

# solar decathlon<sup>23</sup> europe

**BUCHAREST ROMANIA** *Build. Connect. Live!*

# rules

version 1.0r  
21\_06\_2021



energy endeavour  
FOUNDATION

GOVERNING BODY OF THE SOLAR DECATHLON EUROPE



EFdeN  
where N is nature

SOLAR DECATHLON EUROPE 2023 HOST CITY EXECUTIVES

**TABLE 1. LIST OF CHANGES**

VERSION	RULE	PAGE	NOTES
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**Please note: the SDE23 Competition refers to Living Demonstration Units (LDU) to describe the notion of 'house'.**

**The information included in the present document may change!**

Details or complementary information will be added in the future.  
All modifications will be clearly indicated in updated versions.

Revised contents are coloured blue.

Please note: in each version, only the changed content related to the currently valid Rules version is coloured.

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BUCHAREST ROMANIA

SDE23 RULES \_ VERSION 1.0R \_ 21.06.21

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# introduction

## Solar Decathlon

Initiated in 2002 by the United States Department of Energy, the Solar Decathlon (SD) is a university-level student Competition for resource-responsible and energy-efficient architecture and engineering in the building sector. Approximately twenty university Teams compete in the design, construction and management of innovative dwellings powered by renewable energy. The prototypes are brought to the Competition site and assembled in approximately 14 days. The site becomes an open forum and exhibition, where the dwellings are operated, demonstrated to the public, and evaluated by a jury of renowned international adjudicators.

## Solar Decathlon Europe

The European editions of the Solar Decathlon Europe (SDE) were hosted by the Spanish government in Madrid in 2010 and 2012, and by the French government in Versailles in 2014. The SDE19 edition took place in Szentendre, Hungary. Governed by the Energy Endeavour Foundation (EEF), under a shared European vision of sustainable, energy efficient, resource-responsible and affordable building, the SDE21»22 Competition will be hosted in Wuppertal, Germany.

The SDE23 edition will be hosted right in the heart of Bucharest, Romania, and will focus on the new normal, which leans on the multiple facets of everyday living in our homes, habitats, and communities. This SDE23 edition will take into consideration the changing nature of our lifestyles, especially as we adapt to a post-pandemic world.

## SDE23 Organisation

The SDE23 Organisation is composed of the Energy Endeavour Foundation, and the SDE23 Host City Executives (from the Asociatia Solar Decathlon Bucuresti, otherwise known as EFdeN).

## Governing Body

The Solar Decathlon Europe (SDE) is governed by the Energy Endeavour Foundation (EEF). A Netherlands-based non-profit business entity, the EEF is endorsed by the U.S. Department of Energy (DOE) to steward the SDE. Custodian of the SDE Rules and SDE brand, the EEF produces the European-wide SDE Call for Cities and its corresponding international SDE Call for Teams. Providing strategic SDE guidance, tools, systems, networks, data, branding, project advisory, support, and administration, the EEF transfers project-specific knowledge and expertise to SDE Host City Executives, working collaboratively to ensure the continuity of the Solar Decathlon Europe, from one edition to the next. The Energy Endeavour Foundation provides the structure and framework for the future of the SDE.

## Host City Executives

Asociatia Solar Decathlon Bucuresti (EFdeN) is the engine behind Bucharest's SDE legacy involvement. Having participated in previous SD editions in Europe and the Middle East, SDE23 Host City Executives have invested vibrant and relentless energy in the Solar Decathlon and its values. Asociatia Solar Decathlon Bucuresti / EFdeN is the designated winner of the pan-European SDE23 Call for Cities, as directed by the Energy Endeavour Foundation.

## Solar Decathlon Europe 2023 ...Build. Connect. Live!

The upcoming Solar Decathlon Europe 2023 (SDE23) will take place in September 2023, in Bucharest, Romania. A key objective in this SDE edition is to further connect the Competition to current architectural discussions, to the continued and evolving topics in building research, and to the varied social aspects of our built environment. In a society challenged with increasing urbanisation, shifting geopolitical balances, and impoverishing natural habitats, we have the interesting opportunity to reimagine our ways of living. We live in an inextricably interconnected global community, dependent on fast and reliable means of communication, both verbal and physical... a 'place', where contour lines can be blurred and blended, where someone working on one side of the planet can have a positive and meaningful impact on a community several thousands of kilometres away.

### **Connection**

The Solar Decathlon Europe calls eager future professionals to rethink the status quo. The Solar Decathlon Europe 2023 is asking you: what is, what will be, the shape of our connected living? What does it mean to be connected? What are our priorities? How can we be intelligently, comfortably, interconnected in our human habitat? The recent pandemic has pushed us to rethink the value of our surrounding environments. We saw nature re-integrate our silent cities, while we felt a sense of surreal isolation resulting from the shutdown of live social interaction. We asked ourselves: how to gratefully connect the natural and built environment so that these can work in synergy? Many translated commuting hours to quiet moments and spaces for alternative downtime or concentration. We reorganised our homes for our new needs. What if our living spaces were more flexible, better enhanced, and adapted to our needs, our lives? Can we imagine a cross-pollination of solutions to respond to broad audiences? Some of us rediscovered smaller towns, villages and rural environments; others recognised the need for buzzing, lively, healthy urban habitats. How do we reimagine our living environments?

### **Contextualisation**

The SDE23 theme 'Build. Connect. Live!' encourages the spectrum of proposals intended for the contrasting and varied environments from the Teams' different communities of choice or of origin. Teams are challenged to demonstrate how their house, or 'Living Demonstration Unit' (LDU) enables their specific concept of connected living. Teams will be invited to build full-scale functional prototypes in Bucharest intended for their community of choice or origin, while demonstrating how we can build, connect, and live in today's ever-changing built environment. The houses will represent the weaving of well-integrated, innovative, technical, and technological solutions into healthy and flexible living spaces.

The challenge of contextualising the project at all the relevant scales is primordial. Regardless of the location, a project is identified by its position and role within its community and environment. Team projects will consider the differing scales of contextualisation in a built environment: from the levels of city block, neighbourhood, suburb, town, and hamlet to broader regional scales. Teams are free to investigate and propose the direction of their choice from different types of habitation: from collective housing in dense urban contexts, to the grouping of individual houses generating cohesive communities in less dense areas. Projects will consider the way in which the building functions and interacts within the community and neighbouring environment. This emphasis on contextualisation helps to bolster the valuable links between the SDE23 project locations and their corresponding human, logistic, communicative, and technological connections.

### **Connected Living & Communication**

The SDE23 Organisation seeks to investigate different modes of socialisation and community organisation, while respecting the various building landscapes chosen by Teams (dense urban context, or disparate individual houses). Teams are invited to articulate mobility strategies and the corresponding economic viability associated to their project. Importantly, the SDE23 Competition seeks to inform and empower broad audiences, specific stakeholder groups, and the public at large. Climate-change adapted construction, energy-efficient city renewal, and broad participation of citizens are key European ambitions in bringing sustainability mainstream. The SDE23 Organisation expects Teams to take part in multi-channel awareness actions and dissemination, while adapting their language to various, and broad, audiences. The target groups include multi-level government bodies, industry partners, investors, professionals, academia, and the general public, and, importantly, our children and youth. Workshops and energy-literacy strategies will be transmitted by the SDE23 Organisation, which will steward the Teams accordingly through the SDE23 project.

### **Sustainability & Resilience**

Another important SDE23 goal is to highlight the skilfulness and the environmental sensibility of the Teams' project (house design, techniques, systems and components) to attain the maximum reduction of negative environmental impact during the house components' manufacturing, the construction phase, the building's lifespan, and its disassembly. The Teams should also display their ability to prepare and plan for, absorb, recover, and successfully adapt to adverse circumstances they might have to face, such as climate change uncertainty, environmental degradation, population growth, migration, and pandemics.

### **Healthy Homes**

The SDE23 Competition will place emphasis on the topic of healthy homes. Considerations such as transitional and exterior spaces, natural lighting, cross-ventilation, and air quality are integral aspects in the pursuit of human-centric housing, universal design, and a future-proof habitat.

### **3d Design & Modelling**

The utilisation of 3D-modelling techniques and harmonised information management are mandatory during all phases of project, including deliverables produced before the assembly phase. The projects are expected to demonstrate state-of-the art design through 3D and building information modelling (BIM). Innovative measures such as simulation (building performance) and / or animated virtual reality are encouraged, especially to illustrate the design of the entire building in context.

## **Solar Decathlon Europe 2023 Rules**

The Solar Decathlon Europe Rules are designed to meet the SDE23 objectives and to promote a fair, safe, and interesting Competition. These SDE23 Rules are based on those designed for previous editions of the SDE Competition. Each set of Rules evolves from one SDE edition to the next: as such, there are changes in the contests and deliverables, reflecting the dual challenge of developing whole building concepts as well as designing, building, and operating the Living Demonstration Units (LDU). All entries must address the challenging, and transformative, path towards a climate-neutral building stock. This path consists of architectural and building-related measures, such as efficiency improvements and on-site use of renewables, as well as measures related to the contextualised energy infrastructure. This SDE23 Rules document describes what each Team needs to know to be competitive in the Solar Decathlon Europe. It includes five sections:

### **Section 1.0 General Rules**

Includes Rules related to the general aspects of the Competition, describing the SDE23 Organisation, the participating Teams, the site, the housing units, the final phase of the event, and the general conditions.

### **Section 2.0 Contests**

In this section, the SDE23 contests and sub-contests are defined, including information on scoring distribution, the contests' evaluation criteria, and their related protocols and procedures.

### **Section 3.0 Deliverables**

This includes detailed information concerning all documents, drawings, and other materials that Teams must submit to the SDE23 Organisation, along with the submission dates and format requirements.

### **Section 4.0 SDE23 Building Code**

This Code exists primarily to protect the Teams, comply with public health measures, and ensure safety. Compliance with the SDE23 Building Code is a prerequisite for participation in the Competition.

### **Section 5.0 Appendices**

This contains complementary information to the Rules.

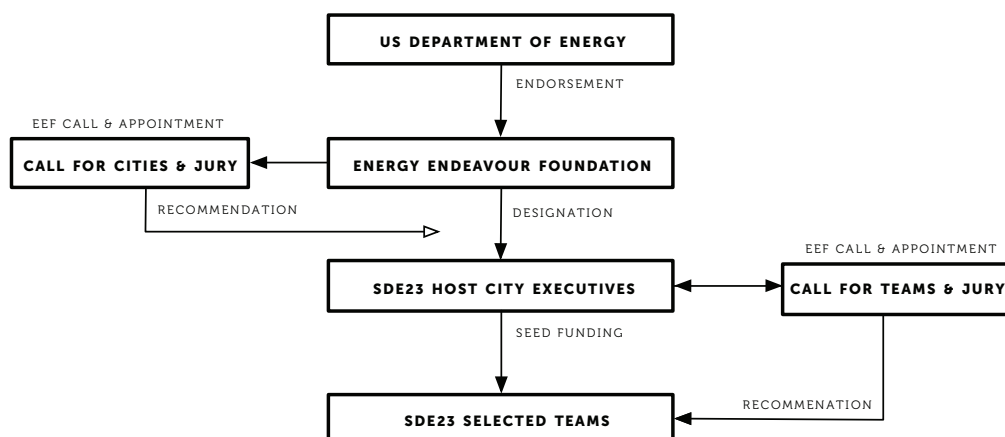
## section I.0 \_ general rules

### rule I \_ sde23 organisation

#### 1.1 SDE Authority

As mentioned, the Energy Endeavour Foundation (EEF) has been endorsed by the United States Department of Energy (US DOE) to govern and steward of Solar Decathlon Europe. The EEF has produced the pan-European SDE23 Call for Cities, including a thorough juried evaluation, and resulting in the EEF designation of Bucharest as SDE23 Host City. The SDE23 Organisation (SDE23 Host City Executives and the Energy Endeavour Foundation), will rely on its appointed jury of experts for final Team selection after Teams' responses to the SDE23 Call for Teams. See Chart 1.

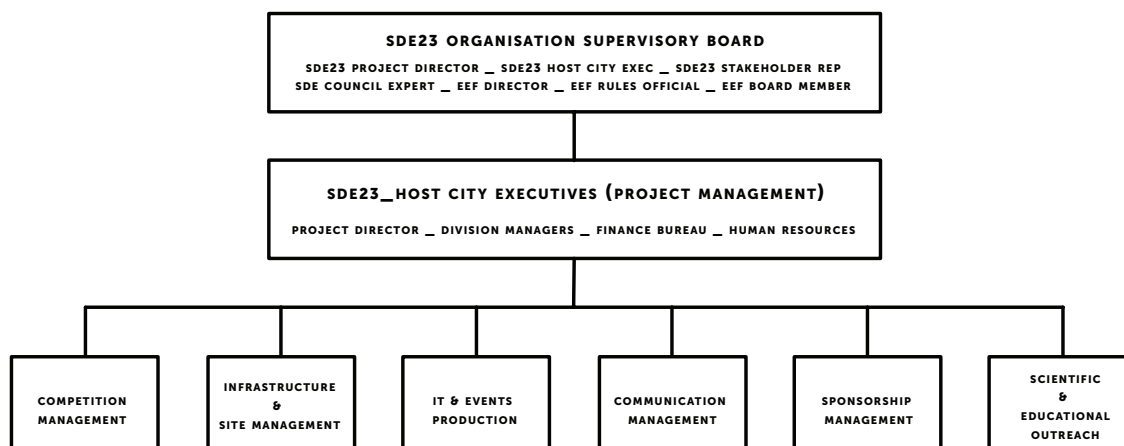
CHART 1. SOLAR DECATHLON EUROPE AUTHORITY



#### 1.2 SDE23 Organisation Chart

The SDE23 Organisation is structured as follows:

CHART 2. ORGANISATION CHART

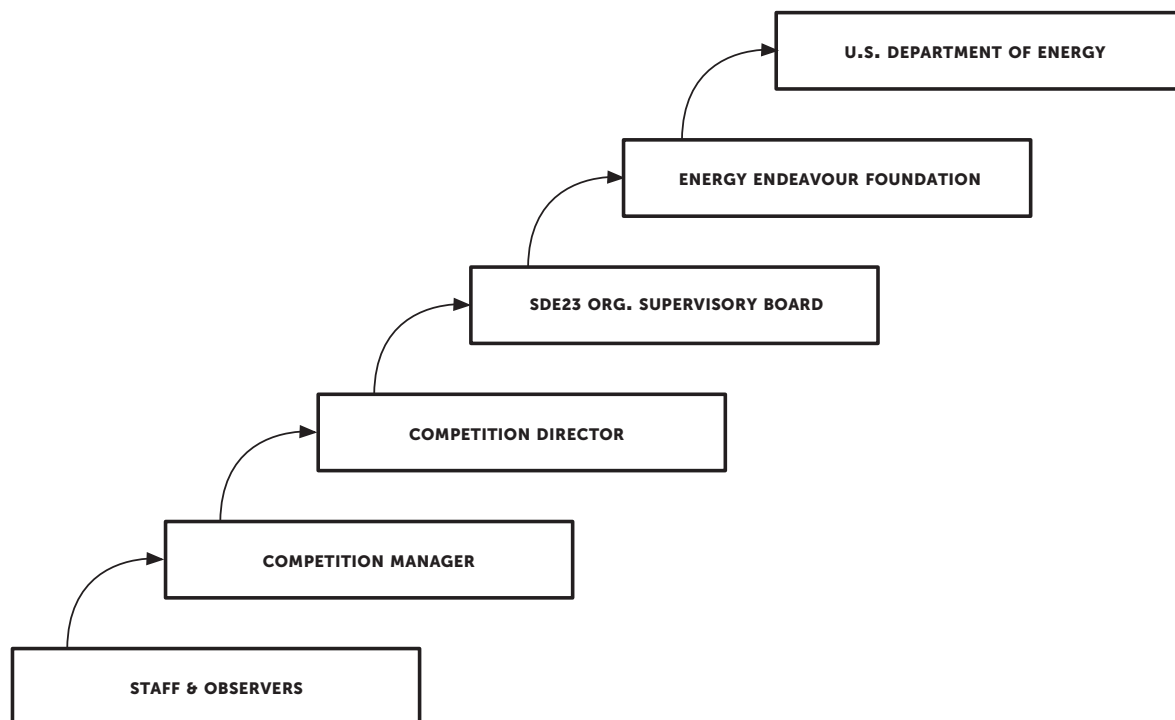




### 1.3 Decision Chart

For the SDE23 edition, the following authority structure will be used for making decisions and solving problems:

CHART 3. AUTHORITY DECISION CHART



## rule 2 \_ administration

### 2.1 Precedence

If there is a conflict between two or more versions of the Rules, the most recent version of the Rules 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 on the SDE23 Workspace Area for Teams (SDE23 WAT) and dated for the year of the event are the Rules in effect.

### 2.4 Official Communication

It is the Team's responsibility to remain continuously updated on all official project communications.

Official communication between the Teams and the SDE23 Executives occur through one or more of the following channels:

#### a. SDE23 Workspace Area for Teams (SDE23 WAT)

Workspace Area for Teams (SDE23 WAT): is the main communication tool for Competition Teams. Appendix A for the SDE23 WAT will be issued with future versions of the SDE23 Rules. The SDE23 WAT is the key communication platform used between the SDE23 Organisation and Teams. The SDE23 WAT is a secure educational web portal, which is accessible for participating Teams only. All Team members must be registered.

**The primary functions of SDE23 WAT are to:**

- Post and receive all official communications;
- Update all Team and event calendars;
- Request and receive information or clarifications;
- Submit questions;
- Upload and download files.

Appendix A will provide further information for the SDE23 WAT.

**b. Email**

For expediency and to protect confidentiality, the SDE23 Organisation may choose to communicate with Teams via Team members' email addresses and the SDE23 WAT email. The content of the communications sent to this email address will remain confidential, unless the Team grants permission to the SDE23 Organisation to divulge the content of these communications to the other Teams. However, most official communication will occur via the SDE23 WAT.

**a. Conference Calls**

SDE23 Organisation may invite the Teams to participate in a conference call. Invitations and instructions for participation in conference calls will be provided via the SDE23 WAT.

**c. Meetings**

**Before the event**

Workshops will permit the Teams and SDE23 Host City Executives to have in-person meetings. Notification of the date and agenda of these workshops will be made via the SDE23 WAT.

**Before the assembly phase**

SDE23 Host City Executives will meet with the Teams to discuss health and safety, and site operations.

**During the event**

Morning meetings are held on a daily basis throughout the event on the SDE23 'solar village'. It is mandatory that at least two Team members assist at these meetings, preferably the Faculty Advisor and the Student Team Leader. Other Team officers may also assist, for example Safety Officers, Contest Captains or Communication Coordinators. Team members can express any doubt, need, or information at the meetings. Attendees are responsible for sharing the meeting information, decisions, and announcements with the other Team members.

**d. Postings at Headquarters**

During the event, a bulletin board (or other venue for posting information) may be established at event headquarters. Teams will be notified via the SDE23 WAT if such a venue is established and the purpose for which it has been established.

## 2.5 Decisions on the SDE23 Rules

The decisions on the Solar Decathlon Europe Rules are interpretations of the SDE23 Rules contained in this document. The Energy Endeavour Foundation appoints Rules Officials who work with the SDE23 Host City Executives to maintain the integrity of the SDE Competition through the SDE23 Rules. SDE23 Host City Executives may ask for changes or clarifications to the SDE23 Rules by making an official request to the Rules Officials. When the Rules Officials make a decision that may, in their opinion, directly or indirectly affect the strategies of all Teams, the Rules Officials will incorporate the decision to the Solar Decathlon Europe Rules. The SDE23 Host City Executives will then notify the Teams of the changes via the SDE23 WAT.

**Exception:** if such a notification would unfairly reveal the strategies of one or more Teams, the SDE23 Host City Executives may, depending on the circumstances, refrain from notifying the decision to all Teams.

## 2.6 Self-Reporting

Teams will self-report definite or possible Rules infractions that have occurred or may occur. The 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 SDE23 Organisation for an official 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.

The Competition Director and Competition Manager will act with discretion when determining the penalty for a Rules infraction. Rules infractions observed by the SDE23 Organisation, i.e., not self-reported by the Team, may be subject to more severe penalties than self-reported Rules infractions.

## 2.7 Penalties & Bonus Points

### a. Rules Infractions

Teams committing Rules infractions are subject to one or more of the following penalties, depending on the severity of the infraction:

- Point penalty applied to one or more contests;
- Disqualification from part of, or all of, one or more sub-contests;
- Disqualification from the Competition.

**Note:** Disqualification from the Competition requires prior notice to the Team and an opportunity for the Team to make a written statement on its behalf.

### b. Late or Incomplete Submission

Point penalties will also be applied to Teams not fulfilling all the deliverables' requirements:

- for late submission: from fifteen minutes after the deadline till 48 hours after - up to 0.5 points;
- from 48 hours after the deadline until one week later - up to 2.0 points;
- for contents missing more than 5% of the content required missing - up to 2.0 points.

**Note:** In case any participating Team delivers beyond one week after the deadline or/and with more than 25% of the content required missing, the SDE23 Organisation reserves the right to apply a larger penalty, considering the special conditions of each particular case.

### c. Infractions during the Assembly / Disassembly Phases

During assembly phase, penalty points will be applied to Teams not respecting:

- Safety on construction site (see Rule 44 \_ Site Operations Plan, Rule 45 \_ Health & Safety Report and Documents, Rule 50 \_ Building Codes and Rule 51 \_ Health and Safety);
- Construction site cleaning and waste management (See Rule 4.9 \_ Site Cleaning & Waste Management).

### d. Daily Tasks during the Competition Week

Teams must do all the daily tasks while following the Competition Calendar. Penalties will be assigned to the Teams if they do not comply with this requirement. Teams must report to the Competition Manager if they have any problem that makes it impossible to do the daily tasks.

### e. Penalty Referee

An individual, appointed by the SDE23 Organisation, will examine and assess the Team's infraction, and propose to the Competition Manager corresponding penalties with respect to the Rules. Based on the agreement with the SDE23 Organisation, the Penalty Referee will determine the severity of Rules infractions, classify them as minor or major, and report them to the Competition Manager. The Penalty Referee will be independent of the SDE23 Organisation and will have a nationality other than the nationality of the competing Teams.

### f. Applying Penalties

The Competition Manager is solely authorized to apply point penalties or disqualify a Team from the Competition or from part of, or all of, one or more contests or sub-contests for Rules infractions.

#### **g. Penalties Notification**

The Competition Manager will notify all Teams via the SDE23 WAT when a penalty has been applied toward any Team. The notification will include the identity of the Team committing the infraction, a brief description of the infraction, including its severity, and the nature of the penalty, giving the Teams the opportunity to protest (see Rule 2.8 \_ Protests). Penalties points related to safety, construction site cleaning, and waste management will be announced day by day to each Team.

#### **h. Respect of the Assembly Plan**

The SDE23 Host City Executives have the authority to apply bonus points at the end of the assembly phase. Teams may gain a bonus of up to five points according to their Health & Safety Plan and documents. For more details, refer to the Building Code section. Teams with buildings that pass all inspections on time will receive a bonus of ten points.

### **2.8 Protests**

Official written protests may be filed by Teams for any reason during the Competition event. A filing fee of up to ten points may be applied to the Team filing the protest if the protest is deemed frivolous by the protest resolution committee. Teams are encouraged to communicate with the Rules Officials in an attempt to resolve issues and complaints before resorting to the protest process. Protests should be filed only if the Team and the Rules Officials are not able to resolve the issues. Protests must be submitted between 9h00 and 17h00, and within 24 hours of the action being protested. The final opportunity to file a protest is five minutes following the conclusion of the final sub-contest on the final day of the Competition weeks.

**Exception:** The results of one or more sub-contests may be announced during the final awards ceremony. The results of sub-contests announced during the final awards ceremony may not be protested. The protest will be submitted to the Competition Manager in a sealed envelope. It will include the name and signature of the Faculty Advisor, the current date and time, an acknowledgement that a ten-point filing fee will be assessed, a clear description of the action being protested, and a succinct description of the protest.

#### **Protest Procedure:**

- The protest resolution procedure is as follows:
- The Competition Manager convenes the Protest Resolution Committee.
- The Competition Manager submits the sealed envelope containing the Team's written protest to the Protest Resolution Committee. Unless the Competition Manager is called by the committee to testify, he is not permitted to read the protest until after the Protest Resolution Committee has submitted its written decision.
- The Protest Resolution Committee opens the envelope and reads the protest in private. SDE23 Host City Executives and Team members are not authorised to attend the Committee's private deliberations. The right to counsel by SDE23 Host City Executives or Team members is not authorised.
- The Protest Resolution 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.
- Testimony is provided by individuals called by the Committee.
- The Protest Resolution Committee notifies the Competition Manager of its decision and indicates how many points will be assessed as a filing fee. The decision of the Protest Resolution Committee is final, and no further appeals are allowed.
- If the decision involves changes to a Team's score or a refund of some, or all, of the filing fee, the Competition Manager notifies the Scorekeeper of the changes, and the Scorekeeper applies the changes to the scoring server.
- The Competition Manager posts a copy of the written protest and decision on the SDE23 WAT.

## 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. Based on the quantity and quality of proposals, a limited number of twenty Teams will be selected for entry in the SDE23 Competition. Universities that have taken part in previous editions of the Solar Decathlon worldwide are welcome to submit their proposal to participate in the Solar Decathlon Europe 2023. However, as projects from previous editions of the Solar Decathlon will not be admitted, Teams will have to submit a new design proposal.

### 3.2 Team Officers & Contact Information

Each Team must provide contact information for the Team Officers listed in Table 2 'Team Officers', and must keep the contact information current through the duration of the project. If a Team's internal officer titles do not exactly match those listed in Table 2, each Team will still provide the contact information for the person fulfilling each of the areas of responsibility described (See Definitions in appendix B). Teams must provide the contact information for one person only in each officer position; this individual is responsible for forwarding information to any 'co-officers', as necessary.

An individual may have multiple officer titles. The requested information must be included in the Press Kit (please refer to Rule 30.1b \_ Press Kit for further details). The Solar Decathlon Europe 2023 is intended to be a primarily student-run project. The only Team officer who must be a faculty member is the Faculty Advisor. The structural and electrical engineers may be a post-graduate student, faculty member, or working professional. It is highly recommended that students fill other Team officer positions.

**TABLE 2. TEAM OFFICERS**

TITLE	NAME
Faculty Advisor	
Project Manager	
Project Architect	
Project Engineer	
Structural Engineer	
Electrical Engineer	
Student Team Leader	
Health & Safety Team Coordinator	
Safety Officers	
Site Operations Coordinators	
Contest Captain	
Instrumentation Contact	
Communications Coordinator	
Sponsorship Manager	

### 3.3 Safety

Each Team is responsible for the safety of its operations, and each Team member and crew will work in a safe manner, at all times, during the project. See Rule 51 \_ Health and Safety for further information.

### 3.4 Conduct

Improper conduct will be not tolerated. Improper conduct may include, but is not limited to, improper language, unsportsmanlike conduct, unsafe behaviour, distribution of inappropriate media, plagiarism, or cheating.

### 3.5 Use of Likeness, Content & Images

Team members and Team crew agree to the use of their names, likenesses, documents, audio-visuals and/or graphics, in any communication materials issued by the SDE23 Organisation (EEF & SDE23 Host City Executives), partners, event supporting institutions and event sponsors. For the Competition dissemination, the SDE23 Organisation, event supporting institutions, and event sponsors may use the Teams' information (content and images). Please refer to the SDE23 Graphic Chart & Brand Manual. The SDE23 Organisation and event sponsors will make all reasonable efforts to credit the sources of content and images, although they may be published without credit. All materials provided by Teams to the SDE23 Organisation including, but not exclusively, the mandatory deliverables, must belong to the participating Teams, or the Team must have been authorized by owners of materials subject to intellectual property regulations, such as background music or third-party images. Therefore, the Teams must submit the SDE23 Dissemination Authorization (available through the SDE23 WAT) signed by the Faculty Advisor, with each audio-visual file.

**Exception:** If a Team submits content or images that it would like to be kept confidential, it should make that request, with an explanation, in writing to the recipient of the content or images. Every effort will be made to honour requests for confidentiality. All confidentiality requests expire at the date of the end of the SDE23 Competition.

### 3.6 Withdrawals

If a participating Team, during the project development, considers withdrawing from the Competition due to any reason, they must communicate it to the SDE23 Organisation before making its final decision. The SDE23 Organisation will try to help the Team through any problem. However, if the Team pursues to withdraw from the Competition, they must notify their decision to the Competition Director with a letter signed by the Faculty Advisor. All written withdrawals complying with the previous items are final. Depending on the stage of work the SDE23 Host City Executives have the right to request returning the full or shares of the base Team funding received from the SDE23 Executives. Details will be addressed in the funding contract.

## rule 4 \_ sde23 solar village

### 4.1 SDE23 Solar Village Specifications

SDE23 solar village specifications will be communicated through the SDE23 WAT, including a detailed plan drawing, indicating its limits, accesses, lots, and circulation areas. The perimeter of SDE23 solar village will be limited by indicating access, allotted lots, established limits and internal paths. The SDE23 Executives will provide general lighting of SDE23 solar village, as well as the supply of water, waste-water removal, workspaces for each Team with wi-fi connection, access to private cafeterias, and public toilets.

### 4.2 Civil Liability

Each Team is financially responsible for any damage it causes on and to the Competition site. Insurance issues are defined in the Team contract. Therefore, Teams must contract compulsory insurance for SDE23 solar village.

#### **4.3 Lot Conditions & Attribution**

The lot size is 20.0 m by 20.0 m. In order to unload/load trucks and place cranes, an operations area of 18.0 m by 10.0 m will be available next to each lot during assembly/disassembly phases. Once the SDE23 lot attribution is defined by a lot-draw process, the SDE23 Executives will notify the Teams of the specific conditions for each lot. Teams must design and plan all site operations accordingly. For exceptional reasons beyond the SDE23 Organisation, the lot size may vary. On the SDE23 solar village, lots' perimeters will be clearly defined and signposted. Teams may not go beyond these limits under any circumstances. Lots must be cleaned and re-established to their original conditions once the assembly and disassembly process is over. As storage, unloading, assembly and disassembly will take place inside the lot's limit during the established period, each Team will use part of their lot for storage and unloading during the assembly and disassembly phases. The Operations Area will have to be freed during the Competition. The SDE23 Host City Executives will provide all Teams with a secondary storage area for materials and equipment not in use during the Competition.

#### **4.4 Footing**

Typically, low-impact footings with neither ground excavation nor penetration will be used to support all unit (LDU) and site components located on the Competition site. Therefore, Teams must provide repartition plates and removable footings systems. As vertical elevation change may exist across the lot design, each Team should plan for adaptable footings systems (ie., hydraulic jacks, sandboxes, adaptable scaffolding ...) to absorb differences between 40 and 60 cm. Footings will be designed to comply with the soil-bearing pressure criteria specified in the SDE23 Building Code. Further details regarding load-bearing pressure are forthcoming. Once the foundation has been laid during the assembly, Teams will notify the appropriate Inspector to verify compliance. The assembly may not continue until this inspection has been passed.

#### **4.5 Assembly Period Video Recording**

For safety purposes, cameras will be installed by the SDE23 Host City Executives to record the entire assembly period. This audio-visual support will also be used for the Competition, and for communication. Images remain property of the SDE23 Organisation which can use them for communication purposes and to verify safety. Teams waive all property rights to the SDE23 Organisation but have access to images through SDE23 WAT to produce communication materials.

#### **4.6 Construction Equipment**

##### **a. Cranes & Other Auxiliary Machinery**

The crane necessary for loading and unloading during assembly and disassembly phases will be provided by the Host City Executives. The participating Teams will only have to pay the crane's hourly rental fees in accordance with the costs indicated by the SDE23 Host City Executives. The SDE23 Host City Executives will administer the use of the crane to guarantee its maximum efficiency, attending to the needs of each Team. To facilitate loading and unloading, the elements of the LDU and the materials must be as 'pallet-able' as possible. As far as possible, the use of cranes or alternative means will be administered with assigned turns.

**The exclusive use of these may be possible in two specific cases:**

- With the university's express request, under the SDE23 Host City Executives' approval.
- For cranes' use incompatibility.

The exclusive use of the elevating machinery is an option that depends on the Teams' resources and planning. The specialised company chosen by the SDE23 Host City Executives will provide auxiliary resources for the elevation and movement of the units and their constitutive elements (forklift, cherry-picker, scaffolding...). Teams will be offered special rental conditions for material available in a catalogue.

## **b. Access & Circulation of Heavy Vehicles**

### **Meeting Point**

This is an allocated space close to the SDE23 solar village intended for parking heavy vehicles prior their entrance to the construction site. Upon arrival, truck-mounted cranes, trailers, semi-trailer trucks, etc. must be parked in this specific Meeting Point.

### **Access of Heavy Vehicles**

Vehicles parked in the meeting point will be called in, one after the other, to guarantee the orderly entry into SDE23 solar village, always through established paths and following the SDE23 Host City Executives' schedule.

### **Entrance Order**

The SDE23 Host City Executives, in accordance with the Site SDE23 solar village Site Operations Plan, will determine a strict entry order of the Teams' trucks to access SDE23 solar village and proceed to unload. This order will be done considering the trucks' order established in each Team Site Operations Plan. The above-mentioned entry of heavy vehicles will be realised only and exclusively in the specific periods established in the Competition calendar. Only light vehicles will access SDE23 solar village after this deadline, with the authorization and coordination of the SDE23 Host City Executives.

### **Heavy Vehicles Circulation**

Vehicles will respect internal circulations which will be laid out for vehicles. Circulation of these vehicles will be generally limited to the designed circulation paths. However, under special circumstances approved by the Site Operations Coordinator, trailers and semi-trailers may be driven on the Competition site.

### **Vehicles at SDE23 solar village**

Only one vehicle/transport per Team will be permitted at a time on SDE23 solar village. Other vehicles/transport must wait for the previous one to leave SDE23 solar village. This process will be coordinated between the persons in charge of the village's Site Operations Plan, and those in charge of each Team.

### **Small Electric Vehicles**

Teams are expected to provide and operate an electric-assisted small vehicle such as a cargo bicycle as part of the Mobility sub-contest. The vehicle must be parked on the Team's lot. Only one electric-assisted small vehicle such as a cargo bicycle per Team will be permitted. All electricity to run the bicycle must come from the unit's energy system. The batteries must be fully charged at the beginning and the end of the Competition. The vehicle must be allowed to drive on cycle paths.

