



# solar decathlon **21** europe

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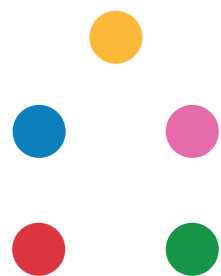
## call for teams

29\_03\_2019

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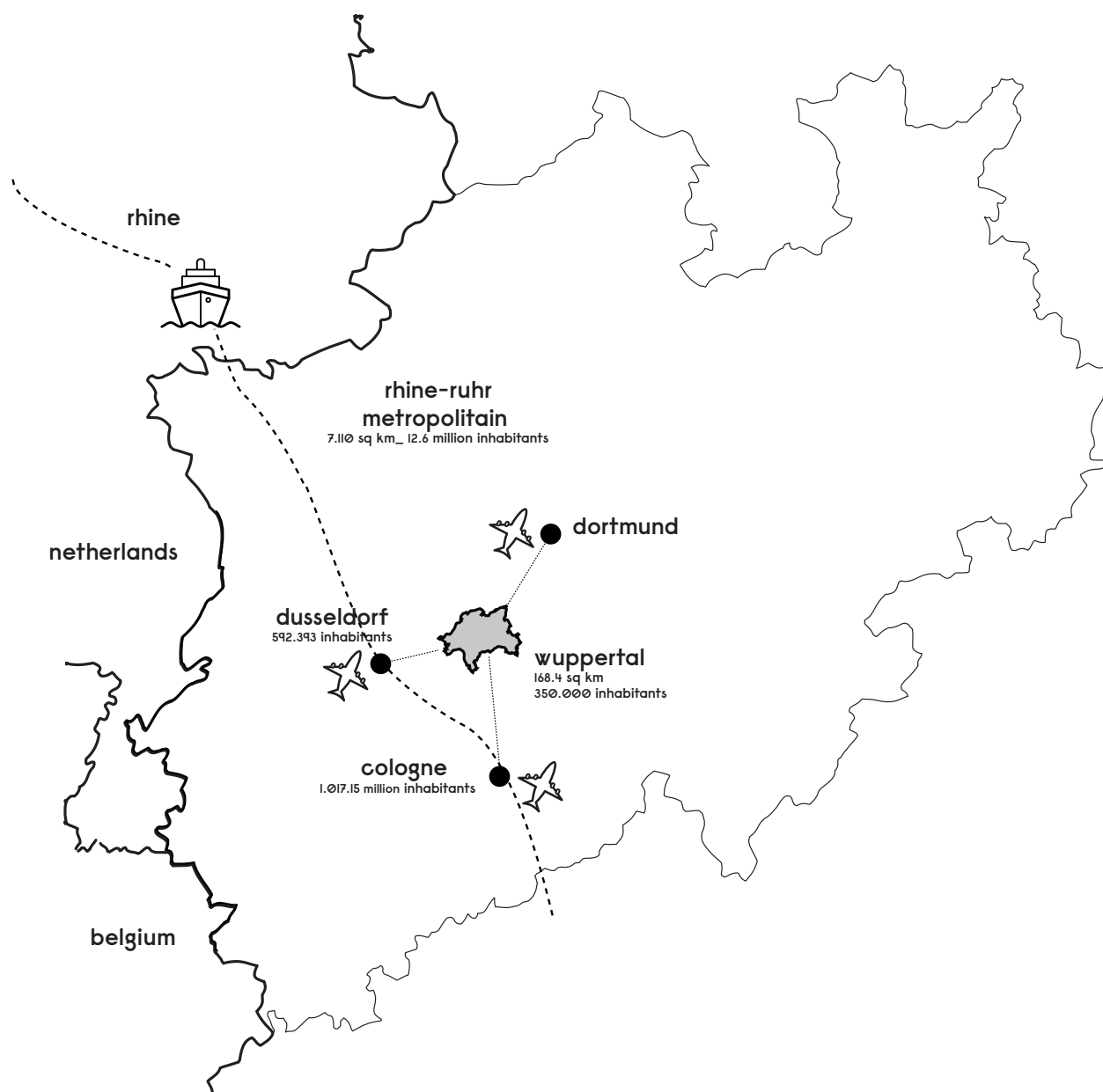


on the basis of a decision  
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# solar decathlon europe 21

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## I\_ sde at a glance

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 based 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.

The Competition is structured around ten contests. These are either measured (i.e. Energy Performance) or juried (i.e. Architecture). The results of the ten contests are calculated, thus determining the overall winner. The contests reflect the emphasis on cross-disciplinary academic education celebrating a great variety of disciplines at the participating universities. It stimulates and offers research and design challenges at the universities beyond the scope of the Competition.

The Solar Decathlon has been hosted in the United States eight times, most recently in October 2017. The Competition has also been held beyond the United States; in Europe (2010, 2012, 2014), China (2013, 2018), Latin America (2015) and Middle East (2018). Further competitions are planned in the United States (2020), Europe (2019, 2021), Latin America (2019), Africa (2019) and the Middle East (2020).

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 upcoming SDE19 edition takes place in Szentendre, Hungary. Stewarded by the Energy Endeavour Foundation (EEF), under a shared European vision of sustainability, energy efficiency and responsible resource management the SDE21 Competition will be and hosted in Wuppertal, Germany. It will be the first time that the Solar Decathlon Europe 'goes urban'!

The SDE21 Organisation's (EEF & SDE21 Organisers) ultimate goal is to stimulate viable solutions for evolving urban contexts and energy systems, supporting the Solar Decathlon Europe's basic objectives, described on the following page.



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### **SDE at a glance\_ cont... Solar Decathlon Europe's objectives**

- Raise awareness of participating students on the benefits and opportunities of renewable energies and sustainable construction, challenging them to think creatively in the development of innovative solutions that contribute to energy savings;
- Encourage planners and professionals in the building industry to select materials and systems that reduce the environmental impact of a building over its entire lifetime, optimizing its economic viability and providing comfort and safety of occupants;
- Educate the general public regarding responsible energy use, renewable energy, energy efficiency and available technologies to help reduce energy consumption;
- Emphasize the correct order of intervention: first, reducing building energy consumption and increasing its energy efficiency and afterwards, integrating solar active systems and other renewable technologies. Moreover, the building systems must be selected and dimensioned using environmental and cost-effective criteria;
- Promote the use of solar technologies, including architecturally attractive solar system integration, working on using the solar technologies to replace conventional construction materials in the building envelope such as the roof, skylights or facades; Demonstrate that high performance solar homes can be comfortable, attractive and affordable.

An in-depth overview of all European, and other, international editions is accessible through the newly developed Knowledge Platform: <https://building-competition.org>.

#### **1.1 Solar Decathlon Europe goals applied to SDE21 in Wuppertal**

A critical long-range goal of the Solar Decathlon project is the development and demonstration of cost-effective, highly energy efficient solar-powered dwellings. The Energy Endeavour Foundation, with the designated SDE21 Host City, Wuppertal, Germany is soliciting proposals from post-secondary educational institutions that not only address participation in the Competition but also include a research and development (R&D) component to achieve this critical outcome.

The SDE21 edition in Germany provides a forum for the development of project requirements, reflected in the new set of Rules. These are intended to address us all, citizens who meet a current challenge: to develop our society through climate protection and the sustainable use of resources. Therefore, the evaluation of proposed projects, through the 10 Contests of the Competition, addresses the vital issues related to our dwellings of the immediate future.



