramps, railings, and guards</li><li>• Glazing types and location</li><li>• Interior finishes</li><li>• Fire protection</li><li>• DC electrical</li><li>• AC electrical</li><li>• Water storage/service</li><li>• Plumbing</li><li>• Mechanical (includes HVAC)</li><li>• Solar mechanical</li></ul>
<input type="checkbox"/> Description of and proposed location(s) for utility meter and organizer dataloggers (1 to 2 pages)
<input type="checkbox"/> Description of public exhibit, communications, and outreach strategy (1 to 2 pages)
<input type="checkbox"/> Drawings showing proposed interior and exterior accessible tour routes (2 to 3 pages)
<input type="checkbox"/> Computer-generated renderings of competition prototype (5-6 pages, images to be minimum 3000 px by 2400 px)
<input type="checkbox"/> Health and Safety Plan outline including approach to meeting OSHA training requirement (1 to 2 pages)
<input type="checkbox"/> Identification of and summary of qualifications for the licensed design professional who will be stamping the structural drawings and calculations (1 page)

## D-2. Computer-Animated Walkthrough and Computer-Generated Renderings

### Computer-Animated Walkthrough

Each team shall provide a computer-animated walkthrough of its house for the following purposes:

1. To be included in a compilation video of all Solar Decathlon 2013 walkthroughs that will be presented to the public and used in marketing materials associated with the project.
2. To be posted on the Solar Decathlon website as an introduction to each house.

#### Format Requirements

<input type="checkbox"/> Packaged into a single Quicktime .mov or H.264 compressed MP4 (MPEG-4) file type using 720 x 480 resolution and 16:9 aspect ratio
<input type="checkbox"/> Runtime between 3 and 3.5 minutes
<input type="checkbox"/> Shall be accompanied by a verbatim transcript in a Microsoft Word-compatible format to meet Section 508 Accessibility standards.

#### Content Requirements

<input type="checkbox"/> Composed of animated computer renderings that demonstrate all aspects of the house
<input type="checkbox"/> Includes an audio narrative that explains to viewers what they're seeing and describes the philosophy behind the design
<input type="checkbox"/> Does not include elements that are inherently inaccessible to those with visual disabilities
<input type="checkbox"/> Does not contain background music that violates U.S. copyright laws. All incorporated music must be an original or royalty-free composition. Proof of licensing shall be submitted with the final file and transcript.

### Computer-Generated Renderings

The computer-generated renderings will be posted to the Solar Decathlon website and used in various communications materials to introduce the public to each competition prototype.

#### Format Requirements

<input type="checkbox"/> Minimum resolution of each image shall be 3000 px wide by 2400 px
<input type="checkbox"/> Composed of image files (JPEG, TIFF, etc.) packaged as one Zip (.zip) file

#### Content Requirements

<input type="checkbox"/> Includes, at a minimum: <ul style="list-style-type: none"><li>• Two (2) elevation views of the competition prototype</li><li>• One (1) Birds-eye perspective views of the competition prototype</li><li>• Two (2) Interior views of the competition prototype</li></ul>
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## D-3. Building Information Model

The BIM is a contractual deliverable that is due at the conclusion of the design development phase, at the conclusion of the construction documentation phase, and again just prior to the competition. Each iteration of the BIM shall include an increasing level of detail and refinement as the project progresses. It will be used by the organizers for several purposes outlined in the Appendix D introduction above. The BIM will not be reviewed by any juries and may be made publicly available following each submission.

#### Format Requirements

<input type="checkbox"/> One (1) Autodesk Revit (.rvt)-compatible file or one (1) Autodesk Revit Architecture (.rvt)-compatible file with relative references to additional Revit (.rvt)-compatible files as required. If multiple Autodesk Revit-compatible files are submitted, they should be packaged as one Zip (.zip) file.
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- |  |
|--|
| <input type="checkbox"/> Extensive use of the Revit template (.rvt) file <sup>17</sup> available for download in the “/Files/Rules/Resources” folder on the Yahoo Group; limited minor modifications to the template are allowed, but must be approved by competition management |
|--|