## **4.7 Electrical Power During the Assembly & Disassembly Phases**

Generators are not permitted to power auxiliary equipment and construction lights needed for assembly and disassembly. Electrical power will be available during the assembly and disassembly phases on each Team's lot in a specific construction site box.

## **4.8 Lighting on the Competition Site**

Teams are responsible for maintaining the adequate interior and exterior lighting levels during the assembly and disassembly phases. General lighting of lots will be provided by the SDE23 Host City Executives during the assembly, disassembly, and grid tied phases. Construction lighting devices remain the responsibility of each Team during assembly and disassembly phases.

## **4.9 Site Cleaning & Waste Management**

### **a. Site cleaning**

Teams are responsible for maintaining their clean construction site, lot, and adjacent areas. Teams must respect all the SDE23 Host City Executives' indications in relation to site cleanliness. In cases of doubt, Teams must consult the Site Operation Coordinator.

### **b. Waste Disposal**

During assembly and disassembly, Teams must take their waste products to the disposal areas available on the SDE23 solar village according to separated wastes collection Rules.



#### c. Liquid Disposal

The release or disposal of water or other liquids on the SDE23 solar village must be realised according to the SDE23 Host City Executives.

#### d. Penalties Related to Site Cleaning & Waste Management

Depending on the degree of the fault, the SDE23 Host City Executives may apply point or time penalties (stopping the work), or both. Penalties will be applied according to Table 3 'Maximum Penalties for Waste Management and Construction Site Cleaning'.

**TABLE 3. MAXIMUM PENALTIES FOR WASTE MANAGEMENT & CONSTRUCTION SITE CLEANING.**

QUALIFICATION OF FAULT	PENALTY POINTS UP TO
Not cleaning construction area	5
Not respecting stock and work areas	5
Incorrect waste thrown in waste disposal	5

### 4.10 Working System

Each Team has to appoint a Site Operation Coordinator, who will be responsible for coordinating the Team's site operations. (Rule 3.2 \_ Team Officers & Contact Information). Assembly and disassembly phases will be clearly indicated in the Competition calendar. During the assembly and disassembly phases, Teams will work during daylight hours. Exceptions must be cleared with SDE23 Host City Executives, always complying with the working shifts established by the health and safety officials. Please refer to Rule 51 for further details regarding working shifts and requirements according to health and safety regulations.

### 4.11 Transport

Every Team is responsible for the transport of its unit, the unit's contents, tools, and equipment to the solar village. See other logistics issues in Rule 11.5 \_ Logistics. Teams will have to consider the dimensional aspects, suggesting the maximum load to be 'pallet-able'. Small exceptional road transports are not permitted.

SDE23 Host City Executives suggests that the participating Teams contact transport companies during the development phase of the project to guarantee compliance with the freight transport Rules. Special attention must be paid to customs regulations by those Teams not from the European Union.

**Note:** Transportation requirements according to the Host City's local laws will be made available after Team selection.

## rule 5 \_ solar envelope

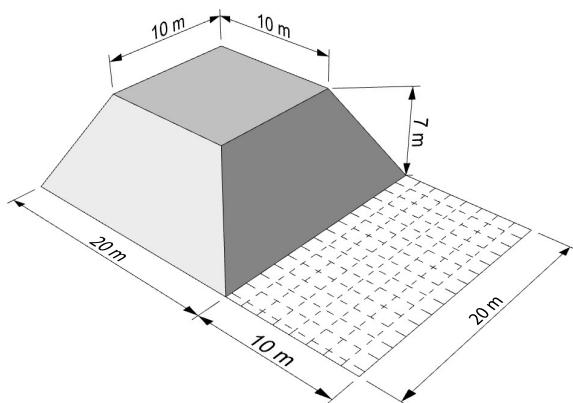
### 5.1 Solar Envelope Dimensions

To protect a neighbour's right to the sun, the Living Demonstration Unit and all site components on a Team's lot must stay within the solar envelope shown in Figure 1. The solar envelope shape is a truncated pyramid whose basis measures 20 m x 20 m and whose centred top section measures 10 m x 10 m while located at a 7-meter height. 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). This height must be clearly indicated in the Project Drawings. Small weather stations, antennas, air vents, or other similar small components may be specifically exempted from the compliance of solar envelope if all the following conditions are met:

- The Team makes a request to the SDE23 Organisation for an exemption.
- The Team can prove to the SDE23 Organisation's satisfaction that the component is not significantly restricting a neighbours' right to the sun.

Moveable or convertible house or site components will not extend beyond the solar envelope.

**FIGURE 1. SOLAR ENVELOPE DIMENSIONS.**



## 5.2 Operations Area

Next to the Teams' lots will be a space designated as the Operations Area, filled with dashed line grid in Figure 1.

The Operations area will be only available during the assembly and disassembly phases. During the Competition phase, the position of the Operations Area will be used as alleys and pedestrian paths.

# rule 6 \_ project extents

The following information only addresses the Living Demonstration Unit (LDU) to be built on the solar village.

## 6.1 Design Approval

### a. Structural Design Approval

Each Team must submit structural drawings and calculations for the Living Demonstration Unit (LDU) that have been signed and stamped by a qualified licensed professional. By signing and stamping the structural drawings and calculations, the licensed professional certifies that the structural provisions of the Solar Decathlon Europe 2023 Building Code have been met by the design, that the structure is safe to be used and visited by the general public, and that it has been constructed as it was designed. The licensed professional must sign and stamp the structural drawings and calculations of the unit and all site components that might pose a threat to public safety if they fail.

### b. Electrical & Photovoltaic Design Approval

Each Team must submit electrical drawings and calculations for the demonstration unit that have been signed and stamped by a qualified licensed professional. They will include the conventional electrical installation as well as the photovoltaic installation. By signing and stamping the electrical drawings and calculations, the licensed professional certifies that the electrical provisions of the SDE23 Building Code have been met by the design, that the electric system is safe to be used and visited by the general public, and that it has been constructed as it was designed. The licensed professional must sign and stamp the electrical drawings and calculations of the unit (LDU) and all site components that might pose a threat to public safety if they fail.

### c. Codes Design Compliance

Each Team must submit a document, certifying compliance for the demonstration unit with the codes from the country of origin, signed by the Faculty Advisor. By signing this document, the Faculty Advisor certifies that the unit (LDU) complies with all the codes of the country of origin, therefore ensuring that the unit (LDU) is safe to be used and visited by the general public and that it has been built as designed.

## 6.2 Maximum Architectural Footprint

### a. Footprint

The footprint includes the entire area within the defined building perimeter (including the unit and the site components) as well as active systems simulating contextual systems set outside of the Measurable Area (see Rule 6.3 \_ Measurable Area). The architectural footprint cannot exceed 150.0 m<sup>2</sup>.

### b. Terraces

Ground floor terrace (deck, platform, etc.) and site components lower than 1.0 m height are not included in the architectural footprint.

### c. Open Spaces

For 'open spaces' adjacent to the unit (LDU) perimeter: if there are elements of the 'open space' which visually continue the unit (LDU) lines or geometric, the total area of these 'open spaces' will be included in the architectural footprint. ('Open spaces' are patios and other unroofed spaces adjacent to the unit perimeter).

### d. Observed Footprint

The maximum observed footprint of each component during jury tours, public hours, or contests is included in the architectural footprint of record. For example, if a Team deploys a motorised awning during public hours to demonstrate its operability, then the additional footprint attributable to the deployed awning is included in the architectural footprint of record. Teams should anticipate this by integrating the deployed awning area in the 150.0 m<sup>2</sup> maximum footprint area.

### e. Component Approval

Teams planning to use particular components must submit their proposal to the SDE23 Organisation. The SDE23 Organisation will evaluate individual proposals and designs and determine if their usage does or does not signify a competitive advantage. Consequently, the component will be approved, and establish the area included in the architectural footprint (the entire area projected and/or exclusively its elements).

## 6.3 Measurable Area

The Measurable Area, as defined below, will be at least 45.0 m<sup>2</sup>, but will not exceed 70.0 m<sup>2</sup> for one-story units and 110.0 m<sup>2</sup> for two-story housing units.

### Measurable Area Definition

The Measurable Area is the net floor area within the thermal envelope of the building. The purpose of identifying the Measurable Area is to determine the size of the net interior space that will be conditioned and measured as a floor area. Covered and constructed area remaining when walls, columns, stairs shaft, high spaces under 1.80m, and closets, or any other storage or technical element built from floor to ceiling, are excluded. Interior surfaces of walls defining the building's thermal envelope form the Measurable Area perimeter. All primary living areas will be located within the Measurable Area. If the building has convertible or moveable components, the maximum and minimum Measurable Areas during live presentations or shown in printed media presented by the Team during jury visits, public exhibits, or contests, counts towards the maximum and minimum Measurable Areas of record respectively.

### Two-story Housing Units

The largest of the two floors will not exceed 70.0 m<sup>2</sup> of Measurable Area. Concerning general public (including disabled persons) access to possible 2nd floor, the regulations of the Host City apply. (See Rule 50 \_ Building Codes)

#### 6.4 Entrance & Exit Routes

The main entrance may be placed on any side of the unit (LDU). However, an accessible route leading to and from the main street of SDE23 solar village to and from the main entrance of the unit will be provided.

[Possible exception: Pending the approval of the SDE23 Organisation, Teams on 'corner lots' may modify the exit route so that it empties onto a 'cross street.' Teams requesting this option will provide an alternate site plan in the construction documents that shows an exit to the cross street. The alternate site plan will be considered if the Team receives a corner lot]. Teams will clearly illustrate and label the entrance and exit routes between solar envelope 'property lines' and unit (LDU) entrance/exit in the Project Drawings and the Competition site. Teams are responsible for providing a walkable surface from their lot limit to the starting point of their ramp(s) and stairs.

#### 6.5 Project's Minimum Requirements

To participate in the ten contests of the Competition, Teams' projects must include, at minimum, the following:

- Appliances. See Rule 22 \_ Contest 8: House Functioning for specific details;
- Workstation, desk or table to work or study at home with a computer (desktop or laptop);
- Interior public area for dinners (See Rule 22\_ Sub-Contest: Dining for further details);
- Interior public areas of the unit (at least living room and kitchen) will be open to public exhibit; complying with accessibility requirements (See Rule 50);
- Bedroom or a bed area;
- Accessibility requirements (See Rule 50);
- Interior and exterior lighting (See Rule 12.7 \_ Interior & Exterior Lighting).

#### 6.6 Competition Prototype Scalability

Teams must present Living Demonstration Units adapted to Bucharest's climate conditions during the Competition period (August-September). All modifications compared to the design competition must be clearly indicated as such in the various documentation materials.

## rule 7 \_ energy

The energy supply of the whole building concept must reflect the energy infrastructure at the area of the chosen context. Teams are free to elaborate sources of energy other than solar, such as ground, ambient or waste-water heat, to develop the site-specific energy concepts for the context design. In the case of Teams working with sites from their own country, the energy infrastructure has to be described.

The general intention is carbon neutrality for the annual balance of the operational energy and any form of feed-in energy. Carbon factors for all situations are expressed as equivalent emissions with Table 4, and based on the EU28 electricity mix reference scenario for 2030<sup>1</sup>. Consumed and feed-in electricity is counted with the identical factor. In the case of other energy carriers, the applied carbon factors must be communicated to the Host City Executives for general consistency.

TABLE 4. EMISSION FACTORS FOR NATURAL GAS & POWER GRID.

EMISSION FACTOR IN CARBON EQUIVALENTS	
NATURAL GAS	241 g/kWh <sub>end</sub>
AC POWER GRID	200 g/kWh <sub>el</sub>

<sup>1</sup> <https://ec.europa.eu/energy/en/data-analysis/energy-modelling/eu-reference-scenario-2016>

### 7.1 Energy Sources

Global solar radiation incident upon the lot and the energy in small primary batteries (see 7.4 Batteries for limitations) together with energy from the solar village grid are the only sources of energy that may be consumed in the operation of the demonstration unit. Electricity from the grid and its equivalent carbon emissions, associated with the operation of the demonstration unit, should be offset by an equal or greater number of feed-in credits.

**Note:** For safety reasons, the use of hydrogen (production, storage and use) is not allowed for the demonstration units.

### 7.2 Village Grid

The SDE23 Host City Executives will provide the solar village with an electric power grid that provides AC power to or accepts AC power from the units. The SDE23 Host City Executives will provide the necessary service conductors and connect the conductors at the utility access point. A Team must notify the SDE23 Host City Executives if its unit operates with an AC service other than 50 Hz, 230V (phase- neutral). The low-voltage grounding means that the system of the electricity distribution grid on the SDE23 solar village follows a TN-C-S configuration. This aspect should be carefully considered when designing the grounding methods of the unit and photovoltaic system (see grounding methods requirements in the IEC standard and local regulations mentioned in Rule 50). There will be a general distribution box in each of the lots with the necessary protections for the electrical connection to the general grid of the SDE23 solar village. Each Team has the responsibility to reach the general distribution box with the conduits. In any case, conduits will be left in the general connection box of the lots and the connection will be made by an authorized technical expert from the SDE23 Host City Executives. The individual branch must have a section of 3x16 mm<sup>2</sup>, insulation 0.6/1 kV and be halogen-free. The Team is responsible for calculating the unit electrical grounding necessities. The SDE23 Host City Executives will execute the grounding system of SDE23 solar village with buried plates grounding connection points; in this way, each unit will have one connection point, both for the electrical consumption (AC, alternate current) and for the electrical generation (photovoltaic system).

### 7.3 PV Technology Limitations

Bare photovoltaic cells must be commercially available to all Teams before the beginning of the final phase of the SDE23 Competition (June 2023). Custom-designed PV modules will be permitted, provided that the manufacturer demonstrates that the PV modules have been manufactured in accordance with the relevant applicable standards (i.e., IEC 61215 for crystalline silicon terrestrial PV modules and IEC 61646 for thin-film terrestrial PV modules). Encapsulated photovoltaic modules must be commercially available to all Teams by the beginning of the final phase of the SDE23 Competition (June 2023). Substantial modification of the crystal structure, junction, or metallisation constitutes the manufacture of a new cell and is not allowed. With respect to the conditions during the Competition weeks and the measured contests, the maximum power of the photovoltaic installations connected to the unit is limited to 5 kWp. To visualize the PV integration as part of a multi-story building, Teams are stimulated to install more PV than 5 kWp, but they won't be allowed to connect to the unit more than 5 kWp of PV panels. The PV system solution of the demonstration unit must be consistent to the solution suggested for the full design project. The PV installation that will be connected to the unit during the Competition (PV panels, inverters, wiring, etc.) must be clearly indicated in the Project Drawings, one-line diagram and in the electrical & PV chart and checklists (see Rule 47 \_ Electrical and PV Design Systems Information). If technologies other than photovoltaics are used for electricity generation, the limit of 5 kWp (mentioned in the Rule 7.1 \_ Energy Sources), applies to the aggregate of electricity generation installations (photovoltaic and non-photovoltaic).

### 7.4 Batteries

The use of primary (non-rechargeable) batteries (no larger than "9V" in size) is limited to smoke detectors, remote controls, thermostats, alarm-clock backups, and other small devices that typically use small primary batteries. For hard-wired battery banks, the building code regulations must be considered. All hard-wired battery banks must respect specific electrical requirements, particularly concerning connections with the photovoltaic installation and the grid. The inverter to be used together with the battery bank must be designed for operation in a grid type TN-C-S (see Rule 7.2 \_ Village Grid).

This characteristic will be properly justified in a corresponding technical document. With respect to the conditions during the competition weeks and the measured contests, the maximal usable storage capacity of the battery bank is 6 kWh. Batteries in the demonstration unit are intended to buffer PV electricity. It is not permitted to charge batteries with grid electricity. At the beginning, as well as the end of the Competition phase, battery banks must be completely charged.

The SDE23 Host City Executives will approve the use of small 'stand-alone' (i.e., non 'plug-in') secondary batteries on a case-by-case basis. 'Plug-in' (non-hard wired) devices with small secondary (rechargeable) batteries that are designed to be recharged by the unit's electrical system (i.e., a laptop computer), will be connected to the demonstration unit's electrical system whenever the devices are located in the unit or on the unit's site. They will not be recharged in a system outside the unit. Failure to end the contests period with a fully charged storage system or EV battery will be considered a Rules violation and be subject to penalty points, disqualification of related sub-contests and energy adjustments, as deemed appropriate by the Competition Manager.

**Exception:** Devices that are not used in the House Functioning Contest at any time during the contest week, such as TV screens for public tour communication; Team members' personal computers; portable electronic devices used for mobile communication, such as cell phones and PDAs; are permitted on site without having to be plugged into the unit's electrical system. However, if a Team uses any of these devices as a remote control of the unit's equipment or systems, or as an active element in the unit's system, penalties can be applied by the SDE23 Host City Executives.

## 7.5 Connection of the Houses to SDE23 Solar Village Grid

Once the final electrical inspection (including photovoltaic systems) has been approved, the units will be officially connected to SDE23 solar village grid. The electrical energy balance for the operation of the units at the beginning of the Competition will be zero. From the approval of the final electrical inspection to the beginning of the contest weeks, in the electrical panels of the units, only the circuit breakers of the appliances, the independent circuit breaker for the home electronics, and the lighting circuit breakers can be activated. The units officially connected to the grid will not use any thermal energy storage active system or conditioning active system until the beginning of the measured contests during the contest weeks.

## 7.6 Thermal Energy Storage

Thermal energy storage devices located outside of the footprint will be fully shaded from direct solar radiation.

## 7.7 Desiccant Systems

Teams must communicate to the SDE23 Organisation if they are planning to incorporate a desiccant system.

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

In most cases, the material or device will be measured prior to and at the conclusion of the Energy Balance contest. In some cases, the measurement at the conclusion of the Energy Balance contest will not be necessary. At the conclusion of the Electrical Energy Performance contest, the weight of the desiccant material or device will be less than or equal to its initial weight. Some desiccant systems with very low moisture storage capacities may be exempt from this requirement.

**Note:** exemptions will be granted on a case-by-case basis.

## 1.1 Humidification Systems

If a Team is intending to use a humidification system, it must notify the SDE23 Organisation for approval of the system's characteristics, and the corresponding certifications of the different elements.

## 1.2 Heat Sink

Dedicated heat sinks are not subject to the requirements of Rule 6.2 or Rule 7.6. A component that may, at different times, perform as either a heat-sink or a heat source will comply with Rule 7.6. If such a component does not comply with Rule 7.6, it will comply with Rule 6.2.

## rule 8 \_ liquids

### 8.1 Containers Locations

Liquid's supply and waste containers will be located outside of the Measurable Area. Liquids' solar storage, hot water, or other thermal storage tanks may be located within the Measurable Area. Liquids' supply and waste tank(s) or container(s) will be fully shaded from direct solar radiation.

### 8.2 Water Delivery

**The procedure and associated requirements for water delivery is as follows:**

- The SDE23 Host City Executives will supply non-potable water for the contest purposes;
- Every Team must have all the necessary means required by the SDE23 Host City Executives to this end;
- Construction Documents must clearly indicate the fill location(s), quantity of water requested at each fill location, container(s) dimensions, diameter of the opening(s) and clearance above the tank(s);
- All openings must be easily accessible. Teams are responsible for distributing water within their units. This includes all necessary pumps, tanks, lines, valves, etc;
- SDE23 Host City Executives will establish the water supply calendar before the Competition. The supply in any other moment will be under express request, approval, and supervision of the SDE23 Host City Executives;
- Moreover, water storages must be completely empty at the beginning of the Competition phase.

### 8.3 Water Removal

**The procedure and associated requirements for water removal is as follows:**

- Construction Documents must clearly indicate the removal location(s), quantity of water to be removed from each removal location, tank dimensions, diameter of the opening(s) and clearance above the tank(s);
- All openings will be easily accessible;
- The water removal will be always under request, approval and supervision of the SDE23 Host City Executives.

### 8.4 Team-Provided Liquids

**A Team may provide its own liquids for the following purposes:**

- Personal hydration;
- Food preparation;
- Thermal mass (quantity limited by soil bearing pressure limit and Rule 4.4 \_ Footing; see Rule 8.8 \_ Thermal Mass for restrictions);
- Hydronic system pressure testing;
- Small volumes of glycol, deionized water, or other working fluids for thermodynamic systems using working fluids other than non-potable water;
- Assembly (ie., hydraulic fluid), finishing (ie., paint), and cleaning (ie., mineral spirits).

### 8.5 Greywater Reuse

On the SDE23 solar village, Teams providing greywater treatment systems may reuse greywater for irrigation and cleaning. Greywater reuse systems will comply with Rule 9.2.

### 8.6 Rainwater Collection

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

- Irrigation source;
- Water feature;
- Heat sink;
- Heat source (only if it is fully shaded or located within the unit Measurable Area, or both).

### 8.7 Evaporation

Water may be used for evaporation purposes.

### 8.8 Thermal Mass

Teams may use liquids as thermal mass. The thermal storage containers will be filled and sealed before their arrival on the Competition site and will remain sealed until they are removed from the Competition site by the Teams.

Thermal storage containers will be isolated, i.e., the contained liquid will not circulate to other containers or systems.

### 8.9 Greywater Heat Recovery

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

'Batch-type' greywater heat recovery is prohibited.

## rule 9 \_ vegetation placement

### 9.1 Vegetation Placement

The use of potted vegetation is permitted. All potted vegetation must comply with Rule 4 \_ SDE23 Solar Village.

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

### 9.2 Watering Restrictions

Greywater, that may possibly contain organisms that may go septic (kitchen sink, dishwasher, ...), will not be used to water vegetation.

## rule 10 \_ monitoring

A significant part of the Competition scoring involves the measurement of different items and the correct performance of various tasks. The Host City Executives' monitoring system is responsible for controlling these measurements.

All sensors, wiring, tripods and other necessary material for these tasks will be provided by the SDE23 Host City Executives.

Monitoring is structured in two independent areas: Electrical and Instrumentation.

- **Electrical:** Electricity metering is mainly responsible for the monitoring of the Electrical Energy Performance Contest, with all of its sub-contests;
- **Instrumentation:** Various sensors are responsible for the monitoring the 'Comfort' and 'House Functioning' Contests, with all their sub-contests.

There are two types of monitoring: Continuous Monitoring and Tasks Monitoring, depending on whether the measurements are continuous, or task based. General information on the monitoring is described in each relevant contest section. Further information regarding the monitoring system of the SDE23 Competition will be available through the SDE23 WAT, Official Communications, Rules & Related Documentation, Monitoring Contest's Procedures Presentation and Technical Monitoring Procedures Document.



## **10.1 SDE23 Sensor Location & Wire Routing**

A summary of the sensor's location and wire routing is provided in this section. Extended information is included in the Technical Monitoring Procedures Document. This document will be available through the SDE23 WAT, Official Communications, Rules & Related Documentation.

### **a. Instrumentation**

The SDE23 Host City Executives will supply a list of all the SDE23 instrumentation devices necessary for the monitoring system of the demonstration units. Teams must ensure the possibility to connect the instruments (electricity meters) in the installations (space in the installation racks, wiring schematic, ...) to be able to take part in the monitoring C.

### **b. Sensors Location**

The location of sensors is determined by the SDE23 Host City Executives, based on Deliverable #3 projects documents.

### **c. Wire Routing**

As sensors will be wired, or wireless, depending on the SDE23 Host City Executives' monitoring concept, a route for running wires from each sensor location to the data logger is required. The Teams are responsible for providing a wire routing that permits a quick and easy installation and removal of the SDE23 Instrumentation wires. This route must be clearly detailed in construction documents (Deliverable #4). This easy installation is mandatory to ensure that the unit is monitored to enter the Competition. These wires and sensors are installed temporarily for the contest weeks.

### **d. Feed-through**

All devices used for the monitoring will be located indoors in a specific monitoring panel room. Units must provide feed-through to pass the power and Ethernet wires from the exterior to the interior of that room.

### **e. Solar Village Weather Station**

The village will be equipped with a weather station (air temperature, humidity, global radiation, wind) for logging the climate data during the Competition phase. Monitored data will be provided together with the monitoring data sets of the units.

### **f. Instrumentation Plan & Approval**

Teams must submit instrumentation drawings showing the location of the SDE23 sensors, meters, and the wire routing. Teams must have the Instrumentation Plan approved by the SDE23 Host City Executives to be able to participate in the final phase of the Competition. The procedure is as follows:

#### **Before the final phase of the Competition**

The SDE23 Host City Executives determine and indicate the location of the sensors based on project documents included in Deliverable #3. Teams must include the wire routing and Monitoring Panel in a Preliminary Monitoring Plan delivered to the SDE23 Organisation two weeks after the sensors' location definition sent by the SDE23 Host City Executives. The SDE23 Host City Executives examine this document and eventually ask for modifications before approval of the final Monitoring Plan. The approved final Monitoring Plan is included in construction documents (Deliverable #4). Final minor changes can be permitted by the SDE23 Host City Executives after submission of updated construction documents (Deliverable #5).

#### **'In Situ' During the Assembly Period**

The SDE23 Host City Executives' monitoring & scoring executives responsible for the monitoring and scoring system implementation will check the spaces provided for the wiring (channels, paths, holes, etc.). If these construction elements are physically not available as indicated in the approved construction documents, penalties can be applied by the SDE23 Host City Executives. Teams will make the necessary adjustments so that the instrumentation system can be safely and robustly installed by the SDE23 Host City Executives. SDE23 Host City Executives will mark the location of the sensors. SDE23 Host City Executives will install the monitoring panel, power it and verify that everything is correctly installed. The SDE23 Host City Executives will wire the sensors to the monitoring panel. The SDE23 Host City Executives will verify the operation of the sensors. Teams are responsible for the integrity of the monitoring system during Competition phase.

## rule II \_ the event

### 11.1 Registration

All Solar Decathlon Europe participants attending the final phase of the Competition must register through the online registration site, which will be available closer to the event. For special cases only, registration will be on-site. Due to safety concerns, the different categories of participants will have different types of access (such as restricted areas or during restricted times). The following Rules apply to registrants:

#### a. All Registrants

Each event participant must register individually. Group registrations are not allowed. When registering, event participants must complete all required information and forms before access to the event is allowed.

#### b. SDE23 Organisation, Team Members & Jurors

Will be required to provide a photo that will be kept on file and used for security purposes. To avoid delays, the SDE23 Organisation encourages using the online registration site and submitting the completed forms, information, and photos prior to the event. Once the SDE23 Host City Executives receive the information required, forms, and photos, an event security ID will be issued to all individuals and must be always visible.

#### c. Staff & Team Crew

Will be required to provide a photo that will be kept on file and used for security purposes.

#### d. Visiting Media

Must check in at event headquarters and will be required to provide a photo which will be kept on file and used for security purposes.

### 11.2 Use of the Solar Decathlon Europe 2023 Logo

All communication materials produced by or in collaboration with the Teams, before, during and after the Competition, must refer prominently to the project as the Solar Decathlon Europe 2023 or SDE23 and will credit the Solar Decathlon Europe as indicated by the SDE23 Organisation. This includes all the materials and/or means in which companies and/or institutions refer to their collaboration with one or more Teams by using their logo(s). The SDE23 Graphic Chart & Brand Manual includes specific instructions for this use. Please refer to this document. The Solar Decathlon Europe 2023 will be recognised wherever Teams' logos are used. The possible combinations between SDE23 and Teams' logos will be described in the Team's visual identity manual (see Rule 38.8a \_ Team Visual Identity Manual) and must comply with the SDE23's Graphic Chart & Brand Manual (available through the SDE23 WAT).

### 11.3 Teams' Sponsors & Supporting Institutions

Teams' Sponsors & Supporting Institutions are a very important aspect of the SDE23 Competition. For this purpose, each participating Team may select the companies and/or institutions that best serve the development of their purposes. However, both (the participating Team, and the Team's sponsors and supporting institutions) will comply with the SDE23 Rules and look over its fulfilment by third parties. The relationship between SDE23 and Teams' sponsors will always be done through the Team's sponsorship contact. The SDE23 Organisation will not have direct contact with the Teams' sponsors. Teams' sponsors and supporting institutions may be recognized with text, logos, or both, but the text and logos must appear in conjunction with the Solar Decathlon Europe 2023 logo (SDE23), the Energy Endeavour Foundation logo, and the event support institutions and main Event Sponsors. However, all these possible combinations must comply with the SDE23's Graphic Chart & Brand Manual (available through the SDE23 WAT). Please refer to that document for specific co-branding usage of the SDE23 and EEF brands. The Solar Decathlon Europe 2023, and the Energy Endeavour Foundation logos are available through the SDE23 WAT and/or <http://solardecathlon.eu/sde-graphicchart-brandmanual-logos-download/>. The event support institutions and main event sponsors logos will be available through the SDE23 WAT. Teams may include the logo of their Teams' supporting institutions and sponsors as follows:

**a. Before the Competition**

In any documentation, while fulfilling the SDE23 Rules requirements regarding use and size.

**b. During the Competition on the SDE23 Solar Village**

Commercial or technical advertising in the Living Demo Unit's (LDU) interior is forbidden, except for the following cases:

- **Panels**  
On the explanatory panels located inside the lot outside the unit, or in the waiting lines and waiting areas.  
Logos must not be bigger than 10% of the total panel surface and must be included inside a vertical or horizontal strip.  
See Rule 12.2 \_ House Occupancy, Rule 12.5 \_ Public Tour, and Rule 38.8c \_ Public Tour Description.
- **Website**  
On the Teams' website and/or other services for mobile devices that Teams may provide, included in the sponsorship's section. Additionally, these may be included inside a vertical or horizontal strip, with a maximum size of 10% of the screen's total surface. See Rule 29 \_ Team Website.
- **Brochures**  
On the informational brochure, handout or any other object that may be given to the public.  
See Rule 12.2 \_ House Occupancy, Rule 12.5 \_ Public Tour, and Rule 38.8c \_ Public Tour Description.
- **Uniforms**  
On the back of the Decathletes' uniforms. See Rule 11.4 \_ Team Uniforms.
- **Components**  
Off-the-shelf components that feature a built-in manufacturer's logo are acceptable and do not need to comply with the SDE23 and Team's logo requirements.
- **Vehicles**  
On any vehicle and/or material, only during assembly and disassembly phases.
- **Audio-visual**  
In the Team's audio-visual #2 (see Rule 28.3 \_ Audio-visual).
- **Living Demonstration Unit**  
Units cannot be named after their sponsors, and units cannot directly refer to their sponsor's corporate identity ('direct reference' is subject to the SDE23 Host City Executives' interpretation).
- **Teams**  
Teams may name specific areas of the unit after their sponsors; however, any reference to these spaces must comply with SDE23 branding.
- **Communication Materials**  
Communication materials or other products that exist largely for the recognition of sponsors are prohibited.  
'Other products' include but are not limited to signs, exhibits, posters, plaques, photos, wall art, and furnishings.

**11.4 Team Uniforms**

- During contest week, workshops and special events specified by the SDE23 Host City Executives, all Team members present on the Competition site, or the site of a special event will wear uniforms representing their Team;
- Uniforms will help to identify Team's members quickly and easily and will be composed of a series of wearable items;
- On the front part of Teams' uniforms (jacket, shirt, hat or another wearable item), only the combined version of the Team's logo and the SDE23's logo may be visible;
- On the back part of Teams' uniforms (jacket, shirt, hat, or other wearable item),  
Team sponsor logos may be visible only if complying with the logos' Rules requirements;
- A built-in clothing manufacturer logo may be visible on the front or back of the Team uniform, or both or none of them;
- Since the SDE23 solar village is a public space, Teams should maintain a dress code required for public areas;
- Each Team will determine its uniforms' colour(s) in Deliverable #2. Two options are to be proposed.  
In case of a too great similarity between two Teams, the SDE23 Host City Executives will request a second choice.  
The objective is to avoid visual uniformity and facilitate SDE23 communication;
- Uniforms design will be evaluated by the jury for the contest in Communication & Social Awareness.  
Please refer to the SDE23 Graphic Chart & Brand Manual.

### 11.5 Logistics

- Each Team is responsible for the transport of its unit, the unit's contents, and all necessary tools and equipment, and will be responsible for any damage to or loss of such items;
- Each Team is responsible for procuring all necessary equipment, tools, and supplies;
- Each Team is responsible for transportation, accommodations, lodging, food, and beverages (including drinking water);
- Each Team is responsible for making its own reservations and arrangements and for covering all necessary costs.

### 11.6 Inspections

- Each project will be inspected for compliance with these Rules and the SDE23 Building Code;
- Teams will notify the appropriate Inspector when they are ready for an inspection.  
When two or more Teams request an inspection simultaneously, the order of inspections will be determined in a draw;
- Spot checks for compliance will take place throughout the final phase of the SDE23 Competition;
- The Competition Manager will check each Team's inspection status, as indicated on the Team's official Inspection Card, to determine which units are eligible to participate in the contest;
- All final inspections will be passed by the end of the Inspectors' workday for a Team to be eligible to participate in the following day's contest.

**Exception:** Jury visits will proceed as scheduled regardless of a Team's inspection status. However, jurors may be aware of the Team's inspection status and may consider it in their evaluations.] Because open, partially functioning units are preferable to closed, fully functioning ones, the SDE23 Host City Executives will direct the Inspectors to require that an unsafe condition be corrected so public tours can occur even if, consequently, the unit (LDU) is ineligible for participation in the contests.

## rule 12 \_ contest period

### 12.1 Contest Period

The final phase of SDE23 Competition is scheduled for September 2023.

### 12.2 House Occupancy

Under normal circumstances, when the occupancy Rule is in effect, no more than six people may be located in the Living Demonstration Unit at any one time.

- Toward the end of each day during contest weeks, the SDE23 Host City Executives will post a message on the SDE23 WAT message board indicating the hours during which the occupancy Rule is in effect the following day;
- The unit occupancy Rule is automatically suspended whenever the Comfort Condition contest measurements are suspended;
- During the dinner party, the unit occupancy Rule is automatically suspended.  
See Rule 22\_ House Functioning sub-contest 8.11;
- Jurors, ss, official Competition photographers and journalists, and others with authority to enter a unit (LDU) as an Executive are not counted in the number of unit occupants;
- Rule 12.1 remains in effect when jury walkthroughs and contest tasks are occurring simultaneously, unless it has been suspended by the SDE23 Host City Executives;
- The Solar Decathlon Europe 2023 is intended to be a primarily student-run project.  
Therefore, when the occupancy rule is in effect, Faculty Advisors are not permitted to stay inside the units.