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### **Solar Decathlon Europe goals applied to SDE21 in Wuppertal\_ cont...**

The Solar Decathlon's wide audience includes university student Teams, architects, engineers, the building industry, sustainable and clean energy industries, homeowners, general civil society and public consumers. The student Teams pursue multi-disciplinary approaches to meet the SDE's goals in designing, building and operating energy-efficient, solar-powered dwellings. Stimulating solutions for urban contexts and energy systems will be a key feature of the SDE21. The program's technology showcase educates the attending public and industry professionals on the benefits, affordability, and availability of clean energy solutions with research papers, media coverage, and digital outreach serving as tools to amplify this message.

The SDE21 Competition is organised by a local partnership headed by the University of Wuppertal in Germany. The partnership includes academic institutes from various faculties and disciplines, the Wuppertal Institute, the Neue Effizienz, the urban initiative Utopiastadt, the local utility WSW, and the city of Wuppertal. The Federal Ministry of Economic Affairs & Energy provides major funding to run the competition as part of its initiatives to work towards a climate-neutral building stock in Germany by 2050.

With this Call for Teams, the SDE21 Organisation (EEF & SDE21 Organisers) intends to select up to 18 university Teams that will participate in the SDE21, through a competitive call and juried process. The ability and plan to obtain sponsorships and Team support are a part of the evaluation, selection criteria, and program policy for this Call for Teams. The challenge to the Teams competing in the SDE21 is to safely and effectively design, build and operate solar-powered dwellings that are cost-effective, energy-efficient and attractive, in less than 24 months. The SDE21 Organisers in Germany have geared the focus on the items further described below.



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## 1.2 SDE21 Campus

Located in the heart of Wuppertal, the backdrop to the SDE21 Competition is an existing, medium dense, mixed-use district, known as [Mirke](#), with its cultural, social and economic facets. Applying Teams are encouraged to detect, consider, value and sustain these prevailing characteristics in their proposals.

The SDE21 Campus is a fairly flat, homogeneous site with compacted soil. It is owned by the local, non profit initiative [Utopiastadt](#) with the perspective to create an innovative and creative urban experimental hub.



Photomontage by Bärbel Offergeld, pictures by Deborah Runkel, Magdalena Spinn; montage figures by Skalgubbar.



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### 1.3 SDE21 Rules

The SDE21 Rules document will be the basis for the Competition. It will be revised leading up to the Event based on lessons learned at the Solar Decathlon events worldwide and the prospect of establishing a Living Lab for long-lasting impact.

This Call for Teams document will provide the fundamental principles regarding the specificity of the SDE21 edition in Wuppertal, Germany. The updated version of the SDE21 Rules will be aligned to reflect this specificity.

The latest version of the SDE21 Rules is currently under development and is expected to be published in September 2019. For a general impression, please refer to [version 1.0R of the SDE Rules](#) (documentation included in the SDE21 Call for Cities, July 2018) posted on the SDE website.

**The official language for the SDE21 Competition in Germany is English.**

## 2\_ the sde21 profile\_ going urban!

The revitalisation of urban building stocks is the key focus of the SDE21. The scope of the Competition centers around the value added renovation, transformation or reuse of existing apartment buildings for densifying cities. This creates a platform for high impact solutions in typical European contexts, and urban challenges in general. There will be a strong orientation toward viability and importance for the wider public. Linking the SDE21 Competition to current architectural discussions, building research and social aspects of urban living is a key focus.

In the 21<sup>st</sup> century, humanity is at a turning point: our planet cannot sustain current human activity, and proliferation of highly populated cities is in full swing. This statistic is evolving upward, and radically. Buildings generate about 40 percent of EU energy consumption and emit 36 percent of CO<sub>2</sub> emissions. About 50 percent of waste in Germany is generated by the construction sector, and about 75 percent of EU building stock is energetically inefficient. If building practices are not altered, half of the IPCC CO<sub>2</sub> budget aimed at a two-degree climate target will be consumed.





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## The SDE21 Profile\_ cont...

It is urgent that we change the way we build and live in our cities. We must signal the alarm for stakeholders around the world, providing paths toward a crucial change. This urban edition of the Solar Decathlon Europe empowers us with a clear and vibrant voice in the name of tomorrow's cities.

Teams are requested to focus on the social scenarios and challenges of construction for today's, and tomorrow's urban living. Teams should articulate which urban challenges and environments they are specifically addressing, while proposing creative project solutions. Different inspirations for this will be identified by the creative community of Wuppertal and the scholars of the Wuppertal University and the Wuppertal Institute. They will provide deep insight related to the concerns of European cities such as Wuppertal. These perspectives will be available shortly after the release of this call with videos and comprehensive information at [www.SDE21.eu](http://www.SDE21.eu). In addition, teams are welcome to address specific urban issues, such as how to build, recycle and investigate urban mining. How to design habitation with personal living space, address ways of sharing, while making citizens feel at home and welcome in an ever-changing urban landscape? How do we turn crowded streets into quiet spaces, and shape the mobility of the city of the future? Teams are free to share their urban issues with the community and show how to creatively build the city of tomorrow.

The SDE21 will maintain the fundamental features of the Solar Decathlon Europe, involving (18) university teams, the 10 contests, the specific (apx. 14-day) assembly and (apx. 16-day) contest periods, including exhibition and evaluation time with a prize-giving ceremony on the 15th or 16th day (Saturday or Sunday). Specifics will be provided in the Competition Calendar. The Competition is set to evolve while 'going urban', with an exciting opportunity for long-lasting impact through the envisioned post-competition Living Lab. This will serve as a testbed for further research.



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## 2.1 One Project \_ Two Challenges \_ 10 Contests

The whole project splits up into a design challenge for a whole building project (similar to an architectural design competition) and the challenge to deploy the design, to build and operate a Demonstration Unit (similar to SDE Demonstration Units from past competitions). All contests are evaluated through the dual-challenge, and all selected Teams are faced with this same dual-challenge.

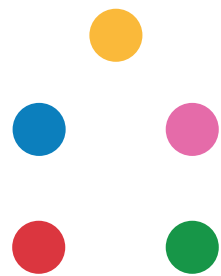
### Design Challenge

This challenges the Teams to plan a whole building for one of the three urban situations (see 2.2). With this link to reality, SDE21 promotes comprehensive solutions for the sustainable improvement of urban living. This new feature gives the chance for every Team to contribute to urban sustainability transition in the size of the whole building.

### Building Challenge

The demonstration unit is a full-scale, full-functional representative part of the design project. It will fit into the slots on the solar Campus within the solar envelope and demonstrate the key features of the whole Team project entry.

This combination leads to a wider impact on the sustainability of urban living, fostering creativity and improvement. In this way, social aspects and typical urban scenarios can be included in a comprehensive, complementary concept. All jury-based disciplines will be judged in both parts of the entry (the design projects as well as the built Demonstration Unit). Teams are free to choose any suitable form of presentation of the whole project design during the Competition, such as architectural models, virtual reality animations, etc.