**Content Requirements**

- |  |
|--|
| <input type="checkbox"/> House model   |
| <input type="checkbox"/> Site model including all exterior site components   |
| <input type="checkbox"/> Drawing set sheet views matching submitted drawings<br>Notes:<br>1) Shop drawings submitted by subcontractors need not be recreated from scratch in the BIM unless they contain information that is required to make the BIM complete<br>2) Even if shop drawings aren’t recreated in the BIM, they shall be imported into the BIM file and included in sheet views for inclusion in the drawing set. |
| <input type="checkbox"/> Sufficient detail to enable the organizers to develop detailed cost estimates and a product directory using only the information included in the BIM; the sample BIM <sup>18</sup> posted for download in the “/Files/Rules/Resources” folder on the Yahoo Group includes the minimum required level of detail  |

**D-4. Drawings**

The drawings shall be generated from sheet views in the BIM file. Each iteration of the drawings shall include an increasing level of detail and refinement as the project progresses. The drawings may be made publicly available after each submission.

**Format Requirements**

- |  |
|--|
| <input type="checkbox"/> Packaged into a single, bookmarked PDF file (see Appendix F for PDF formatting and file-naming requirements) using NCSv4-compliant order and formatting.  |
| <input type="checkbox"/> Compliant with <a href="#">United States National CAD Standard® – Version 5.0</a><br>EXCEPTION: The use of keynotes is not required.  |
| <input type="checkbox"/> ANSI “D” (22 in. X 34 in.) sheet size   |
| <input type="checkbox"/> Graphic scales included to allow users to reduce or enlarge printed sheets  |
| <input type="checkbox"/> Very similar formatting as the sample drawings <sup>19</sup> generated from the sample BIM; limited minor modifications to the sample drawings format are allowed, but must be approved by competition management |

**Content Requirements**

- |   |
|---|
| <input type="checkbox"/> Sufficient detail to enable the organizers to develop detailed cost estimates and a product directory using only the information included in the drawings and project manual; sample drawings posted <sup>19</sup> for download in the “/Files/Rules/Resources” folder on the Yahoo Group include the minimum required level of detail |
|---|

**D-5. Project Manual**

The project manual is a contractual and competition deliverable that is due at the conclusion of the design development phase, at the conclusion of the construction documentation phase, and again just prior to the competition. Each iteration of the project manual shall include an increasing level of detail and refinement as the project progresses. The project manual may be made publicly available following each submission.

<sup>17</sup> The Revit template was posted in summer 2012

<sup>18</sup> A first version of the sample BIM was posted for download in summer 2012.

<sup>19</sup> A first version of the sample drawings was posted for download in summer 2012.



### Format Requirements

<input type="checkbox"/>	ANSI “A” (8.5 in. X 11 in.) sheet size
<input type="checkbox"/>	Organization and formatting of construction specifications in compliance with the Construction Specifications Institute’s <a href="#">MasterFormat 2004 Edition</a> , <a href="#">SectionFormat</a> , and <a href="#">PageFormat</a> standards
<input type="checkbox"/>	Packaged into a single, bookmarked PDF file (see Appendix F for PDF formatting and file-naming requirements)
<input type="checkbox"/>	Extensive use of the Word template (.dotx) file <sup>20</sup> available for download in the “/Files/Rules/Resources” folder on the Yahoo Group; limited minor modifications to the template are allowed, but must be approved by competition management

### Content Requirements

<input type="checkbox"/>	Complete set of construction specifications (including links to manufacturers’ data sheets)
<input type="checkbox"/>	Rules compliance checklist <sup>21</sup> (see content requirements below)
<input type="checkbox"/>	Structural calculations
<input type="checkbox"/>	Detailed water budget
<input type="checkbox"/>	Summary of unlisted electrical components
<input type="checkbox"/>	Summary of reconfigurable features (see Appendix B-2b)
<input type="checkbox"/>	Interconnection application form
<input type="checkbox"/>	Complete quantity take-offs of entire competition prototype