### 12.3 House Operators

Only Decathletes are permitted to operate the Living Demonstration Unit and participate in the contest during contest week. All Competition-related communications on the Competition site will be between the SDE23 Host City Executives and Decathletes.

### 12.4 Late Design Changes

The final project assembled on the Competition site will be consistent with the design and specifications presented in the construction documents. If there are known inconsistencies between the final project and the construction documents, the Team is strongly encouraged to document these inconsistencies and submit the documentation to the SDE23 Host City Executives as soon as possible after the inconsistency is known. The SDE23 Host City Executives will then submit this documentation or a summary of the documented inconsistencies to the respective juries and Inspectors at the appropriate time. If undocumented inconsistencies are discovered during inspections, the SDE23 Host City Executives will compile a summary of the inconsistencies and submit the summary to the respective juries at the appropriate time.

### 12.5 Public Tour

During contest weeks, units (LDU) will be open to public tours during the times specified in the Competition calendar. Teams are required to provide an accessible route to all areas of the unit (LDU) and site that are available to the public during exhibition hours. Teams are permitted to distribute only one informational brochure or handout per person. Nevertheless, Teams are permitted to produce different brochures for different target groups. The handout addressing the general public must be bi-lingual, in English and Romanian languages. The handout material and its properties, like its recyclability, content and creativity, will be evaluated. Teams will develop signage that complements public tours by informing visitors about the Team project and engaging visitors waiting in line. Only SDE23 Host City Executives-approved vendors may provide food and beverage to the general public on the Competition site. The SDE23 Host City Executives will inform all Teams of the specific location of the access to each lot before the lot selection.

#### Additional requirements

Although Teams have to design only one route for all public tours, they may plan different explanations for each of the target groups: general public, professionals (architects, engineers, technicians and specialised press), undergraduates, teenagers and children, while considering long and short tours and attending to the number of waiting visitors. Teams are advised to pay special attention to structuring the different explanations for various juries and audiences.

- Teams will manage the waiting lines during public tours, and therefore design a specific waiting area inside the lot, with corresponding entertainment activity. Information panels and/or equivalent electronic equipment (always using the LDU's energy) may be installed in this area.
- Teams are encouraged to plan their route according to accessibility requirements (see Rule 50 \_ Building Codes), trying to avoid any awkward point, such as crossing of ways, narrowing, etc. If avoiding the awkward point is not possible, Teams will have to explain how these points (as well as turns, entrance and exit accesses...) are solved (see Rule 38.8c \_ Public Tour Description for further details concerning the information required).
- Public tours and explanations must take into account those people with sensorial or motor disabilities and will design these according to 'Total Accessibility Criteria'. Therefore, Teams must plan all the necessary actions or systems to let all visitors follow the same tour as the rest of the public, without any loss of information; those visitors with disabilities will not be segregated from other visitors, nor given special attention. However, once the public tour and explanations are finished, wheelchairs and strollers/push chairs (and accompanying persons) may have a different exit from the general public.
- During public tours, Teams must provide access to the public areas of the unit (at least living room and kitchen). If the unit has two different levels, and the planned public tours include visiting both levels, access must be granted for disabled people by means of mechanical elements (lifts). Moreover, as it is mandatory to show the rest of the unit (LDU), Teams may make use of other means (such as models, videos, mirrors, drawings, photos, virtual reality solutions) to this end.
- Augmented reality systems and/or any other electronic systems to enrich the public visit are permitted, beyond those provided for people with sensorial disabilities. All auxiliary electric/electronic systems used during public tours (such as screens, beamers, audio guides, fans, music players) must be powered by the unit's energy.
- When planning their communication strategy during the final phase of the SDE23 Competition, Teams must consider the following aspects:

- > Due to the duality of the design project and the demonstration unit, Teams must present and communicate on the lot the full design approach through their architectural model, virtual reality, and brochure. This includes the full energy concept and the mobility strategy.
- > Most of the visitors coming to SDE23 solar village will be native speakers of the host country.
- > Teams are encouraged to plan shading and rain protection areas, elements and/or devices inside their lot for the waiting public.

### 12.6 Housing Units' Use During Event & Impound Periods

The SDE23 Host City Executives are currently working on the definition of a real-life condition process using prototypes during the Competition (24 hours/day). This process will be determined in the next edition of the Rules. However, each unit can be impounded under the direct supervision of the SDE23 Host City Executives during a specific period of time. Team members and Team crew are not allowed to occupy, move, or conduct maintenance on any part of the unit during the impound.

### 12.7 Interior & Exterior Lighting

The units must keep all interior and exterior unit lights on during specified periods of time. Please refer to the Competition calendar for the specified periods. All the dimmers will be adjusted to their highest positions and all other lighting control equipment will be disabled or overridden so that the controlled lamps are fully and continuously on during the specified periods. In case of technical problems, Teams may notify these to the designated officials before turning selected lamps on or off, in order to avoid point penalties.

### 12.8 Safety During the Event

Each Team is responsible for the safety of the general public during the tours of their unit.

### 12.9 Housing Units Configuration for Jury Tours

Teams will show the juries all possible configurations of the unit (LDU) during the jury tours. Unit configurations that could affect the outcome of contests but were not seen by the jury during their tours, are prohibited during contest weeks. Some examples of reconfigurable features are the following:

- A significant movable component, such as a room, wall, or bed;
- Shading devices, such as retractable awnings or operable shutters;
- Towel-drying locations;
- Window coverings that may obstruct views or reduce light levels.

If there is insufficient time to do a live reconfiguration during jury tours, Teams may use some other method, such as photographs or video, to show all reconfigurable features in their various configurations. Reconfigurable features that will not actually be reconfigured at any time during contest weeks need not be reconfigured during jury tours. All plug-in or portable appliances that may be used during contest weeks will be in their fully deployed locations and configurations during jury tours. Also, be aware that juries may request that plug-in, portable, or hard-wired appliances be turned on so they can evaluate noise levels or other characteristics of the appliances that may not be evident when the appliance is off.

### 12.10 Teams Activities on the SDE23 Solar Village

Only SDE23 approved activities are permitted on SDE23 solar village. Teams wishing to hold any kind of activity not specified in the Competition calendar, in their homes, lot or any other area of the SDE23 solar village, must request the SDE23 Host City Executives' approval. These include any event co-organised by Teams and governments/supporting institutions/sponsoring companies, from official receptions to product presentations. Further information regarding the procedure for requesting approval of the SDE23 Host City Executives is available through the SDE23 WAT. The SDE23 Organisation has the authority to reject or approve any request and may issue a conditional approval or suggest a change of date or time.

**12.11 Evaluation Period**

Two consecutive days in the Competition calendar will be dedicated to the participating houses' exclusive use of 'passive cooling or heating'. For purposes of the Competition 'passive' means any form of strategy that does not rely on a 'thermodynamic cycle' or on internal heat or cool production devices. The use of pumps and fans are allowed, but electrical heaters, chillers (air conditioner), heat pumps and other equipment that include a thermodynamic cycle are not allowed during the passive evaluation period. Batteries are not permitted. Therefore, Teams will have to plan passive strategies to maintain their houses comfort conditions. The consumption of heating, cooling, ventilation and hot water systems (Ev) will be monitored to verify that Teams are respecting the Rules regarding the passive period. Penalties will be applied to the Teams that do not follow the Rules for this passive period.

**12.12 Impact Assessment**

In the aftermath of the disassembly phase, the SDE23 Host City Executives conducts an impact assessment of the SDE23 Competition event. The objective of this assessment is to share, extend and implement best practices and lessons learned toward all industry-related stakeholders and sectors: academic, professional, societal, governmental etc. Final jury evaluations and Teams' final impact assessments will be considered for this purpose. As such, the Teams' impact assessments are of great value, and Teams are urged to follow Rule 39 with great attention.

## section 2.0 \_ contest

### rule 13 \_ general contest information

The Solar Decathlon Europe Competition consists of ten separately scored contests. Each of these contests in the Competition may consist of several sub-contests and different assessment criteria. The Team with the highest total points at the end of the Competition wins the Competition. The SDE23 Competition consists of the combined approach to the social and territorial context and the final design of one Living Demonstration Unit (LDU).

Each participating Team will design a proposal from a specific type of habitation: from dense, collective housing in urban contexts, to the grouping of individual houses generation cohesive communities in less dense areas. Each Team will decide whether to design a new housing development from scratch, or to act through retrofitting on existing buildings. Projects will consider the way in which the building functions and interacts within the community and neighbouring environment. This emphasis on contextualisation helps to bolster the valuable links between the SDE23 project locations and their corresponding human, logistic, communicative, and technological connections.

The ten contests of the SDE23 are as follows:

TABLE 5. MAIN CONTESTS, POINTS, APPLICATION & EVALUATION

		EVALUATION TYPE	
CONTESTS	TOTAL POINTS	JURIED	MONITORED
1 Architecture	120	•	
2 Engineering & Construction	80	•	
3 Energy Efficiency	80	•	
4 Electrical Energy Performance	120		•
5 Comfort Conditions	120		•
6 House Functioning	120		•
7 Communication & Social Awareness	80	•	
8 Connected Living & Affordability	120	•	
9 Innovation	80	•	
10 Sustainability	80	•	

### rule 14 \_ general competition criteria

#### Scoring options

In the SDE23 Competition there are four different ways to earn points:

- Jury evaluation;
- Task completion;
- Tests;
- Monitored performance.

Participating Teams will have access to all the information related to the monitoring of the units, as well as to the scoring, tables, different measurements results, scoring periods, etc. The public will be continuously informed about the scoring. See Table 6 for an overview of contests and scores.



TABLE 6. POINTS DISTRIBUTION IN DETAIL

	CONTESTS & SUB-CONTESTS	CONTESTS	SUB-CONTESTS	ASSIGNED BY
<b>1</b>	<b>Architecture</b>	<b>120</b>		Jury
<b>2</b>	<b>Engineering &amp; Construction</b>	<b>80</b>		Jury
<b>3</b>	<b>Energy Efficiency</b>	<b>80</b>		Jury
<b>4</b>	<b>Electrical Energy Performance</b>	<b>120</b>		
4.1	Load Consumption per Surface Area		40	Monitored Performance
4.2	Energy Balance		30	Monitored Performance
4.3	Self-consumption		10	Monitored Performance
4.4	Distributed Solar Generation		20	Monitored Performance
4.5	Network Load State Adjustment		10	Monitored Performance
4.6	PV System Performance		10	Monitored Performance
<b>5</b>	<b>Comfort Conditions</b>	<b>120</b>		
5.1	Temperature		40	Monitored Performance
5.2	Humidity		20	Monitored Performance
5.3	Indoor Air Quality (CO <sub>2</sub> )		20	Monitored Performance
5.4	Natural Lighting		10	Monitored Performance
5.5	Workstation Lighting		10	Monitored Performance
5.6	Acoustic Performance		20	Test
<b>6</b>	<b>House Functioning</b>	<b>120</b>		
6.1	Refrigeration		10	Monitored Performance
6.2	Freezing		10	Monitored Performance
6.3	Clothes Washing		10	Task & Monitored
6.4	Clothes Drying		10	Task Completion
6.5	Dish Washing		10	Task & Monitored
6.6	Oven		10	Task & Monitored
6.7	Cooking		10	Task Completion
6.8	Home Electronics		5	Task Completion
6.9	Hot Water Draws		10	Task Completion
6.10	Water Balance		5	Monitored Performance
6.11	Dining		10	Guest Evaluation
6.12	User-friendliness		10	Guest Evaluation
6.13	Urban Mobility		10	Task Completion
<b>7</b>	<b>Communication &amp; Social Awareness</b>	<b>80</b>		Jury
<b>8</b>	<b>Connected Living &amp; Affordability</b>	<b>120</b>		Jury
<b>9</b>	<b>Innovation</b>	<b>80</b>		Jury
<b>10</b>	<b>Sustainability</b>	<b>80</b>		Jury

### 14.1 Jury Scoring

A multidisciplinary jury, composed by internationally renowned experts in their respective fields, will use their experience and knowledge for the evaluation of the Living Demonstration Units. The scorings will be done following the maximum point distribution per sub-contest, the evaluation criteria, and the guidelines developed by the SDE23 Organisation for these contests. The jury constellations will be selected by the SDE23 Organisation (SDE23 Host City Executives and the Energy Endeavour Foundation), with consideration for academic and professional histories relative to the evaluated contests. See Table 7 Jury Overview.

**TABLE 7. JURY OVERVIEW**

JURY	TIME COMMITMENT FOR DELIVERABLES REVIEW (PER TEAM)	RELEVANT DELIVERABLE FOR REVIEW	TIME COMMITMENT FOR VISITS TO EACH UNIT
Architecture	45 minutes	Drawings, 3-D-Model Architectural Models Architecture Design Report Architecture Brief Report Innovation Report Audio-visual presentation	30 minutes
Engineering & Construction	45 minutes	Drawings, 3-D-Modell Engineering & Construction Report Engineering & Construction Brief Report Innovation Report Audio-visual presentation	30 minutes
Energy Efficiency	45 minutes	Drawings, 3-D-Model Energy Efficiency Report Energy Efficiency Brief Report Innovation Report Audio-visual presentation	30 minutes
Communication & Social Awareness	45 minutes	Website & Social Media Communication Plan & Press Kit Audio-visual Presentation Guided Public Tour & Materials Innovation Report Speed Peer Review	30 minutes
Connected Living & Affordability	45 minutes	Sustainability Report Sustainability Brief Report Innovation Report Audio-visual presentation	30 minutes
Innovation	45 minutes	Each thematic Jury gives the points for the innovation in that category. The SDE23 Host City Executives take care of the summary.	
Sustainability		Sustainability Report Sustainability Brief Report Innovation Report Audio-visual presentation	

The review will be performed in four phases:

- **First Phase: Documents Review**  
The deliverables outlined in Table 28 give the juries the opportunity to study the projects, to familiarise themselves and explore specific technical details. For each juried contest a pre-evaluation of the documents will be performed by the SDE23 Host City Executives.
- **Second Phase: Unit (LDU) Visits**  
The visits take place during the contest weeks on the SDE23 solar village, giving the juries the opportunity to visually verify the previously delivered information, and raise any question or clarification directly to the Decathletes that the jury may consider appropriate. Each jury visit may be introduced by the Teams with a compact audio-visual presentation of the juried topic.
- **Third Phase: Deliberation**  
The deliberation is the process where the different members of the same jury combine ideas, sharing their opinions regarding the previous phases.
- **Fourth Phase: Scoring**  
Juries will provide a written feedback to each Team explaining the scoring assigned and the evaluation criteria considered.

#### 14.2 Task Completion Scoring

Teams will obtain points for successfully completing the requested tasks. The carrying out of each task will be controlled by an officially designated Observer, who will register the results and her/his remarks in the 'Observers' Logs'. The scoring is based on the approach to the goals predetermined in the contests.

#### 14.3 Monitored Performance Scoring

During the contest weeks, the unit will be continuously monitored, and specific measurements will also be made. The scoring is based on the approach to the goals predetermined in the contests.

#### 14.4 Awards

During the final phase of the Competition, the following awards will be given to Teams:

##### a. Overall Awards

During the final award ceremony, the overall competition award will be granted. The Team with the highest total points at the end of the Competition wins the overall competition award. There will also be awards for the Teams with the second and third overall higher scores.

##### b. Contest Awards

Each of the ten contests will be individually rewarded. There will be awards for first, second and third positions for each contest, one for each position. Juries will award only one Team per position. In an extraordinary circumstance, juries will be able to grant the third position to two different Teams.

##### c. Out of Contest Awards

In addition to the contest awards, other awards or acknowledgments may be granted to Teams with outstanding performance in off-Competition areas. The SDE23 Host City Executives will inform the Teams about these SDE23 out of contest awards.

## rule 15 \_ contest 1: architecture

### Objectives

To assess the quality and coherence of the design, the flexibility of space, the integration of materials and technologies in architecture and the incorporation of bioclimatic strategies. To assess the general coherence of the projects and its alternates in relation with spatial and socio-economic environment of each Team's country.

### Assessment

The assessment is based on the drawings, the Architecture Design Reports, models and/or VR animations as well as the on-site evaluation of the living Demonstration Unit (LDU). A jury of renowned architects will evaluate the deliverables, as well as the on-site LDU on the solar village.

### Criteria

- Due to the nature of the SDE23 edition a convincing consideration of the contextual built environment is important as well as the socio-economic scenario addressed for the project. The relevant location-specific information has to be provided to allow the jury's understanding of the project's intention.
- **Proposal's coherence:** clarity in the conception of space and concepts. Correct use of architectural values as site integration, composition, balance, scale and proportions. Synthetic, essential, simple and radical proposals will be assessed positively.
- **Perceptive evaluation:** 'in situ' verification: how architectural design intentions have been achieved in the constructed house.
- **Spatial and interior design:** the use of expansion-transition areas, making the best use of space, transformable or multi-use spaces, and an adequate indoor/outdoor relation. The daylighting and artificial light design will also be evaluated.
- **Materials use:** coherence of the use of matter and materials with the architectural concept and the local resources available in the environmental context of each project.
- **Technologies integration:** the seamless integration of all the house technologies, including the solar systems, in the design concept and the formal expression of the project; the home-office-setup for audio-video conferencing / podcasting / live streaming; and the indoor air treatment technologies, among others.
- **Universal design:** the concept of designing all products and the built environment to be aesthetic and usable to the greatest extent possible by everyone, regardless of their age, ability, or status in life. Universal design expands 'accessibility's definition by including all persons. Universal design is about good design that works for everyone.

## rule 16 \_ contest 2: engineering & construction

### Objectives

To assess the construction and engineering systems design merit and implementation. Teams will have to demonstrate the higher level of functionality of the house structure; envelope; mechanical, electrical, and plumbing system (MEP); and solar system design and construction, its safety, viability and adequate integration of these into the project.

### Assessment

The assessment is based on the deliverables relative to the project, in particular the drawings, the Engineering and Construction Reports as well as the on-site evaluation of the Living Demonstration Unit. A jury of engineers and/or architects specialised in the different areas of this contest will evaluate the deliverables, as well as the on-site LDU.

### Criteria

- **House structure:** the structural concept, typology, innovation, calculations, and construction will be assessed.
- **Mechanical, electrical, plumbing, and automation systems; design, and construction:** concept, dimensioning and resolution of the different systems facilities and active services of the house, as well as equipment selection and its suitability considering the house's needs.
- **Solar system design and construction:** functionality, design, implementation, robustness, and economic value of solar systems will be assessed, in addition to the building integration of the active solar systems.
- **Construction system and assembly management:** constructive solutions for envelope, interior divisions, and finishes, as well as the acoustic performance of the adopted solutions; the acquired assembly/disassembly optimisations gained by using prefabricated elements/strategies.

## rule 17 \_ contest 3: energy efficiency

### Objective

To encourage excellence in systems and house design, while looking for reduction of energy consumption, and assessing the functionality and efficiency of all the house components. Teams must demonstrate to what degree the house design and its systems contribute to enhance the energy efficiency of the house, taking outdoor climatic and local conditions into account, as well as indoor climate requirements and cost-effectiveness.

### Assessment

The deliverables relative to the project, in particular the construction documents, as well as the on-site evaluation of the Living Demonstration Unit. A jury of engineers and/or architects specialised in the different areas of this contest will evaluate the deliverables, as well as the on-site LDU.

### Criteria

- **Energy efficiency concept:** effective communication and synthesis of the Team's design and analysis process, focusing on the application of engineering principles, modelling, simulations and creative solutions; an overall description of the project geometric, envelope, air-tightness and any singular element that could contribute to the house energy efficiency; the influence of simulations in the decisions and changes to the house design will be evaluated, as well as the needs calculations, the thermal loads, and the energy consumption of the house.
- **Passive bioclimatic strategies:** the success in the selection of the passive and hybrid strategies will be assessed. The followings elements will be analysed: house envelope, glazing, daylight use, space planning, heating and cooling strategies, thermal energy storage systems, natural ventilation, exterior design and semi-passive conditioning systems.
- **Efficiency of HVAC systems:** concept, dimensioning, and resolution of the HVAC systems facilities, and active strategies of the house will be evaluated, as well as its efficiency in fulfilling the house's needs.
- **Efficiency of the appliances:** the appliances selections due to their technical specifications, according to the house's dimensions and foreseen uses; the inclusion of energy savings method will be positively evaluated.
- **Efficiency increase due to house management:** strategies designed (human or automatically controlled) for a contribution to the energy saving of the house will be evaluated through their influence on inhabitant's awareness and behavioural change, ease in daily tasks performance, and efficiency in building comportment.
- **Efficiency of housing and transport coupling:** relevance and efficiency of the coupling between habitat and vehicle; how the building's production of electricity provides energy to the vehicle, and how the vehicle can be used as energy storage for building.

## rule 18 \_ contest 4: electrical energy performance

### Objective

To evaluate the house's electrical energy self-sufficiency, electrical energy efficiency, and individual solar energy consumption; to assess the house's energy consumption, energy balance, and network load management.

### Assessment

The assessment is based on high resolution monitored data by the SDE23 HC Executives' monitoring system during the Competition weeks.

### Criteria

The assessment is separated into four monitoring sub-contests, based on the electric energy measurements.

#### Sub-Contest 4.1: Load Consumption per Surface Area

This contest aims to evaluate the electrical energy efficiency of the house's ability to fulfil comfort conditions and functions. Some consumptions depend on the surface of the house, as heating, cooling and ventilation and others are fixed as with appliances. To not penalise the house's smaller areas, the consumption of houses is estimated through the following formula:

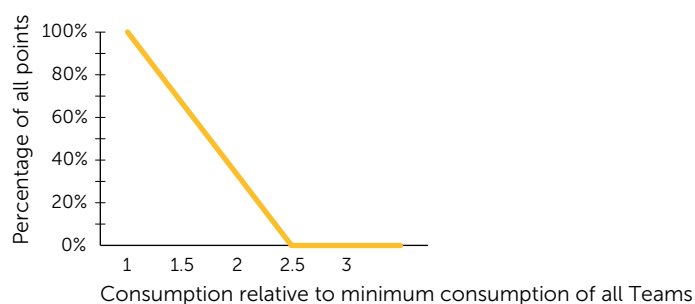
$$I_{LC} = \frac{E_V}{A} + \frac{E_F}{C}$$

#### Where:

- $I_{LC}$  is the index for load consumption per surface area.
- $E_V$  is the consumption for heating, cooling, ventilation, and water systems.
- $E_F$  is the consumption of appliances, electric vehicle, lighting and home automation systems.
- $A$  is the measurable area of the LDU, defined in Rule 6.3 Measurable Area.
- $C$  is the average measurable area of all projects.

All available points will be earned by the house with the lowest energy consumption. Houses which consume equal to or more than 2.5 times the energy of the house with the lowest consumption, will receive zero points as shown in Figure 2. The rest of the houses will receive points in a linear manner depending on the energy consumption.

**FIGURE 2. LOAD CONSUMPTION SUB-CONTEST POINTS' DISTRIBUTION**



**Note:** Teams who, to reduce energy consumption, intentionally do not try to maintain comfort conditions by disconnecting or not fully using active systems integrated in their project, could be disqualified in this sub-contest. Passive strategies are nevertheless encouraged.

#### Sub-Contest 4.2: Positive Energy Balance

This sub-contest will evaluate the cumulated balance of the Living Demonstration Unit's generation and consumption during the Competition weeks.

Since the Competition takes place in September, production during this period is greater than the annual average. To take this into account, the balance must be in excess at the end of the Competition. This excess depends on the installed photovoltaic power and the houses' measurable area.

A reference value for electrical energy generated in the Competition weeks is obtained by using the PVGIS interactive tools. By using the calculator for Bucharest, Romania, for optimized slope and azimuth, a building integrated photovoltaic system (crystalline silicon) will yield 116.39 kWh / kWp during September.

To have reference values for loads, building annual energy demand criteria of the Active House Standard are taken into consideration. Thus, a positive evaluation of houses meets the 'less than 40 kWh / m<sup>2</sup> / year' criteria, while discouraging houses that have an energy demand higher than 60 kWh / m<sup>2</sup> / year.

The result of this sub-contest is determined using the following formulae:

$$E_{EB} = E_G - E_L$$

$$E_L = E_V + E_F$$

$$E_{L\ ref\ max} = 60\ kWh / m^2 / year \times A \times \frac{12\ days}{365\ days / year}$$

$$E_{L\ ref\ min} = 40\ kWh / m^2 / year \times A \times \frac{12\ days}{365\ days / year}$$

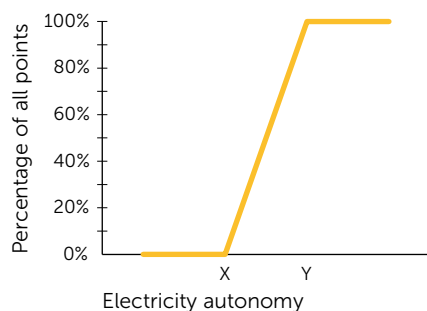
$$E_{G\ ref} = 116.39\ kWh / kWp / month \times P \times \frac{12\ days}{30\ days / month}$$

$$X = E_{G\ ref} - E_{L\ ref\ min} \quad Y = E_{G\ ref} - E_{L\ ref\ max}$$

Where:

- $E_{EB}$  is the electrical energy balance.
- $E_G$  is the generated electrical energy.
- $E_L$  is the loads' electrical energy consumption.
- $E_{G\ ref}$  is the reference value for generated electrical energy.
- $E_{L\ ref\ min}$  is the reference value for consumed electrical energy for a more efficient house.
- $E_{L\ ref\ max}$  is the reference value for consumed electrical energy for a less efficient house.
- $A$  is the measurable area of the LDU, defined in Rule 6.3 Measurable Area [m<sup>2</sup>].
- $P$  is the installed photovoltaic power of the LDU [kWp].

**FIGURE 3. POSITIVE ELECTRICAL BALANCE SUB-CONTEST POINTS' DISTRIBUTION**



**TABLE 8. POSITIVE ELECTRICAL BALANCE CALCULATIONS**

FULL POINTS		Electrical energy balance	$\geq$	Y [kWh]
REDUCED POINTS	X [kWh]	<	Electrical energy balance	< Y [kWh]
NO POINTS	X [kWh]	$\geq$	Electrical energy balance	

**Notes:**

- Teams who, to reduce energy consumption, intentionally do not try to maintain comfort conditions by disconnecting or not fully using active systems integrated in their project, could be disqualified in this sub-contest.
- Passive strategies are nevertheless encouraged.

**Sub-Contest 4.3: Self-Consumption**

Self-Consumption is the amount of energy provided by the solar technology divided by the total energy required by loads. Thus, the self-consumption is 0% for no solar energy utilisation, to 100% for all energy provided by renewable solar energy. The self-consumption ratio of a particular system is dependent on many factors, such as the load, the collection (photovoltaic system) and storage sizes, the operation, and the climate.

This sub-contest will evaluate the degree of self-supply or electrical energy balance of the Living Demonstration Unit during the Competition weeks.

$$R_{SC} = \frac{E_L - E_M}{E_L}$$

**Where:**

- $R_{SC}$  is the self-consumption ratio.
- $E_L$  is the loads' electrical energy consumption.
- $E_M$  is the electrical energy taken from the grid.



#### Sub-Contest 4.4: Distributed Solar Generation

One of the main advantages of distributed solar generation is that electricity is consumed in the same place that it is generated. This reduces the need for transmission lines and minimises electricity transport losses.

One house might reduce its own impact on the electrical network, but it might be insignificant in relation to the community. A real impact will be observed through wider implementation.

This sub-contest will evaluate the degree of self-supply or electrical energy balance of the Living Demonstration Unit in relation with the other LDU's during the Competition weeks.

$X$  = lowest  $R_{SC}$  of all projects

$Y$  = highest  $R_{SC}$  of all projects

FIGURE 4. DISTRIBUTED SOLAR GENERATION POINTS' DISTRIBUTION

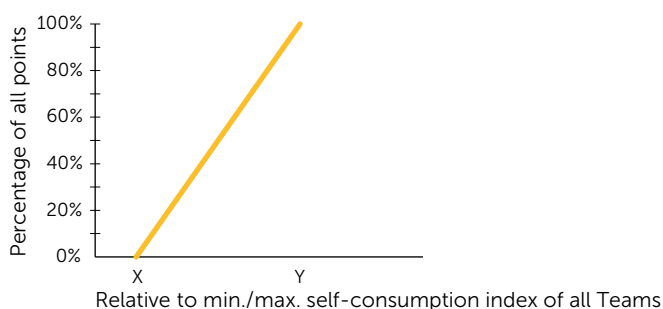


TABLE 9. DISTRIBUTED SOLAR GENERATION POINTS

FULL POINTS			Distributed solar energy	=	Y [%]
REDUCED POINTS	X [%]	<	Distributed solar energy	<	Y [%]
NO POINTS	X [%]	=	Distributed solar energy		

#### Sub-Contest 4.5: Network Load State Adjustment

The Competition evaluates how the houses solicit the power grid to which they are linked. Indeed, a grid is not equally solicited throughout the day, and one of the challenges of the future is to reduce peak load on the network. Habitants must be able to manage their interaction with the network according to its general state of stress.

They must use the minimal energy when the network load is at its maximum.

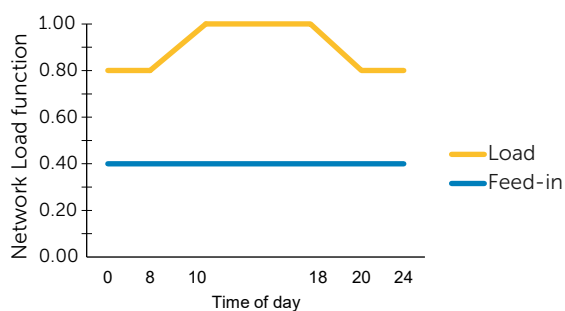
An evaluation indicator will be calculated according to the following equation:

$$\eta_0 = E_M(t) \times F(t)$$

Where:

- $\eta_0$  is the self-consumption ratio.
- $E_M(t)$  is the electrical energy passing through the general meter (consumption / feed-in).
- $F(t)$  is the function representing the network load.

FIGURE 5. NETWORK LOAD STATE ADJUSTMENT



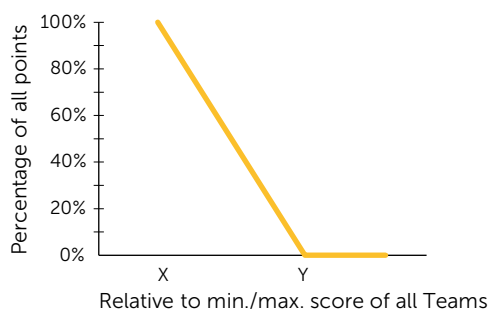
$X = \text{lowest } \eta_0 \text{ of all projects}$

$Y = \text{highest } \eta_0 \text{ of all projects}$

TABLE 10. NETWORK LOAD STATE ADJUSTMENT POINTS

FULL POINTS	$X =$	Network load state adjustment evaluation indicator		
REDUCED POINTS	$X <$	Network load state adjustment evaluation indicator	$<$	$Y$
NO POINTS		Network load state adjustment evaluation indicator	$=$	$Y$

FIGURE 6. NETWORK LOAD STATE ADJUSTMENT POINTS' DISTRIBUTION



**Note:** Teams who intentionally do not try to manage their consumption during peak period could be disqualified in this sub-contest.

#### Sub-Contest 4.6: PV System Performance

This sub-contest evaluates the quality of the PV system in real operation. The so-called performance ratio provides the performance of the installation (including the orientation or inclination of the panel). It typically ranges from 0.7 to 0.9. It includes all losses: temperature, inverter, DC cables, AC cables, panel mismatch, shadings, losses at weak radiation, losses due to dust, snow, etc.

$$R_{PV} = \frac{E_G}{A_{PV} \times 3.6 \times I_{IRR-PYR}}$$

Where:

- $R_{PV}$  is the photovoltaic system performance ratio.
- $E_G$  is the generated electrical energy.
- $A_{PV}$  is the surface of the photovoltaic system.
- $I_{IRR-PYR}$  is the pyranometer solar irradiance value on horizontal plane.

FIGURE 7. PV SYSTEM PERFORMANCE POINTS' DISTRIBUTION

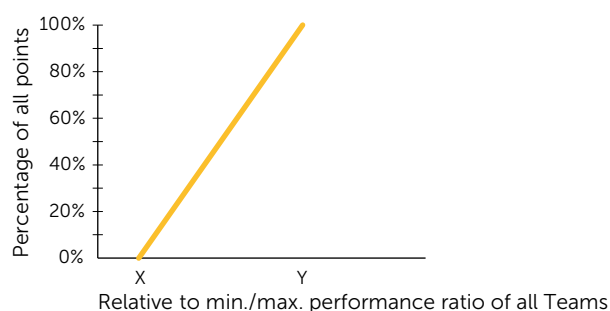


TABLE 11. PV SYSTEM PERFORMANCE POINTS

FULL POINTS	X =	Network load state adjustment evaluation indicator	
REDUCED POINTS	X <	Network load state adjustment evaluation indicator	< Y
NO POINTS		Network load state adjustment evaluation indicator	= Y

## rule 19 \_ contest 5: comfort conditions

### Objective

To assess the capacity for providing interior comfort through the control of temperature, humidity, acoustics, lighting, and the quality of interior air.

### Assessment

Through the collected data by the SDE23 Host City Executive's monitoring system during the Competition period and the measures realised 'in situ' in SDE23 solar village.

### Criteria

#### Sub-Contest 5.1: Temperature

The interior temperature will be constantly measured. Two temperature sensors will be located in the two main rooms of the house. If required, a third temperature sensor will be installed. All available points are earned at the conclusion of each scored period by keeping the time-averaged interior dry-bulb temperature between 23°C to 25°C.

See the Competition calendar for the schedule of scored periods. Reduced points are earned if the indoor temperature stays between 21 °C and 23°C, or between 25°C and 27°C. Reduced points values are scaled linearly, as shown in Figure 8.