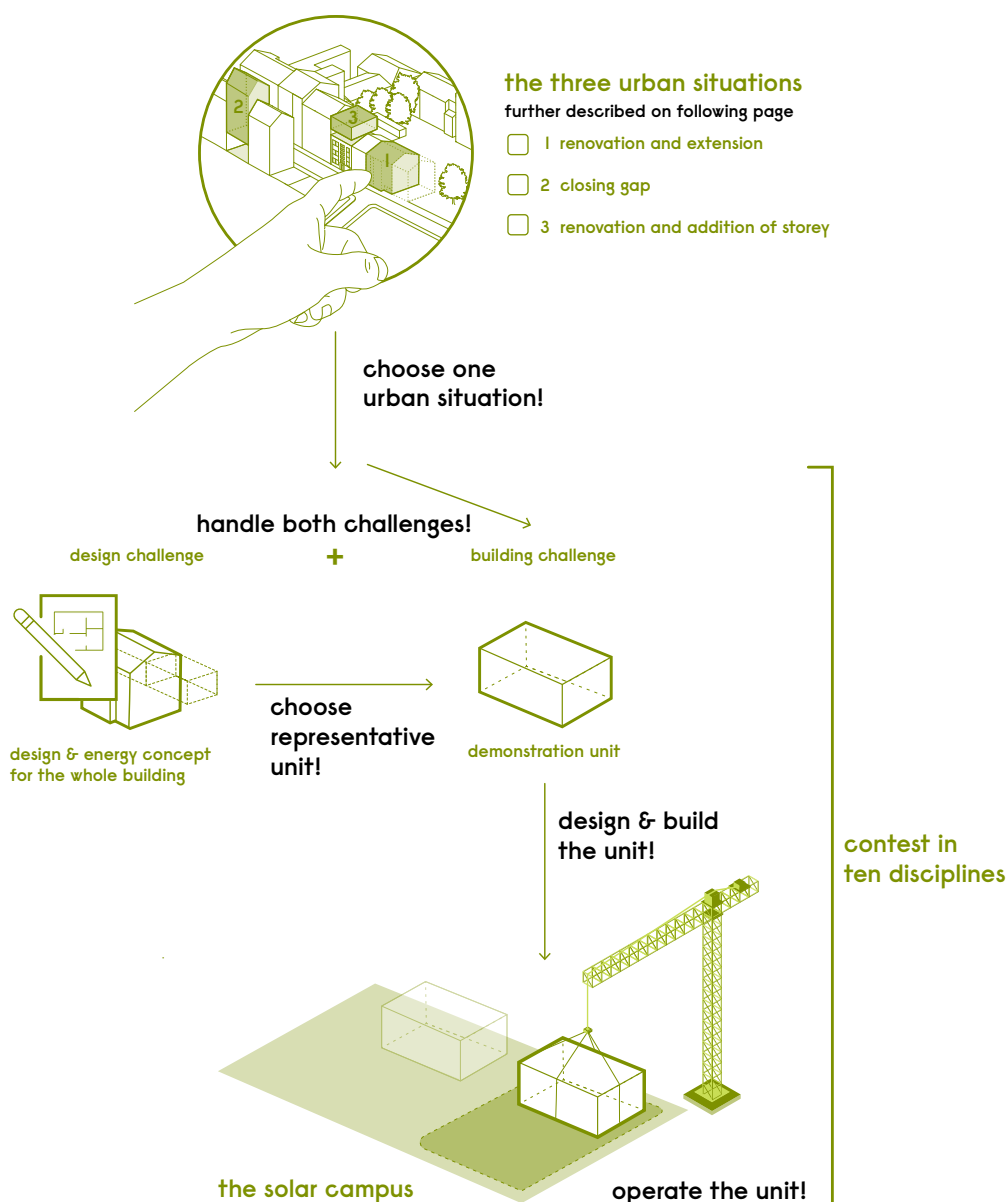


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Competition mode at a glance, further described on following page.

overview of the competition mode





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## 2.2 Three Situations

Teams may choose to reason one of three situations based on examples from Wuppertal's built environment. Each situation will be illustrated through existing examples from Wuppertal's built environment in a detailed brief made available to Teams containing crucial information (architectural drawings, structural analysis, infrastructure, etc). Specific properties of these examples will also be discussed during the SDE21 Workshops in Wuppertal in the build-up to the SDE21 Event.

To further inspire Teams to take a deep-dive into real-life urban challenges, various social, cultural, economic or mobility-related scenarios will be communicated through the SDE21 website and social media channels. Teams have the possibility to fully experience the characteristics of the transformative and vibrant District Mirke surrounding the SDE21 Campus, connecting to its creative citizens and interesting social scenarios.

While Teams are encouraged to choose the 'Wuppertal in-situ' option, they are free to propose one of the three urban situations as applied to their city of origin. The task is challenging: regardless of their direction, Teams are invited to integrate their cultural parameters, while addressing typical European, urban situations.

In the framework of the SDE21 Competition, the proposed projects will address one of the three situations described below: renovation / extension, closing gaps, renovation / addition of storey:

- **1\_ renovation & extension \_**

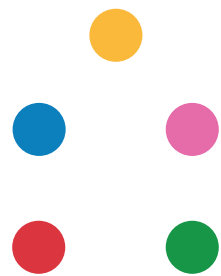
Teams have the possibility to focus on renovation issues as an important step towards the transitions of cities. A renovation makes existing buildings more efficient and attractive through transformation or renewal of components. The renovation can be combined with an extension and also increase urban density.

- **2\_ closing gaps \_**

Within the city, undeveloped areas completely surrounded by buildings are designated as vacant lots. Teams are welcome to develop attractive and energy-efficient architectural solutions for closing these gaps and to repair the cityscape.

- **3\_ renovation & addition of storey \_**

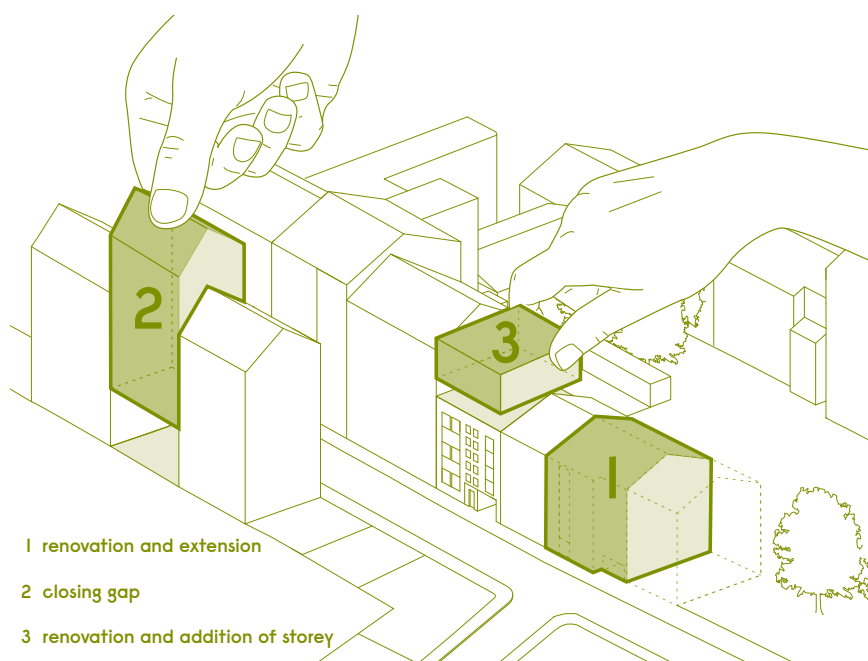
The addition of one or more extra storeys to an existing building, (including the renovation of an entire building), is a great possibility for the Teams to propose new design ideas and creations of alternative living spaces, thus increasing urban density in a sustainable way.



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## Three Situations\_ Illustrated



### 2.3 Contests

While the ten contests for the SDE21 Competition build further on its forerunners' legacy of local urban design and streamlined communications, they have evolved to give the SDE21 its unique character in highlighting various forms of new challenges.