### Content Requirements for Rules Compliance Checklist

Rule #	Rule Description	Content Requirement(s)
<input type="checkbox"/>	4-2 Construction Equipment	Drawing(s) showing the assembly and disassembly sequences and the movement of heavy machinery on the competition site
<input type="checkbox"/>	4-2 Construction Equipment	Specifications for heavy machinery
<input type="checkbox"/>	4-3 Ground Penetration	Drawing(s) showing the locations and depths of all ground penetrations on the competition site
<input type="checkbox"/>	4-4 Impact within the Solar Envelope	Drawing(s) showing the location, contact area, and bearing pressure of every component resting directly within the solar envelope
<input type="checkbox"/>	4-5 Generators	Specifications for generators (including sound rating)
<input type="checkbox"/>	4-6 Spill Containment	Drawing(s) showing the locations of all equipment, containers, and pipes that will contain liquids at any point during the event
<input type="checkbox"/>	4-6 Spill Containment	Specifications for all equipment, containers, and pipes that will contain liquids at any point during the event
<input type="checkbox"/>	4-7 Lot Conditions	Calculations showing that the structural design remains compliant even if 12 in. (30.48 cm) of vertical elevation change exists
<input type="checkbox"/>	4-7 Lot Conditions	Drawing(s) showing shimming methods and materials to be used if 12 in. (30.48 cm) of vertical elevation change exists on the lot
<input type="checkbox"/>	5-2 Solar Envelope Dimensions	Drawing(s) showing the location of all house and site components relative to the solar envelope
<input type="checkbox"/>	5-2 Solar Envelope Dimensions	List of solar envelope exemption requests accompanied by justifications and drawing references
<input type="checkbox"/>	6-1 Structural Design Approval	List of, or marking on, all drawing and project manual sheets that have been or will be stamped by the qualified, licensed design professional in the stamped structural submission; the stamped submission shall consist entirely of sheets that also appear in the drawings and project manual

<sup>20</sup> A first version of the project manual template was posted for download in summer 2012.

<sup>21</sup> A template version of the rules compliance checklist was included in the project manual template.

<b>Rule #</b>	<b>Rule Description</b>	<b>Content Requirement(s)</b>
<input type="checkbox"/> 6-2	Finished Square Footage	Drawing(s) showing all information needed by the rules officials to measure the finished square footage electronically
<input type="checkbox"/> 6-2	Finished Square Footage	Drawing(s) showing all movable components that may increase the finished square footage if operated during contest week
<input type="checkbox"/> 6-3	Entrance and Exit Routes	Drawing(s) showing the accessible public tour route
<input type="checkbox"/> 7-1	Placement	Drawing(s) showing the location of all vegetation and, if applicable, the movement of vegetation designed as part of an integrated mobile system
<input type="checkbox"/> 7-2	Watering Restrictions	Drawing(s) showing the layout and operation of greywater irrigation systems
<input type="checkbox"/> 8-1	PV Technology Limitations	Specifications for photovoltaic components
<input type="checkbox"/> 8-3	Batteries	Drawing(s) showing the location(s) and quantity of all primary and secondary batteries and stand-alone, PV-powered devices
<input type="checkbox"/> 8-3	Batteries	Specifications for all primary and secondary batteries and stand-alone, PV-powered devices
<input type="checkbox"/> 8-4	Desiccant Systems	Drawing(s) describing the operation of the desiccant system
<input type="checkbox"/> 8-4	Desiccant Systems	Specifications for desiccant system components
<input type="checkbox"/> 8-5	Village Grid	Completed interconnection application form
<input type="checkbox"/> 8-5	Village Grid	Drawing(s) showing the locations of the photovoltaics, inverter(s), terminal box, meter housing, service equipment, and grounding means
<input type="checkbox"/> 8-5	Village Grid	Specifications for the photovoltaics, inverter(s), terminal box, meter housing, service equipment, and grounding means
<input type="checkbox"/> 8-5	Village Grid	One-line electrical diagram
<input type="checkbox"/> 8-5	Village Grid	Calculation of service/feeder net computed load per NEC 220
<input type="checkbox"/> 8-5	Village Grid	Site plan showing the house, decks, ramps, tour paths, and terminal box
<input type="checkbox"/> 8-5	Village Grid	Elevation(s) showing the meter housing, main utility disconnect, and other service equipment
<input type="checkbox"/> 9-1	Container Locations	Drawing(s) showing the location of all liquid containers relative to the finished square footage
<input type="checkbox"/> 9-1	Container Locations	Drawing(s) demonstrating that the primary supply water tank(s) is fully shaded from direct solar radiation between 9 a.m. and 5 p.m. PDT or between 8 a.m. and 4 p.m. solar time on October 1
<input type="checkbox"/> 9-2	Team-Provided Liquids	Quantity, characteristics, and delivery date(s) of all team-provided liquids for irrigation, thermal mass, hydronic system pressure testing, and thermodynamic system operation
<input type="checkbox"/> 9-3	Greywater Reuse	Drawing(s) showing the layout and operation of greywater reuse systems
<input type="checkbox"/> 9-4	Rainwater Collection	Drawing(s) showing the layout and operation of rainwater collection systems
<input type="checkbox"/> 9-6	Thermal Mass	Drawing(s) showing the locations of liquid-based thermal mass systems
<input type="checkbox"/> 9-6	Thermal Mass	Specifications for components of liquid-based thermal mass systems
<input type="checkbox"/> 9-7	Greywater Heat Recovery	Drawing(s) showing the layout and operation of greywater heat recovery systems
<input type="checkbox"/> 9-8	Water Delivery	Drawing(s) showing the complete sequence of water delivery and distribution events
<input type="checkbox"/> 9-8	Water Delivery	Specifications for the containers to which water will be delivered
<input type="checkbox"/> 9-9	Water Removal	Drawing(s) showing the complete sequence of water consolidation and removal events
<input type="checkbox"/> 9-9	Water Removal	Specifications for the containers from which water will be removed
<input type="checkbox"/> 11-4	Public Exhibit	Interior and exterior plans showing entire accessible tour route