FIGURE 8. TEMPERATURE SUB-CONTEST POINTS DISTRIBUTION

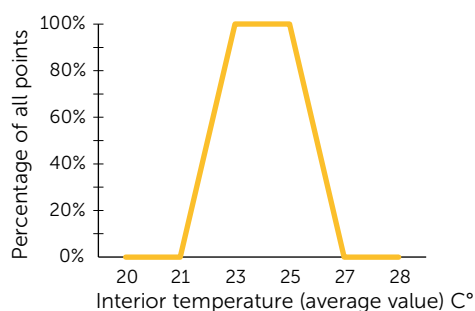


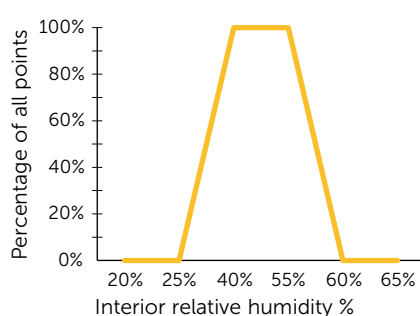
TABLE 12. TEMPERATURE CALCULATIONS

FULL POINTS	23°C	≤	Temperature	≤	25°C
REDUCED POINTS	21°C	<	Temperature	<	23°C
	25°C	<	Temperature	<	27°C
NO POINTS			Temperature	≤	21°C
NO POINTS			Temperature	≥	27°C

### Sub-Contest 5.2: Humidity

The relative humidity will be constantly measured. A humidity sensor will be located next to a temperature sensor. All available points are earned at the conclusion of each scored period by keeping the time-averaged interior relative humidity between 40% and 55% during the scored period. See the Competition Calendar for the schedule of scored periods. Reduced points are earned if the time-averaged interior relative humidity keeps between 25 % & 40 %, or between 55 % & 60%. Reduced points values are scaled linearly, as shown in Figure 9.

**FIGURE 9. HUMIDITY SUB-CONTEST POINTS DISTRIBUTION**



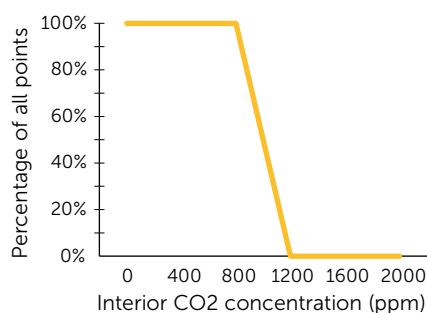
**TABLE 13. HUMIDITY CALCULATIONS**

FULL POINTS	40%	<	Relative humidity	<	55%
REDUCED POINTS	25%	<	Relative humidity	<	40%
	55%	<	Relative humidity	<	60%
NO POINTS			Relative humidity	<	25%
NO POINTS			Relative humidity	>	60%

### Sub-Contest 5.3: Air quality – CO<sub>2</sub>

The content in CO<sub>2</sub> in the air will be constantly measured. In most cases, CO<sub>2</sub> sensors will be located next to temperature sensors. All available points are earned at the conclusion of each scored period by keeping the content in CO<sub>2</sub> below 800 ppm during the scored period. See the Competition calendar for the schedule of scored periods. Reduced points are earned if the content in CO<sub>2</sub> is between 800 ppm and 1200 ppm. Reduced points values are scaled linearly, as shown in Figure 10.

**FIGURE 10. CO<sub>2</sub> SUB-CONTEST POINTS DISTRIBUTION**



**TABLE 14. CO<sub>2</sub> CALCULATION**

FULL POINTS	40%		CO <sub>2</sub> content	<	800 ppm
REDUCED POINTS	800 ppm	<	CO <sub>2</sub> content	<	1200 ppm
NO POINTS			CO <sub>2</sub> content	>	1200 ppm

#### Sub-Contest 5.4: Natural Lighting

The natural lighting level measurements will take place at the scored period in the Competition calendar. Photometer(s) will be located in the living room. Light intensity of the area will be measured according to the spectral levels defined by the SDE23 Organisation. All available points are earned by keeping the daylight factor, ratio lighting level / exterior (direct and indirect) lighting above 4% during measurement periods (cloudy sky). See the Competition calendar for the schedule of scored periods. Reduced points are earned if the ratio is between 2,5% and 4%. Reduced points values are scaled linearly. The measurement point height is 0.9m and the minimum distance to a window is 2m. Direct light-emitting devices and direct sunrays are not permitted on the sensor.

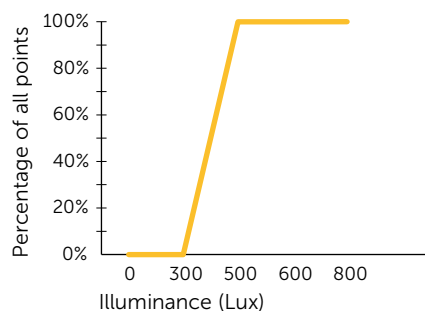
**TABLE 15. DAYLIGHT CALCULATION**

FULL POINTS			Daylight factor	>	4%
REDUCED POINTS	2.5%	<	Daylight factor	<	4%
NO POINTS			Daylight factor	<	2.5%

#### Sub-Contest 5.5: Workstation Lighting

The lighting level measurements in the workstation will take place at the scored period in the Competition calendar. A photometer will be located in the workstation. The light intensity of the area will be measured according to the spectral levels defined by the SDE23 Organisation. All available points are earned at the conclusion of each scored period by keeping the lighting level above 500 lux during the scored period. Reduced points are earned if the lighting level is between 300 lux and 500 lux. Reduced points values are scaled linearly, as shown in Figure 11. Light-emitting devices within 45 cm of the sensors are not permitted.

**FIGURE 11. WORKSTATION LIGHTING COMFORTSUB-CONTEST POINTS DISTRIBUTION**



**TABLE 16. WORKSTATION LIGHTING CALCULATION**

FULL POINTS				Lighting level	≤	500	lux
REDUCED POINTS	300	lux	<	Lighting level	<	500	lux
NO POINTS				Lighting level	≥	300	lux

### Sub-Contest 5.6: Audible Environment & Acoustic Performance

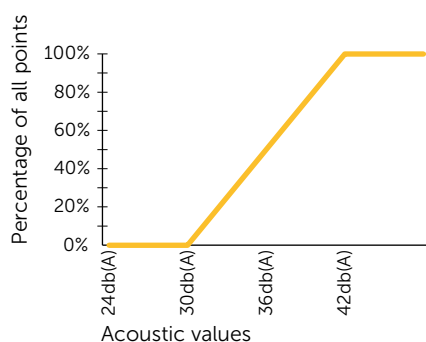
The acoustic performances that will be measured on site, are:

- The sound insulation from the outside;
- The reverberation time in the living room;
- The sound level of the HVAC system and all other active systems (inside measurement).

#### Facade airborne sound insulation:

The measurement will be done according to the global method proposed in the ISO 140-5:1998. The sound insulation DIs, 2m, nT (dB) values for each of the 1/3 octave bands will be calculated between 100 Hz and 5 kHz. The DIs, 2m, nT, w(dB) will be calculated according to ISO 717-1:1996 and used as an assessment parameter. Total points are earned if the houses' sound measurements have an acoustic value equal to or above 42 dB. Reduced points are earned if the acoustic value is between 30 dB and 42 dB. Reduced point values are scaled linearly, as shown in Figure 12.

**FIGURE 12. SOUND INSULATION SUB-CONTEST POINTS DISTRIBUTION**



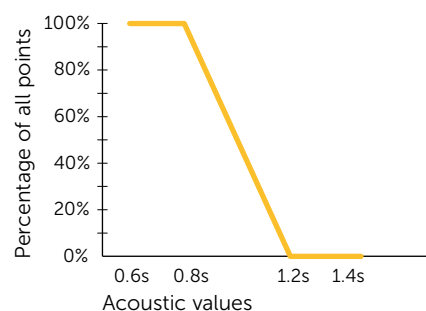
**TABLE 17. ACOUSTIC CALCULATIONS**

FULL POINTS		Acoustic values	>	42 dB
REDUCED POINTS	30 dB	Acoustic values	<	42 dB
NO POINTS		Acoustic values	<	30 dB

#### Reverberation time with the mobile furniture in the living room:

The reverberation time is measured according to the ISO 3382-2:2004. All available points are earned if the reverberation time is equal or below 0,8 second. Reduced points are earned if the reverberation time value is between 0,8 and 1,2 second. Reduced point values are scaled linearly, as shown in Figure 13.

**FIGURE 13. REVERBERATION SUB-CONTEST POINTS DISTRIBUTION**



**TABLE 18. ACOUSTIC REVERBERATION CALCULATIONS**

<b>FULL POINTS</b>			Acoustic values	<	0.8 sec
<b>REDUCED POINTS</b>	0.8 sec	<	Acoustic values	<	1.2 sec
<b>NO POINTS</b>			Acoustic values	>	1.2 sec

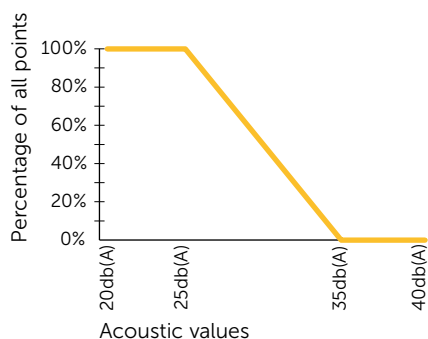
**Sound level of HVAC and active systems (inside measurement):**

The measurement of the sound level produced by all HVAC and active equipment in the bedroom (or the sleeping area) will be done according to the ISO 10052: 2004. The sound level measurements must be performed to ensure interior comfort in the most demanding conditions. They will be done with all technical equipment in operation (for example the air dehumidifier) and for the nominal air flow (seeking desired comfort). The value of the air flow must be provided at the time of measurement and in the 'ventilation specifications'. All measures must be taken to allow control of this flow by the operators (provision of one or more measurement points on the sleeves, depending on the configuration of the network). This requirement is also to be added to the 'ventilation specifications'.

Total points are earned if the houses' sound measurements have an acoustic value equal to or below 25 dB(A).

Reduced points are earned if the acoustic value measured inside is between 25 dB(A) and 35 dB(A). Reduced points values are scaled linearly, as shown in Figure 14.

**FIGURE 14. HVAC SOUND LEVEL POINTS DISTRIBUTION**



**TABLE 19. HVAC ACOUSTIC CALCULATIONS**

<b>FULL POINTS</b>			Acoustic values	<	25 dB(A)
<b>REDUCED POINTS</b>	25 dB(A)	<	Acoustic values	<	35 dB(A)
<b>NO POINTS</b>			Acoustic values	>	35 dB(A)



## rule 20 \_ contest 6: house functioning

### Objective

To evaluate the unit's functionality and the efficiency of the selected appliances, to maximise the performance of the unit, while complying with the demanding standards of present-day society. This contest tries to reproduce the average energy use in a modern dwelling. The SDE23 Organisation wants to encourage Teams to think about innovative solutions meeting all appliances-required performances. That is why evaluation will concern results rather than means. The operation of the appliances defines the major energy load of the demonstration unit during the Competition weeks and is of major importance for the overall energy figure of the whole building design project. Due to improved insulation, ventilation, and shading, the energy load of advanced buildings becomes more and more determined by the appliance and the domestic hot water.

### Assessment

The assessment is conducted through the collected data by the SDE23 Executives' monitoring system during the Competition weeks, the measurements realized 'in situ' on the SDE23 solar village, and the successful completion of tasks. The evaluation will be based on the unit's measurements realised during the Competition weeks and on the completion of corresponding tasks, with the exception of the Dining & User Friendliness sub-contests in which each guest Team will assign an evaluation to the host Team after each dinner party.

#### Monitored Performance Scoring

- Refrigeration;
- Freezing.

#### Tasks completion scoring

- Clothes washing;
- Clothes drying;
- Dishwashing;
- Oven;
- Hot water draws;
- Cooking;
- Home electronics;
- Urban mobility.

#### Guests scoring

- Dining;
- User friendliness.

#### Monitored performance (direct reading)

- Water balance.

**Important notes:** to participate in the units' functioning sub-contest, Teams must use appliances and equipment that comply with the requirements stated in the criteria section below.

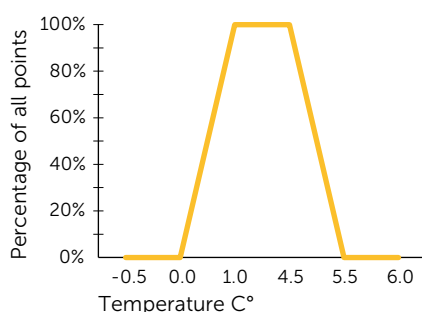
Appliances' characteristics, specifications, and user manuals must be included in the project specifications as stated in Rule 48 \_ Project Specifications. Information submitted in this section must show that appliances and equipment comply with the Rules requirements.

## Criteria

### Sub-Contest 6.1: Refrigeration

The refrigerator must be used for storage of all food and beverages used during the dinner contest. All available points are earned at the conclusion of each scored period by keeping the time-averaged interior temperature of the refrigerator between 1.0°C and 4.5°C during the scored period. A temperature sensor will be located inside the volume and will be continuously measuring. Points are attributed if the time-averaged interior refrigerator temperature is between 0.0°C and 1.0°C or between 4.5°C and 5.5°C. Reduced point values are scaled linearly, as shown in Figure 15. The refrigerator volume will be a minimum of 150 litres; the refrigerator must be used to store food and beverages.

**FIGURE 15. REFRIGERATOR SUB-CONTEST POINTS DISTRIBUTION**



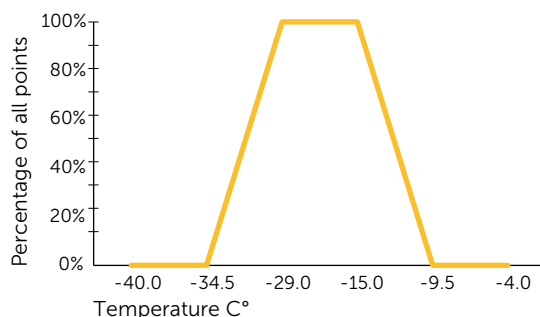
**TABLE 20. REFRIGERATION CALCULATION**

FULL POINTS	1.0°C	≤	Temperature	≤	4.5°C
ATTRIBUTED POINTS	0.0°C	<	Temperature	<	1.0°C
	4.5°C	<	Temperature	<	5.5°C
NO POINTS			Temperature	≤	0.0°C
NO POINTS			Temperature	≥	5.5°C

### Sub-Contest 6.2: Freezing

A freezer may be used for storage of all food and beverages used during the dinner contest. All available points are earned at the conclusion of each scored period by keeping the time-averaged interior temperature of the freezer between -29.0°C and -15.0°C during the scored period. A temperature sensor will be located inside the volume and will be continuously measuring. Points are attributed if the time-averaged interior temperature is between -34.5°C and -29.0°C or between -15.0°C and -9.50°C. Attributed points are scaled linearly, as shown in Figure 16. Freezer volume will be a minimum of 50 litres.

**FIGURE 16. FREEZER SUB-CONTEST POINTS DISTRIBUTION**



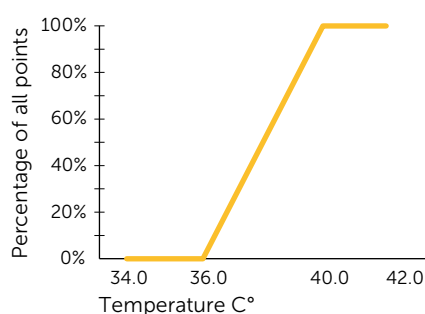
**TABLE 21. FREEZER CONTEST CALCULATION**

FULL POINTS	-29°C	≤	Temperature	≤	-15°C
ATTRIBUTED POINTS	-34.5°C	<	Temperature	<	-29°C
	-15°C	<	Temperature	<	-9.5°C
NO POINTS			Temperature	≤	-34.5°C
NO POINTS			Temperature	≥	-9.5°C

### Sub-Contest 6.3: Clothes Washing

All available points are earned for washing laundry by running a clothes washer through one or more complete, uninterrupted, 'normal' or 'eco' (or equivalent, but > 1 h program) cycles within a specified period, during which a temperature sensor placed inside the clothes washer must reach 40° C at some point in the cycle. The sensor will be measuring continuously during the washer cycle. Points are earned if the temperature sensor reaches 36° C but does not reach 40° C. Points are scaled linearly as shown in Figure 17. A load of laundry is defined as six SDE23 Host City Executives-supplied bath towels (approx. 2.5 kg). The clothes washer will operate automatically and have at least one wash and rinse cycle. One or more complete, uninterrupted, 'normal' or 'eco' (or equivalent) cycle(s) in an automatic clothes washer will be used to wash the laundry. Drying function in a combination washer/dryer will be disabled until the completion of the wash 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 will be confirmed by the observance of an audible or visible signal. The SDE23 Host City Executives will consult the operations manual to identify appropriate cycle settings. The 'normal' or 'regular' settings will be selected, if available. Otherwise, settings most closely resembling typical 'normal' or 'regular' settings will be selected. Only water may be used for clothes washing. No other kind of soap or similar products may be used during the contest.

**FIGURE 17. CLOTHES-WASHING SUB-CONTEST POINTS DISTRIBUTION**



**TABLE 22. CLOTHES-WASHING CALCULATION**

FULL POINTS	40°C	≤	Temperature		
ATTRIBUTED POINTS	36°C	<	Temperature	<	40°C
NO POINTS			Temperature	<	36°C

#### Sub-Contest 6.4: Clothes Drying

All available points are earned by returning a load of laundry (defined as the six supplied bath towels) to a total weight less than or equal to the towels' total weight before washing. Clothes drying will be completed within a specified period. Points are attributed 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 18. A load of laundry is eligible for clothes-drying points only if the load experienced a complete, uninterrupted cycle in an automatic washing cycle. However, scoring points in the Clothes Washer sub-contest is not a prerequisite for scoring points in the Clothes Dryer sub-contest.

FIGURE 18. CLOTHES-DRYER SUB-CONTEST POINTS DISTRIBUTION

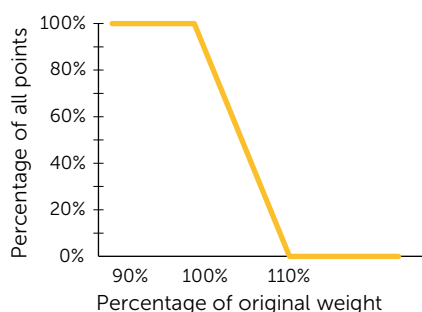


TABLE 23. CLOTHES-DRYER CALCULATION

FULL POINTS		Weight	≤	100%
ATTRIBUTED POINTS	100%	< Weight	<	110%
NO POINTS		Weight	≤	110%

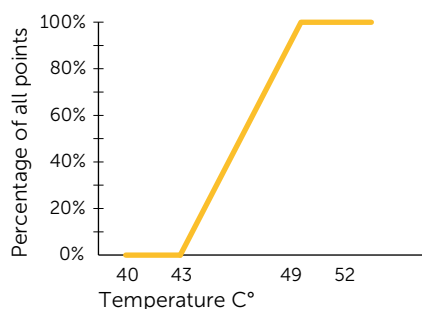
#### Clothes Drying Method

Teams must specify the clothes drying method or methods that they plan to use during the Competition. Clothes drying methods are active drying (ie. drying machine), passive drying, (ie., on a clothes line), or combined (any combination of active and passive drying). The use of drying machines (or any other active dryer system) is not mandatory since the Team can decide to use only a natural dryer system. Teams that plan to use drying machines or other commercial clothes drying systems must submit to the SDE23 Host City Executives their technical information as stated in Rule 48 \_ Project Specifications. Teams planning to use any custom made or non-commercial active or semi-passive drying system must submit drawings and explicative documentation and drawings of the proposed system. Additionally, an agency or external professional must certify that the proposed solution is safe and does not represent any risk for the users or visitors. All drying systems that Teams plan to use during the Competition must be clearly shown in the Project Drawings. To use any drying method that requires the clothes to be visible (such as on a clothes lines), in addition to including its information in the drawings, Teams must show the drying place to the Architecture jury.

### Sub-Contest 6.5: Dishwashing

All available points are earned by running a dishwasher through a complete, uninterrupted, 'normal' or 'eco' (or equivalent but > 1 h program) cycle within a specified period, during which a temperature sensor placed inside the dishwasher must reach 49.0°C at some point during the cycle. The sensor will be measuring continuously during the washer cycle. Points are attributed if the temperature sensor reaches 43.0°C but does not reach 49.0°C. Attributed points are scaled linearly, as shown in Figure 19. The dishwasher will operate automatically, have at least one wash and rinse cycle, and have a minimum capacity of six place settings according to the manufacturer's specifications. If the dishwasher has a heated drying option, this option will be disabled. 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 will be confirmed by the observance of an audible or visible signal. SDE23 Host City Executives will consult the operation manual to identify appropriate cycle settings. The 'normal' or 'regular' or 'Eco' settings will be selected, if available. Otherwise, settings most closely resembling typical 'normal' or 'regular' or 'eco' settings will be selected. Dishwasher may be run empty, partially loaded, or fully loaded; the load may be soiled or clean.

**FIGURE 19. DISHWASHER SUB-CONTEST POINTS DISTRIBUTION**



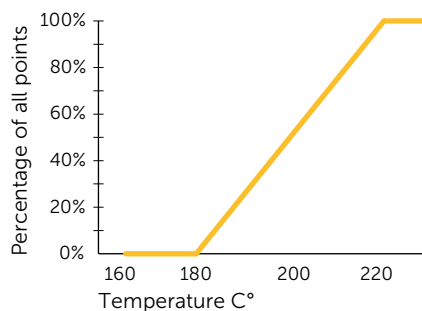
**TABLE 24. DISHWASHER CALCULATION**

FULL POINTS	49°C	≤	Temperature	
ATTRIBUTED POINTS	46°C	<	Temperature	< 49°C
NO POINTS			Temperature	≤ 43°C

### Sub-Contest 6.6: Oven

All available points are earned at the conclusion of each scored period by keeping the oven temperature above or equal to 220°C during specified scored periods. A temperature sensor will be located inside the oven and will be measuring continuously every time it is turned on. Attributed points are earned if the time-averaged interior oven temperature during specified scored periods is between 180°C and 220°C. Attributed points are scaled linearly, as shown in Figure 20. The oven volume published in the manufacturer's specifications will be a minimum of 55 litres.

**FIGURE 20. OVEN SUB-CONTEST POINTS DISTRIBUTION**



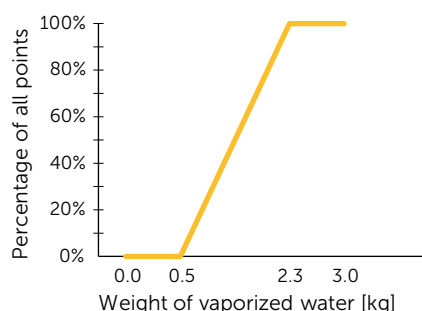
**TABLE 25. OVEN CALCULATION**

<b>FULL POINTS</b>			Temperature	$\geq$	220°C
<b>ATTRIBUTED POINTS</b>	180°C	<	Temperature	<	220°C
<b>NO POINTS</b>			Temperature	$\leq$	180°C

### Sub-Contest 6.7: Cooking

All available points are earned by using a kitchen appliance to evaporate 2.3 kg of water within a specified period. Attributed points are attributed if between 0.5 kg and 2.3 kg of water are vaporised. Reduced point values are scaled linearly, as shown in Figure 21. Any kitchen appliance may be used, but it must operate in its 'normal' configuration as it is vaporising the water. The water will be evaporated in a single pot and the starting water weight will be at least 2.75 kg.

**FIGURE 21. COOKING SUB-CONTEST POINTS DISTRIBUTION**



**TABLE 26. COOKING CALCULATION**

<b>FULL POINTS</b>			Weight	$\geq$	2.3 kg
<b>ATTRIBUTED POINTS</b>	0.5 kg	<	Weight	<	2.3 kg
<b>NO POINTS</b>			Weight	$\leq$	0.5 kg

### Sub-Contest 6.8: Home Electronics

All available points are earned for operating a computer and TV (or equivalent audio-visual equipment) during specified periods of time. See the Event Calendar for details regarding the number of points per home electronics task and the time periods designated for home electronics tasks. The TV will be a minimum of 32 in. (81.3 cm) according to the manufacturer's stated display size. The computer display will be a minimum of 17 in. (43.2 cm) according to the manufacturer's stated display size. The computer may be a notebook, laptop, or desktop computer, with integrated or separated display(s). The computer and video displays will be able to be operated simultaneously and controlled independently of each other.

The video player function may be integrated in the TV. During the home electronics periods, the TV must be presenting a video and the computer must be powered on. Functions of 'Screensaver', 'Stand by', or another mode that reduces the energy consumption of these devices must be disabled during this sub-context period. The brightness of TV and computer displays will be set to at least 75% of maximum. Observers will conduct spot checks to verify the conformity to this sub-contest.

### Sub-Contest 6.9: Hot Water Draws

Hot water draws will occur during the times specified in the Competition Calendar. For each draw, at least 50 litres of hot water will be delivered in 10 minutes to qualify for points. All available points are earned by delivering an average temperature of at least 43° C. An average temperature below 37° C earns no points. For temperatures between 43° C and 37° C, points are scaled linearly, as shown in Figure 22. These hot water draws are designed to simulate most of the washing and bathing tasks that would take place in a typical day. The schedule of 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. Hot water will be drawn from the shower. For that, it is necessary to connect a hose in the shower, Teams are responsible for providing the fitting to accept the SDE23 Host City Executives' hose and replace their showerhead prior to performing this task. For information about the hose connection requirements please refer to the Technical Monitoring Procedures Document.

FIGURE 22. HOT WATER DRAWS SUB-CONTEST POINTS DISTRIBUTION

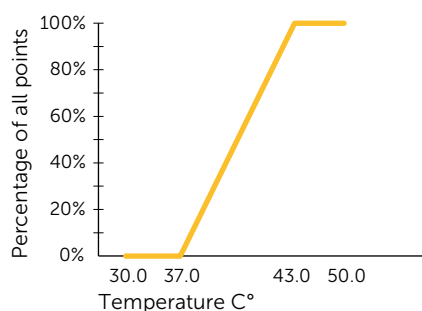


TABLE 27. HOT WATER CALCULATION

FULL POINTS			Temperature	≥	43°C
ATTRIBUTED POINTS	37°C	<	Temperature	<	43°C
NO POINTS			Temperature	≤	37°C

### Sub-Contest 6.10: Water Balance

To complete a whole House Functioning, water management has an important role in the process. Therefore, water consumption of participating units will be measured during Competition. The scoring will be calculated using the meter's initial value (beginning of the Competition phase) and the end value (end of the Competition phase). The Team with the lowest water consumption will achieve the maximum points. The points for the rest of the Teams will be determined linearly in relation to the water consumed by the winning Team. SDE23 Executives will perform a daily reading of the meters in order to verify the functioning of the measuring system. In relation to the water meters, Teams must take the following into account:

- Water meters will be supplied by the SDE23 Host City Executives;
- The water meter's model and size will be announced to the teams through the SDE23 WAT. Its selection will be in accordance with the European Union directive MID. (the typical length of water meters is about 150 mm, without considering connecting parts.)

Water meters will be installed between the water pump and the water distribution circuit of the unit (LDU). The nominal diameter of the inlet and outlet of meters is 15 mm. Teams will choose upstream and downstream pipes compatible with the meter inlet and outlet diameters. If the pipes' diameters are not compatible, Teams must provide the required connection fittings to perform the adaptation. The Team should provide two valves, one upstream and the other one downstream the meter. These valves will allow shutting (closing) the water flow, if there are any problem with the meters. Water meters should be accessible, and their location must permit easy reading of their measurements. Teams must submit a drawing showing where and how they plan to place the meters. They must also include details showing that the meter is accessible and including valves, connections, and any other necessary fittings. Meter location must be approved by the SDE23 Host City Executives.

#### **Sub-Contest 6.11: Dining**

Each Team will host three dinner parties during contest weeks. Dinner parties will feature a pair of guest Decathletes from three neighbouring units, and each pair of guest Decathletes will assign a score to the host Team after each dinner party. To maintain consistency of this sub-contest, guest Teams will use the scoring chart that the official Observers will give to them (one per guest Team) when entering the unit for the dinner party. The guests must give the chart back to the designated official Observers, once completely filled out at the end of the dinner. Each guest Team will assign a score to the host Team after each dinner party. The quality of the meal, atmosphere, and overall experience needs to be considered in the evaluation as excellent, very good or good. There will be eight participants: two hosts and six guests (two per Team). Each host Team will prepare dinner for guests and Team members. Non-Decathletes are prohibited from preparing the meal or instructing Decathletes in any way on the Competition site. All meals have to be prepared in the units with fresh ingredients stored in the refrigerator. Take-out and prepared over-the-counter food items are not permitted. Meals have to contain at least one main hot dish. The meal will be served and eaten in the conditioned space at the eating area designated in the construction documents. 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 outdoors. Teams are required to submit detailed dinner party menus to the SDE23 Host City Executives, who will review each menu for compliance. If corrective actions are required to meet all safety requirements, a Team must submit an updated version of the menu. See Rule 41 \_ Dinner Party Menu).

#### **Teams hosting dinner parties will comply with the following safety requirements:**

- The use of fire for cooking is prohibited;
- All water used for cooking and drinking will be drinking water purchased in sealed containers;
- All dishes and cookware will be washed with hot water and soap and rinsed prior to use;
- Normal domestic wastewater may go into the wastewater tank;
- All beverages and food must be stored properly and according to the instructions on the packaging, ie., beverages and foods marked 'refrigerate after opening' must be refrigerated appropriately after opening;
- To help prevent allergic reactions among dinner party guests, teams will 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, etc.), fish, shellfish, soy, and wheat. See Rule 41 \_ dinner party menu;
- Outdoor cooking and grilling equipment may be incorporated into the competition unit, but the use of such equipment is prohibited on the competition site because of fire safety reasons.



#### **Sub-Contest 6.12: User Friendliness**

The three dinner parties give the floor to explain within one hour the functionality and operation of the unit to each pair of the invited decathletes and let them try to operate and evaluate it. Each guest Team works with a predefined questionnaire developed by the SDE23 Host City Executives to evaluate the unit operation from the perspective of the user group, for whom the unit is designed. The questionnaire is handed to the guests prior to the dinner party together with the scoring charts.

**At minimum, the following aspects are covered by the questionnaire:**

- General intuitiveness of operation;
- General information transfer (system approach, language, ...);
- User interfaces for control of indoor climate and air quality;
- User interfaces for shading and lighting operation;
- User information on energy use;
- Gender aspects;
- Age suitability;
- Innovations.

Teams are required to provide any information handed to the dinner party guests for explanation. The scoring for the contest is based on averaging the score of all dinner parties hosted by a Team.

#### **Sub-contest 6.13: urban mobility**

- Beverages must be provided by a cargo bike or a miniature electric vehicle. Several crates with mineral water are to be delivered during specified times indicated in the Competition calendar from a defined place to the SDE23 solar village. The vehicle must be charged at the LDU only. More details will be communicated via the SDE23 WAT.
- All ingredients and implements for the dinners (as a part of the house functioning contest) are to be provided by foot, a miniature electric vehicle, or a cargo bike. The vehicle must be charged at the demonstration unit only. Further details will be communicated via the SDE23 WAT.
- The Decathletes are to retrieve food during specified times indicated in the competition calendar. The goods are to be provided by foot, a miniature electric vehicle or a cargo bike. If the food is not consumed by the participants themselves, it can be brought to a food sharing fridge. Further details will be communicated via the SDE23 WAT.

#### **Notes:**

- The vehicle must be driven by a Decathlete;
- The driver must comply with Romanian driving laws;
- The vehicle must be charged from the Living Demonstration Unit (LDU) electrical system.
- The vehicle's batteries must be fully charged at the completion of the contests period.
- The vehicle must be allowed to drive on cycle paths.

## rule 21 \_ contest 7: communication & social awareness

### Objective

To assess the communication skills of the Teams in their creative, effective, and efficient dissemination of SDE23 Competition topics; this includes presenting the ideas that describe the work process and identity of the Teams, and the Teams' corresponding projects. It is crucial to adapt messaging to all target groups and audiences within the fundamental sectors of broad-based communication, education, and social awareness (including a wide range of stakeholders: sponsors, industry professionals, policymakers, specific academic communities, research entities, younger students and children, and the general public). This key objective is intended such that all target groups are sufficiently addressed through a high level of effectiveness.

### Communication

Each Team will present an integrated communication strategy, that includes a complete communication cycle (analysis, strategic planning, operative planning, implementation, controlling, impact assessment). The strategic goals must support the communication for the SDE23 and the SDE in general. The goals must also incite and motivate stakeholders and audiences from the teams' cities/countries of origin to visit the SDE23 event.

### Social Awareness

Each Team will present and perform separate educational concepts and actions for students and for the general public. Concepts will include detailed learning objectives, teaching methods and content. The focus in the education of students is on the integration of resource-responsibility, innovation, and energy literacy into an academic curriculum; this should also extend to teaching at participating faculties and universities in general. With regards to the general public, which includes schoolchildren, the central goal is to raise awareness and provide incentives to visit SDE23 event, understand the SDE23 topics, and the specific necessity of energy transition in the built environment.

### Assessment

This contest is divided into the assessment of communication on the one hand, and social awareness on the other. These will be assessed through the results of various actions and tasks linked to the deliverables, and actions related to the SDE23 Competition event (activities involving interaction with the public, ie. public tours). The material submitted for deliverables (transmission of information through various media and channels ie. audio-visual, electronic (web, social media), written etc. such as documentaries; articles; interviews; gatherings, virtual or other etc...) will be used to assess the progress and calibre of each project. A jury of experts in the fields of communication and education will award the scores.

### Criteria

#### Quality of Strategies

- How well did the Team's communication/ educational concepts, materials and activities work together to convey comprehensive, consistent, and integrated strategies in the three aspects of this Competition?
- How clearly defined are the Team's target audiences and communication/ education goals?
- How effective and efficient are the Team's communication/ education strategies (including indications on criteria or key performance indicators, expected impacts, and definitive impact assessments)?
- How well do the Team's communication/ education strategies align with the Team's stated goals and objectives?

#### Quality of Implementation

- How successfully did the Team conduct outreach and education?
- How successfully does the Team incorporate digital communications strategies and products to engage online and offline audiences?
- How effective are the Team's educational and outreach messages about the Solar Decathlon Europe, the Team, and the design concept?
- Is the content efficiently tailored for different communication channels?

#### **Quality of On-Site Communications**

- How informative, interesting, engaging, and audience-appropriate was the Team's personalised tour?
- How effectively does the Team use on-site features, displays, models, or other materials to engage and educate the public?
- How effective is the Team's strategy for accommodating large crowds and long lines?
- How well do the on-site communications materials educate and inform the visiting public and groups of students of different ages?