The ten SDE21 contests are as follows:

- Architecture
- Engineering & Construction
- Energy Performance
- Communication, Education & Social Awareness (CESA)
- Innovation
- Affordability & Viability
- Sustainability
- Comfort
- House Functioning
- Urban Mobility



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## 2.4 Energy Systems

In keeping with previous Solar Decathlon Competitions, the Demonstration Units as well as the whole building designs have to include active solar energy systems. In contrast to previous editions, no further heat or cold generation systems are required in the Demonstration Units but are indeed required in the whole building designs. Only the heat transfer systems such as radiators, floor heating panels, DHW heat exchangers etc. need to be installed in the Demonstration Units according to the planning. This allows later connection to central installations for dwellings kept on the Solar Campus in Wuppertal or rebuilt at Teams' home locations. This approach reduces the Team's efforts in the service engineering for the Demonstration Units, such as the integration of reversible heat pumps for heating and cooling. The whole building as well as the Demonstration Unit must be designed to consider space for installations such as shafts, ducts and pipes. If mechanical ventilation is part of the design it has to be installed and operated as part of the demonstration unit as well.

The thermal performance will be evaluated in the passive and solar system only mode, including domestic hot water. There is practically no need for space heating or cooling in a typical September in Germany. The background for this approach is the fact that multistory buildings usually run with centralized or grid based heating systems. In the absence of active cooling, convincing passive strategies are the challenge.

The design projects have to consider the specific energy infrastructure on site backed up with proper documentation. All teams addressing one of the situations described above in a local context work within the same infrastructure framework. Teams addressing building challenges at an alternative location are expected to provide their own thorough infrastructure information.

## 2.5 Four-Season Design

The Competition and measurements will take place in September 2021, with a view on four-season house designs and the Demonstration Unit. A data set with hourly climate information will be provided for modelling purposes that is representative for Wuppertal. Data sets for alternative climates or sites of origin should be provided by the Teams.



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## 2.6 3D Design & Modelling

The utilization of 3D-Modelling techniques and a harmonized information handling (BIM) are mandatory during the design phase and for Deliverables. Details will be incorporated in the SDE21 Rules. The projects are expected to demonstrate state-of-the-art design through 3D and building performance modelling. Innovative measures of animated virtual reality are encouraged, especially to illustrate the whole building design projects during the SDE21 Event.

## 2.7 Circularity

Special attention will be given to concepts and construction methods oriented on a closed life cycle of buildings. This includes reuse of materials (e.g. of the existing buildings) as well as consequent recycling of resource-responsible materials and constructions. The priority goes to circular systems such as urban timber constructions. Relevant aspects will be discussed in specific sections of the SDE21 Rules that describe the Sustainability Contest.

## 2.8 Urban Mobility

Urban mobility should be addressed throughout the whole length of the Competition and can also be reflected in the Demonstration Units. This ranges from shared mobility to reduce the space for parking and the individual investment to various forms of electric mobility. Energy for mobility has to be considered as part of the energy concept. The SDE21 Rules will set the framework for judging the concepts and the demonstration.

## 2.9 Monitoring & Testing

In tandem with the International Energy Agency, IEA, the SDE21 Organisation also works towards a [Competition & Living Lab Platform](#). The platform stimulates the technological knowledge, the scientific level and the architectural quality within future competitions and living labs based on the link to know-how from previous and current IEA activities. The monitoring and testing procedures during the event will be further developed to make use of the results in the building science community. Details will be described in the SDE21 Rules.

## 2.10 Education & Communication

Part of the SDE21 Competition is to inform and empower the general audiences and specific stakeholder groups. Climate-change adapted construction, energy-efficient city renewal and broad participation of various actors are key national and European ambitions to make



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## Education & Communication\_ cont...

sustainability a mainstream issue. The SDE21 Organisation invites Teams to take part in dissemination workshops where they are encouraged to adapt their language accordingly to the broad range of audiences they are addressing. The target groups encompass all kinds of interested audiences including multi-level government bodies, industry partners, investors, homeowners and children. Workshops and dissemination events will be coordinated by the SDE21 Organisers who will inform the applying Teams on a range of options.

### 2.11 SDE21 Campus in Detail

All SDE21 related activities will take place in walking and cycling distances from the SDE21 Campus. An express cycle path, the Nordbahntrasse, runs along the edge of the Competition site and extends across the entire city. With its numerous landmarks, cafés and cultural centers, the Nordbahntrasse is popular for leisure activities. Tunnels at certain intervals along the cycle path offer projection surfaces for exhibitions.







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### SDE21 Campus in Detail\_ cont...

The district provides the perfect backdrop for a range of urban challenges beyond European cities. These include dealing with urban density, finding modern mobility solutions, integrating attractive public spaces and safeguarding a liveable co-existence of heterogeneous societal groups. Up-and-coming districts like Mirke should not simply develop into gentrified residential areas for the wealthy and well-educated but be a role model for build-and-live sustainability.

#### 2.12 Living Lab

To increase the Competition's impact, the SDE21 Organisers are developing a Living Lab concept to stimulate common research activities and awareness. Applying Teams should indicate their preference to:

- Dismantle and remove the Demonstration Unit directly after the event for individual purposes. Teams will receive a base funding of € 100.000,- by the organizers in 2020.
- Keeping the Demonstration Unit on the solar Campus in Wuppertal for permanent use.

A full year design for Wuppertal climate is the precondition for this option. Teams will receive an additional donation of € 50.000,- in 2020 adding to the base funding.

Ownership of the Demonstration Unit will be transferred after the Competition to the local, non-profit initiative Utopiastadt. The intended use is a hostel, depending on the number of houses kept on the Campus after the event phase. The SDE21 Organisers set the goal to keep up to 8 Demonstration Units on the site.

The house and its measurement data and will be maintained and accessible, and will be part of a permanent solar village, or 'Campus', thus raising awareness, drawing further attention and stimulating visibility.

