

Owner's Project Requirements
Team Kentuckiana 2013 Solar Decathlon Home

SECTION II: CONTEST CRITERIA AND REQUIREMENTS

1. ARCHITECTURAL

Intent: Architectural Jury reviews and evaluates the drawings, construction specs., audiovisual architectural presentation, and final constructed project.

Criteria:

A) A jury of architects shall assign an overall score for the design's architectural merit and implementation. (See Appendix D, Appendix B)

B) Key criteria are:

1. Did the team create a *holistic* design that will be comfortable for occupants and compatible with the surrounding environment?
2. Are the lighted spaces rich and varied?
 1. Do they have adequate light for tasks?
 2. Do the luminaries properly distribute light?
 3. Is the admission of direct and diffuse sunlight effectively controlled?

C) See (Table 4) for examples of livability considerations.

Criticality: Juried event with a maximum score of (100).

See Section III-2 for specifications and detailed criteria for each of the five scored sections. **Lighting quality and lighting control evaluations are conducted by the Architecture, Market Appeal, and Engineering juries.**

2. MARKET APPEAL

Intent: Market Appeal Jury reviews and evaluates the drawings, construction specifications, audiovisual sales presentation, and final constructed project.

Criteria:

A) A jury of professionals from the home building industry shall assign an overall score for the house's market appeal. (See Appendix D, Appendix B)

B) See (Table 3) for examples of target client characteristics and requirements.

C) Key criteria are:

1. Are the unique needs and desires of the target client met by the design.

2. Does the house demonstrate curb appeal, interior appeal, and quality craftsmanship.
 3. Does the house offer a good value to potential home-buyers.
- D) See (Table 4) for examples of livability considerations.

Criticality: Juried event with a maximum score of (100).

See Section III-2 for specifications and detailed criteria for each of the five scored sections. **Lighting quality and lighting control evaluations are conducted by the Architecture, Market Appeal, and Engineering juries.**

3. ENGINEERING

Intent: Engineering Jury reviews and evaluates the drawings, construction specs, energy analysis results and discussion, audiovisual engineering presentation, and final constructed project.

Criteria:

- A) A jury of engineers shall assign an overall score for the design's engineering merit and implementation. (See Appendix D, Appendix B)
- B) Key criteria are:
 1. Do the systems function as intended?
 2. Relative to conventional systems, how much energy will the systems save over the course of an entire year?
 3. Were any unique approaches used to solve design challenges?
 4. Do the HVAC and lighting controls facilitate a reduction in energy consumption during an entire year or operation?

Criticality: Juried event with a maximum score of (100).

See Section III-3 for specifications and detailed criteria for each of the five scored sections. **Lighting quality and lighting control evaluations are conducted by the Architecture, Market Appeal, and Engineering juries.**

4. COMMUNICATIONS

Intent: Communications Jury reviews and evaluates the drawings, construction spec, energy analysis results and discussion, audiovisual engineering presentation, and final constructed project.

Criteria:

- A) A jury of communications professionals will evaluate and assign an overall score to

the following team communications products: Web site (Appendix E-1), public exhibit materials (Appendix E-6), public exhibit presentation (Appendix B-3), and video walk-through (Appendix E-3).

Criticality: All efforts should be made in order to receive all points (100).

See Section III-4 for specifications and detailed criteria for each of the four scored communications products.

5. AFFORDABILITY

Intent: Keep construction costs under Decathlon target and within $\pm 20\%$ of the professional cost estimator's final estimated construction cost.

Criteria:

- A) Teams earn all available points for achieving a target construction cost of \$250,000 or less.
- B) Teams must declare a target construction cost by a specified deadline. The final estimated cost must be within 20% of this target.

Criticality: *Important:* An estimated cost over \$250,000 receives a reduced score. These points are scaled in linearly in two steps. Point drop-offs are less between \$250,000 and \$350,000 and houses in this range receive no less than 90 points. All efforts should be made to stay within this range in order to be competitive.

6. COMFORT ZONE

6-1 Temperature

Intent: Keep zone temperature within Decathlon specified range.

Criteria:

- A) Organizers will identify at least two thermal zones in each house and measure the temperature of each zone.
- B) Reduced points are earned if the time-averaged interior dry-bulb temperature is between 67°F - 71°F and 76°F - 80°F. Homes averaging temperatures outside these ranged receive 0 points.

Criticality: *Important:* Based on the steep drop-off in scaled points, all effort should be made to, at minimum, keep average dry-bulb temperatures between 70°F - 77°F. All available points (75) are earned at the conclusion of EACH scored day and the zone temperature deviating farthest from the target temperature is the zone temperature of record.

6-2 Humidity

Intent: Keep zone humidity under Decathlon specified target.

Criteria:

A) Reduced points are earned if the time-averaged interior relative humidity is between 60% and 70%. Homes averaging relative humidity above 70% receive 0 points.

Criticality: *Important:* All effort should be made to receive all available points (25).

7. HOT WATER

Intent: Deliver 15 gallons of water at average 110°F temperature within 10 minutes; 16 water draws during contest week.

Criteria:

A) 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.

B) Hot water will be drawn from the shower. Teams shall replace their shower head with an organizer-supplied fitting prior to the start of the contest.