#### **Quality in all three levels is understood considering these dimensions:**

- **Level of effort and creative input:** How much creative input, time, money, and other resources did the Team invest in concepts and actions?
- **Effectiveness:** To which degree are pre-formulated objectives achieved by different actions?
- **Efficiency:** What is the relation between the level of effort and the achievement of pre-formulated objectives?

## **rule 22 \_ contest 8: connected living & affordability**

### **Objective**

To evaluate the relevance of the housing unit's positioning within different types of habitation, and how it responds to collective housing in dense urban contexts, or how it pertains to the grouping of individual houses generating cohesive communities in less dense areas; to address the topic of the unit's implication in social and built contexts chosen by Teams in their country of choice; to evaluate the economic strategy and the associate mode of production and transportation, in relation to the topics of contextualisation; to analyse how projects consider the way in which the building functions and interacts within the community and neighbouring environment; To ensure that this contextualisation bolsters links between the SDE23 project locations and their corresponding human, logistic, communicative, and technological connections.

#### **To recapitulate, in this sense four developmental intentions are identified:**

- To study different types of urban development, looking toward multifamily and collective housing buildings for dense urban contexts; or to study the grouping possibilities of houses in order to generate coherent communities for less dense areas;
- To evaluate the coherence of the mobility strategy associated to the proposal and its economic viability (including the impact of transportation involved in the strategy);
- To develop a housing solution with an adapted or innovative production process that responds to building industry of the country of origin, and its resources;
- To identify and justify the affordability and the target market of the project, emphasising the attraction capacity for potential end-users and the scalability of the project; to evaluate the proposed strategies for financial control and economic issues as these relate to most stakeholders.

### **Assessment**

The assessment is based on the deliverables relative to the project, in particular the drawings, the Connected Living & Affordability Report as well as the on-site evaluation of the demonstration unit. A jury of urban planners, sociologists, architects, developers and building industry professionals specialised in the various themes of this contest will evaluate the deliverables, as well as the on-site demonstration unit.

### Criteria

- Spatial organisation of housing in relation to mobility, territorial and local policy: built environment generated by the proposal, land use and flexibility, providing a variety of grouping typologies, in which the integration of transportation means will be evaluated;
- Economic feasibility study and modes of production: construction cost, constructive systems coherence, use of local know-hows, modes of production evolution potential, standardisation levels will be evaluated;
- Affordability and market viability: financial conditions for renting; integration of the project in social housing policies; identification of target markets; product marketing, with methods and means to reach potential buyers; economic impact of energy-saving features and equipment pooling; economic impact of renewable energy systems investments and pay-back; maintenance costs; and economic impact of mobility strategies will be evaluated according to the projects agenda.

## rule 23 \_ contest 9: innovation

### Objective

The objective of this contest is to evaluate the innovative content of the whole building design project and the demonstration unit in six different areas. Innovations can be strategies, methods, designs, processes or technologies demonstrating new approaches to meet the challenges of the future and add to the value or the performance of buildings in the urban environment. Inventions may be in some cases related to innovations.

### Assessment

The six juries from the other six contests mentioned below will assess the different deliverables relative to each project with special attention to the innovations mentioned on:

- Innovation in Architecture;
- Innovation in Engineering & Construction;
- Innovation in Energy Efficiency;
- Innovation in Communication & Social Awareness;
- Innovation in Connected Living & Affordability;
- Innovation in Sustainability.

The maximum points are equally divided into the six categories. The sum of the points gained in each category define the scoring for the Team in the contest.

### Criteria

The jury scoring is based on the six 'Innovation Reports' addressing the whole building project, as well as the demonstration unit in the six contests mentioned above, and the correlated, individual jury assessments. An overall assessment adds to the sectoral assessment.

## rule 24 \_ contest 10: sustainability

### Objective

To evaluate the skilful and the environmental sensibility of the Teams' (house design, techniques, systems, and components) to attain the maximum reduction of negative environmental impact, during the house components manufacturing, the construction phase, the building's life and demolition.

### Assessment

The assessment is based on the Sustainability Reports and Drawings, with checklists and calculations provided. The on-site evaluation of the Living Demonstration Unit complements the process. A jury of professionals specialised in the specialised areas will evaluate this contest.

### Criteria

- **General Concept & Sustainability:** relation of the general concepts of the house and the proposal for urban sustainability will be evaluated, as well as the Team's comprehension of the sustainable built environment, and how this is reflected in their project.
- **Connected Living & Affordability:** relevant applied urban strategies of the project will be assessed, and how the solution for density contributes to environmental, economic, and social sustainability. In relation to mobility, the evaluation includes mobility strategies and their relation to energy efficiency in housing, and to the urban design proposal. Factors that influence the sustainability of the production of the houses and the economic viability of industrialization will be also assessed.
- **Sustainability in Engineering & Construction:** to evaluate the life cycle, the water consumption, and residue generation through the construction process, from the materials manufacturing (including energy) to the final set-up (selective demolition plan, reusability). The structure's flexibility, possibilities for reuse, and adaptation to future technological changes will also be evaluated, as well as the adequacy of the systems selected according to the house's needs. Positive impact of the selected construction systems in elements related with the sustainable construction as water use, solid waste, time, etc. Will also be evaluated.
- **Materials Selection:** selection of the materials will be evaluated, taking their LCA into account, (reuse or recycle, incorporated energy, incorporated CO<sub>2</sub>, durability, necessity of maintenance). Usage of green, renewable, recyclable, reusable materials will be assessed, as will embodied energy and incorporated CO<sub>2</sub> in the materials selection criteria.
- **Active Systems & Equipment:** to evaluate the success in the selection of HVAC system, DHW, artificial lighting and appliances and their energy efficiency, building energy management systems and demand management, and their contribution to the sustainability of the project will be evaluated; to evaluate the means to reduce energy demands, the degree of local self-supply, and adjustment strategies of the temporary correlation generation-consumption; to evaluate the active strategies and systems which improve hydrothermal efficiency, artificial lighting efficiency, acoustic performance and air quality, minimising the associated energy consumption to the proposed solution. The high efficiency equipment (heating, cooling, and ventilation, among others) maintenance will also be evaluated. The high efficiency of the electric appliances selected for each house will be evaluated, as will the BEMS, CAFM, or IWMS, to improve demand energy management, or to improve efficient building operation.
- **Solar Systems:** evaluation of these systems will include the energy recovery time, CO<sub>2</sub> emissions and design characteristics such as their accessibility, integration (BIPV), and efficiency of the implemented system.
- **Water:** evaluation includes the water management cycle, water saving, re-collection, conservation, treatments and reuse.
- **Solid Waste:** evaluated in three periods: waste management during construction phase; building operation and associated waste collection and management; and waste, recycling, and reusing possibilities at the end of life.
- **Life Cycle Analysis:** whole building assessment will be evaluated. LCA must be carried out using one of the international recognized LCA standards and guidelines (ie. - ISO 14040:2006). LCA must include the embodied energy analysis.

- **Circularity & Circular Economy Approach:** relying on system-wide innovation, and how it aims to redefine products and services to design waste-out, while minimising negative impacts. The jury will assess the circular model approach defined by Teams to build economic, natural, and social capital, underpinned by a transition to renewable energy sources.
- **Resilience:** evaluation of the ability of the project to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events it might have to face, associated with the climate change uncertainty, environmental degradation, population growth, migration, and pandemics.
  - > identify hazards;
  - > assess vulnerabilities;
  - > analyse impacts;
  - > modify programming with desired outcomes;
  - > create performance targets;
  - > design and implement; measure and evaluate.

## section 3.0 \_ deliverables

The SDE23 Teams work within a highly defined context, simultaneously combining the work of designing and building the Living Demonstration Unit (LDU). The deliverables will reflect both levels of definition to document the full Team entry. The level of detail is the highest for the LDU (implementation planning). As Teams will design the unit as a result of the whole project design, the first deliverables will focus on the development of the building's context; further deliverables will emphasise the implementation planning of the LDU. The SDE23 participating Teams will submit seven separate sets of deliverables. The deliverables are intended to document the progress of their design development, their compliance with the SDE23 Rules and Building Codes, and to indicate the potential performance of their LDU designs.

The SDE23 Organisation expects to leverage building information (BIM) modelling to streamline the review process and to enable digital simulation technologies for verification of compliance and performance. The SDE23 Host City Executives are also expected to manage this information to allow other technologies such as virtual reality (VR) to be employed for dissemination purposes. Teams are encouraged to manage a single BIM model (or set of models) to manage the information about their LDU. The following description of the deliverables is expected to be 'extracts' or 'views' taken from the source BIM model. While the SDE23 Host City Executives do not prescribe software to do this, they do insist that any BIM model conform to the Industry Foundation Classes (IFCs) standard (ISO 16739-1:2018). The Solar Decathlon Europe seeks to promote modern technologies as part of creating resource-responsible buildings and construction. To this end, the SDE also promotes innovation in the design, assembly and management of buildings using digital applications that support efficient, long-lasting information about buildings and cities. As part of the SDE23 LDU design assessment and solar village management, the SDE23 Organisation expects to implement digital submission and review processes that employ (BIM) and associated technologies. Teams are expected to manage BIM models of their individual LDU to incorporate into a BIM model of the solar village through a common platform. Separate documents will be provided to explain the BIM related deliverables options in more detail.

## rule 25 \_ schedule of deliverables

**TABLE 28. SCHEDULE OF DELIVERABLES**

<b>DELIVERABLE #1</b>	<b>SCHEMATIC DESIGN DOCUMENTATION &amp; DISSEMINATION MATERIALS</b>	<b>16/03/2022</b>
Electronic File	Press Kit & Press Release #1	PK#1 & PR#1
Electronic File	Project Manual #1	PM#1
Electronic File	Project Drawings #1	PD#1
URL	Preliminary Website	
<b>DELIVERABLE #2</b>	<b>CONCEPT DOCUMENTATION &amp; DISSEMINATION MATERIALS</b>	<b>29/06/2022</b>
Electronic File	Press Kit & Press Release #2	PK#2 & PR#2
Electronic File	Project Manual #2	PM#2
Electronic File	Project Drawings #2	PD#2
Electronic File	Audio-visual #1 (presentation of project)	AV#1
URL	Website	

<b>DELIVERABLE #3</b>	<b>DESIGN DEVELOPMENT DOCUMENTATION &amp; DISSEMINATION MATERIALS</b>	<b>19/10/2022</b>
Electronic File	Press Kit & Press Release #3	PK#3 & PR#3
Electronic File	Project Manual #3	PM#3
Electronic File	Project Drawings #3	PD#3
Electronic File	Electric & PV Chart & Checklists	ELEC#1
Electronic File	Project Energy Performance Simulation	EPS#1
Electronic File	Workshop Documentation	WD
Electronic File	Audio-visual #2 (updated version of Audio-Visual #1)	AV#2
Model	Architectural Model #1 – Built Context	
<b>DELIVERABLE #4</b>	<b>CONSTRUCTION DOCUMENTATION &amp; DISSEMINATION MATERIALS</b>	<b>15/02/2023</b>
Electronic File	Press Kit & Press Release #4	PK#4 & PR#4
Electronic File	Project Manual #4	PM#4
Electronic File	Project Drawings #4	PD#4
Model	Architectural Model #2: Demonstration Unit	
Electronic File	Electric & PV Chart & Checklists (Updated)	ELEC#2
Electronic File	Project Energy Performance Simulation	EPS#2
Electronic File	SDE23 Solar Campus Visiting Guide information	GUIDE
Electronic File	Design Approval Documents	APP
<b>DELIVERABLE #5</b>	<b>UPDATED CONSTRUCTION DOCUMENTATION &amp; DISSEMINATION MATERIALS</b>	<b>19/04/2023</b>
Electronic File	Press Kit & Press Release #5	PK#5 & PR#5
Electronic File	Project Manual #5	PM#5
Electronic File	Project Drawings #5	PD#5
Electronic File	Electric & PV Chart & Checklists (Updated)	ELEC#3
Electronic File	Project Energy Performance Simulation	EPS#3
Hard Copies	Design Approval Documents	APP
<b>DELIVERABLE #6</b>	<b>DESIGN ADJUSTMENTS DOCUMENTATION &amp; DISSEMINATION MATERIALS</b>	<b>14/06/2023</b>
Electronic File	Press Kit & Press Release #6	PK#6 & PR#6
Electronic File	Project Manual #6	PM#6
Electronic File	Project Drawings #6	PD#6
Electronic File	Jury Reports	JURY
Electronic File	Electric & PV Chart & Checklists (Updated)	ELEC#4
Electronic File	Audio-visual #3 (presentation of final project)	AV#3
Hard Copies	Design Approval Documents	APP
<b>DELIVERABLE #7</b>	<b>AS BUILT DOCUMENTATION &amp; DISSEMINATION MATERIALS</b>	<b>01/11/2023</b>
Electronic File	Press Kit and Press Release #7	PK#7 & PR#7
Electronic File	Project Manual #7	PM#7
Electronic File	Project Drawings #7	PD#7
Electronic File	Electric and PV Chart and Checklists	ELEC#5
Electronic File	Project Energy Performance Simulation	EPS#4
Electronic File	Audio-visual #4	AV#4
Electronic File	SDE23 Official Dissemination Materials	DM



## rule 26 \_ deliverable submission instructions

Each Team will follow the defined schedule in sending the deliverables with the stipulated format, at the specific due dates, and following the guidelines of the SDE23 Organisation. Although the official languages for communication of the SDE23 Competition and public event are English and Romanian, for scientific dissemination reasons, all the deliverables are in English. Only the constructions specifications, to be included in the Project Manual, may be in another language, in case they are not available in English or Romanian. Deliverables may be submitted either by shipped or electronic means, depending on the materials or documentation required. Deliverables are on time if they are accessible on the SDE23 WAT or, in the case of physical objects, received by the SDE23 Host City Executives in their offices on the respective due date by 17h00 (Bucharest time). Teams who send late deliverables, or do not fulfil all content requirements, will be subject to penalties. Please refer to Rule 2.7 for further details. All submitted deliverables are property of the SDE23 Organisation.

### 26.1 Shipped Submission

Requested hard copies of documents, including models, are the only required Deliverable materials to be sent to the postal address of the SDE23 Host City Executives:

**TBD: <<Solar Decathlon Europe 2023 postal address>> will be announced on the WAT.**

Teams do not submit physical copies of any other deliverables.

### 26.2 Electronic Submission

All electronic files will be uploaded to the SDE23 WAT Deliverable area. 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 standard extraction software. For further details please refer to the SDE23 WAT guidelines in Appendix B.

#### a. Computer Generated File Requirements

All electronic files generated from a computer (drawings, specifications, renderings, etc.) will be submitted as a PDF meeting the following criteria:

- Embed all fonts;
  - Maintain a minimum resolution of 300 dpi;
  - The different sections will be indicated with bookmarks;
  - Whenever possible, utilise the 'Save As' or 'Export' to PDF functions within a CAD, 3-D rendering, or illustration application to produce a PDF;
  - Utilising the native application's PDF functions usually produces a smaller, cleaner PDF with fonts defined and illustrations and drawings retained as vector objects;
  - Available options for PDF creation vary between applications. Be sure to always select the option to embed all fonts and keep image compression at a minimum of 300 dpi;
  - If there are colour options, choose no conversion if available. If not, select RGB conversion as that will typically yield a smaller file than CMYK;
  - 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;
  - Creating a PDF from scans, or by outputting the drawings into a raster image format (.jpg, .tiff, .png, .gif, etc.) and then creating a PDF from the images, is NOT ACCEPTABLE;
  - Large, all-raster PDFs files at 300dpi are of unacceptable quality at lower resolutions, and are not scalable without degradation;
  - Logos must be submitted in vector format (eps) using Adobe Illustrator software in CMYK (specifically, in 4 colours, no additional colour: no 5th colour and no Pantone!).
- Teams must include the name, phone number and e-mail of the person submitting the logo.

#### b. Multimedia File Requirements

- Teams may submit photographs, graphics or videos in each Deliverable, to complete the information submitted or provide further details;
- Photographs will be submitted in the native format of the camera, such as JPEG or RAW, if available. Every file conversion or image resampling from the original results in image degradation, so keep conversions to a minimum;
- Colour photos must be in RGB, 8-bit colour;
- For multimedia files to be properly credited, the following information will be included in each file's metadata or in a text file accompanying the files:
  - > name, phone number, and e-mail of person submitting the file;
  - > multimedia file editor's name and affiliation.
- For photographs, please indicate date and location.

#### c. File Naming Instructions

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

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

**Example #1:** A set of Updated Constructive Development Project Drawings submitted by University X (AAA) to the SDE23 Host City Executives for follow-up review on April 12, 2023, would have the following file name: AAA\_PD#4\_2023-04-12.pdf

**Example #2:** A set of three multimedia files submitted by University X (AAA) to the SDE23 Host City Executives, would have the following file names:

- AAA\_MUL\_1\_2023-05-16.pdf
- AAA\_MUL\_2\_2023-05-16.pdf
- AAA\_MUL\_3\_2023-05-16.pdf

**Note:** Table 29 will be updated after Team selection.

TABLE 29. TEAM LIST OF ABBREVIATIONS

CODE	TEAM NAME

### 26.3 Document Formatting Requirements

#### a. Project Drawings & Hard Copies Drawings

ISO 'A3' (297 mm X 420 mm) sheet size 'packaged' into a single PDF file  
(see Rule 26.2 \_ Electronic Submission) Consistent with Rule 30.2 Project Drawings Structure & Contents.

#### b. Project Manual & Hard Copies Manual

ISO 'A4' (210 mm X 297 mm) sheet size 'packaged' into a single PDF file  
(see Rule 26.2 \_ Electronic Submission) Consistent with the Project Manual Structure & Contents (see Rule 30.3).

#### c. Press Kit & Press Release

ISO 'A4' (210 mm X 297 mm) sheet size 'packaged' into a single PDF file  
(see Rule 26.2 \_ Electronic Submission)

### 26.4 Revision & Evaluation Criteria

The deliverables will be reviewed by the SDE23 Host City Executives during all phases of the Competition to verify compliance with the Rules. The SDE23 Host City Executives seek to assist the Teams in the understanding and compliance of the Rules. During the SDE23 Competition weeks, juries for each contest will evaluate the documentation delivered by the Teams following the criteria, guidelines, and basic parameters established in the SDE23 Rules.

## rule 27 \_ deliverable phases

The primary objectives of each Deliverable are as follows:

- **Deliverable #1**
  - > To verify the work that the Teams are generating;
  - > To verify any aspect or design which does not comply with the Competition Rules.
- **Deliverable #2**
  - > Based on the requirements made by the SDE23 Organisation, to obtain additional information and update the documentation sent in Deliverable #1.
- **Deliverable #3**
  - > Based on the requirements made by the SDE23 Organisation, to obtain additional information and update the documentation sent in Deliverable #2;
  - > To ensure that the documentation is compliant with the SDE23 Building Code and the SDE23 Rules.
- **Deliverable #4**
  - > To obtain all necessary information in order to define the construction of SDE23 solar village;
  - > To foresee all the elements required for the above purpose.
- **Deliverable #5**
  - > Based on the requirements made by the SDE23 Organisation, to obtain additional information and update the documentation sent in Deliverable #4;
  - > To structure documentation for juries, and to clarify any ambiguities in Teams' documentation.
- **Deliverable #6**
  - > To begin the integration of materials into the building competition knowledge platform;
  - > To update Deliverable #5 with late design changes that may occur;
  - > To make sure that the final project assembled on the Competition site is consistent with the design and specifications presented in the construction documents.

• **Deliverable #7**

- > To finalise the entries in the building competition & living lab knowledge platform;
- > To have the 'as-built' drawings and specifications of the participating LDUs, with an extensive description of details and specifications;
- > To secure the relevant information in the building competition & living lab knowledge platform.

### 27.1 Schematic Design Documentation

The primary objective of Deliverable #1 is to verify the work that the Teams are generating through the various facets of the project's development. It is also designed to identify, as soon as possible, any aspect or design which does not fit nor is applicable to the sense of the Competition. As of Deliverable #2, the documentation includes a short audio-visual presenting the Teams' strategies. In the Schematic Design Documents, the project must be defined as a functional machine, demonstrating the advancements, targets, and goals of their original proposal, in compliance with the SDE23 Building Code and the SDE23 Rules; at the very least, it should reveal the intention and corresponding degree of accomplishment. Therefore, it is not mandatory for this Deliverable to provide all the data for each section included in the Project Manual, nor in the Project Drawings, nor in the Communication Plan.

**Note:** The proposals sent with this Deliverable can be subject to complete revisions by the Teams in following deliverables.

### 27.2 Dissemination Materials

Deliverables of the SDE23 Competition are intended to compile materials from participating Teams, to organise different events and activities, to contribute to the ongoing SDE objective of disseminating knowledge and project results, with an ultimate goal of raising awareness on climate change and energy literacy. Dissemination materials will be verified for compliance with SDE23 Rules. The materials submitted by the participating Teams in each Deliverable will be used by the SDE23 Organisation for the different dissemination activities planned. Please refer to the SDE23 Graphic Chart & Brand Manual.

### 27.3 Concept & Design Development Documentation

At this stage of the Competition, projects will include an extensive description of the Project.

**The level of detail is different for each project facet:**

- The neighbourhood integration (concept level);
- The whole building design (moderate with detailing on regular building parts) and;
- The LDU (detailed); the implementation planning for the LDU includes details and specifications, including materials, constructive systems, equipment, footing, a Structural & Trades Report, and detail drawings. Teams will have to consider all the remarks made by the SDE23 Host City Executives in the previous Deliverable, and design and plan accordingly. This Deliverable will be used to prepare the sessions for the workshops in the Host City. Therefore, Teams are encouraged to submit as much specific documentation, beyond the specifically required workshop documentation, in order to receive much more detailed workshop feedback.

### 27.4 Construction Documentation

Deliverable #4 aims to obtain the necessary information to define the construction of the LDU on the SDE23 solar village, and to foresee all the factors and items required for that purpose.

**The construction documentation includes the following important functions:**

- The construction documents will demonstrate compliance with the SDE23 Building Code and the SDE23 Rules so that Inspectors will be able to grant final on-site approval by simply verifying that the constructed project on the Competition site was accurately represented by the construction documents;
- The construction documents will clearly describe Team's proposed assembly and disassembly procedures. The SDE23 Site Operations Coordinator will review the Teams' procedures to identify and address potential conflicts among the Teams. Each Team is encouraged to consult the SDE23 Site Operations Coordinator as the relevant sections of the construction documents are being developed;

- The construction documents will include 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 construction documents must be exhaustive because the design Team will assume that the contractor has had no prior communication with them, has no prior knowledge of the design, and has little or no experience building high-performance residences.

### 27.5 Update Construction Documentation

The objective of Deliverable #5 is to obtain additional information and update the documentation sent in Deliverable #4 based on the requirements made by the SDE23 Organisation, including changes and design adjustments from the previous Deliverable.

**Note:** Deliverable #5 is the most important Deliverable of the SDE23 Competition prior to the final phase of the SDE23 Competition.

This deliverable is planned to organise documentation for juries, and to ensure clarity of Teams' documentation. Since the juries have a very limited opportunity to evaluate the constructed projects on the Competition site, the construction documents are the only means for a Team to provide a detailed presentation of its project to the juries. In the lead-up to contest weeks, each juror will evaluate sections of the Teams' construction documents relevant to the juror's respective area of expertise.

### 27.6 Design Adjustments Documentation

As stated in Rule 12.4 \_ Late Design Changes: 'The final project assembled on the Competition site will be consistent with the design and specifications presented in the Construction Documents'. The Design Adjustments Documentation Deliverable will be opened to the participating Teams from the day after Deliverable #5 due date. Therefore, if there is any change in the Team's project, after Deliverable #5 \_ Updated Construction Documentation, the Team must send it to the SDE23 Executives, as soon as possible. The corresponding missing and/or revised information will be passed on to the building inspections group, who will verify that the constructed unit corresponds to the unit's design, at the Competition Site, and will not penalise the Team for any incongruity. However, there will be neither feedback nor revision if not specifically requested by Teams. Please do not send the complete documentation again, but just the modified section, attaching to the documents a brief description of the changes that have taken place. Deliverable #6 also includes SDE23 solar village Documentation, with information required to prepare the SDE23 solar village Visiting Guide and the Jury Reports. With Deliverable #6, Teams initialise their project in the building competition & living lab knowledge platform.

### 27.7 As Built Documentation

The objective of Deliverable #7 is to have the 'as-built' drawings and specifications of the participating LDUs, with an extensive description of the details and specifications of the materials, constructive systems, equipment, structure, plumbing, ventilation, etc. Teams must record any changes of the project documentation during the fabrication, construction or assembly process and reflect them in the as-built documents. Deliverable #7 is the last Deliverable of the SDE23 Competition, and it will be issued after the final phase of the SDE23 Competition, so it will define the unit as it was built on the SDE23 solar village, as well as the Team's strategy during the contest week. The final documents are to be entered into the building competition and living lab knowledge platform together with a representative set of pictures as well as the completed fact sheets and technology tag list.; another key aspect of D#7 is the comprehensive impact assessment, in which Teams ensure a complete and relevant analysis of the Team's SDE23 project impact and implication in the SDE23. Details regarding content for the impact assessment will be communicated on the SDE23 WAT.

## rule 28 \_ shipped deliverable material

### 28.1 Hard Copies

- Electric drawings and calculations (see Rule 6.1b \_ Electrical and Photovoltaic Design Approval);
- Structural drawings and calculations (see Rule 6.1a \_ Structural Design Approval);
- Certificate of country-of-origin Code compliance (see Rule 6.1c \_ Codes Design Compliance).

### 28.2 Architectural Models

Teams must submit two architectural models of their project to the SDE23 Organisation within deliverables #3 and #4.

- The model in Deliverable #3 is intended to illustrate the built context design including the site with its existing structures and the LDU's as a removable part;
- The model in Deliverable #4 specifically focuses on the LDU.

The level of detail will be determined by the Team, according to the model scale and to their Competition strategy.

The model in Deliverable #3 will be metric scale 1:100, base dimensions of 80 cm x 80 cm. Teams should choose the part of the urban surrounding area of the site that is important for their concept.

The model should be aligned north, that means the north direction should be parallel to the side edge of the base plate of the model. The model of the LDU in Deliverable #4 will be metric scale 1:25, with base dimensions of 80 cm x 80 cm. It is possible to include lighting in the model but the SDE23 Host City Executives may not guarantee that it will be switched on during exhibitions. The model must be built and packaged with appropriate materials, in order to withstand handling and transportation. Along with the model, a methacrylate 5 mm thick display case must be included, following the indications given by the SDE23 Host City Executives. Models will be shown in exhibitions, conferences, fairs and other events, representing and explaining the SDE23 project.

To make transportation and exhibition assembly easier, and contribute to the exhibition homogeneity, models will be sent with the display case inside a plywood box, according to the design proposed by the SDE23 Host City Executives.

Teams may replace their model by shipping the new model to the address specified in Rule 26.1 \_ Shipped Submission, only after having communicated that decision to the SDE23 Host City Executives via the SDE23 WAT, and specified if they wish to have the previous model sent back to their university (at the university's expenses) or discarded by the SDE23 Host City Executives.

### 28.3 Project Description Poster

Teams must submit a poster describing their project. This poster will be shown with the model in exhibitions, or independently in events, to disseminate the SDE23 Competition. The requirements for the model, display case, and poster design and packaging will be specified through the SDE23 WAT. The project description poster may be updated whenever the Team wishes to, after having communicated that decision to SDE23 Executives via the SDE23 WAT.

**Note:** see Rule 30.4b.

### 28.4 Audio-Visual

#### a. Audio-Visual #1

For Deliverable #2, each Team must produce an audio-visual presentation to reveal their goals, describe their project objectives, the technologies to be used, and the corresponding sustainable concepts applied. These audio-visuals will be used for the SDE23 Organisation for dissemination purposes.

#### b. Audio-Visual #2

For Deliverable #3, Teams must produce an updated version of their Audio-visual#1. The audio-visuals #1 and #2 may be replaced at any time after having communicated that decision to SDE23 Host City Executives via the SDE23 WAT. The SDE23 Host City Executives will verify compliance with the SDE23 Rules and replace revised audio-visual material as promptly as possible.

### c. Audio-Visual #3

For Deliverable #6, Teams must produce an audio-visual presentation to reveal their final achievements, explain their units (LDU), the technologies used, and the sustainable concepts applied. These audio-visuals will be used for dissemination by the SDE23 Organisation during and after SDE23 Competition.

#### Technical Requirements

- **Maximum length**
  - > 5 minutes
- **Language**
  - > English. While other spoken languages may be used in punctual interventions, these must be subtitled or dubbed in English;
  - > A written version of all spoken parts must be provided as an appendix to the SDE23 Host City Executives in English. Additionally, Teams may send a Romanian or any other language translation.
- **Video Format**
  - > Full HD 1080p or 1080i (1920×1080 px);
  - > Encoding: Mp4 compression H.264;
  - > Frames per second: 25 or 50 fps;
  - > Minimum Bitrate: 4000 (more is better).
- **Audio Encoding**
  - > MP3 (MPEG-1 Audio Layer 3) or other with Frequency: 44.1 KHz;
  - > Number of channels: 2 channels stereo;
  - > Minimum Bitrate: CBR or VBR 128kb/s.

Recognition of all Team sponsors and supporting institutions must be limited to a maximum of 1 minute or 20% of the total time (whichever is less).

## rule 29 \_ team website

Please refer to the SDE23 Graphic Chart & Brand Manual.

### 29.1 Preliminary Website

A preliminary URL to a website consisting of at least three pages will be submitted with Deliverable #1. The initial site should offer, at least, basic information about the university or universities that support the Team, as well as the webmaster, communications, and sponsorship manager contacts. SDE23 and EEF logos must be included and linked to their respective webpages. Please refer to the SDE23 Graphic Chart & Brand Manual.

### 29.2 Website

The final Team website will consist of considerably greater content than the preliminary website and must comply with the following requirements. The SDE23 Organisation will continuously monitor the Team's websites; SDE23 Host City Executives will request changes and propose improvements where necessary to comply with the Competition's Rules. The final website will be evaluated by the Communication & Social Awareness jury during the Competition.

#### a. Encoding

Teams' websites must comply with the W3C encoding guidelines, as well as the international accessibility standards WCAG 2.0 (<http://www.w3.org/WAI/guid-tech.html>). Websites must pass the W3C test for HTML 4.01 Transitional or XHTML 1.0 Transitional (<http://validator.w3.org/>). File names will not contain uppercase letters, spaces, or special characters (ie., & or \$). Forms will include text labels that correspond with form controls and mark-up to associate the two. Equivalent alternatives will be provided for all multimedia. Pages requiring an applet or plug-in must provide a link to a page where the applet or plug-in can be downloaded.

#### **b. Compatibility**

The website will be compatible with the current web browsers for both PC and mobile devices (responsive web design). Pages must display correctly (ie., no horizontal scrolling is necessary to view the full width of the page) in 1024 x 768 resolution (800 x 600 resolution is also acceptable). The website will be accessible by mobile devices such as smart phones and tablets. If that is not possible an alternative dedicated version must be developed, in a way that users are diverted automatically by an automatic device detection system. The website will be compatible with the most popular mobile systems. Other:

- Scripts/applets/dynamic pages (CGI, JavaScript, Java, etc.): every script works correctly in the standard browser set;
- Content produced by scripting languages is accessible or has an accessible alternative.

#### **c. Style**

The website must have an attractive design and clear, impactful messaging, that invites navigation and offer a good user experience. It will provide legible and accessible contents, with dynamic combinations of images and/or videos/demos that accompany the texts. Page information conveyed with colour should be available in black & white, and foreground and background colours must provide sufficient contrast. Graphic style must be consistent throughout the site. Basic elements of content must include the objective of the page and its identification with its creator, which must be clear from the beginning. A brief description (with the possibility of extending it) of the key identification data: who, what, where, when, why, how (description, objectives, etc.) is required. It is recommended that the website be regularly updated.

#### **d. Language**

The entire website's content must be available in English, and optionally, in any additional other language. It is recommended to publish a shortened version in the Team's mother language and in Romanian, the Host City's language.

#### **e. URL**

Teams must have their own internet domain, using either a geographical (.es, .fr etc.) or a generic .com or .org.

#### **f. Contact**

At a minimum, an e-mail contact to the Webmaster is provided as a graphic link or text link on the home page of the site. Additionally, the webpage will include a press and a sponsorship contact.

#### **g. Sponsors' Recognition**

Teams' websites will contain a specific section where supporting institutions and sponsors will be named or represented by their logos, linking to their websites. Linking to sponsors must be verified with supporting institutions and sponsors to ensure full understanding of all legal and financial responsibilities. We encourage Teams to ask those institutions and business entities to place the SDE23 logos as it appears with the Team logo in a given sponsorship situation, with the 'Team sponsor' or equivalent heading, in their homepages, linking to the website of the Team which they are supporting.

#### **h. SDE23 & EEF Branding Recognition**

The SDE23 and EEF logos must appear in every section of the Teams' website. Please refer to the SDE23 Graphic Chart & Brand Manual for this. Both logos have to be linked to the SDE23 Organisations' websites (<https://solardecathlon.ro/>, <http://energyendeavour.org>, <http://solardecathlon.eu>). Teams' website must include a section for the publication of all the press releases that the SDE23 Host City Executives send to the Teams. In this same section, Teams may include any complementary information they find appropriate (for example, news and blogs).

#### **i. Advertising**

Advertisements are forbidden on Team's websites. Sponsors' logos may be freely placed but commercial messages are not allowed.

#### **j. Current Legislation Compliance**

Contents as images, files or codes employed in programming, have to be copies authorised to Teams or owned by them. If forms or any kind of user information storage is enabled, it must comply with Team's (or its server's) country law.



## rule 30 \_ electronic deliverable documents

### 30.1 Press Release & Press Kit

The SDE23 Organisation will use the information provided by the Teams in the press release and Press Kit for dissemination of the SDE23 Competition. Therefore, this will be the part of every Deliverable.