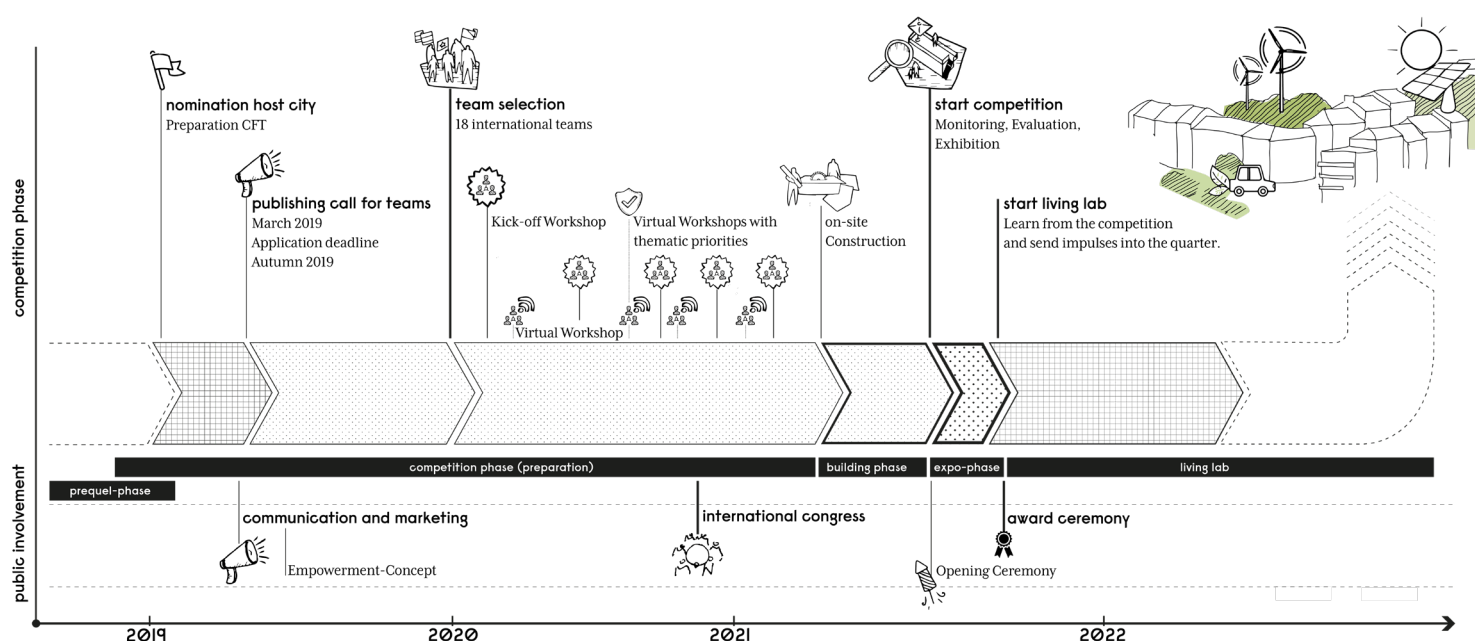


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## 2.13 SDE21 Timeline

The SDE21 project kicks-off with this Call for Teams, builds up to the SDE21 Event scheduled for September 2021, and finalises in parallel to the Disassembly phase. After Team selection at the end of 2019, the Teams have nearly two years to design, plan and build their projects. Within these two years several workshops and events are planned to inspire and support the Teams. In the aftermath of the Competition the SDE21 Campus will transition into a Living Lab that continues the research on a selected number of Demonstration Units kept on site in full operation.





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#### 2.14 Recap of Contextual Concerns of the SDE21 Competition

As previously stated, the specificity of Wuppertal's SDE21 addresses the very particular challenges of the urban landscape. The Wuppertal 'situations' present great possibilities for comprehensive solutions in Europe and in cities around the world, all embracing densification challenges posed by our built environments.

If Teams choose a non-Wuppertal scenario, it may seem paradoxical that these Teams would design a prototype of a dwelling adapted to another region, while being efficient on the site of the Competition. This paradox is clearly affirmed and those projects must be good responses to the climatic and social contexts of the chosen region as well as a high-performance prototype that should successfully perform during the short period of time during which it compares with others. This duality is meant to encourage young minds to acknowledge both sources of inspiration for the future: the very local conditions of and the universal dimensions of an international common goal for the planet. This dual stream of thoughts is also meant to encourage an innovative cultural relationship to R&D in the field of building industry: future urban designers, architects, engineers as well as social and financial managers are required to find the most adapted solutions for a specific context while sharing the most innovative ideas with colleagues from other countries.

The Solar Decathlon Europe is also a public event designed to increase awareness about energy for residential use. The Competition demonstrates that a beautifully and well-designed dwelling can generate enough electricity to meet the needs of a household, including electricity for lighting, cooking, washing clothes and dishes, powering home and home-office electronics, maintaining a comfortable indoor temperature and air quality.

Solar Decathlon Europe objectives are consistent with the European Union goals for 2020, and have demonstrated to be effective on making students, professionals and the general public aware of the importance of energy savings. This constitutes the most immediate and cost-effective way of addressing the European energy challenges of sustainability, guaranteeing supply sources and competitiveness. The SDE participating houses present solutions that contribute to reach the EU targets: saving 20% of the primary energy consumption, reducing 20% of greenhouse gas emissions and producing 20% of the energy from renewable resources.



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### Recap of Contextual Concerns of the SDE21 Competition\_ cont...

All SDE editions demonstrate pioneer work with respect to the European Commission's Energy Performance of Buildings Directive. This Directive has set the goal of nearly zero-energy buildings as the [future building standard](#). The design of the SDE Demonstration Units reflects the ongoing architectural dialog on resource efficiency, climate protection, and building-integrated solar systems.

Undoubtedly, the Solar Decathlon Europe brings prestige and raises the visibility of the selected participating universities as they are part of the small group of top institutions that will compete in the world's most important solar housing event. One of the main characteristic elements of the European edition of the Solar Decathlon is its emphasis on sustainability, innovation and research. Participating Teams work not only to develop and build their dwellings, but also to enhance the systems' integration and generation of knowledge on sustainable construction.

The Solar Decathlon Europe offers students a unique opportunity for learning, taking theory and putting it into practice, and doing so through a case study. Students working on the project will be challenged to use their innovation capacity, and their ability to design and build an energetically self-sufficient solar housing unit. The projects are developed by multidisciplinary Teams, giving the students the opportunity to learn not only about technical issues but also about teamwork, communication skills, sustainable lifestyle and socio-economic issues in order to ensure the viability of their project, and of their futures in the clean-energy workforce.



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## 3\_ sde21 call for teams\_ process

### 3.1 Schedule

Submission Period begins \_ March 29, 2019  
 Informational Webinar \_ September 2019 \_ TBD  
 Registration date \_ September 13, 2019 \_ 17:00 CET  
 Letter of Intent deadline \_ As early as possible; deadline October 24, 2019 \_ 17:00 CET  
 Submission Period ends \_ October 25, 2019 \_ 17:00 CET  
 Selections announced \_ December 2019

### 3.2 Registration

Teams can register by sending an email to: [application@solardecathlon.eu](mailto:application@solardecathlon.eu)

The email should contain the following information:

- Institution Name
- Contact Person's Name
- Contact Person's Role in the Institution
- Contact Person's email and telephone number(s)
- Other Institutional partners in the Team.

Please submit only one registration per consortia of institutions.

A confirmation email will be sent with a 6-digit code to be used in all submissions.

### 3.3 Letter of intent

Teams are encouraged to send a letter of intent as early as possible after the publication of the Call for Teams. To be eligible to submit a full application, applicants must submit their letter of intent before the submission due date to: [application@solardecathlon.eu](mailto:application@solardecathlon.eu). Letters of intent will be used by the EEF\_SDE21 Team Selection Committee to plan for the merit review process. The letters should not contain any proprietary or sensitive business information. The letters will not be used for application pre-selection purposes, and do not commit an applicant to submit an application.

The following information must be included in the letter of intent:

- Project title;
- 6-digit code given upon registration;
- Prime Applicant University;
- The project Team (including consortium partners, if applicable), including the Lead Person for the Prime Applicant & the Backup Lead Person;
- List of Team members;



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#### **Letter of intent\_cont.**

- Other project participants (i.e., individuals who contribute in a substantive, measurable way to the execution of the project);
- Thematic focus for the project;
- Abstract – The abstract provided should be maximum 400 words in length, and should provide a concise explanation of the application;
- Finally, the Letter of Intent should be signed by an authorized person (presumably the Lead Person) to act on behalf of the Prime Applicant.

#### **3.4 Questions**

Questions about the Call for Teams can be sent to: [questions@solardecathlon.eu](mailto:questions@solardecathlon.eu)

Answers to questions will be published on the Solar Decathlon Europe website at: <http://solardecathlon.eu>

#### **3.5 Webinar**

An online Webinar will be held in September 2019. Date, Time and URL: **TBD**

#### **3.6 Full Submission**

Full submissions are to follow the requirements stated in Section 5 & 6.

#### **3.7 Selection**

Selection of Teams will be carried out by a jury appointed by the joint EEF\_SDE21 Team Selection Committee (EEF and the University of Wuppertal). The jury plans to submit a list of selected Teams by mid-December 2019.

#### **3.8 Notification**

Teams will be notified of the status of their bids once the EEF and the University of Wuppertal have approved the list of selected Teams (December 2019).