## D-6. Jury Narratives

The jury narratives are written documents that provide a summary of each team’s approach to meeting the contest requirements for the Architecture, Market Appeal, Engineering, and Communications contests. The narratives will be reviewed by the respective jury prior to the competition in accordance with Table 4. The narratives will not be made public prior to the release of the respective contest results.

### Format Requirements

<input type="checkbox"/> ANSI “A” (8.5 in. X 11 in.) sheet size
<input type="checkbox"/> Packaged into a single, bookmarked PDF file (see Appendix F for PDF formatting and file-naming requirements)

### Content Requirements

<input type="checkbox"/> Architecture Narrative (5 pages, maximum)
<input type="checkbox"/> Market Appeal Narrative (5 pages, maximum)
<input type="checkbox"/> Engineering Narrative (5 pages, maximum)
<input type="checkbox"/> Communications Narrative (2 pages, maximum) The narrative should present the team’s communications goals, objectives, 2-3 high-level strategies/tactics for meeting these goals and objectives, target audiences, key messages, and metrics for success (e.g., how will the team know if its communications succeeded?).

## D-7. Audiovisual Presentation

The audiovisual presentation is a competition deliverable that is due just prior to the competition. The juries will review the audiovisual presentation prior to the competition in accordance with Table 4. The presentation will be made publicly available soon after the submission as an update to the Computer-Animated Walkthrough.

### Format Requirements

The format requirements for the audiovisual presentation are outlined below.

- .MOV or H.264 compressed.MP4 (MPEG-4) file type
- 3–3.5 minute runtime
- 16:9 aspect ratio
- 720 x 480 resolution
- Accompanied by a verbatim transcript of the audio narrative to meet Section 508 Accessibility standards. Transcript should be submitted in a Microsoft Word-compatible format. For an example of a text version script, see the [Wind Power Animation \(Text Version\)](#).

### Content Requirements

<input type="checkbox"/> Must include video footage of the actual constructed house
<input type="checkbox"/> May contain still photos and graphics
<input type="checkbox"/> Gives the jurors a realistic preview of what they will experience during the on-site walkthroughs
<input type="checkbox"/> Explains how the project meets the criteria <sup>22</sup> listed in the relevant contest section of the rules
<input type="checkbox"/> Includes an audio narrative that explains to viewers what they’re seeing and describes the underlying philosophy
<input type="checkbox"/> Contains only originally created or properly credited work that does not violate U.S. copyright laws
<input type="checkbox"/> Does not contain background music that violates U.S. copyright laws. All incorporated music must be an original or royalty-free composition. Proof of licensing shall be submitted with the final file and transcript.