#### a. Press Release (PR)

The press release is meant to provide the most synthetic interpretation of key information related to the Team project. It should explain the most fundamental 'bites' of information, sufficient to attract the interest of a journalist for follow-up reporting, broadcasting, or publication. The press release (one, new, topic-related, Press Release for each deliverable) must be under two pages and must follow the structure and contents provided below:

- Team logo, lead university logo and corresponding branding principles as specified in the SDE23 Graphic Chart & Brand Manual.
- Headline and sub-headline: sum it up in approx. fifteen words.
- City, Dateline (ie. Barcelona, 02\_12\_22).
- Key texts: a few paragraphs, 600 words max, including:
  - > **catch intro:** a powerful, engaging first sentence(s);
  - > **quote(s):** the human factor as enticement, at least one quote from the Faculty Advisor and one quote from a Team member (max. 35 words each);
  - > **description (body text):** use a compelling tone to describe, including a short description: "Our motivation to participate in SDE23..." (max. 45 words);
  - > the **who, what, where, when, why & how** of your project;
  - > **about your Team:** key info that reveals the essence or values that your project represents;
  - > **contact:** name, phone, email, social media links and (eventually) a link to your downloadable Press Kit;
  - > **keys:** words that can lead in search functions;
  - > **links:** lead your reader toward your website, social media channels or other sources of additional info as well as to the SDE23 website;
  - > **images:** key images/visuals, three max. with credits and legends.

#### b. Press Kit (PK)

Teams are requested to consider the press release as the first component that will figure in a broader Press Kit. A Press Kit is often also referred to as a 'media kit', a well-structured compilation or package of information to be distributed to those interested in your project, notably the press or media. While it is important to provide specific information, it is equally important and highly advisable to curate and produce well-written, streamlined information for all sections in the Press Kit. In the context of the SDE23 deliverables, the Press Kit is obligatory in every Deliverable and must include the following information:

##### Press Release

Each set of deliverables should include the most recent press release (see Rule \_ 30.1a Press Release). Please include all previous press releases chronologically in each set of deliverables.

##### List of Team Members

Team Officers, students, teachers and other collaborators indicating their studies/specialty. Moreover, students will specify the university course they are attending, and teachers and other collaborators will mention their degree, research field and teaching areas, emphasising aspects which the Team consider most relevant. Please keep this information updated within each Deliverable and include all Team Officers (please refer to Rule 3.2 \_ Team Officers & Contact Information).

### **Project Description**

Teams must include an essay from 500 to 1500 words, describing the progress made in the project, as well as updated information on the dissemination activities realised since the previous Deliverable. The target audiences for these documents include international mass media journalists, so it is important to use a clear structure, and include complete, updated and easy to understand information. Among others, Teams should provide information on the following key sections:

- Team's organisation and objectives;
- Project development and current status;
- House description and relevant items (technologies, materials, etc.);
- Dissemination activities and current impact;
- Collaborating institutions and sponsoring entities. Please provide a short description of each, identifying their field of work and defining the collaboration established with the Team.

Please keep this information updated within each Deliverable.

### **Project Images**

Within each Deliverable, Teams must provide new, high quality images (300 dpi .jpg) all free of rights, for their publication in printed or online media and/or television. The following copyright information for photos and drawings needs to be used by each Team: © Team name / SDE23. If the author wishes to be specifically credited, please indicate: author name / Team name / SDE23. The copyright should also be embedded in the EXIF information of the image. These images must reveal the progress of the project. Each image or drawing must be accompanied by a short description. Images can include sketches/drawings, renderings, working models, interesting devices in the project, pictures of parts of the unit, of the daily work of the Team, and of the dissemination activities. An updated group photo of all the Team members must be included with each Deliverable. The Team logo must also be included (please add a vectorised version ie. eps/pdf of the Team logo). All images must be included in the Press Kit as well as be submitted as independent multimedia files (complying with Rule 26.2 Electronic Submission requirements). Teams must keep the requested information updated from one Deliverable to the next. Additionally, Teams may include any other material they wish the SDE23 Organisation to use for the SDE23 Competition dissemination, which complements the aforementioned information. The Teams' press releases will be published through the SDE23 website.

The press release and corresponding elements that appear in the Press Kit can contribute to the content that will be developed for the sponsorship manual. The press release and corresponding Press Kit will be made public for SDE23 dissemination activities.

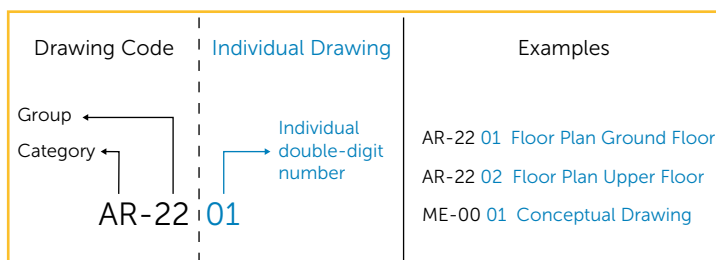
## **30.2 Project Drawings Structure & Contents**

As stated in Rule 26.3 \_ Documents Formatting Requirements, the Project Drawings must be consistent with the following guideline. To have the drawings of the deliverables organised and named, the basic principles outlined below should be followed. It is not necessary to include all the Drawings mentioned. In case there are particular drawings (plans, sections, elevations, details etc.) that do not fit in this Structure & Contents guideline, these must be located where appropriate (you may ask the SDE23 Executives through the SDE23 WAT, if necessary). If you have drawings corresponding to two different sections, put it in the most general one and use reference notes to indicate their final location.

#### a. Drawings Code

To name the drawings a code will be used, which is binding for all Teams:

FIGURE 23. CODING OF THE DRAWINGS



#### b. Drawings General Requirements

The drawing structure and contents guideline must be followed. Teams must include dimensions and graphic scales in all scale drawings, north indication and plan date in all plans. Project Drawings and Project Manuals need to be clearly understood as independent documents. Readers should not have to juggle the two documents in order to access and understand the information. In the Project Drawings each individual section will start with a single cover page. The table of contents should include bookmarks which link to every single page (drawings and cover pages). A visible differentiation of the existing versus new building parts must be made in the drawings. We encourage you to show the difference between both through high quality visual design. The following colour code needs to be used: Existing building (dark grey), new building part (black), demolition elements (grey, dashed).

**Note:** It is not mandatory for each Deliverable to provide all the data for each section included in the Project Drawings. However, the drawings related to the emphasised items for a specific deliverable should be included. Only the sheet list must show all existing drawings, even they are not up to date.

#### c. Structure & Contents Guideline

The tasks relate to three different planning levels

- Site concept;
- Contextual design;
- Demonstration unit.

##### Site Concept (SC)

- SC-00 site concept design explanation (include graphics and notes to briefly explain the proposal's main aspects, including aspects related to social context);
- SC-10 mobility concept (illustrate your design with drawings and/or site plans);
- SC-20 Competition area (illustrate with drawings and brief notes to explain the relation between your site concept design, the existing building/ your building design, and the LDU );
- SC-30 Isometry of the 3D-Model of the site concept (basic volume model of the site concept with the LDU and the surrounding buildings to indicate the shade and the solar potential);
- SC-40 exterior renderings (renderings or perspective drawings of the contextualised situation).

Your site concept will be presented as a layout of the Competition Plan (ISO 'A1' upright / 594 mm X 841 mm / sheet size, 'packaged' into a single PDF file). The code above should be used as a drawing number, not as single plans.

#### **Contextual Design (CC)**

- CC-00 Conceptual Drawings (ie. Building Design and Urban Mining Concept);
- CC -10 Site Plan [scale 1:500];
- CC -11 Floor Plan [scale 1:100];
- CC -12 Roof Plan [scale 1:100];
- CC -13 Building Elevations [scale 1:100];
- CC -14 Building Sections [scale 1:100];
- CC -20 Construction Details (special solutions, ie. integration of photovoltaics) [Scale 1:5/1:10/1:20];
- CC -21 Construction Details (regular building parts);
- CC -30 Energy Concept (including PV-integration);
- CC -31 System Details (all necessary component structures regarding the energy concept);
- CC -40 Isometry of the 3D-Model (basic volume model of the competition unit with the LDU, including interior walls, ceilings etc.);
- CC -50 Group of residents;
- CC -60 Exterior Renderings (renderings or perspective drawings of the building design).

Your collective context design will be presented as a layout of the Competition Plan (ISO 'A1' upright / 594 mm X 841 mm / sheet size 'packaged' into a single PDF file). The code above should be used as a drawing number, not as single plans.

#### **Living Demonstration Unit**

The following categories of the LDU will be presented as single plans ISO 'A3' (297 mm X 420 mm) sheet size, 'packaged' into a single PDF file. Usually, the scales should be observed; only in special cases may they deviate. Teams must use the plan template which will be available on the SDE23 WAT.

- **General (GE)**
  - > GE-00 Cover sheet;
  - > GE-10 Sheet List (the index including all existing drawings with their current valid date);
  - > GE-20 General Symbols (defined symbols and list notes used throughout the entire drawing set);
  - > GE-21 General Abbreviations (list of abbreviations used throughout the entire drawing set).
- **Architecture (AR)**
  - > AR-00 Conceptual Drawings;
  - > AR-10 SDE23 solar village Plan (Site Plan including the lot location inside the 'SDE23 solar village') [Scale 1:1000];
  - > AR-20 Site Plan [scale 1:100];
  - > AR-21 Floor Plan [scale 1:50];
  - > AR-22 Roof Plan [scale 1:50];
  - > AR-23 Building Elevations [scale 1:50];
  - > AR-24 Building Sections [scale 1:50];
  - > AR-30 Construction Details (including all details, important for general and energy concepts, and which consider the building code) [scale 1:2/1:5/1:10/1:20];
  - > AR-31 Constructive section of the façade (from the roof to the base point) with respective horizontal section and elevation (cut-out), focusing on circularity and the representation of the building elements (ie. wall/floor elements or modules) [scale 1:20];
  - > AR-40 Solar Envelope (Site Plan and Site Elevations, showing the solar envelope geometry) [scale min. 1:100];
  - > AR-41 Measurable Area [Scale 1:100] (floor plan(s), please highlight the Measurable Area with colour and indicate its size);
  - > AR-42 Empty;
  - > AR-43 Architectural Footprint [scale 1:100] (Site Plan, highlighting the footing area with colour and indicating its size);
  - > AR-44 Site Elevation [scale 1:100] (site elevations showing solar envelope and architectural footprint compliance);
  - > AR-45 Reconfigurable features [scale 1:100] (plan showing the exterior moveable components, the solar envelope and the architectural footprint).

- **Interiors (IN)**
  - > IN-00 Conceptual Drawings;
  - > IN-10 Floor (materials, properties, compliance to building code: ie. slip-resistant, accessibility) [scale 1:50];
  - > IN-11 Reflected ceiling [scale 1:50];
  - > IN-12 Elevations [scale 1:50];
  - > IN-20 Kitchen Plan (Furniture and Appliances) [scale 1:50];
  - > IN-21 Kitchen Elevations (Furniture, Appliances) [scale 1:50];
  - > IN-22 Kitchen Details [scale 1:5/1:10/1:20];
  - > IN-30 Bathroom Plan (fixtures and accessories) [scale 1:50];
  - > IN-31 Bathroom Elevations (fixtures and accessories) [scale 1:50];
  - > IN-32 Bathroom Details [scale 1:5/1:10/1:20];
  - > IN-40 Furnishings;
  - > IN-50 Interior Renderings.
- **Structural (ST)**
  - > ST-00 Conceptual Drawings;
  - > ST-10 Foundation Plan [Scale mind. 1:50];
  - > ST-11 Structural Floor Plan [Scale 1:50];
  - > ST-12 Structural Roof Plan [Scale 1:50];
  - > ST-13 Structural Sections [Scale 1:50];
  - > ST-20 Structural Details [Scale 1:5/1:10/1:20].
- **Plumbing (PL)**

Please refer to Note 1

  - > PL-00 Conceptual Drawings;
  - > PL-10 Plumbing Plan, including supply and removal (cold and hot water);
  - > PL-20 Greywater;
  - > PL-30 Drain / Waste / Vent;
  - > PL-40 Schematic Diagram;
  - > PL-50 Supply and removal Isometric (cold and hot water);
  - > PL-51 Greywater Isometric;
  - > PL-52 Drain/Waste/Vent Isometric.
- **Solar Water Heating (SW)**
  - > SW-00 Conceptual Drawings;
  - > SW-10 Plan;
  - > SW-20 Isometric.
- **Mechanical (ME)**
  - > ME-00 Conceptual Drawings;
  - > ME-10 HVAC Distribution Plan;
  - > ME-11 HVAC Equipment;
  - > ME-20 Heating;
  - > ME-23 Ventilation;
  - > ME-30 Mechanical Room Elevation;
  - > ME-40 HVAC System Schematic Drawings;
  - > ME-41 Heating mode Schematic Drawings;
  - > ME-50 Controls;
  - > ME-60 Isometric Distribution.

- **Electrical (EL)**

Please refer to Note 2.

- > EL-00 Conceptual Drawings;
- > EL-10 Grid Interconnection;
- > EL-20 DC wiring Diagram;
- > EL-30 Power Plan;
- > EL-40 Lighting Plan;
- > EL-50 One-line Diagram;
- > EL-60 AC Circuit Layout.

- **Photovoltaic System (PV)**

Please refer to Note 3.

- > PV-00 Conceptual Drawings;
- > PV-10 Photovoltaic system: general;
- > PV-20 Photovoltaic system: DC circuits;
- > PV-30 Photovoltaic system: AC circuits;
- > PV-40 Photovoltaic system: grounding system.

- **Telecommunications and Building Management System (BMS)**

- > BMS-00 Conceptual Drawings;
- > BMS-10 Wiring Plan;
- > BMS-20 Schematic Diagram;
- > BMS-30 Equipment.

- **Instrumentation Drawings (ID)**

Please refer to the Technical Monitoring Procedures Document.

- > ID-00 Conceptual Drawings;
- > ID-10 General Monitoring;
- > ID-20 Monitoring panel room;
- > ID-30 Electricity meters' topology;
- > ID-40 Electricity meters' connection;
- > ID-50 House appliances.

- **Site Operations (SO)**

Please refer to Rule 44 \_ Site Operations Plan.

- > SO-00 Trucks Shipment;
- > SO-10 SDE23 solar village;
- > SO-20 Lot Plan SO-30 Phases.

- **Fire Protection (FP)**

Several plans and details regarding fire protection of the LDU are necessary for the approval of the site construction. Specific requirements will be published in Rule 50 'Building Code Application'.

- **Health and Safety (HS)**

Several plans and details regarding health and safety during the construction time of the LDU are necessary. Specific requirements will be published in Rule 51 'Health and Safety'.

- **Public Tour (PT)**

- > Please refer to Note 4
- > PT-00 Site accessibility;
- > PT-10 House Tour Floorplan;
- > PT-20 House Tour General Information.

**Notes:**

1. Include a note indicating that the unit toilet(s) will not be installed on SDE23 solar village, see SDE23 Building Code, Water Use.
2. The ELECTRICAL (EL) drawings must include electrical layouts, detailed electrical components information, and complete electrical diagrams of the conventional electrical installation showing all elements and protections (including those of the interface between the Photovoltaic system and the electricity distribution network). The one-line diagram of the electrical installation must include battery charger, inverter charger and photovoltaic installations as well as the locations of the SDE23 electric meters. For more information about the SDE23 meters' requirements please refer to the Monitoring Procedures document.
3. The PHOTOVOLTAIC (PV) drawings must include electrical diagrams describing all components (equipment), wiring and protections. The general diagram of the photovoltaic system (PV-001) will include the interface with the electrical installation of the unit (LDU) and the electrical distribution network. Drawings reference numbers indicated show the minimum drawings required for approval. Additional drawings can be included, provided that they are placed on the corresponding sub-section, for example: for details of DC circuits, new drawings with reference numbers PV-012, PV-013, up to PV-019 can be added; the same applies to details of the PV system as a whole (new drawings: PV-002 to PV-009), AC circuits (PV-022 to PV-029) and Grounding system (PV-031 to PV-039).
4. PUBLIC TOUR (PT) The tour must be illustrated and explained in detail; drawings must show the points at which the Decathletes will make their explanations and specify the information that will be explained at each point. The location of the waiting line and the number of people per tour must be indicated. Drawings must include furniture, objects, and all possible obstacles in the proposed route. They also must include accessibility-related information, ie. widths of ramps, steps, doors and narrow areas in the tour route, and circles to turn wheelchairs. If there are any movable elements to be shown to visitors, include a sketch of the moving mechanisms and measures adopted to assure the safety of the visitors. Add explanatory notes as needed.

### 30.3 Project Manual Structure & Contents

As stated in Rule 26.3b, the Project Manual must be consistent with the SDE23 Project Manual formatting and guidelines provided below. In order to have the Project Manual of the deliverables organised and named, it is important to adhere to the basic principles illustrated in the Project Manual Structure & Contents'. If there are particular sections which do not fit in this guideline, these must be located where appropriate (you may ask the SDE23 Host City Executives through the SDE23 WAT). If there is information that corresponds to two different sections, please put it in the most general one and make the appropriate reference to its corresponding location.

**General requirement**

In order for the SDE23 Host City Executives and the juries to quickly understand the project, please put the relevant information into the Project Manual and place the support documents (calculations, software outputs, data sheets, etc.) into appendices, using reference notes to indicate their location.

The SDE23 Project Manual contents & structure is as follows:

**TABLE 30. PROJECT MANUAL STRUCTURE**

COVER SHEET	
SUMMARY OF CHANGES	RULE 31 _
TABLE OF CONTENTS	RULE 32 _
RULES CHECKLIST	RULE 33 _
CONTESTS SUPPORT DOCUMENTS	RULE 34 _
ARCHITECTURE DESIGN REPORT	RULE 35 _
ENGINEERING & CONSTRUCTION REPORT	RULE 36 _
ENERGY EFFICIENCY DESIGN REPORT	RULE 37 _
COMMUNICATION & SOCIAL AWARENESS REPORT	RULE 38 _
CONNECTED LIVING & AFFORDABILITY REPORT	RULE 39 _
SUSTAINABILITY REPORT	RULE 40 _
INNOVATION REPORT	RULE 41 _
DINNER PARTY MENU	RULE 42 _
CONTEST WEEK TASKS' PLANNING	RULE 43 _
COST ESTIMATE AND PROJECT FINANCIAL SUMMARY COST	RULE 44 _
SITE OPERATIONS PLAN	RULE 45 _
HEALTH & SAFETY REPORT AND DOCUMENTATION	RULE 46 _
DETAILED WATER BUDGET	RULE 47 _
ELECTRICAL & PV DESIGN SYSTEMS INFORMATION	RULE 48 _
PROJECT SPECIFICATIONS	RULE 49 _
STRUCTURAL CALCULATIONS	RULE 50 _
APPENDIX	

**Notes:**

- Teams must follow the SDE23 Project Manual Structure & Contents which will be made available on the SDE23 WAT.
- To rationalise the Team's strategies, technical decisions must be justified by parametric studies and calculations. Figures and diagrams should highlight most relevant findings or results.
- With regards to Contest Support Documents, the jury will attach greater importance to quality of information rather than to quantity.
- Jurors will focus specifically on their corresponding sections, since it is recommended that Teams systematically introduce a brief, synthetic, project recapitulative at the introduction to each section including a project statement and statement regarding the project's intended / local context.
- Electrical & PV Chart Checklists must be submitted as four separate documents (see Rule 47 \_ Electrical and PV Chart and Checklists).



### 30.4 Workshop Documentation

SDE23 & EEF co-branding principles as applied to Teams' documentation/dissemination material will be communicated after Team selection, in an additional chapter of the SDE23 Graphic Chart & Brand Manual.

#### a. Team Brochure

**Public SDE23 Workshop Dissemination Brochure:** Teams must submit the following information, which will be used for the SDE23 Workshop Dissemination Brochure:

- **Text:** Include the name of the unit, of the Team, and of the university. Also, a brief description of the full project (Collective Context design & LDU), of approximately 200 words, explaining its main goals and innovative elements. This text will be published in English and in Romanian, the Host City's local language; both versions of this text will be provided by the Teams;
- **Images:** three photographs for public dissemination of the project;
- **LDU rendering:** one high-quality rendering (minimum 300dpi .jpg) or vector (.eps or .pdf);
- **LDU Plan, vertical and cross sections:** one clean vector file of the vertical section, plan and cross section, scaled 1/500 - 1/1000 (.eps or .pdf);
- **Other relevant image:** one high-quality image of the project (.jpg minimum 300dpi, or vector .eps or .pdf).

#### b. Project Description Poster

- Teams must submit a poster describing their project (Collective Context design & LDU). This poster will be shown with the model in exhibitions, or independently at events, to raise awareness of the SDE23 Competition. The requirements for the poster design will be specified through the SDE23 WAT.
- The project description poster may be updated whenever the Team wishes to, after having communicated that decision to the SDE23 Host City Executives via the SDE23 WAT.

**Note:** see Rule 28.3.

#### c. Team Description Poster

- Teams must submit a poster describing their Team's organisation. This poster will be shown with the model in exhibitions, or independently at events, to raise awareness of the SDE23 Competition. The requirements for the poster design will be specified through the SDE23 WAT.
- The Teams' description poster may be updated whenever the Team wishes to, after having communicated that decision to SDE23 Host City Executives via the SDE23 WAT.

### 30.5 SDE23 solar village Documentation

#### Information to prepare SDE23 solar village Visitor's Guide

Teams must submit information and material regarding their project, in order to prepare the Visitor's Guide, which will be given to all professional visitors attending SDE23 solar village. For the sake of efficiency in producing the SDE23 solar village Visitor's Guide, it is extremely important to follow the provided indications, as the descriptions and images must be exactly as specified. The requirements for this item, as well as a layout example of this SDE23 solar village Visitor's Guide, will be available through the SDE23 WAT.

Professional visitors must be able to understand the basic layout and characteristics of the Team's project with a brief reading of this guide; it is mandatory to provide the most precise, accurate information possible. Teams must submit the required documentation in English and in Romanian.

**Note:** Regarding the preparation of information for the SDE23 solar village Visitor's Guide, please refer to the SDE23 WAT for specific due dates.

### 30.6 SDE23 Official Dissemination Materials

The SDE23 official dissemination materials will be used for publications in magazines, brochures, web platforms, etc. Details are to be determined. As per all communications actions, please refer to the SDE23 Graphic Chart & Brand Manual for style guidelines.

### 30.7 Project Energy Performance Simulation Data & Documents

#### a. Fact Sheet

The fact sheet will provide the project key dimensions for the contextual design and the LDU.  
The form will be provided through the SDE23 WAT.

#### b. Energy Simulation

Energy Simulation aims to provide a measurable evaluation of project by analysing different aspects:

- Solar: shading protection, daylight harvesting, photovoltaic production, solar-thermal production;
- Thermal Comfort: heating/cooling loads, natural/artificial ventilation, hot water;
- Electrical: loads assessment, electrical balance simulation, energy payback time, CO<sub>2</sub> reduction.

These simulations will be done with tools provided by SDE23 Host City Executives.  
More details will be provided through the SDE23 WAT.

#### Simulations required for the Architecture Design Report (Rule 35):

- Solar shading;
- Daylight.

#### Simulations required for the Energy Efficiency Report (Rule 37):

- Heating, Cooling, Ventilation, DHW, Solar-Thermal;
- Electrical, PV.

#### c. Life-Cycle Assessment

Life-Cycle Assessment (LCA) is a standardized process to assess lifetime environmental impact. LCA takes into consideration all the stages that lead from raw material through manufacturing/ construction, distribution, and usage to final disposal. LCA will be evaluated only for the Living Demonstration Unit.

#### Life-cycle assessment is divided in four stages:

- **Product stage:**
  - > A1 - raw material supply, including processing of secondary material input;
  - > A2 - transport of raw material and secondary material to the manufacturer;
  - > A3 - manufacture of the construction products, and all upstream processes from cradle to gate.
- **Construction process stage:**
  - > A4 - transport of construction products to the building site;
  - > A5 - the building installation/construction;
- **Use stage:**  
(building fabric)
  - > B1 - use of the installed product, service or appliance;
  - > B2 - maintenance of the product;
  - > B3 - repair of the product;
  - > B4 - replacement of the product;
  - > B5 - refurbishment of the construction product;
 (operation of building)
  - > B6 - operational energy;
  - > B7 - operational water use;
- **End-of-life stage:**
  - > C1 - demolition of the building/building product;
  - > C2 - transport of the demolition waste comprising the end-of-life construction product to waste processing facility;
  - > C3 - waste processing operations for reuse, recovery or recycling;
  - > C4 - final disposal of end-of-life construction product.

**Note: Letter A** refers to all processes that happen before the building is taken into use.

**Letter B** covers the period when the building is in use. **Letter C** refers to the end-of-life processes.

**LCA is defined by standards:**

- ISO 14040, ISO 14044, ISO 21929-1, ISO 21931-1, ISO 14025, ISO 21930;
- EN 15978, EN 15804, EN 15942.

The Life-Cycle Assessment is required for the Sustainability Report (Rule 40) and will highlight embodied energy analysis, carbon footprint and water/electrical energy consumption reductions.

These simulations will be done with tools provided by SDE23 Host City Executives. More details will be provided through the SDE23 WAT.

## rule 31 \_ summary of changes

Changes and additions to the Project Drawings and Project Manual listed in the summary of changes will be reviewed. Anything not listed is assumed to be unchanged from the previous version of the Project Drawings and Project Manual and will not be reviewed. As always, an important question to ask before submitting is, 'Will the information be easy for the reviewers and jurors to find?'

## rule 32 \_ table of contents

Most users of the document will be reviewing it electronically and will navigate using the PDF bookmarks and hyperlinks. For the benefit of the reviewers and jurors, Teams must use the basic bookmarking structure and section titles supplied by the SDE23 Organisation. Remember that some users will print the document, so make sure that the printed version is also easy to navigate, i.e., clearly numbered sections and/or pages are essential. Also, remember to design the margins appropriately. For example, the SDE23 Rules PDF document is intended for electronic and printed viewing; PDF bookmarks and hyperlinks are provided, as well as margins and end-of-section blank pages designed for double-sided, spiral-bound, portrait printing. A similar approach is recommended for the Project Manual. A 'test print' is advised, to ensure a successful print for an A4 binder.

## rule 33 \_ rules checklist

The SDE23 Rules checklist is intended to make revisions easier. Participating Teams must fill in each of the aspects required, specifying the drawing or section included.

**TABLE 31. SDE23 RULES CHECKLIST.**

RULE DESCRIPTION	CONTENT REQUIREMENT(S)	DRAWING(S)/ REPORT(S)
3.2 Team Officers & Contact Information	Team officer's contact information completely fulfilled in Table 2 (SDE23 WAT).	
4.3 Lot Conditions & attribution	Drawing(s) showing the storage and unloading areas and corresponding load's calculations.	
4.3 Lot Conditions	Calculations showing that the structural design remains compliant even if there is a level difference, and drawing(s) showing shimming methods and materials to be used if needed.	
4.4 Footings	Drawing(s) showing the locations and depths of all ground penetrations on the Competition site.	

4.4 Footings	Drawing(s) showing the location, contact area and soil-bearing pressure of every component resting directly on the ground.	
4.7 Construction Equipment	Drawing(s) showing the assembly and disassembly sequences and the movement of heavy machinery on the Competition site and specifications for heavy machinery.	
5.1 Solar Envelope Dimensions	Drawing(s) showing the location of all unit and site components relative to the solar envelope.	
6.1 Structural Design Approval	Structural drawings and calculations signed and stamped by a qualified licensed professional.	
6.1 Electrical & Photovoltaic Design Approval	Electrical and Photovoltaic drawings and calculations signed and stamped by a qualified licensed professional.	
6.1 Codes Design Compliance	List of the country-of-origin codes complied, properly signed by the faculty advisor.	
6.2 Architectural Footprint	Drawing(s) showing all information needed by the Rules Officials to digitally measure the architectural footprint.	
6.2 Architectural Footprint	Drawing(s) showing all the reconfigurable features that may increase the footprint if operated during Contest week.	
6.3 Measurable Area	Drawing(s) showing the Measurable Area.	
6.4 Entrance & Exit Routes	Drawing(s) showing the accessible public tour route, specifying the entrance and exit from the unit to the main street of SDE23 solar campus.	
7.3 PV Technology Limitations	Specifications and contractor price quote for photovoltaic components.	
7.4 Batteries	Drawing(s) showing the location(s) and quantity of stand-alone, PV-powered devices and corresponding specifications.	
7.6 Thermal Energy Storage	Drawing(s) showing the location of thermal energy storage components and corresponding specifications.	
8.1 Containers locations	Drawing(s) showing the location of all the water tanks.	
8.2 Water Delivery	Drawing(s) showing the fill location(s), quantity of water requested at each fill location, tank dimensions, diameter of opening(s) and clearance above the tank(s).	
8.3 Water Removal	Drawing(s) showing the quantity of water to be removed from each fill location, tank dimensions, diameter of opening(s) and clearance above the tank(s).	
8.5 Greywater reuse	Specifications for greywater reuse systems.	
8.6 Rainwater Collection	Drawing(s) showing the layout and operation of rainwater collection systems.	
8.8 Thermal Mass	Drawing(s) showing the locations of water-based thermal mass systems and corresponding specifications	
8.9 Greywater Heat Recovery	Specifications for greywater heat recovery systems.	
9.1 Placement	Drawing(s) showing the location of all vegetation and, if applicable, the movement of vegetation designed as part of an integrated mobile system.	
9.2 Watering Restrictions	Drawings showing the layout and operation of greywater irrigation systems.	

10.2 SDE23 Sensors' Location & wire routing	Drawing(s) showing the location of bi-directional meters, metering box, sensors, cables and feed-through to pass the instrumentation wires from the interior to the exterior of the unit.	
11.2 Use of the SDE23 Logo	Artwork, and content of all communications materials, including signage (please refer to the SDE23 Graphic Chart & Brand Manual).	
11.3 Teams' sponsors & Supporting Institutions	Drawing(s) showing the dimensions, materials, artwork, and content of all communications materials, including signage (please refer to the SDE23 Graphic Chart & Brand Manual).	
11.4 Team Uniforms	Drawing(s) showing the artwork, content and design of the Team uniform (please refer to the SDE23 Graphic Chart & Brand Manual).	
12.4 Public Tour	Drawing(s) showing the public tour route, indicating the dimensions of any difficult point, complying with the accessibility requirements.	
23.0 Contest 5: Drying Method	Drawing(s) showing the clothes drying method and the place where the clothes will be dried.	
23.0 Contest 5: House Functioning	Appliances and corresponding technical specifications (Appliances and Home Electronic Equipment specifications and user manuals).	
36.5 Photovoltaic systems design	Specifications of PV generators, inverters, wiring, cables, protections, earthing systems, interface with the electricity distribution network turned on.	
36.5 Photovoltaic systems design	Inverters' certificates.	
36.5 Photovoltaic systems design	Maintenance plan for PV generators, supporting structure, inverters, wiring, cables, protections, circuit breakers in case of fire and earthing system. Fire protection systems for PV DC wiring.	
36.5 Photovoltaic systems design	The corresponding table 'design summary' must be completed.	
51.3 Fire Safety	Specifications for Fire Reaction of Constructive elements, extinguishers and fire resistance of the unit's structure.	
51.3 Fire Safety	Drawings showing compliance with the evacuation of occupants' requirements and fire extinguishers location.	
51.4 Safety against falls	Specifications of compliance with the slipperiness degree classes of floors included in House Tour.	
51.4 Safety against falls	Drawing(s) showing compliance with conditions for uneven flooring, floors with different level, Restricted Areas stairs, Public Areas Staircases, Restricted Areas Ramps and Public Areas Ramps.	
51.4 Safety for impact risk & avoiding trapping	Drawing(s) showing compliance with conditions for avoiding impact risk and trapping.	
51.4 Safety against the risk of inadequate lighting	Specifications for level of illumination of House Tour areas light fittings.	
51.5 Accessibility for People with Disabilities and Special Needs	Interior and exterior plans showing the entire accessible tour route.	
51.6 Structural Safety	Specifications for the use of dead loads, live loads, safety factors and load combinations in the structural calculations.	
51.7 Electrical and PV Systems	Complete the 'Electrical System Design PV Chart and Checklist'.	

51.7 Electrical and PV Systems	Specifications of the wiring, channels, panels and protections of the electrical installation.	
51.7 Electrical and PV Systems	One-line electrical diagram and drawings showing the grounding, execution and paths.	

## rule 34 \_ contests support documents

The contests support documents will be used to justify the Teams' strategies towards the ten Competition contests, as well as describing the project objectives in the different aspects of each contest. The following rules describe the specific content required for each contest support document.

**The contest support documents must be presented in the following order:**

1. Connected Living and Affordability Report - see Rule 39
2. Architecture Design Report - see Rule 35
3. Engineering and Construction Design Report - see Rule 36
4. Energy Efficiency Design Report - see Rule 37
5. Innovation Report - see Rule 40
6. Sustainability Report - see Rule 41
7. Communications Plan - see Rule 38

### Notes:

- Connected Living & Affordability Report and Architecture Report are closely linked; global design strategy must be described in both sections. In the Connected Living & Affordability Report Teams must include a macro-vision, addressing global, geographic, and contextual issues; the Architecture Report must provide a micro-vision of the proposals, addressing topics related to local and spatial housing organisation.
- Juries appreciated the Teams' capacity of synthesis and the clarity of the text.
- In case that the information required in one support document has been mentioned elsewhere in the Project Manual, the section where it is located must be clearly indicated.

## rule 35 \_ architecture design report

### 35.1 Architectural Concepts

Teams must include in this section a summary of their context design strategies; detailed description must be included in the Connected Living and Affordability Report (See Rule 39 \_). Context aspects in this report must explain the global design strategy and must address local and spatial housing organisation issues. Teams must include a complete description of the architectural concepts taken into consideration in the project design. Therefore, it is necessary to explain the process, from the primitive idea up to the final project design. In the same way, the project materials and construction will be described, as well as all the concepts and architectural elements included.

- **Technologies integration:** the seamless integration of the house technologies, including the solar systems, in the design concept and the formal expression of the project; the home-office-setup for audio-video conferencing / podcasting / live streaming; and the Indoor Air Treatment Technologies, among others.
- **Universal Design:** the concept of designing all products, and the built environment, to be aesthetic and usable to the greatest extent possible by everyone, regardless of their age, ability, or status in life.