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## 4\_ sde21 call for teams\_ elaboration

The SDE21 Organisation seeks applicants to its Competition in Wuppertal, Germany. This Competition will support the commitment of Europeans to improving science, technology, engineering, and mathematics (STEM) education efforts, and to building a more knowledge-intensive workforce. The EEF and the University of Wuppertal are eager to create and support education and workforce development programs that are specific to applied energy, and are essential to carrying out the original mission of the US DOE Solar Decathlon.

One of the world's most pressing and technically difficult scientific and engineering challenges is developing new and better technologies to supply clean and renewable energy. As the world's demand for energy increases and the energy sector grows to meet these needs, we face an impending shortage of the skilled workforce needed to support this sector. An educated and highly-trained workforce is imperative if it is to support today's low-carbon economy as it develops—and lead it to tomorrow. Finding solutions to these challenges is critical today and for our future. For this reason, the EEF supports the development and provision of educational and technical training opportunities for students and for the workforce.

The EEF and the University of Wuppertal is inviting university teams of creative designers and innovators to enter this Competition. The SDE21 Organisers will assign up to €1,800,000 in funding to selected participating teams that bring an eligible Demonstration Unit to the Solar Decathlon Europe Competition in Wuppertal, Germany. The funds will be awarded to the same lead organisational entities that submit applications under this Competition and are selected by the joint EEF\_ SDE21 Team Selection Committee to compete, and that complete a Demonstration Unit for the Solar Decathlon Europe. Payment schedule will be announced upon dissemination of Team selection. Ultimately, Teams will receive 100,000€ each, shortly after Team selection and contractual agreements are signed. Additional funds (50,000 €) will be granted to up to 8 Teams who successfully apply to leave the Demonstration Unit on the site.



# solar decathlon 21 europe

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## 4.1 Summary of Competition

This SDE21 edition seeks up to 18 Teams to compete in the Solar Decathlon Europe Competition. The challenge to the teams competing in the Solar Decathlon is, in less than 24 months, to safely and effectively design, build, and operate solar-powered dwellings that are cost-effective, energy-efficient, and attractive. The winner of the Competition is the Team that best blends affordability, consumer appeal, and design excellence with optimal energy balance and maximum efficiency.

Competition designs must be viable for one or more of the situations described in the introductory section of this document and repeated below. The scope of the Competition centers around the value added renovation, transformation or reuse of existing apartment buildings for densifying urban contexts.

Teams may opt to:

- Renovate / extend;
- Close gaps between structures;
- Add a storey.

A critical long-range goal of the Solar Decathlon Europe is developing and demonstrating cost-effective, highly energy efficient solar-powered homes. The SDE21 Organisation is soliciting proposals from post-secondary educational institutions that not only address participation in the Competition, but also include a description of how the design will help to achieve this critical outcome.

The SDE21 Rules document will be the basis for the Competition. It will be revised prior to the SDE21 Event based on lessons learned at the Solar Decathlon competitions worldwide. As previously mentioned, the joint EEf\_ SDE21 Team Selection Committee intend to select approximately 18 university Teams that will participate in the Solar Decathlon Europe 2021 Competition.





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#### 4.2 Contests of the SDE21

The ten contests for the SDE21 Competition are as follows:

- Architecture
- Engineering & Construction
- Energy Performance
- Communication, Education & Social Awareness (CESA)
- Innovation
- Affordability & Viability
- Sustainability
- Comfort
- House Functioning
- Urban Mobility

#### 4.3 Versions

Please note that changes in the Rules may be adapted as preparations for the SDE21 evolve. The Solar Decathlon Europe Rules for reference are posted on the SDE website [version 1.0R of the SDE Rules](#).



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## 5\_ application & eligibility requirements

### 5.1 Eligibility Requirements

Teams must be led by a post-secondary educational institution.

### 5.2 Application Process

The application process requires the submittal of a Full Application. The EEF will perform an initial eligibility review of the applicant submissions to determine whether they meet the eligibility requirements of the Call for Teams. The EEF will not review or consider noncompliant and / or nonresponsive or otherwise ineligible submissions. Applications deemed eligible will then be reviewed for compliance with the application requirements stated below.

### 5.3 Submissions

All submissions must conform to the following form and content requirements, including maximum page lengths described below and must be submitted via the email: [application@solardecathlon.eu](mailto:application@solardecathlon.eu) or by a file-transfer service with a link indicated in an email sent to [application@solardecathlon.eu](mailto:application@solardecathlon.eu). The EEF will not review or consider submissions submitted through means other than described above, submissions submitted after the applicable deadline, and incomplete submissions. The EEF will not extend deadlines for Applicants who fail to submit required information and documents due to server / connection congestion. A control number will be issued when an Applicant sends an initial email to: [application@solardecathlon.eu](mailto:application@solardecathlon.eu). This control number must be included with all Application documents, as described below.

### 5.4 Fees

A non-refundable fee of € 750,00 is to be paid to the account of the Energy Endeavour Foundation by the submission date. Please make transfers to:

ABN AMRO Bank  
Coolsingel 93  
3012 AE Rotterdam, Netherlands

Account Holder _	Energy Endeavour Foundation
IBAN _	NL54ABNA0547070179
BIC / SWIFT _	ABNANL2A



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#### 5.4.1 Full Application Requirements

- 5.4.1.1 Each must be submitted in Adobe PDF format unless stated otherwise.
- 5.4.1.2 Each must be written in English.
- 5.4.1.3 All pages must be formatted to fit on DIN A4 paper with margins not less than 10mm on every side. Embed the typefaces, use a black typeface colour, and a font size of 12 point (except in figures or tables, which may be 10 point). A symbol font may be used to insert local alphabet letters or special characters, but the font size requirement still applies. References must be included as footnotes or endnotes in a font size of 10 or larger. Footnotes and endnotes are counted toward the maximum page requirement.
- 5.4.1.4 The Control Number must be prominently displayed on the upper right corner of the header of every page. Page numbers must be included in the footer of every page.
- 5.4.1.5 Each must not exceed the specified maximum page limit, including cover page, charts, graphs, maps, and photographs when printed using the formatting requirements set forth above and single spaced. If Applicants exceed the maximum page lengths indicated below, The EEF and the SDE21 Organisers will review only the authorized number of pages and disregard any additional pages.

Applicants are responsible for meeting the submission deadline. Applicants are strongly encouraged to submit Full Applications at least 48 hours in advance of the submission deadline. Once the Application is submitted, Applicants may revise or update their application until the expiration of the applicable deadline.

The EEF urges Applicants to carefully review their Full Applications and to allow sufficient time for the submission of required information and documents. All Full Applications that pass compliance review will undergo comprehensive technical merit review according to the criteria identified in this Call for Teams.

#### 5.5 Communication

For questions about this Call for Teams, send email to: [questions@solardecathlon.eu](mailto:questions@solardecathlon.eu).



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## 6\_ content & form of full applications

Applicants must submit a Full Application by the specified due date for consideration to enter this Competition. Applicants must complete the application in accordance with the instructions. All Full Application documents must be marked with the Control Number issued to the Applicant through their registration. Applicants will receive a control number when they create an application and should include that control number in the file name of their Full Application submission (i.e., Number\_Organisation\_#\_Filename).

### 6.1 Full Application Content Requirements

The EEf will not review or consider ineligible Full Applications. Each Full Application must be limited to a single project. Full Applications will consist of the following documents:

Submission	File Name
• Application Letter (PDF)	Number_Organization_0_Letter
• Technical Volume (PDF)	Number_Organization_1_Tech
• Budget (Microsoft Excel)	Number_Organization_2_Budget
• Summary for Public Release (PDF)	Number_Organization_3_Summary
• Summary Slide (PDF)	Number_Organization_4_Slide
• Letters of Commitment (PDF)	Number_Organisation_5_Partner

Please find detailed guidance on the content and form of each component below.