<sup>22</sup> The audiovisual presentation shall address the design and implementation criteria for architecture; the livability and marketability criteria for market appeal; and the functionality, efficiency, innovation, and reliability criteria for engineering.

- |   |
|---|
| <input type="checkbox"/> Follows guidelines for logos as described in Rules 10-2 and 10-3   |
| <input type="checkbox"/> Does not contain interactive elements that are inherently inaccessible to those with visual disabilities |

## D-8. Website

The website is a contractual and competition deliverable that is due near the beginning of the project as a preliminary website and again just prior to the competition. The website serves as part of each team's communications strategy and will be reviewed by the communications jury in accordance with Table 4.

### Preliminary Website

A preliminary website consisting of at least three pages shall be evaluated by communications professionals at NREL to ensure compliance with the Minimum Website Coding Standards document available on the Yahoo Group<sup>23</sup>.

### Final Website

The final website shall be evaluated by the Communications Jury. The final website shall consist of considerably more content than the preliminary website.

Each team may request up to two courtesy reviews of the final website prior to submission. Teams shall request a courtesy review by contacting [sdrules@nrel.gov](mailto:sdrules@nrel.gov). After each courtesy review, each team shall be notified of required changes it should make to achieve compliance.

The Communications Jury shall begin evaluations of team websites at the same time as the as-built deliverable submission. Communications professionals at NREL will also evaluate each final website for compliance with the Minimum Website Coding Standards document posted in the Yahoo Group. The organizers will provide the Communications Jury with a summary of aspects that are not in compliance for each team so that the jury is aware of any violations.

The Communications Jury will re-evaluate the website following the on-site walkthrough to determine effective use of project updates, photographs, social media, and other communications efforts.

## D-9. Project Summary

Important to many communications-related aspects of the Solar Decathlon, project summaries:

- Provide essential content for the organizers to use while developing various event materials (e.g., the website, event program, media kit, and village signage)
- Prepare teams to answer questions from visitors to their construction sites and to the competition site at Orange County Great Park.
- Help organizers and teams respond effectively to media inquiries.

All project summary materials (narrative, photograph, computer-generated house rendering, and logos) shall be saved in the formats indicated and submitted to organizers packaged as a single .zip file.

## Overview

### Format Requirements

- |   |
|---|
| <input type="checkbox"/> Packaged into a single, bookmarked PDF file (see Appendix F for PDF formatting and file-naming requirements) |
| <input type="checkbox"/> 10 pages maximum   |
| <input type="checkbox"/> 11-pt. type, double spaced, 1-in. (or metric equivalent) margins   |

### Content Requirements

- |  |
|--|
| <input type="checkbox"/> A 100-word or less description of your team house. (1 paragraph)  |
| <input type="checkbox"/> Design philosophy and house design. What is the team trying to portray or accomplish with this design? What will the house look like? What are some of the key features? (1 page) |

<sup>23</sup> The Minimum Website Coding Standards document was posted for download in spring 2012

<input type="checkbox"/> Unique house features. What makes the house unlike any other? (1 page)
<input type="checkbox"/> Technological innovations. Summarize the unique or unusual technologies incorporated into your house. (1-2 pages)
<input type="checkbox"/> Define the target client for the team house. How does the design accommodate the needs and desires of this client? (1 paragraph)
<input type="checkbox"/> Team organization and contacts. Indicate how your team is organized and approximately how many students, faculty, and others (e.g., sponsors, volunteers, family members) are involved in the project. (1 page)
<input type="checkbox"/> Future plans for your house, if known. Where will it go after the competition? (1 paragraph)

### **Team Photograph**

For use in the event program, media kit, and Solar Decathlon website, the team photo is an important conveyance of your team's personality.