### 35.2 Solar System Integration

The solar system integration is a key component of the building design and the LDU. Details must illustrate the beauty and functionality of the general approach, and of the construction in detail. Teams will explain the building integrated solar systems concept and selection criteria, and how the solar systems fulfil energetic and aesthetic functions according to the following items:

- **Aesthetic integration:** how the solar systems become an integrated part of the architecture;
- **Additional properties:** conformity of the systems performing architectural functions, such as weather protection, thermal insulation, noise protection, modulation of daylight etc., while considering the functioning requirements of the systems.

### 35.3 Summary of reconfigurable features

This summary will be used before, during, and after jury tours to verify that the Team complies with Rule 6.2. Be sure to include references to relevant drawings and/or specifications. If you are not sure whether something is considered a 'reconfigurable feature', include it in this summary, just in case. The Competition Manager will review the summary and notify the Team if any of the listed items are not considered 'reconfigurable features'.

### 35.4 Lighting Design Narrative

The lighting design narrative will describe the use of both natural and artificial lighting, to fulfil the unit's lighting requirements. The calculations of the lighting systems and energy efficiency will be included. The lighting quality for the space and comfort definition will be positively assessed, evaluating the night and day specific needs. The lighting used to highlight the unit's architectural values will be also evaluated. The results from the evaluation of solar shading explaining the optimisation for daylight will also be assessed.

## rule 36 \_ engineering & construction design report

The Engineering & Construction Design Report will include a description of the following aspects:

- Structural design;
- Systems design: mechanical, electrical, plumbing, and automation;
- Solar system design;
- Constructive system and assembly management.

### 36.1 Structural Design

Teams will explain the structural design of the project, from the initial premises to its consequent project development, describing the materials used, its objectives and the main reasons for the final adopted solution. The calculations are to be included in the structural calculations section in the Project Manual.

### 36.2 Systems design: mechanical, electrical, plumbing, and automation

#### a. Mechanical System Design

Teams will submit a general description of the design criteria adopted for the mechanical system of their project. A detailed description of the electrical systems of the project will be included, including calculations of the needs and expected energy contribution from the installation. Details will include the accessibility of the installation for maintenance and repair tasks, the effectiveness of the insulation, and control systems.

#### **b. Electrical System Design**

Teams will submit a general description of the design criteria adopted for the electrical system of their project.

A detailed description of the electrical systems of the project will be included, including detailed calculations of the needs and expected energy contribution by the installation. Details will include information on the accessibility of the installation for maintenance and repair tasks, the effectiveness of the insulation, and the control systems.

#### **c. Plumbing System Design**

Teams will submit a general description of the design criteria adopted for the plumbing system of their house.

A detailed description of the plumbing systems will be provided, including detailed calculations of the needs.

Teams must describe the water cycle of the house, explaining the recycling and/or reuse of rainwater, greywater, etc.

Details will include information on the accessibility of the installation for maintenance and repair tasks, the effectiveness of the insulation, and the control systems.

#### **d. Automation System Design**

Teams will submit a general description of the design criteria adopted for the automation system of their house.

A detailed description of the automation system will be provided, explaining the strategies and means used to control and monitor the house systems: heating, cooling, ventilation, lighting, shading, plumbing, etc. Information regarding the accessibility of the installation for maintenance and repair tasks, and system upgradability, if applicable, will be included.

### **36.3 Solar System Design**

#### **a. Building Integrated Solar Active Systems**

Building-Integrated Solar Active Systems (BIPV, BIT, BIPVT) are materials that are used to replace conventional building materials in parts of the building envelope such as the roof, skylights, or facades. They are increasingly being incorporated into the construction of new buildings as a principal or ancillary source of electrical power, although existing buildings may be retrofitted with these modules as well. The advantage of integrated solar active systems over more common non-integrated systems is that the initial cost can be offset by reducing the amount spent on building materials and labour that would normally be used to construct the part of the building that these modules replace.

Teams will explain the house 'Building Integrated Active Solar System' concept and selection criteria, how the active solar systems fulfil energetic and aesthetic functions, and the economic impact of the integration in the house's design, according to the following items:

- **Constructive solution:** quality and consistency of the constructive details, and the modules are adapted to the structure, to the modularity and to other conventional materials of the LDU;
- **Maintenance:** specific conditions for operating, maintaining and repairing the systems;
- **Economy of the installation:** including its economic justification, considering the savings for replacing conventional materials, electrical energy production, and possible extra energy saving costs influenced by the systems integration in the unit's general performance (architectural function).

#### **b. Photovoltaic Systems Design**

A document describing the solar photovoltaic system (and other electricity producing solar systems) must be written, containing at least the following aspects:

- General description of the photovoltaic system (and other electric solar systems) and design criteria followed.
- Design and specifications of: photovoltaic generator(s) (including characteristics of the photovoltaic modules used), inverter(s), batteries, cables and wiring methods, protection, earthing systems, interface with the electricity distribution network;
- Maintenance plan, with specific recommendations for the different components: photovoltaic modules/generator(s), supporting structure, inverter(s), cables and wiring methods, protections and earthing systems, etc;
- Inverters certificates, which demonstrate compliance with the requirements stated for grid interconnection (Rule 51.8.2.4 Over/under voltage and frequency; Rule 7.4 for the battery bank inverter, if applicable).



To demonstrate code compliance, from D#3 onward, Teams must complete and submit the 'Photovoltaic Checklist' and 'Electrical Storage System Checklist'. Teams must provide the necessary information to evaluate the conformity of their proposals (certificate of compliance, calculus, etc.) in their Project Manual. The 'Photovoltaic Checklist' and 'Electrical Storage System Checklist' are part of the 'Electric and PV Chart and Checklists' document. See more details in Rule 48 \_ Electrical and PV Design Systems Information.

### c. Solar Thermal Design

Teams must include detailed need estimations and expected contribution of the system, and information about the supporting structure, storage system, backup energy source, the accessibility of the installation for maintenance tasks, the effectiveness of the insulation, and control systems. Moreover, the cost of the installation will be clearly indicated.

## 36.4 Constructive system design & assembly management

Teams will explain the constructive design of the house, from the initial premises to its consequent project development, describing the materials used, its objectives, and the main reasons for the final adopted solution.

- **Building envelope:** Material, characteristics, detailing, coherence. The specifications and technical data of all the materials are to be included in the construction specifications section in the Project Manual.
- **Interior divisions and finishes:** Material, characteristics, detailing, coherence. The specifications and technical data of all the materials are to be included in the construction specifications section in the Project Manual.
- **Acoustic performance of the adopted solutions:** Materials, characteristics, calculations, simulation (with reverberation time). Estimate indoor reverberation time: In order to complete the reverberation time estimation, you must include the most significant internal coating materials absorption coefficients and the calculations that have been carried out. The reverberation time may be estimated theoretically or through acoustic simulation. The absorption coefficients and the reverberation time must be shown for the following frequencies: 125 Hz, 250 Hz, 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz. The specifications and technical data of all the materials are to be included in the construction specifications section in the Project Manual.
- **Prefabricated Elements:** Elements that can be factory made and improve assembly management. The proposed prefabricated elements should prove themselves scalable and replicable, easy to use in order to allow adaptation in time, and easy to include in multiple variants of the building.
- **Assembly Management:** The proposal must take into consideration the previous prefabricated elements concept, which consists of using replicable elements/units and their capacity for easing transportation, construction and the adjustments of costs, execution time, workmanship etc. Assembly management will be assessed based on all the processes and includes the Site Operation Plan (use of allowed space, storage, routes, times, safety of operations, etc.).
- **Transportation:** Transportation should respect regulations for the EU and other passing countries and should be correlated with the Site Operations plan. This module will be assessed based on its integration in the assembly management and resources used for transportation. Size of elements, simulation, number of transportation platforms must be included.

## rule 37 \_ energy efficiency design report

### 37.1 Energy Efficiency Concept

In these reports, Teams must include the detailed explanation of their design strategies with regards to energy efficiency.

#### General Concept

The general concept of energy efficiency shall include a description of the following aspects:

- A fact sheet listing the project's key dimensions for the whole building and the demonstration unit.  
The form will be provided through the SDE23 WAT;
- Measures taken to reduce the building energy demand, such as insulation, air tightness, solar shading, heat recovery, energy efficient household devices, etc;
- Measures undertaken to decarbonise the energy supply, such as the use of ambient heat, solar energy utilisation, etc;
- Systems design: plumbing, ventilation ducts, electrical and photovoltaic installations.

The drawings and technical descriptions must be clear, precise and complete.

#### a. Efficiency of Passive Systems

This section must include the justification of bioclimatic strategies (passive design strategies) selected and its relation to energy efficient construction. The functioning of the used strategies must be explained with figures or drawings.

Some aspects to consider are:

- **Project's envelope:** justify the used building envelope types;
- **Glazing:** justify the orientations, types and sizes of the house's openings;
- **Daylight:** justify the selected daylight strategies to ensure the optimal use of daylight and controls, to provide sufficient, but evenly distributed, light;
- **Space planning:** justify the interior spaces distribution (according to their heating and cooling requirements, and the use of thermal buffer spaces);
- **Passive heating strategies:** justify the use of direct and indirect solar gains;
- **Passive cooling strategies:** justify the use of the selected cooling strategies (ie. shading devices, natural ventilation, night ventilation, evaporative cooling, night radiation);
- **Thermal energy storage:** justify the use of sensible or latent thermal energy storage system (if applicable);
- **Ventilation:** justify the selected passive ventilation strategies;
- **Hybrid or semi-passive system:** justify the selected semi-passive systems;
- **Exterior design:** explain how the exterior design solutions improve the microclimate around the dwelling and contribute to its energy efficiency;

#### b. Efficiency of Active Systems

This section must include the justification of selected active systems strategies. The functioning of the systems/strategies deployed must be explained with figures or drawings. Some aspects to consider are:

- Using energy efficient heating, cooling and ventilation systems; comparison to legacy systems;
- Using energy efficient appliances;
- Using energy efficient lighting and light controls;
- Building controls to improve the efficiency of systems; occupancy scenarios;
- Strategies regarding user (inhabitant) behaviour that improve the general efficiency of the building;
- Using electric vehicles as energy storage or to increase the self-consumption ratio of the building.

### 37.2 Project Performance Simulation

All Teams will synthesise and provide information on their project's design and analysis process, focusing on the application of engineering principles, modelling, simulations, and creative solutions, with an overall description of the project geometric, envelope, airtightness and any singular element that could contribute to the project's energy efficiency.

All Teams will analyse the energy demand of the Contextual Design and the Living Demonstration Unit by dynamic building simulations. Simulations for the Contextual Design must have minimum monthly time steps, while the Living Demonstration Unit must have minimum hourly time steps. Calculations must use a publicly available weather data set. Data sets must be confirmed by the SDE23 Host City Executives.

Simulation tools will be provided by the SDE23 Host City Executives via the WAT for the dynamic simulation of both Contextual Design and Living Demonstration Unit. The application of this tool is mandatory.

The influence of the simulations in the decisions and changes to the house design will be evaluated, as well as the needs calculations, thermal loads, and energy consumption of the house.

**The following items should be simulated:**

- **Solar Shading**
  - > Passive solar gains in heating season;
  - > To reduce/eliminate solar gains in cooling season;
  - > Optimisation for daylight and PV installation.
- **Photovoltaic Systems**
  - > Annual energy production (time-step simulation);
  - > System efficiency.
- **Solar-Thermal Systems**
  - > Annual energy production (time-step simulation);
  - > System efficiency.
- **Heating systems**
  - > Loads/gains calculation (time-step simulation);
  - > Solar-thermal influence, if applicable;
  - > System selection justification.
- **Cooling systems**
  - > Loads/gains calculation (time-step simulation);
  - > Solar-thermal influence, if applicable;
  - > System selection justification.
- **Ventilation systems**
  - > Air change requirements (time-step simulation);
  - > System selection justification.
- **Domestic hot water systems:**
  - > Loads calculation (time-step simulation);
  - > Solar-thermal influence, if applicable;
  - > System selection justification.
- **Electrical & Automation Systems**
  - > Loads calculation (time-step simulation);
  - > Electrical energy balance, taking into account PV systems & energy storage (time-step simulation);
  - > Self-consumption ratio;
  - > Energy payback-time.

## rule 38 \_ communication & social awareness reports

### 38.1 Communication Sub-Report

Each Team will present an integrated communication strategy and show its development and success in chapters that include a full communication cycle (analysis, strategic planning, operative planning, implementation, control, impact assessment). Through the ongoing deliverables, the concept develops while proceeding through this cycle. The Communication Sub-Report must be submitted in D#3 and onwards, explaining the Team's intentions, plans, and on-going activities toward the dissemination of the project. In Deliverable #6, Teams must only describe what was previously realised and document the results. The Communication Sub-Report must include the following sections:

### 38.2 Analysis

The analysis of the situation answers the question: 'Where do we stand? What is fundamental to the communication management process?' The analysis should reveal the conclusive information necessary to understand and contextualise the strategy, target audiences, and tactical / operative actions. Teams will include a SWOT analysis (Strengths, Weaknesses, Opportunities and Threats).

### 38.3 Strategic Planning

#### a. Definition of the Strategic Communications Objectives

The strategic planning answers the question 'What do we want to achieve?'. In this, the long-term communication objectives are defined according to an initial analysis. The strategy will be developed and described based on the 'who what where when why' fundamentals: these must describe the Teams' goals and corresponding actions to implement the Communication Plan.

#### b. Identification of the Target Groups

Beyond the end user or consumer who will inhabit, operate, or purchase the dwelling, and beyond the corresponding technologies and innovations deployed, Teams will identify audiences to whom the Team's communication is addressed. Teams must consider the SDE23 target groups: school children, academia, professionals, general public, industry and policymakers. To facilitate the distribution of information, it will be helpful to create distribution lists, identifying to whom the Team must address the project. Note: one of the target groups will be the communications media. While this target audience is not the sole target group, each Team must include a short list of media channels they are aiming to reach with their press releases.

#### c. Message/s Establishment

When dealing with different target groups, it is necessary to articulate the main message in different ways, treating the main message specifically for each target group.

#### d. Social Media/Online Strategy

Each Team will present a social media/online communication strategy, which shows the Team's approach to building, maintaining, and developing social media networks, in order to reach specific communication objectives.

#### e. Offline Strategy

Each Team must present an offline strategy, indicating the Team's approach to offline instruments for reaching specific communication objectives. This will include a press and event plan.

### 38.4 Operative Planning

The operative planning includes the setting of operative objectives and the confirmation of concrete messages and corresponding actions. Describing the activities to be carried out during project development is fundamental. Teams are encouraged to include a timetable (where a panorama of the work is provided), and a budget (including the cost of each action and each communication channel used). For example: cost of brochures, insertions in the press, communications agency fees or similar, merchandising costs, etc.

#### **Previous to the Competition**

- Online and offline addressed to three different scopes within the identified target groups: university, city and country. International activities and actions are encouraged;
- Teams' participation in events organised by themselves, or by others;
- Information on the project produced in any format, by the Teams or by third parties, from an article in a newspaper to a collaboration with a complementary content creator.

#### **During the Competition**

- Speed Peer Review presentation;
- Public tours;
- Leaflets/objects for the public;
- Audio-visual #3, to be shown at SDE23 solar village.

#### **a. Tracking Table of the Communication Actions**

Teams must include a table defining the following actions: Project appearances in national media (from the Team's country of origin) and/or international media if identified. This table should list the materials generated for the Team's dissemination, either done on Teams' or third parties' stands, other than materials generated by external media channels. Organised events or those with a confirmed future celebration date must be included. Teams must also include the latest version (including ALL previous information, beyond the information added after the latest Deliverable) of the tracking tables relative to communication actions in each Deliverable.

### **38.5 Implementation, Assessment / Controlling**

Teams must provide a description and documentation of their implemented activities and corresponding successes. The success of the actions must be tracked according to suitable and measurable variables (ie. visitors (online/ offline), followers, sponsorships). In the next step, the deviations to the expected outcome of the actions must be shown, indicating how these deviations lead to changes in the chosen communication strategy and/or operative actions, leading to the ultimate achievement of communicative objectives.

### **38.6 Social Awareness Sub-Report**

This report focuses on the strategy and actions for raising social awareness of urban sustainability topics toward target audiences, (notably students of all ages and general public) in the context of the SDE23 Competition.

#### **Guiding questions are:**

- How can the Team use the SDE23 as a tool for teaching sustainable living and urban building practices to students, both in the Team's country of origin and through actions and on-site classes, courses or workshops?
- How can the Team use the SDE23 as a tool to teach the general public about sustainable living and building practices in the Team's country of origin, through specific actions in Bucharest, and through the general guided tours on-site?
- The proposed approach indicates the structure of the Communication Report applied to the specific topic:
- Analysis, including a SWOT Analysis
- Strategic planning on different levels country of origin, Bucharest, on-site)
- Operative planning of measures on the different levels (for instance: courses, actions, tours)
- Implementation, control, impact assessment.

### **38.7 Mandatory Attachments**

#### **a. Team Visual Identity Manual**

Teams must submit to the SDE23 Organisation (Deliverable #3 and onwards), a PDF version of the manual and an annexe .eps, including the vector graphic versions of all the different components. The manual must be consistent with the SDE23 Graphic Chart & Brand Manual, which will be available on the SDE23 WAT. The Team Visual Identity Manual will include the branding and design of, at least:

- Name of the Team project;
- Team project logo in its three possible versions (isolated, combined with the SDE23's logo, and combined with the Team's supporting institutions and sponsors, in vector graphic format, and coloured and grey scale variations). Please refer to the SDE23 Graphic Chart & Brand Manual;
- Rules of use and possible compositions, including a slogan, tagline or baseline, if intended;
- All the Team's supporting institutions and sponsors' logos;
- The chosen typography with all variants used in the communication materials.

**Note:** In each Deliverable, the Visual Identity Manual must be updated, containing all the information submitted in previous deliverables, as well as updated developments. Before the final phase of the Competition, Teams must also include the design of their uniforms, to verify compliance with the SDE23 Rules.

#### **b. Sponsorship Manual**

The sponsorship manual will include:

- A list of supporting / sponsoring / collaborating institutions and companies indicating their names, industry sectors and/or fields of work, including the type of collaboration;
- Contact details of Team members in charge of the communication with the company or entity: full name, telephone, and e-mail address. This contact information will be used by the SDE23 Organisation to review the companies' R&D implication and impact in the Competition, enriching the integrated activity in an international professional network. This information must be included from Deliverable #3 onwards;
- Presentations used to raise sponsorships.

#### **c. Public Tour Description**

From Deliverable #3 onward, Teams must describe the route proposed for the Public Tours at SDE23 solar village, indicating: access and exit of the lot (located in the main roadside); access and exit of the unit; waiting lines and waiting line management; the demonstration unit tour itself (a single route for all visitors). Teams must submit drawings showing the route and contouring: intersection paths' circle diameter, width of doors, corridors, crossings and narrow paths, demonstrating compliance with the accessibility requirements stated in Rule 50 \_ Building Codes Application. A complete tour description is required, indicating the stops established throughout the tour while explaining the unit's features. Different explanations will be required for various target groups; please include a brief description of each. Teams must explain the choreography of the route (one Decathlete guiding, or several Decathletes positioned at specific points), the time-length of each tour, the languages used and the number of people per group. Teams intending to realise live demonstrations of the project's mobile elements must include sketches showing the adopted measures to guarantee public safety. If Teams plan any measure for the sensorial or motor disabled, this must also be described. Teams must plan entertainment and/or animation for the public while waiting in line (indicate any type of activity planned and its organisation). To verify compliance with the Rules, Teams will submit, before the final phase of the Competition, the design of the brochure (or) handout (or any other) object to be given to visitors. Please refer to Rule 12.5 \_ Public Tour for further details. In the same way, any additional information sources must be described, indicating its format (such as posters or electronic means), location and content.

**Note:** All this information may be explained either with drawing/s and/or on a written document.

#### **d. Implementation List**

This will contain a list of activities with a short description, date, time (duration), place, number of participants, audiences or other appropriate variables that indicate outreach. Further documentation of the activities and their impact can include description of concepts through various materials, texts, photos and videos. Please deliver this for all sub-reports separately.

## rule 39 \_ connected living & affordability report

The Connected Living and Affordability Report must include the Team's global design strategy and must address population, geographic, and contextual development issues. This report must include the following sections:

- Contextual design strategy
- Market viability and scalability
- Individual or collective housing building concept
- Mobility strategies
- Affordability strategies
- Participatory design strategies

This report must be submitted from Deliverable#1 onwards.

### 39.1 Contextual design strategy

In this section Teams must include a full description of their global contextual design strategy.

Teams must describe their project's context and how their proposals respond to the applicability of the intended location.

### 39.2 Market viability & scalability

The target market must be defined, including the project's population sector and their needs.

#### a. Market

To define a market, the most common variables are related to the buyer and its location.

- **Buyer:** Teams must define the buyer including the following aspects: sociocultural aspects (if these satisfy their prospects), economic aspects (if these are affordable for the buyer) and age (if these fulfil the basic needs of people of that age).
- **Location:** geographical situation (if this adapts to climate, topography, etc.)

#### b. Target market

The target market may be distinguished as much for geographical features as for social aspects. In order to adapt the product to the potential customer's specific needs, this differentiation will be detailed enough. Once the target market is identified, the Team will make sure the project satisfies its needs and prospects and is affordable. The project will be a product adapted to its potential customers' prospects for size, aesthetic, closings, spaces, distribution, equipment, etc.

#### c. Appealing characteristics

Usual market viability's characteristics: appeal, spatial distribution, flexibility, innovative components, etc., as far as the project's ecologic and economic benefits can be commercially exploited. Environmental advantages, use of renewable energies, high-energy efficiency, the use of green / recycled or recyclable materials, among others, will be highlighted. The economic benefits in commercialisation of the project will include information regarding its reduction in energy expense: explain how and how much money is saved due to the appropriate house's design, the energy efficiency level of the systems, and the inclusion of renewable energies.

### 39.3 Individual or collective housing building characteristics

Teams must explain their choice regarding density according to the project's context of origin. They must describe all elements that can help the jury to better understand the spatial strategies developed in the project. In the case of an urban setting, Teams will explain the densification strategy and the spatial solution chosen to achieve a balanced ecosystem. They will present a perspective of development for a span of thirty years. In the case of a rural setting, Teams will explain how they avoid urban sprawl, how they optimise infrastructures, and what kind of spatial organisation is foreseen for the future of these territories over a span of thirty years.

In both cases, it is highly recommended to put the project's historical and cultural heritage into perspective. Teams should also emphasise the project's flexibility and capacity to evolve with respect to the environment.

#### 39.4 Mobility strategies

Teams must demonstrate how their location strategies and associated mobility systems can reduce both cost and energy impact on their proposals. They must describe how different kinds of mobility means are used according to use. They must indicate how all generations and population classes are considered. They should indicate how they imagine that energy resources produced by the project can meet living and mobility needs. They also must explain how the project addresses the correlation between housing and mobility as this affects the inhabitants. Note: This contest has nothing to do with transportation of the prototype to the SDE23 solar village.

#### 39.5 Affordability

Teams must explain their strategies toward the global cost of the project (building cost, maintenance, mobility...) and related performance of the project over spans of twenty years and fifty years. The question of affordability for the greatest number of people must be addressed. According to the context of origin, Teams will explain how the financial system (bank loans, cooperative housing, social public housing, etc.) and the building industry (prefabrication, self-construction, traditional building production, etc.) are organised and which businesses are considered. They must indicate the targeted population class(es).

#### 39.6 Participatory design strategies

Teams must propose responsive design strategies for involving future users in the process of designing, building and maintaining their residential built environment.

## rule 40 \_ sustainability report

The objective of the Sustainability Report is that the Teams reveal, in a systematic and organised way, those elements related to the sustainability of the proposals; these must be visualised as a whole, with a holistic approach to show how this variable has been integrated into the work. Teams must consider that the sustainability evaluation will be done in the house's local context, (context of origin).

The report must include the elements that link the design proposal to sustainability. The arguments may be based on economic, social, and environmental issues. The report must contain the following sections:

#### 40.1 General Concept of the Project's Sustainability

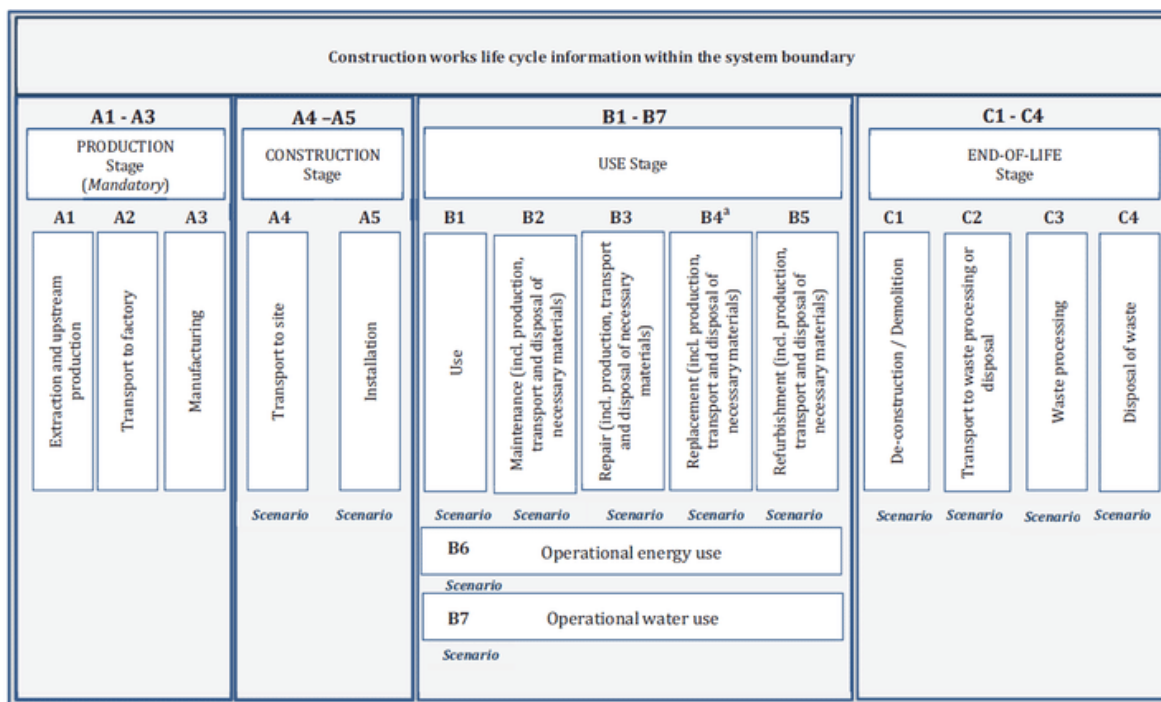
Teams must briefly describe their architectural concept, its contextualisation, and how these relate to sustainability. In this introductory section, Teams must explain their understanding of 'sustainable built environment', and how this is reflected in their proposal at residential and broader scales.

#### 40.2 Life-Cycle Stages

The life cycle of a building's materials can be divided into four stages: production, construction, use, and end-of-life. In each of these stages, various topics must be addressed with a view on sustainability.



FIGURE 24. LIFE CYCLE STAGES (ISO 15804)



**a. Life-Cycle – Production Stage**

Selection of materials, equipment. To evaluate embodied energy and the carbon footprint of materials (ie. from raw material processing, transportation, etc.). To consider material life in relation to building life. The usage of renewable/reusable/recycled materials (circularity) will be positively evaluated, as will approaches to a circular economy, and reduction of virgin material usage.

**b. Life-Cycle - Construction Stage**

Module and unit assembly, transportation, waste management. To evaluate embodied energy and carbon footprint of the construction process (ie. from transportation, waste management, construction vehicles). Making use of energy / carbon footprint/waste mitigation strategies will be positively evaluated.

**c. Life-Cycle - Use Stage**

Energy, water, waste management, inhabitant behaviour. Strategies to reduce resource usage and to correct habits that affect the environment will be positively evaluated.

**d. Life-Cycle - End-of-life Stage**

De-construction, material re-use/recycling, waste management, transportation. Strategies to reintroduce materials into the building circuit will be positively evaluated.

**40.3 Life-Cycle Assessment**

Whole building assessment will be evaluated through the life-cycle assessment component of the project energy performance evaluation data. LCA must be carried out using one of the internationally recognised LCA standards and guidelines (ie. ISO 14040:2006, EN 15978, ISO 21931-1 & ISO 21929-1). LCA must include the embodied energy analysis, carbon footprint and water/electrical energy consumption reductions.

The calculation and documentation will summarise the energy performance analysis for a utilisation period of 50 years for construction, operation, maintenance, and demolition/recycling of the whole building. The energy data will be converted to the equivalent carbon emission scale using harmonised conversion factors. Kept or recycled parts of the existing building do not add to the carbon footprint. While the evaluation of the embodied energy should focus on the major building construction elements, it must include estimations for the ventilation and energy supply system (duct work, wiring, PV modules, solar collectors, batteries, ...). Teams should synthesise and integrate the evaluation into their Sustainability Report.

## rule 41 \_ innovation report

The objective of the Innovation Report is that the Teams reveal, in a systematic and organised way, those components related to innovative elements or systems used for the design, development, construction, and management of the proposals.

The report structure will correspond to the following index, including all elements that refer to the innovation of the proposal. If the required documentation has already been mentioned in another section of the Deliverable, its location must be clearly indicated.

### 41.1 Innovation in Architecture

New spatial and functional concepts at all scales (local scale, building scale, living unit scale), new languages in the formal use of materials, use of textures, and the appropriate use of light. See Rules 15.1, 15.5, 23.1 and 23.5.

### 41.2 Innovation in Engineering & Construction

Innovation concepts in projects' structure and construction systems, as well as the innovation in the houses' services (plumbing, electrical, photovoltaic, green roof / façade etc.) See Rules 16.1, 16.5, 23.1 and 23.5.

### 41.3 Innovation in Energy Efficiency

The active and passive innovative technological contributions maximising the energy efficiency of the project; innovative ways to improve the hydrothermal comfort, air quality and daylight, as well as facilitation of the perfect functioning of the project, and innovative aspects of house's systems, appliances, and equipment. Innovation concepts in house functioning. Innovative concepts in coupling building and mobility solutions. See Rules 17.1, 17.5, 23.1 and 23.5.

### 41.4 Innovation in Communication & Social Awareness

New initiatives proposed to attract the attention of the general public as well as specific audiences. See Rules 21.1, 21.5, 23.1 and 23.5.

### 41.5 Innovation in Connected Living & Affordability

Innovative solutions for denser urban areas or rural areas. Innovation in strategies developed to make affordable habitats and their means of mobility in their local context. See Rules 22.1, 22.5, 23.1 and 23.5.

### 41.6 Innovation in Sustainability

Innovative local and housing solutions as well as materials, equipment, and systems that contribute to improve the sustainability of the built environment. See Rules 23.1, 23.5, 24.1 and 24.5.

## rule 42 \_ dinner party menu

Teams will submit the dinner menu, indicating:

- Name of the courses and drinks;
- List of ingredients and quantities per course;
- Food preparation;
- An image of every course;
- Cost evaluation of the menu;
- Evaluation of energy consumption for cooking;
- Nutrition data in relation to guest dietary requirements;
- Content of ingredients (according to local (country or culture of origin) context).

## rule 43 \_ contest week tasks' planning

In the general timetable of actions Teams will include the planning given by the SDE23 Host City Executives for the realisation of the tasks' sub-contests during the contest weeks. This timetable will help the Team and the SDE23 Host City Executives to provide the resources needed and plan in advance.

## rule 44 \_ cost estimate & project financial summary

Teams will submit the Cost Estimate and the Business and Fund-Raising Plan, including updated information and details, from one Deliverable to the next. This section should provide a clear understanding of the costs associated with the project and the need for fund-raising, how the fund-raising is planned, and whether there are available or obtainable equipment, instrumentation, and facilities.

### 44.1 Business & Fund-Raising Plan

Teams are required to submit plans that describe their overall project, including a projected budget and Fund-Raising Plan. The plan should include a description of each Team's interactions with stakeholders involved in fund-raising (ie., the university's development office), identification of key sponsors, and contact info for sponsors.

### 44.2 Cost Estimate & Project Summary Budget

Teams must provide complete, current, and accurate cost or pricing. A project summary budget is required according to the price cost proposal form (available on the SDE23 WAT). The following guidelines help Teams fill in the cost estimate table.

#### a. Direct Materials

Direct materials are normally purchased parts, purchased items or services (ie., welding, minor fabrication etc.), raw materials, standard commercial items, interdivisional transfers at other than cost, etc. All direct materials should be identified separately on an attached sheet with the quantity, unit price, and total amount provided. Further, price / cost proposal should indicate whether the unit price for each direct material item was determined and documented using written vendor quotes, catalogue prices, prior invoices, engineering or shop estimates, or some other method with an explanation provided. Provide supporting documentation (cost or pricing data) such as the written vendor quotes, copies of the catalogue page indicating the price, or prior invoices for all direct material items.

**b. Material Overhead**

If the accounting system includes material overhead, Team will propose such indirect costs in this area, and indicate the rate(s) used with an appropriate explanation.

**c. Direct Labour**

Direct labour should indicate the hours, hourly rate, and total for each individual or category of proposed labour.

**d. Labour Overhead & Fringe Benefits**

If the accounting system includes labour overhead, Teams will indicate such indirect costs. Indicate the rate(s) used and provide an appropriate explanation. If fringe benefits are not included in direct labour and are not a portion of the labour overhead, identify fringe benefits in this area and provide the same type of information concerning fringe benefits as required for labour overhead.

**e. Lower-tier Subcontractors**

Identify each proposed lower-tier subcontractor and obtain a cost proposal containing the same information and in the same format from each proposed lower-tier subcontractor. Consultants: Identify each proposed consultant and the estimated budget of their services.

**f. Other Direct Costs**

Include any direct costs not covered by one of the other cost elements in this area. A detailed list of each cost item including description, and estimated budget is required. An example of this type of cost could be general and administrative expenses, indirect expenses, security activities and services, cost of models, communications costs etc.

**g. Travel & Costs for Final Phase in Host City**

The travels costs will be, for some universities, an important chapter of their budget. The number of Team members and the unit cost estimate of travel costs, expense allowances, accommodations, and miscellaneous expenses must be defined.

**h. Insurance Policies**

According to the MOU (Memorandum of Understanding) that will be signed between the university and the SDE23 Host City Executives (SDE23 Host City): 'their respective officers, directors, employees, agents, contractors, subcontractors, and representatives (the 'Released Parties') from any and all claims, losses, expenses, and demands, including those resulting from injury or death to any person or damage to any property, arising from the University's work on or participation in the event or any activities incidental thereto': liability insurance costs, transport insurance, accidents and medical insurances, must be included in the estimated budget of the project.