#### 6.1.1 Application Letter

The application should be written on the lead institution's letterhead and be signed. The letter should include the name of the institution, the appointed lead person(s), their contact information (telephone, email) and a list of any other partner institutions in the application. The letter should be submitted in PDF format. Save the letter with the following format: "Number\_Organisation\_0\_Letter"



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### 6.1.2 Technical Volume

The Technical Volume must be submitted in Adobe PDF format. The Technical Volume must conform to the following content and form requirements, including maximum page lengths. If Applicants exceed the maximum page lengths indicated below, the EEF and the University of Wuppertal will review only the authorized number of pages and disregard any additional pages. This volume must address the Merit Review Criteria as discussed in this Call. Save the Technical Volume in a single PDF file using the following convention for the title: "Number\_Organization\_1\_Tech".

Applicants must provide sufficient citations and references to the primary research literature to justify the claims and approaches made in the Technical Volume. The EEF, the University of Wuppertal and reviewers may review primary research literature in order to evaluate applications. However, the EEF, the University of Wuppertal and reviewers are under no obligation to review cited sources (e.g., internet websites).

The Technical Volume to the Full Application may not be more than 20 pages, including the cover page, table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all of the information listed below. The applicant should consider the weighting of each of the evaluation criteria listed in this Call for Teams when preparing the Technical Volume.

#### 6.1.2.1 Cover Page / 1 page

The cover page should include the project title, both the technical and business points of contact, names of all Team member organizations, and any statements regarding confidentiality.



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#### 6.1.2.2 **Project Overview (This section should constitute approximately 10% of the Technical Volume.)**

The Project Overview should contain the following information:

- **Background:** The Applicant should discuss the background of their organization, including the history, successes, and current research and development status (i.e., the technical baseline) relevant to the technical topic being addressed in the Full Application.
- **Project Goal:** The Applicant should explicitly identify the targeted improvements to the baseline technology and the critical success factors in achieving that goal.
- **Impact:** The Applicant should discuss the impact that this innovative design will have on the current state of the technology in this area.
- **Situation:** The Applicant should choose one of the three described situations presented in this document. If the chosen situation is not specific to Wuppertal, a short description of site and context should be provided.
- **Living Lab:** The Applicant should decide on one of the two options described in this document for the afters competition situation of the Demonstration Unit (disassemble or leave on the site).
- **Visuals and / or graphics,** e.g., sketches, drawings, diagrams, etc., and a one-page 500-word maximum narrative summarizing the key elements of the conceptual design solution. Refer to the Solar Decathlon Europe 2021 rules for additional information.

#### 6.1.2.3 **Technical Description, Innovation, and Impact (This section should constitute approximately 30% of the Technical Volume.)**

The Technical Description should contain the following information:

- **Relevance and Outcomes:** The Applicant should provide a detailed description of the project. This section should describe the relevance of the proposed project to the goals and objectives of the Notice, including the potential to meet specific technical targets of the SDE Rules or other relevant performance targets. The Applicant should clearly specify the expected outcomes of the project.
- **Feasibility:** The Applicant should demonstrate the technical feasibility of the proposed project and capability of achieving the anticipated performance targets, including a description of previous work done and prior results.
- **Innovation and Impacts:** The Applicant should describe the current state of the art in the applicable field, the specific innovation of the proposed project, and the overall impact on advancing the state of the art / technical baseline if the project is successful.



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#### 6.1.2.4 Workplan (This section should constitute approximately 40% of the Technical Volume.)

The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure, Milestones, Go / No-Go Decision Points, and Project Schedule. The Workplan should contain the following information:

- **Project Objectives:** The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes.
- **Technical Scope Summary:** The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete, approximately annual decision points (see below for more information on go/no-go decision points). The applicant should describe the specific expected end result of each performance period.
- **Work Breakdown Structure (WBS) and Task Description Summary:** The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard work breakdown structure (WBS) for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as “we will then complete a proprietary process” is unacceptable). It is the applicant’s responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this Call.
- **Go / No-Go Decision Points:** The applicant should provide a summary of project-wide go / no-go decision points at appropriate points in the Workplan. A go / no-go decision point is a risk management tool and a project management best practice to ensure that, for the current phase or period of performance, technical success is definitively achieved and potential for success in future phases or periods of performance is evaluated, prior to actually beginning the execution of future phases. Unless otherwise specified in the Call, the minimum requirement is that each project must have at least one project-wide go / no-go decision point for each budget period (12 to 18-month period) of the project. The Applicant should also provide the specific technical criteria to be used to make the go / no-go decision.



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- **Project Schedule (Gantt Chart or similar):** The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and go / no-go decision points.
- **Project Management:** The applicant should discuss the Team's proposed management plan, including the following:
  - The overall approach to and organization for managing the work;
  - The roles of each Project Team member;
  - Any critical handoffs / interdependencies among Project Team members;
  - The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices;
  - The approach to project risk management;
  - A description of how project changes will be handled;
  - If applicable, the approach to Quality Assurance / Control;
  - How communications will be maintained among Project Team members.

#### 6.1.2.5 **Technical Qualifications and Resources** (Approximately 20% of the Technical Volume)

The Technical Qualifications and Resources should contain the following information:

- Describe the Project Team's unique qualifications and expertise, including those of key subrecipients.
- Describe the Project Team's existing equipment and facilities that will facilitate the successful completion of the proposed project; include a justification of any new equipment or facilities requested as part of the project. This section should also include relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives.
- Describe the time commitment of the key Team members to support the project.
- Attach one-page resumes for key participating Team members as an appendix. Resumes do not count towards the page limit. Multi-page resumes are not allowed.
- Attach letters of commitment from all subrecipient / third party cost share providers as an appendix. Letters of commitment do not count towards the page limit.





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**6.1.2.6** Attach any letters of support from partners / end users as an appendix (1 page maximum per letter). Letters of support do not count towards the page limit. For multi-organizational or multi-investigator projects, describe succinctly:

- The roles and the work to be performed by each PI and Key Participant;
- Business agreements between the applicant and each PI and Key Participant;
- How the various efforts will be integrated and managed;
- Process for making decisions on scientific / technical direction;
- Publication arrangements;
- Intellectual Property issues; and
- Communication Plans
- Concept and Design Elements

### **6.1.3 Budget**

Applicants are required to complete a Budget. The budget must be for the project as a whole, including all work to be performed by the Applicant, Partners, and their Subrecipients and Contractors. Save the Budget in a single Microsoft Excel file using the following convention for the title "Number\_Organization\_3\_Budget".

### **6.1.4 Summary / Abstract for Public Release**

Applicants are required to submit a one-page summary/abstract of their project. The project summary / abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the project director / principal investigator(s), the project title, the objectives of the project, a description of the project, including methods to be employed, the potential impact of the project (i.e., benefits, outcomes), and major participants (for collaborative projects). This document must not include any proprietary or sensitive business information as the EEF and the University of Wuppertal may make it available to the public after selections are made. The project summary must not exceed 1 page when printed using standard DIN A4 paper with 1 cm margins (top, bottom, left, and right) with a typeface not smaller than 11 point. Save the Summary for Public Release in a single PDF file using the following convention for the title "Number\_Organization\_4\_Summary".