#### *Format Requirements*

<input type="checkbox"/> Native format of the camera, such as JPEG or RAW, if available
<input type="checkbox"/> 2048 × 1080 minimum pixel dimensions
<input type="checkbox"/> RGB, 8-bit color, not black and white

#### *Content Requirements*

<input type="checkbox"/> Include all team members (if possible) and strive for creativity. For examples of past team photos, visit the <a href="#">History section</a> of the Solar Decathlon website.
<input type="checkbox"/> For a photograph to be properly credited, the following information shall be included in a Microsoft Word-compatible text file accompanying the photograph file: <ul style="list-style-type: none"> <li>• Name, phone number, and email of person submitting the photograph</li> <li>• Photograph date and location</li> <li>• Photographer's name and affiliation.</li> </ul>

### **Team Logo**

The team logo is used by organizers in village signage, the event program, media kit, and Solar Decathlon website.

#### *Format Requirements*

<input type="checkbox"/> Submit two versions of your logo: <ul style="list-style-type: none"> <li>• One for Web (GIF or JPG, at least 200 px wide). GIF is preferred for simple flat-color logos. JPG is preferred for complex logos.</li> <li>• One for print (high-resolution or vector format; EPS preferred).</li> </ul>
--

#### *Content Requirements*

<input type="checkbox"/> Include a text file containing the following additional information: <ul style="list-style-type: none"> <li>• Name, phone number, and email of person submitting the logo</li> <li>• A list of all Pantone (PMS) or CMYK numbers used in the logo. Please consult the graphic designer of your logo if you need help providing these specific color requirements.</li> </ul>
---

### **Computer-Generated Renderings**

The computer-generated renderings will be posted to the Solar Decathlon website and used in various communications materials to introduce the public to each competition prototype.

#### *Format Requirements*

- |   |
|---|
| <input type="checkbox"/> Minimum resolution of each image shall be 3000 px wide by 2400 px          |
| <input type="checkbox"/> Composed of image files (JPEG, TIFF, etc.) packaged as one Zip (.zip) file |

***Content Requirements***

- |   |
|---|
| <input type="checkbox"/> Includes, at a minimum: <ul style="list-style-type: none"> <li>• North Elevation View of the competition prototype</li> <li>• South Elevation View of the competition prototype</li> <li>• East Elevation View of the competition prototype</li> <li>• West Elevation View of the competition prototype</li> <li>• Two (2) Birds-eye perspective views of the competition prototype</li> <li>• Four (4) Interior views of the competition prototype</li> </ul> |
|---|

**Dinner Party Menus and Recipes**

The dinner party information will be provided to visiting teams for review prior to participation in the dinner party subcontest and will be posted to the Solar Decathlon website.

***Format Requirements***

- |   |
|---|
| <input type="checkbox"/> Packaged into a single, bookmarked PDF file (see Appendix F for PDF formatting and file-naming requirements) |
|---|

***Content Requirements***

- |  |
|--|
| <input type="checkbox"/> Restaurant-style dinner party menu for each dinner party  |
| <input type="checkbox"/> Cookbook-style recipes for all components of dinner party |
| <input type="checkbox"/> Comprehensive ingredient list for each dinner party       |

**D-10. Public Exhibit Materials**

All team communications materials on the competition site shall support the goal of Contest 4: Communications, which is to educate consumers about the project and topics relevant to the project.

- Teams shall submit all public exhibit materials to organizers for review. Organizers will determine whether materials meet competition guidelines.
- Public exhibit materials shall be evaluated by Communications Jury members.

***Format Requirements***

- |   |
|---|
| <input type="checkbox"/> Packaged into a single, bookmarked PDF file (see Appendix F for PDF formatting and file-naming requirements)   |
| <input type="checkbox"/> Each public exhibit material shall be represented at its full scale within the PDF. Therefore, it is expected that the PDF may contain sheets at several different scales. |

***Content Requirements***

- |   |
|---|
| <input type="checkbox"/> Team handout (shall abide by Rules 10-2, 10-3, and 11-4b)  |
| <input type="checkbox"/> Signage (shall abide by Rules 10-2, 10-3, and 11-4c)   |
| <input type="checkbox"/> Team uniform design (shall abide by Rule 11-5)   |
| <input type="checkbox"/> Plan drawing of team site depicting public exhibit material locations and tour route at 1:48 scale |

**D-11. Final Report**

The Final Report shall reflect the results of the team’s Solar Decathlon project.