Additionally, Teams will have to clearly specify the total construction cost of the LDU, indicating the items corresponding exclusively to the construction process and materials. Teams may do so underlining the items in the above-mentioned cost estimate or elaborating a construction cost budget apart.

**Note:** All costs are calculated including value added taxes (VAT). Local expenses are calculated with local VAT rate. Expenses in the host country are calculated with national VAT rate.

## rule 45 \_ site operations plan (sop)

### 45.1 Objective

The Site Operations Plan (SOP) is an executive document for planning, specific for each Team, in which they must consider all activities, resources, needs and deadlines. The plan must guarantee the assembly and disassembly of the unit (LDU) with logic, order, and total safety. Every Team must hand in its plan to the SDE23 Host City Executives, who will draw up the general Site Operations Plan of the SDE23 solar village that will harmonise the needs of all Teams and avoid interference. The SDE23 Host City Executives will review all the Teams' plans to verify their efficiency and identify possible conflicts between them. Based on the information sent by the Teams in their respective plans, the SDE23 Host City Executives will develop a general Site Operations Plan of SDE23 solar village. Teams' plans must be as specific as possible. The SDE23 Organisation draws all competing Teams' attention to the fact that this document acquires a specific value in the Competition process since the assembly phase is part of the Construction contest evaluation. Teams need to provide the jury with a clear and well-illustrated SOP to score points in this contest.

### 45.2 Content & Structure

The SOP will be required from Deliverable #3 onwards and will comply with all the requirements specified in Rule 4 \_ SDE23 solar village. Information will be updated and specified throughout the project's development, including further details in each Deliverable. The plan consists of the Site Operations Report (to be included in the Project Manual) and the Site Operations Drawings (to be included in the Project Drawings).

**The Site Operations Report must include at least the following sections:**

**TABLE 32. SITE OPERATIONS PLAN CONTENTS STRUCTURE**

1.0 General data	This part must describe general data, aims, and deciding factors.
2.0 Site Operations Coordinators	Names and contacts of each Site Operations Coordinator (One per construction working Team).
3.0 Logistic outside of SDE23 Solar Campus	
3.1 Trucks route	Map and brief description of the trucks' route.
3.2 Trucks specifications and shipments	This part must include (for each truck) the type of vehicle, order of entry, dimensions, load per axle of each vehicle, turn ratios, specifications of the load to be transported (including dimensions and weights of all elements) and machinery use for unloading.
4.0 Logistic in SDE23 Solar Campus	
4.1 Infrastructures	Description of all infrastructures that will be installed on the lot during the assembly and disassembly phases.
4.2 Construction working Teams	Construction site working Team's composition, including one Site Operation Coordinator on each Team.
4.3 Phases description	Description of all phases of assembly and disassembly process. For each phase, it must include at least working Teams' members, necessary timing and necessary machinery.
4.4 Waste management	Description of the Team's waste management strategy.
5.0 Assembly / Disassembly schedules	Schedules summarizing all assembly and disassembly processes. Must appear: all assembly and disassembly phases, trucks presence, cranes presence and working Teams on site.
6.0 Equipment requirement Chart	Teams must fill in this file, available in the SDE23 WAT.
7.0 Assembly & Disassembly Chart	Teams must fill in this file, available in the SDE23 WAT
8.0 Site Operations Chart	Teams must fill in this file, available in the SDE23 WAT

**The Site Operations drawings must include at least the following sections:**

**TABLE 33. SITE OPERATIONS SECTIONS**

SO-001 Trucks shipment	Trucks drawing including shipment view.
SO-101 SDE21 Solar Campus	Must include a brief description of SDE23 Solar Campus using the drawings that will be given to the Teams by the SDE23 Host City Executives technical and spatial constraints of the Campus and the way to solve them will be identified. Must include (at least) the truck route into SDE23 Solar Campus and waste disposal areas that will be used by the Team.
SO-102 Lot plan	Must include (at least) lot accesses, loading/unloading area with the truck footprint, the crane footprint and the stock area(s).
SO-201 Phases	3D graphics illustrating the assembly and the disassembly phases. Must show the construction evolution and for each phase, crane, trucks and stocks positions.

## rule 46 \_ health & safety report & documents

The Health & Safety Report, as well as the Health & Safety Specific Terms and Conditions Document, are part of the H&S Plan of the project. Please refer to Rule 51 \_ Health and Safety for further details.

## rule 47 \_ detailed water budget

The water budget information may either be divided between the Project Drawings and this section of the Project Manual or provided entirely in the Project Drawings. If the information is divided, make sure this section of the Project Manual is clearly referenced on the relevant drawing sheet(s).

## rule 48 \_ electrical & pv design systems information

The electric and PV design system information consists of two parts: the one-line diagram and the Electrical and PV Chart and Checklists'. These documents enable the verification of regulation compliance and prepare the monitoring system for the Electrical Energy Balance contest. While the electric and PV design system documents have direct relation to the information in the Project Manual, they are not part of the Project Manual. As stated in the Rule 7.3 \_ PV Technology Limitations, the one-line diagram must be included in the Electrical Drawings. The Electrical and PV Chart & Checklists must be submitted as an independent document.

#### 48.1 Electrical and PV Chart & Checklists

Teams must complete and submit the Electrical and PV Chart and Checklists. This is a document that includes the Electrical and Photovoltaic Chart, Electrical System Design Checklist, Photovoltaic Checklist and Electrical Storage System Checklist. The Electrical and PV Chart and Checklist will be included in an Appendix. Teams must use the MS Word template which will be available on the SDE23 WAT. Completed 'Electrical and PV Chart and Checklists' documents must be sent as an independent document along with other Deliverable documents (Project Drawings, Project Manual, etc.) from Deliverable #3 onwards. These documents must be submitted as four independent MS Word files.

In addition to completing the chart and checklists, Teams must include in the Project Manual all necessary information to evaluate the conformity of their proposals (certificates of compliance, calculus, etc.). Teams must locate the required information indicated on the checklists. Teams who do not send the required documents and information will not be permitted to include the following elements: DC Loads, hard-wired battery bank and battery inverter, and special grid voltage and/or frequency, fire protection on DC side.

## rule 49 \_ project specifications

The following structure organises all the different divisions of the project construction specifications. If there are no specifications under a particular division, simply delete that division's bookmark. Every specification will be clearly referenced on one or more relevant sheet(s) in the Project Drawings. Hyperlinks between references in the drawings and corresponding specifications in the Project Manual are greatly appreciated, but certainly not required because current software does not seem to facilitate this level of construction document integration. Develop a clear, consistent method to differentiate Competition unit specifications (and drawings) from Competition unit alternate specifications (and drawings). See Rule 6.6 \_ Competition Prototype Alternates 6.6 for more information about alternates.

- **Structure**
  - > Foundation;
  - > Structural floors & sections.
- **Architecture**
  - > Enclosure;
  - > Openings;
  - > Partitions;
  - > Finishes;
  - > Furnishings.
- **Systems Installations**
  - > Fire Suppression;
  - > Plumbing;
  - > HVAC;
  - > Electrical;
  - > Solar Systems – Photovoltaic and thermal;
  - > Telecommunications & Building Automation.
- **Safety Information**
  - > Fire Safety table (Template will be available in the SDE23 WAT);
  - > Safety in Use table (Template will be available in the SDE23 WAT).
- **Appliances & Home Electronic Equipment specifications and user manuals**

#### 49.1 Appliances & Home Electronic Equipment (specifications & user manuals)

This section must be submitted from Deliverable #4 and onwards, and must include:

- **The 'Appliances & Home Electronic Equipment Tables' (filled out by the Team):** In these tables, Teams will include all the appliances and equipment that they plan to use for the contest in House Functioning, indicating compliance with the requirements stated in Rule 22. These tables will be part of a future version of the 'Project Facts' that will be available on the SDE23 WAT;
- **Appliances specifications & user manuals:** With the technical specifications, Teams will justify the Rules compliances related to capacity, volume, as well as other important information such as energy consumption and energy class (label). The user manuals help to understand the appliances' general characteristics and cycles options;
- **Home electronic equipment basic specifications & user manuals:** With the technical specifications, Teams will justify the Rules compliances related to display sizes, as well as other important information such as their energy consumption and energy class (label). The user manual helps to understand the appliances' general characteristic and display brightness settings (Rule 22 \_ sub-contest 8.8).

##### Notes:

- Only include the sections of the appliances' user manuals related to the appliances' general characteristics, cycles and energy consumption.
- From the TV and computer display user manuals, only include the sections related to their general characteristics, energy consumption, and display brightness settings.
- If English versions of the manuals or specifications are not available, Teams must include copies of the documents in the original language and an English translation of the parts that justify the Rules compliance.
- Teams intending to use energy saving programs during the final phase of the SDE23 Competition must communicate this to the SDE23 Host City Executives.
- The SDE23 Host City Executives will define the appliances' cycles to be used during the Competition.

## rule 50 \_ structural calculations

Structural calculations for the demonstration unit include the unit itself and all site components (terraces, railings, ramps, stairs, etc.). These calculations must comply with the requirements stated in the SDE23 Building Code. For structural aspects not covered by the SDE23 Building Code the structural designer will use requirements stated in their local Building Code. As required in Rule 6.1a \_ Structural Design Approval, a qualified licensed professional must certify that the structural provisions of the Solar Decathlon Europe Building Code have been met by the design, and that the structure of the units, terraces and all site component is safe to be used and visited by the general public, if it has been built as designed. Each Team must submit structural drawings and calculations that have been signed and stamped by this qualified licensed professional, and the Team is responsible for constructing and assembling their units following these signed structural documents. If there are any changes in the unit or site component that require an adjustment or modification of the signed structural design or details, a qualified licensed professional must certify that the new or revised structural solution meet the SDE23 Building Code structural requirements and it is safe to be used and visited by the general public. In the case that structural requirements of the local building code are more restrictive than the SDE23 Building Code, it is recommended that the Team follow their local building code (the most restrictive one). In that way, the unit will can be assembled in SDE23 solar village and in the Team's country.



### 50.1 Structural Calculations Justification

The structural calculations justification must have the following sections:

- The justification of the adopted structural solutions, including a description of the unit's (LDU) bearing system and the list of codes used for the design and construction.
- A description of the materials and its resistant properties;
- Actions carried out: Particularly, the different wind hypothesis of pressure/suction over the envelope will be detailed through the use of sketches;
- Loads combinations made and safety factors used: Loads considerations during the unit transportation, assembly and disassembly;
- Calculations model's) description, identifying the software (program object and application field), indicating the adopted simplifications, the methodology of the analysis done, specific models of singular areas where traditional material resistant theories can't be applied, edging or supporting conditions, type of connections, etc;
- Tensional and distortional verification results, explaining the representation of the software or obtained calculations results, indicating the phases or hypothesis in which dreadful efforts are produced, and covering all the different phases (transport, assembly and use);
- Deflection calculations and tabulated results. Applicable expansion, contraction, and crack-control measures;
- Superficial footing design, indicating soil bearing pressure of each footing (For further details, please refer to Rule 4.4);
- Structural fire resistance justification, according to the national codes of the Team's country of origin.

For materials not considered in the Rules, Teams must submit a document signed by a competent technician.

This document justifies the resistant properties of the materials and the design, from a structural safety point of view, considering the actions indicated in their national codes.

## section 4\_ building code

Although there is some degree of overlap between the two, it is important to note some crucial distinctions between the Solar Decathlon Europe 2023 Rules and the Solar Decathlon Europe 2023 Building Code. Rules exist primarily to promote a fair and interesting competition. The SDE23 Building Code exists primarily to protect public health and ensure safety. Failure to comply with the Rules may result in official warnings, penalties points, or disqualification from the Competition. Failure to comply with the SDE23 Building Code may prohibit the participation of the unit in any aspect of the overall Competition. Therefore, compliance with the SDE23 Building Code is a prerequisite for participation in the Competition. The SDE23 Building Code is the planning basis for the Living Demonstration Units (LDU) and is binding in all parts. For the Contextual Design, the SDE23 Building Code can be considered, but compliance with the regulations is not necessary.

**The SDE23 specific building code will be published shortly after Team selection.**

# appendix a: sde23 wat

## Introduction

The Solar Decathlon Europe 2023 Workspace Area for Teams (SDE23 WAT) is the main communication platform between the Teams and the SDE23 Host City Executives. The SDE23 WAT is a secure educational website, which is only accessible to the participating Teams, and the SDE23 Organisation (the SDE23 Host City Executives and the Energy Endeavour Foundation, the governing body of the SDE23).

A personal password is required for each user. All Teams must be registered in order to be informed of the project communications. The platform can be reached through this link: TBD

### The primary functions of SDE23 WAT are:

- disseminate all official communications;
- provide calendar updates;
- request and receive information or clarification;
- submit questions;
- upload and download files.

This user manual explains how to use the Solar Decathlon Europe 2023 Workspace Area for Teams (SDE23 WAT). Teams are responsible for the communications made by their Team members through the SDE23 WAT.

## Login

For the first access to the SDE WAT, the SDE Host City Executives will give each Team two usernames, with a corresponding individual personal password. These two user-logins are for the Faculty Advisor and for the Student Team Leader. After the first access, the Team may request additional users to the platform. For each Team the number of users is limited to 3 personalised logins per Team. The SDE23 Executives recommend the following designated Team representatives:

- FA – Faculty Advisor
- PM – Project Manager
- STL – Student Team Leader

Each Team can apply for an additional user account. This is a read-only account and is meant for all other Team members who do not have a personalized WAT-account. It is named after the Team name and the Team ID (ie. Team SUM [TUD-Delft]). To request additional users the Faculty Advisor will send an e-mail to [sde23wat@solardecathlon.ro](mailto:sde23wat@solardecathlon.ro) filling in the excel format table, named “[Team Abbreviation, ie. CHA]-New Wat Users”, available through the SDE23 WAT, including the personal details of the new members. Teams may request additional users at any time throughout the project development. Once you have your username and password, go to the login page, insert your username [1] and password [2], and press ‘enter’ [3] to access the main page. It is important that you edit your user information when you first log in.

## Edit your profile

When you first log in, you will need to change the default password. After that, click on your name and edit your user information with accurate data (select the ‘edit profile’ tab). Please set the following values to these settings:

- Email display: Allow everyone to see my mail address;
- Email activated: the email address is enabled.

**Before updating your profile, press the 'show Advanced' button and fill in the following fields:**

- Web page;
- Institution;
- Department;
- Phone;
- Address;
- Description (Logo, name, or any relevant information).

In order for the login information to be retained it is imperative that all areas have information. In case some information is still being developed by your Team, please fill in the words 'under construction'. In the area called 'description', place your name or the information you wish; either way, you must insert some text. If you want to upload an image, photo or logo, a png-file will be uploaded with an aspect ratio of 1:1, 100x100 px and a maximum file size of 300KB.

### Main Screen

Once you are logged in you will have access to the screen showing the SDE23 WAT Main Screen. The following SDE23 WAT Main Areas are visible in the middle section of the main screen and a shortcut to view all competition participants (People > Participants) in the left side of the screen:

- **Main Board**
  - > Official Communications
  - > Global Workspace
  - > Private Team Area
- **Deliverable #1 (...#2,#3,...)**
  - > Deliverable –

**Upload Area On the right side of the main screen there are some useful tools, such as:**

- Latest announcements: displays information about news posted in official communication area;
- Upcoming events: displays upcoming events and a link to the user calendar;
- Tags: displays the most popular tags and a link to tag search by clicking on a tag;
- Search forums: quick search for the question and answers area.

**On the left side of all the different areas, the following tools are available:**

- **Course – Navigation**
  - > Participants – List of all SDE23 WAT Members
  - > Main Board – Link to Official Communications & Documents area
  - > Deliverable – Link to Deliverable Upload Area
- **Website – Navigation**
  - > Dashboard – Course Overview
  - > Site Home – Landing Page
  - > Calendar – Shows all of the contests' relevant dates (including Deliverable deadlines).
  - > Private files – Displays individual user files
- **My Courses – SDE23WAT link to Main Screen**
  - > Site administration – User settings

## Official Communications

While access to these message boards is granted to all users, only the SDE23 Organisation may create or modify posts. The official communications area has four message-boards:

- **Announcements**
  - > including relevant information for the Competition, such as changes in Rules or deadlines, required documentations, deliverables and events (meetings, workshops, etc).
- **Rules and Related documentation**
  - > will include the latest version of the SDE23 Rules and related documentation needed for the project development.
- **Glossary/ FAQ**
  - > will include definitions of the most important terms, frequently asked questions (FAQ) and the SDE23 Host City Executive answers.
- **Building Energy Competition & Living Lab Knowledge Platform**
  - > link to the Knowledge Platform, where Teams will upload their project documentation after the event.

## Global Workspace

The SDE Organisation, as well as all Teams, may create posts in this area. This is the SDE23 WAT's main work area and is the space where questions and answers are posted.

- **Questions to the SDE Host City Executives**
  - > Working as a public forum, open to all Teams, for posting any question regarding the Competition. (For private questions, Teams must use their Private Team Area);
  - > The SDE Host City Executives may create sub-forums to different topics in this area.

## Private Team Area

The Private Team Area is a space where the Team can communicate with the SDE Host City Executives. Only the Team and SDE Organisation members have access to this message board.

- **Communications to & from the Executives**
  - > Team members may use this message board to ask private questions to the SDE Host City Executives;
  - > The SDE Host City Executives may create sub-forums to different topics in this area.

## Team Privacy Levels on the SDE23 WAT

Privacy levels are defined as follows:

- **Official Communications Area (public, read)**
  - > User access: organisation, all Teams;
  - > Teams may only read posts.
- **Global Workspace (public, read/write)**
  - > User Access: SDE23 Organisation, all Teams;
  - > Teams may read and write posts, as well as upload files, in every message board.
- **Private Area for Team X (private, read/write)**
  - > User access: SDE23 Organisation, Team X;
  - > Each Team may read and write posts, as well as upload files, in every message board.

# appendix b\_ definitions

## General Definitions

### Assembly

Period of time between the arrival of trucks and the beginning of the contests on SDE23 solar village.

### Brief Reports

Brief report with maximum 4 pages to inform a jury on the key issues of a Team project related to a specific contest.

### Building Energy Competition and Living Lab Knowledge Platform

An international web-based knowledge platform to add and secure information from new competitions and Teams: <https://building-competition.org/>. This platform runs under the Annex 74 within the Energy in Buildings & Communities Programme of the International Energy Agency IEA.

### Climate Neutrality

The calculated balance of equivalent carbon emissions resulting from the operation of the whole building including all energy carriers and sources. A standardised emission factor for the EU28 power grid is provided reflecting a 2030 energy system outlook.

### Competition

All aspects of the Solar Decathlon Europe 2023 related to the ten contests and the scoring of those contests, along with the project development of the Competition's Living Demonstration Units (LDU).

### Competition Calendar

The timetable establishing the dates of the final phase of the Competition and the daily activities assigned.

### Contest

The Solar Decathlon Europe Competition consists of ten separately scored contests, each containing one or more sub-contests. See Rule 13 \_ General Contest Information.

### Contest Period

Period of days in the SDE23 solar village when some or all contests are active.

### Decision

The SDE23 Rules Officials' interpretation or clarification of a Rule.

### Disassembly

Period of time between the conclusion of public tours and the completion of SDE23 solar village clean-up.

### Dissemination Materials

All printed or electronic publications designed to convey information supporting the Competition's goals. Please refer to the SDE23 Graphic Chart & Brand Manual.

### Division Manager

The SDE23 Host City Executive who carries definitive responsibility for one of the divisions depicted in the Organisation Chart. See Rule 1.2 \_ SDE23 Organisation Chart.

### Energy Endeavour Foundation

The Energy Endeavour Foundation (EEF) is the governing body of the Solar Decathlon Europe. The Netherlands-based non-profit business entity, endorsed by the U.S. Department of Energy (DOE) to steward the SDE, is the custodian of the SDE Rules and SDE brand. The EEF produces the European-wide SDE Call for Cities and its corresponding international SDE Call for Teams. Providing strategic SDE guidance, tools, systems, networks, data, branding, project advisory, support, and administration, the EEF transfers project-specific knowledge and expertise to SDE Host City Executives, working collaboratively to ensure the continuity of the Solar Decathlon Europe, from one edition to the next. The Energy Endeavour Foundation provides the structure and framework for the future of the SDE.

#### **Electric and Photovoltaic Chart – Interconnection Application**

Form submitted by the Team's electrical engineer to the Site Operations Coordinator, which provides the technical details needed to determine the suitability of the Team's electrical and photovoltaic systems for interconnection to the village grid. This form is part of the Electric and PV Chart and Checklists document.

#### **Electric and PV Chart and Checklists**

Document that includes the 'Electric and Photovoltaic Chart', 'Electric System Design Checklist', 'Photovoltaic Checklist' and 'Electrical Storage System Checklist'. It must be completed and submitted by Teams from Deliverable 3 onwards.

#### **Event**

Activities that take place on SDE23 solar village including, but are not limited to, registration, assembly, inspections, contests, special events, public exhibits, and disassembly.

#### **Event Sponsor**

An entity selected by the SDE23 Organisation to support the SDE23 project and help to ensure its success. Final phase of the SDE23 Competition The period of days including assembly, disassembly and Contest week periods.

#### **Grid-Tie Assembly**

Period of time during assembly after the Living Demonstration Unit ((LDU) has been interconnected to the village grid.

#### **Living Demonstration Unit (LDU)**

Complete assembly of physical components installed on SDE23 solar village, in compliance with the SDE23 Rules.

#### **Inspection**

Each of the inspections realized to all the Competition Living Demonstration Units on SDE23 solar village verifying compliance with the SDE23 Rules. See Rule 11.6 \_ Inspections.

#### **Inspections Card**

Official card indicating the Teams' inspections' status.

#### **Penalty Referee**

Individual, appointed by the SDE23 Organisation, to examine and assess the Team's Rule infringements, and propose to the Competition Manager all penalties with respect to the Rules. She/he will determine the severity of Rules infractions in consultation with the SDE Organisation, classifying them as minor or major, and report them to the Competition Manager. Penalty Referee will be independent of the SDE23 Organisation and will have a nationality other than the nationality of the competing Teams.

#### **Project**

All activities related to the Solar Decathlon Europe 2023 in from the initial meetings to the conclusion of the event.

#### **Protest Resolution Committee**

Group of individuals selected by the SDE23 Organisation to resolve Team protests during the Competition. The Protest Resolution Committee consists of people who are familiar with the project, but not part of the SDE23 Organisation or the Teams.

#### **Public Showcase**

Areas of the SDE23 solar village open to the public during designated hours.

#### **Rule**

Principle or regulation governing conduct, action, procedure, arrangement, etc., for the duration of the project.

#### **Scored Period**

Any period of time during which a particular measured Contest is in progress.

#### **Scoring Server**

Digital application that collects data from the central data logger server, includes forms for manually entering Jury and task-based Sub-Contest results, and calculates composite scores.

#### **SDE23\_EEF Supervisory Board**

Supervisory entity consisting of the SDE23 Project Director, SDE23 Host City & Stakeholder representatives, an SDE legacy member, the EEF director, an EEF Rules official and an EEF Board Member.

#### **SDE23 Graphic Chart & Brand Manual**

A document that describes, defines and illustrates how the SDE's visual identity elements, when used correctly, can help to create consistent and memorable communications programmes and actions, thus building a distinct personality for the SDE brand. This document guides users to present the brand in various visual media such as print, internet and broadcast.

#### **SDE23 Host City Executives (SDE23 HC Execs)**

The designated SDE23 officials responsible for the implementation and execution of the divisions described in the SDE23 Organisation Chart. See Rule \_ 1.2 SDE23 Organisation Chart. The Asociatia Solar Decathlon Bucuresti (EFdeN) is the engine behind Bucharest's SDE legacy involvement. Having participated in previous SD editions in Europe and the Middle East, SDE23 Host City Executives have invested vibrant and relentless energy in the Solar Decathlon and its values. Asociatia Solar Decathlon Bucuresti / EFdeN is the designated winner of the pan-European SDE23 Call for Cities, as directed by the Energy Endeavour Foundation.

#### **SDE23 Jury**

Group of individuals selected by the SDE23 Organisation to make evaluations on a specific aspect of each Team's project according to SDE23 contests.

#### **SDE23 Organisation**

The SDE23 Organisation is composed of the Energy Endeavour Foundation, and the SDE23 Host City Executives (from the Asociatia Solar Decathlon Bucuresti, otherwise known as EFdeN). Including the corresponding supervisory board and divisions according to the Organisation Chart. See Rule 1.2 \_ SDE23 Organisation Chart.

#### **SDE23 Solar Village**

The SDE23 Competition event site, where the Teams' Living Demonstration Units (LDU) are assembled along with the common areas needed for parallel Competition activities.

#### **SDE23 Workspace Area for Teams (SDE23 WAT)**

The SDE23 WAT is the official communication tool of the Competition. See Rule 2.4a \_ SDE23 Workspace (SDE23 WAT)

#### **Site**

The site is where the Competition will take place, where Living Demonstration Units are located.

#### **Solar Decathlon Europe 2023 (SDE23)**

Building Code A set of design and construction standards set forth and enforced by the Solar Decathlon Europe 2023 (SDE23) Building Official for the protection of public health and safety during the event.

#### **SDE Council of Experts**

The SDE Council of Experts is a contributing group of SDE legacy experts supporting the EEF's Solar Decathlon Europe mandate, committed to the long-term impact and vitality of the SDE. Members provide initial, voluntary input to the EEF, bringing additional counsel for SDE-related topics.

#### **Speed Peer Review**

A platform for exchange and knowledge to improve presentation skills, public speaking, professional pitching. Teams make short presentations of their projects in front of their peers, juries and broader communities. They synthesise their concepts, learn from other Team projects, and from each other, leading to professional-standard communication, project positioning, and messaging.

#### **Stand-Alone Assembly**

Period of time before the Living Demonstration Unit (LDU) has been interconnected to the solar village grid.

#### **Sub-Contest**

An individually scored element within a contest.



#### **Sub-Contest - Juried**

A sub-contest based on jurors' assessment.

#### **Sub-Contest – Measured**

A sub-contest based on task completion or measured performance.

#### **Solar Village Grid**

Bi-directional, AC electrical network system installed on the Competition site which will constantly and individually measure the contribution and consumption of electrical energy of each Living Demonstration Unit (LDU).

### **SDE23 Host City Executives' Functions & Roles**

The following roles and functions are to be implemented into a clear organisation chart. In each instance, one specific individual must carry definitive responsibility for each function.

#### **Communication Management**

The division responsible for the project's public outreach, communication activities and special events.

#### **Communication Manager**

The head of the Communication Management division.

#### **Competition Director**

Competition Director is the official SDE23 Host City Executive responsible for the management of the Competition and responsible for mobilisation of all necessary resources for the achievement of its objectives, with decision-making authority in aspects related to the scope, planning, Rules (following EEF authority) ,and quality of the Competition.

#### **Competition Management**

The division planning, coordinating and controlling all the activities related to the Competition including deliverable reviews. This entity enforces the Rules document and states its content, conducting a fair and compelling Competition, assigning penalties and scoring.

#### **Competition Manager**

The head of the Competition Management division.

#### **Design Reports**

Comprehensive report of a Team to describe all aspects of the Team entry regarding a specific contest.

#### **Event Production**

The SDE23 Host City Executives' division responsible for the organisation of the SDE23 event, in cooperation with the Energy Endeavour Foundation.

#### **Event Production Manager**

The head of the Event Production division.

#### **HS Coordination**

The SDE23 Host City Executives' division responsible for evaluating the Teams' Health & Safety Plans, consequently developing the Competition's Health & Safety Plan, and supervising the Demonstration Units' assembly and disassembly works in the SDE23 solar village. The HS Coordination is part of the Infrastructure Management division.

#### **Infrastructures Management**

The SDE23 Host City Executives' division responsible for planning, execution, development and control of all the activities related to the assembly, functioning, and disassembly of the SDE23 solar village.

#### **Infrastructure Manager**

The head of the Infrastructure Management division.

#### **Inspector**

SDE23 HC Executive inspecting Living Demonstration Unit's, filling out the corresponding Inspection Card, according to the SDE23 Building Code.

#### **Jury Manager**

SDE23 HC Executive, liaison between the SDE23 Organisation and the jury, responsible for accompanying the jury during the Living Demonstration Units' visits, the deliberation process, the evaluation reporting; and reporting to the Competition Manager.

#### **Monitoring & Scoring Coordinator**

Member of the Competition Management division responsible for the instrumentation system, monitoring and scoring of the Competition.

#### **Observers**

An SDE23 HC Executive assigned by the Competition Manager to observe Team activities during the Contest week. While an Observer reports observed Rules infractions to the Rules Officials and records the results of specific contest tasks, she/he does not provide interpretations of the SDE23 Rules.

#### **Office Services Coordinator**

Member of the Project Management division responsible for planning, coordinating, and directing a broad range of services that allows the SDE23 Organisation to operate efficiently.

#### **Press & External Communications Coordinator**

Member of the Communication Management division responsible for communication topics between the internal and external parties of the SDE23, acting as proxy between the participating Teams and the media. This Executive works collaboratively under the direction of the Energy Endeavour Foundation.

#### **Project Director**

SDE23 HC Executive responsible for the management of the project and responsible for the mobilisation of all necessary resources for the achievement of the objectives, with the final decision-making authority in all the aspects related to the scope, planning, costs, quality, resources, communication, risks, sponsorship, and acquisitions of the project.

#### **Public Events Coordinator**

Member of the Event Production division responsible for planning, coordinating, executing and developing all the public activities and events related to the Competition and for public outreach of the project.

#### **Rules Official**

Member of the Competition Management division authorized to interpret the Rules. The Competition Manager is the lead Rules Official and reports to the Senior Rules Official of the Energy Endeavour Foundation.

#### **Scientific & Educational Outreach**

The division responsible for planning, coordinating and analysing activities concerning scientific & educational outreach.

#### **Scientific & Educational Outreach Manager**

The head of the Scientific & Educational Outreach division. Scorekeeper Individual selected by the Competition Management division to operate and maintain the scoring server during the Competition.

#### **Site Operations Coordinator**

Member of the Infrastructure Management division responsible for the evaluation of the Teams' Site Operations Plans, consequently developing the Competition Site Operation Plan and the coordination and supervision of the Demonstration Units' assembly and disassembly works at SDE23 solar village.

#### **Social Media & Marketing Coordinator**

Member of the Communication Management division responsible for managing the Social Media platforms and producing the official SDE23 multimedia files (videos, photos, presentations, etc.). This coordinator is also responsible for administrating the SDE23 Website, working collaboratively under the direction of the Energy Endeavour Foundation.

#### **Sponsorships and Exterior Relations Coordinator**

Member of the Sponsorship Management division responsible for developing and implementing a long-range corporate giving strategy, to identify, cultivate, solicit and steward relationships with business supporters, fostering strong worldwide awareness and support. This Executive works collaboratively in consultation with the Energy Endeavour Foundation.

### **Sponsorship Management**

Division responsible for the strategy, recruitment and development of the project's sponsorship relations and the support of the Teams' sponsorship activities.

### **Sponsorship Manager**

The head of the Sponsorship Management division. This Executive works collaboratively in consultation with the Energy Endeavour Foundation.

### **Staff**

Individuals working for the SDE23 Executives on the project.

### **Team Communication Manager**

Member of the Competition Management division responsible for the communication with the participating Teams, helping them through the project development.

## **SDE Decathlete Team Members**

### **Communications Coordinator**

Team member responsible for the Team's communications with the media and for developing communications materials (please refer to the SDE23 Graphic Chart & Brand Manual), including updating information concerning communications activities through the SDE23 WAT; works in conjunction with the SDE23 Executives to coordinate the Team's interactions with the media.

### **Contest Captain**

Team member responsible for the Team's primary strategies and coordination of Tasks contests; is also responsible for demonstrating the compliance of equipment and appliances with the Rules.

### **Decathlete**

Team member who is an enrolled student – undergraduate or post graduate studies, at a participating university or has graduated from a participating university within twelve months of the beginning of assembly phase.

### **Electrical Engineer**

Team member responsible for completing the Electric and PV Chart and Checklists and working in conjunction with the SDE23 Host City Executives' electrical engineer to interconnect the Demonstration Unit to the grid on SDE23 solar village. Must be a licensed professional, which approves and signs the unit's electrical systems (drawings and specifications).

### **Faculty Advisor**

Team member who is the lead faculty member and primary representative of a participating university in the project; also provides guidance to the Team on an as-needed basis throughout the project. Responsible for signing the official document certifying the compliance of the codes of the country of origin.

### **HS Team Coordinator**

Team officer who is responsible for developing and enforcing the Team's Health & Safety Plan during the Competition phases, including assembly and disassembly of the Living Demonstration Unit. See Rule 51.

### **Instrumentation Contact**

Team member collaborating with the SDE23 HC Executives' instrumentation Team to develop a plan that accommodates the equipment used to measure the performance of the dwelling during the Competition.

### **Project Architect**

Team member responsible for the architectural design effort; license not required.

### **Project Engineer**

Team member responsible for the engineering design effort; license not required.

### **Project Manager**

Team member responsible for the planning and execution of the project.

**Safety Officer**

Team member responsible for the safety measures observance during the event. See Rule 51.

**Site Operations Coordinators**

Team members responsible for developing and enforcing the Teams' Site Operations Plan during the Competition phases, including assembly and disassembly of the Living Demonstration Unit.

**Student Team Leader**

Student Team member responsible for the coordination among the Team. Ensures that official communication from the SDE23 HC Executives is routed to the appropriate Team member(s).

**Structural Engineer**

Team member responsible for approving the Demonstration Unit's structural systems; license required.

**Team Crew**

Person who is integrally involved with a Team's project but is unaffiliated with the participating university(ies); contractors, volunteers, and sponsors are examples of Team crew.

**Team Member**

Enrolled student, recent graduate, faculty member, or other person who is affiliated with one of the participating universities and is integrally involved with a Team's project activities; Decathletes, Faculty Advisors, and involved staff from participating universities are all considered Team members.

## items to be revised

For internal purposes only. Suggestions for corrections can be sent to [info@solardecathlon.ro](mailto:info@solardecathlon.ro)

## supporting entities



*The Energy Endeavour Foundation supports the mandate, vision & objectives of the original U.S. Solar Decathlon, initiated by the U.S. Department of Energy.*