C) Teams shall provide a male 1/2" National Pipe Thread Tapered Thread (NPT) to accept the organizers equipment.

Criticality: *Important:* All available points (100) are earned by delivering an average temperature of at least 110°F, for temperatures between 100°F - 110°F points are scaled linearly. Average draws with a temperature of less than 100°F receive 0 points.

8. APPLIANCES

8-1 Refrigerator

Intent: Keep refrigerator temperature in 34°F - 40°F range

Criteria:

A) The refrigerator volume published in the manufacture's specifications shall be a minimum of 6.0 ft³ (170 L).

B) The refrigerator may be used to store food and beverages.

Criticality: All available points (10) are earned by delivering a temperature between 34°F - 40°F, temperatures outside that range up to a maximum of 2°F in either direction receive reduced points, scaled linearly. Temperatures outside that range result in 0 points.

8-2 Freezer

Intent: Keep refrigerator temperature in -20°F - 5°F range

Criteria:

- A) The freezer volume published in the manufacture's specifications shall be a minimum of 2.0 ft³ (57 L).
- B) The automatic defrost function may be disabled.
- C) The freezer may be used to store food and only enough ice to fill the freezer's ice bin.

Criticality: All available points (10) are earned by delivering a temperature between -20°F - 5°F, temperatures outside that range up to a maximum of 10°F in either direction receive reduced points, scaled linearly. Temperatures outside that range result in 0 points.

8-3 Clothes Washer

Intent: Successfully wash 8 load of laundry (one load = six bath towels) during contest week.

Criteria:

- A) A load of laundry is defined as six organizer-supplied bath towels.
- B) The organizers will consult the operations manual to identify appropriate cycle settings.

Criticality: All available points (20) are earned for washing laundry by running a clothes washer through one or more complete, uninterrupted, normal cycles within a specified period of time.

8-4 Clothes Dryer

Intent: Return 8 loads to their original weight during contest week.

Criteria:

- A) The drying method may include active drying, passive drying, or any combination of the two. All drying methods that require the towels to be visible must be demonstrated to the architecture and market appeal juries as they visit the house.
- B) 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 cycle, but each load will be scored separately.
- C) Clothes drying must be completed with a specified period of time.

Criticality: *Important:* Max points (40) are awarded for towels returned to their original weight. Reduced points are earned if the "dry" total weight is between 100.0% and 110.0% of the original towel weight. Reduced point values are scaled linearly. No points are earned for "dry" weights over 110.0%

8-5 Dishwasher

Intent: Successfully wash five loads of dishes during contest week.

Criteria:

- A) Dishwasher must be run through a complete, uninterrupted, normal cycle within a specified period of time, during which a temperature sensor placed in the dishwasher must reach 120°F at some point during the cycle. (See Appendix A-3)
- B) The dishwasher may be run empty, partially loaded, or fully loaded; the load may be soiled or clean.

Criticality: *Important:* All points (20) are awarded as long as the temperature sensors reach at least 120°F during some point in the complete cycle. Half points are awarded if the temperature reaches does not reach 120°F but reaches at least 115°F. No points are awarded for temperatures below that.

9. HOME ENTERTAINMENT

9-1 Lighting

Intent: All interior and exterior lights on at full levels at night.

Criteria:

- A) All dimmers on highest position, all lights on.

Criticality: *Important:* All points (40) are earned by simply having all exterior and interior lights on during specified times.

9-2 Cooking

Intent: Successfully perform four cooking tasks during contest week.

Criteria:

- A) Vaporize 5.0lbs. of water within 2 hours.

Criticality: *Moderate:* All points (20) are earned for vaporizing all water. Points for water leftover are scaled linearly and reduced points are received for weights between 79oz and 16oz. No points are received for weights where less than 16oz of water were vaporized during the specified time.

9-3 Dinner Party

Intent: Host two dinner parties during contest week.

Criteria:

- A) Dinner parties will feature a pair of guests from each of three competing teams.
- B) Scores are give for the quality of the meal, ambiance, and overall experience.
- C) Teams are not permitted to serve the same meal at each dinner party.

- D) Teams must submit detailed dinner party menus, recipes and ingredients to the organizers.
- E) The use of coolers to store food, beverages, or ice associated with the dinner party on site is not permitted.

Criticality: *Moderate:* Juried competition, scores are averaged each of the two nights and then those scores are averaged to come up with the final score.

9-4 Home Electronics

Intent: Operate a TV and computer during specified hours.

Criteria:

- A) TV shall be a minimum of 27 in. Computer monitor shall be a minimum of 15 in.
- B) Brightness of TV and computer monitor shall be set to at least 75% of maximum.

Criticality: *Moderate:* (25) points are earned by displaying the content supplied by organizers during the scored periods.

9-5 Movie Night

Intent: Invite neighbors to watch a movie on the home theater system.

Criticality: *Low:* (5) 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.

10. ENERGY BALANCE

Intent: Produce at least as much electrical energy (kWh) as is consumed during contest week.

Criticality: *Important:* All points (100) are earned at the conclusion of the specified energy balance period for a net electrical energy balance of at least 0 kWh. Reduced points are earned for a net electrical energy balance between -50 kWh and 0 kWh. Points are scaled linearly.