***Format Requirements***

<input type="checkbox"/> Packaged into a single PDF file (see Appendix F for PDF formatting and file-naming requirements)
<input type="checkbox"/> Intent of figures shouldn't be lost if printed in black & white
<input type="checkbox"/> ANSI "A" (8.5 in. X 11 in.) sheet size
<input type="checkbox"/> 20 pages maximum, including figures, tables, and appendices; cover sheet and table of contents do not count toward page limit
<input type="checkbox"/> 11-point body text minimum, maximum 14-point heading text
<input type="checkbox"/> One-inch margins on top, bottom, left, and right
<input type="checkbox"/> Include page numbers and numbered captions for figures and tables for easy navigation through document

***Content Requirements***

<input type="checkbox"/> Results of fundraising activities—final quantity of contributions (cash and in-kind); final project budget and accounting; lessons learned—what went well, what didn't, and what you would do differently.
<input type="checkbox"/> Results of media-outreach activities—include statistics.
<input type="checkbox"/> Results of on-site exhibition activities—estimates of the number of visitors to the house (justify estimates); assessment of visitor experiences (include qualitative data); and lessons learned—what went well, what didn't, and what you would do differently.
<input type="checkbox"/> Evaluation of the team's website—number of hits, unique visits, and any other user statistics; lessons learned—what went well, what didn't, and what you would do differently.
<input type="checkbox"/> Team perspective on the effectiveness of the organizers' communications efforts with both the teams and the public.
<input type="checkbox"/> Description of future plans for the house, including a statement indicating whether the participating institution(s) would be interested in partnering with NREL to use the house for follow-up collaborative research and outreach projects.
<input type="checkbox"/> Short description of each team officer's future plans for employment, continued study, or other endeavors. NREL requests this information for possible inclusion in publications and presentations describing how the Solar Decathlon serves as an effective workforce development and university research project.
<input type="checkbox"/> Suggested competition improvements.
<input type="checkbox"/> Any other information you feel would be helpful to the organizers or future teams.





## Appendix E Health and Safety Plan

The overall success of the Solar Decathlon competition is dependent on the health and safety of all members, volunteers, organizers, and the public. To achieve this objective, each team is required to submit a Health and Safety Plan that identifies the following elements:

- How you will be minimizing risk
- How you will address major hazards that may be encountered during assembly and disassembly activities on the competition site
- How you will control these hazards to prevent injury to team members, volunteers, organizers and the public.
- Areas of high risk such as electrical safety, working at elevated heights/fall protection, hoisting and rigging activities and safe equipment operations shall include the necessary level of detail to ensure the health and safety of all site personnel.
- How you will ensure that you are in compliance with applicable regulations.
- The roles and responsibilities for the health and safety officer(s) throughout the event.

### E-1. Plan Development

A Health and Safety Plan template is available in the “/Files/Site Ops and Safety”<sup>24</sup> folder of the Yahoo Group. The template identifies major topics to address, the level of detail required, performance expectations, and requirements such as minimum levels of training needed for various team positions. The format of each team’s submitted plan can deviate slightly from the recommended template as long as the information and level of detail is equivalent.

Teams are encouraged to work or consult with your school’s environment, safety and health department during the development process. They can be an excellent resource when developing your Health and Safety Plans, while also ensuring that school-specific requirements are addressed.

### E-2. Required Training

To ensure a minimum knowledge base regarding health and safety issues during construction activities, the team’s project manager, construction manager, and health and safety officer are required to complete the OSHA 30-hour Construction Safety Training course. Each role must be filled by a different individual. Proof of course completion for the OSHA 30-hour Construction Safety Training shall be included in the final Health and Safety Plan.