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#### 6.1.5 Summary Slide

Applicants are required to provide a single 16:9 ratio (Keynote, PowerPoint or other) slide summarizing the proposed project. The slide must be submitted in PDF format. This slide is used during the evaluation process. Save the Summary Slide in a single file using the following filename "Number\_Organization\_5\_Slide". The Summary Slide template requires the following information:

- A project Summary;
- A description of the project impact;
- Proposed project goals;
- Any key graphics (illustrations, charts and / or tables);
- The project's key idea / takeaway;
- Project title, Prime Recipient, Principal Investigator, and Key Participant information.

#### 6.1.6 Letters of Commitment

Applicant will need a letter of commitment from the leadership (Head, President, or Rector of universities) of all partner institutions that make up the applicant Team consortium (if applicable). Please save these as one page PDF named: "Number\_Organisation\_6\_Partner".



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## 7\_ evaluation criteria

The evaluation process consists of multiple phases that each includes an initial eligibility review and a thorough technical review. Rigorous technical reviews are conducted by reviewers that are experts in the subject matter of this Call for Teams. Ultimately, the EEF and the University of Wuppertal will consider the recommendations of the reviewers, along with other considerations such as program policy factors, in determining which applications to select.

### 7.1 **Criterion 1: Technical Innovation and Design (Weight: 25%)**

The proposal demonstrates that the institution(s) is taking an aggressive yet practical approach to the project, maximizing its chances of success by studying past competitions and committing to a design philosophy that demonstrates it has learned valuable lessons from them. The proposal also demonstrates innovations with a high likelihood of success, with potential benefit to professional home builders and energy efficiency and renewable energy industries.

### 7.2 **Criterion 2: Sponsorship Engagement and Team Support (Weight: 25%)**

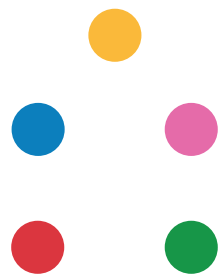
The proposal demonstrates a clear understanding of the costs associated with the project and the need for obtaining sufficient sponsorship or other funds to support all phases of the two-year project. Sponsorship engagement has been adequately planned. The level of available or obtainable equipment, instrumentation, and facilities is adequate. Industry involvement in the project is considered.

### 7.3 **Criterion 3: Organization and Project Planning (Weight: 20%)**

The proposal demonstrates that the Team understands all the activities involved in the project. The activities are planned and organized adequately to ensure successful completion.

### 7.4 **Criterion 4: Conceptual Intention (Weight: 15%)**

The proposal demonstrates an energy-efficient, solar-powered Demonstration Unit at the conceptual design stage. The conceptual design communicates ideas, character, and forms of an architectural design including aesthetics, building envelope, and solar components. The design offers a sense of aesthetic inspiration or delight. The design demonstrates a potential to benefit professional home builders.



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## 7.5 Criterion 5: Curriculum and Integration (Weight: 15%)

The proposal demonstrates that the institution(s) has an architecture and / or building science curriculum and that the Solar Decathlon project is well-integrated into the students' course work. The institution(s) entices top students to make long-term commitments to the project by offering scholarships, independent study credit, paid research assistantships or other paid or academic compensation.

## 7.6 Other Selection Factors

In addition to the above criteria, the Jury may consider the following factors in determining which Full Applications to select for the Competition:

- The level of industry involvement and demonstrated ability to commercialize energy or related technologies;
- Whether the proposed project is likely to lead to increased employment and manufacturing in Europe;
- Technical, market, organizational, and environmental risks associated with the project;
- Whether the proposed project will accelerate technological advances in areas that industry by itself is not likely to undertake due to technical and financial uncertainty;
- Geographic and / or Technological Diversity;
- Whether the proposed project will advance the objectives of the UN Sustainable Development Goals, as designated by the United Nations Development Program:
  - No Poverty
  - Zero Hunger
  - Good Health and Well-Being
  - Quality Education
  - Gender Equality
  - Clean Water & Sanitation
  - Affordable & Clean Energy
  - Decent Work & Economic Growth
  - Industry, Innovation & Infrastructure
  - Reduced Inequalities
  - Sustainable Cities & Communities
  - Responsible Consumption & Production
  - Climate Action
  - Life below Water
  - Life on Land
  - Peace, Justice & Strong Institutions
  - Partnerships for the Sustainable Development Goals



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## 8\_ notification of selected teams

### 8.1 Selection Notices

The SDE21 Organisation anticipates notifying applicants of its decisions by December 2019.

### 8.2 Rejected Submissions

Ineligible Full Applications will be rejected by the EEF and will not be reviewed or considered. The EEF will send a notification letter by email to the technical and administrative points of contact designated by the Applicant in their Application. The notification letter states the basis upon which the Full Application was rejected.

### 8.3 Full Application Notifications

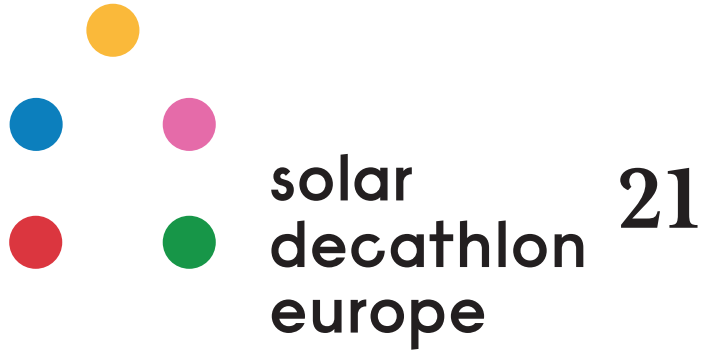
The EEF will notify Applicants of its determination via a notification letter by email to the technical and administrative points of contact designated by the Applicant. The notification letter may inform the Applicant that its Full Application was selected for the Competition, or not selected. Alternatively, the EEF may notify one or more Applicants that a final determination on particular Full Applications will be made at a later date, subject to the programmatic or other factors.

### 8.4 Successful Applicants

A notification letter selecting a Full Application for the Competition does not authorize the Applicant to commence performance of the project. If an application is selected for the Competition, it is not a commitment to issue an award. Applicants are not officially accepted into the Competition until negotiations with the University of Wuppertal are complete. Applicants must designate a primary and a backup point-of-contact in their Application with whom the University of Wuppertal will communicate to conduct negotiations. The Applicant must be responsive during negotiations (e.g., provide requested documentation) and meet the negotiation deadlines. If the Applicant fails to do so or negotiations are otherwise unsuccessful, the University of Wuppertal will cancel negotiations and rescind the Selection. The SDE21 Organisation reserves the right to terminate negotiations at any time for any reason.

### 8.5 Unsuccessful Applicants

The EEF shall promptly notify in writing each applicant whose application has not been selected for the Competition. If the application was not selected, the written notice shall explain why the application was not selected.



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#### 8.6 Terms and Conditions

Selectees must continue to comply with all terms and conditions of the SDE21 Rules, and receiving funds or other awards is contingent upon fulfilling all requirements contained therein.

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## 9\_ contact information

Energy Endeavour Foundation  
Godelindeweg 62  
1412HE Naarden  
The Netherlands

email questions to \_ [questions@solardecathlon.eu](mailto:questions@solardecathlon.eu)  
email applications to \_ [application@solardecathlon.eu](mailto:application@solardecathlon.eu)  
all other inquires \_ [info@solardecathlon.eu](mailto:info@solardecathlon.eu)

Bank Payments \_  
ABN AMRO Bank  
Coolsingel 93  
3012 AE Rotterdam, Netherlands  
IBAN: NL54ABNA0547070179  
BIC/SWIFT: ABNANL2A

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.*

UTOPIASTADT



Supported by:



Federal Ministry  
for Economic Affairs  
and Energy

on the basis of a decision  
by the German Bundestag