### E-3. Submission and Approval

Teams are required to submit their Health and Safety Plan to NREL for acceptance. Teams are responsible to update the Health and Safety Plans, both before and after acceptance, to reflect changes in construction parameters. For example, if a team did not plan to use a crane to place their house when the plan was submitted but later decide that a crane will be necessary, then the team is required to update the plan accordingly.

During the event, a current copy of each team’s Health and Safety Plan shall be posted on their site in a prominent location. Individuals working on your site shall be briefed on the final, approved plan and should know the expectations regarding safety, hazards, and controls.

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<sup>24</sup> The template was posted to the Yahoo Group in spring 2012



## Appendix F Deliverable Submission Instructions

Deliverables are considered to be on time if they are received by the competition manager by 5 p.m. Mountain time on the respective due date. Refer to the “Deliverable Status Sheet” in the “/Files/Deliverable status sheets” folder on the Yahoo Group for deliverable due dates and required file formats for each of the respective deliverables.

### F-1. Website URL

Website URLs shall be emailed to the competition manager at [sdrules@nrel.gov](mailto:sdrules@nrel.gov).

### F-2. PDF Requirements

- a. Files submitted as a PDF shall meet the following criteria:
  - (i). Embed all fonts.
  - (ii). Maintain a minimum resolution of 300 dpi.
- b. If an application does not support a direct-to-PDF function, create a postscript file by printing to a postscript printer with the “print to file” option selected. Use this postscript (.ps or .prn) file to create a PDF using Acrobat Distiller’s high-resolution job settings.
  - (i). Creating a PDF from scans, or by outputting the content into a raster image format (.jpg, .tiff, .png, .gif, etc.) and then creating a PDF from the images, is NOT ACCEPTABLE.
  - (ii). All-raster PDFs are large files at 300dpi, are of unacceptable quality at lower resolutions, and are not scalable without degradation.

### F-3. Electronic File-Naming Instructions

The required file-naming convention for all electronic files follows:

[TEAM ABBREVIATION]\_[DELIVERABLE ABBREVIATION]\_[SUBMISSION DATE (YYYY-MM-DD)].[EXTENSION]

See Table 8 for a list of team name and deliverable abbreviations.

Example: A building information model submitted by West Virginia on April 5, 2013 would have the following file name:

WVU\_BIM\_2013-04-05.rvt

**Table 8: Team and deliverable abbreviations**

<b>Team Name</b>	<b>TEAM ABBREVIATION</b>	<b>Deliverable Name</b>	<b>DELIVERABLE ABBREVIATION<sup>25</sup></b>
AZ State/New Mexico	ASUNM	Schematic Design Summary	SCHEMATIC
Czech Republic	CTU	Building Information Model	BIM
Kentucky/Indiana	KEN	Project Manual	MANUAL
Las Vegas	UNLV	Health and Safety Plan	SAFETY
Middlebury College	MIDD	Computer-Animated Walkthrough	ANIMATION
Missouri S&T	MST	Stamped Structural Drawings	DRAWINGS
North Carolina	UNCC	Stamped Structural Calculations	CALCS
Norwich	NU	Project Summary ZIP file	SUMMARY
Santa Clara	SCU	Jury Narratives	NARRATIVE
SCI-Arc/Caltech	SCICAL	Audiovisual Presentation	AV
Stanford	SU	Overview	OVERVIEW
Stevens	SIT	Team Photograph	PHOTO
Team Alberta	CALG	Team logo	LOGO
Team Austria	VUT	Computer-Generated Renderings	RENDER
Team Capitol DC	DC	Dinner Party Menus and Recipes	DINNER
Team Ontario	ONT	Public Exhibit Materials	EXHIBIT
Team Texas	TEX	Final Report	FINALREPORT
Tidewater Virginia	VA		
U of So Cal	USC		
West Virginia	WVU		

#### **F-4. Electronic File Submission Options**

All electronic files shall be uploaded to the [Solar Decathlon dropbox](#). Teams wishing to reduce file upload times may archive electronic files in ZIP files. Please verify that files in ZIP archives can be extracted using [WinZip](#).

<sup>25</sup> Accompanying files, such as text transcripts for videos and metadata files for photos and logos, should also use the appropriate abbreviation from this list.