



solar  
decathlon  
europe

SZENTENDRE  
HUNGARY

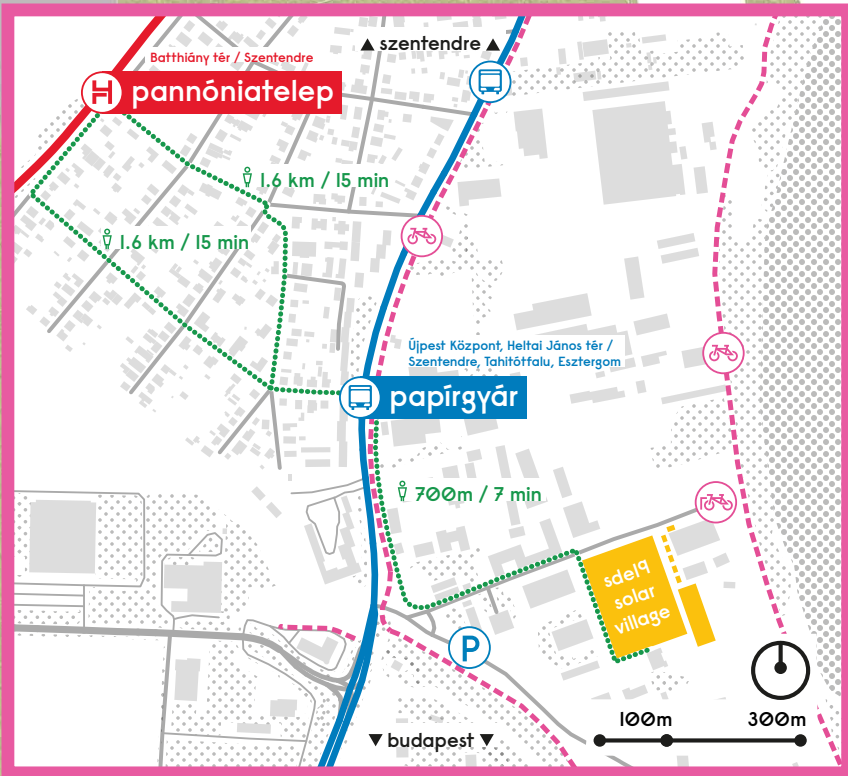
19

*The art of smart building.*

# visiting guide

The ultimate international university competition  
in innovative homebuilding





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11

solar  
decaathlon  
europe  
SZENTENDRE  
HUNGARY

19

The art of smart building.




bike stands 

car parking 


entrance 


registration 

event hall 

sd worldwide 

resting area 

restrooms 

food trucks 

first aid 

50m



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KMUUTT TEAM  
THAILAND

**2 hungarian nest+**  
SOMESHINE TEAM  
HUNGARY-ALGERIA

**3 koeb**  
KOEB TEAM  
HUNGARY

**4 over4**  
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BELGIUM

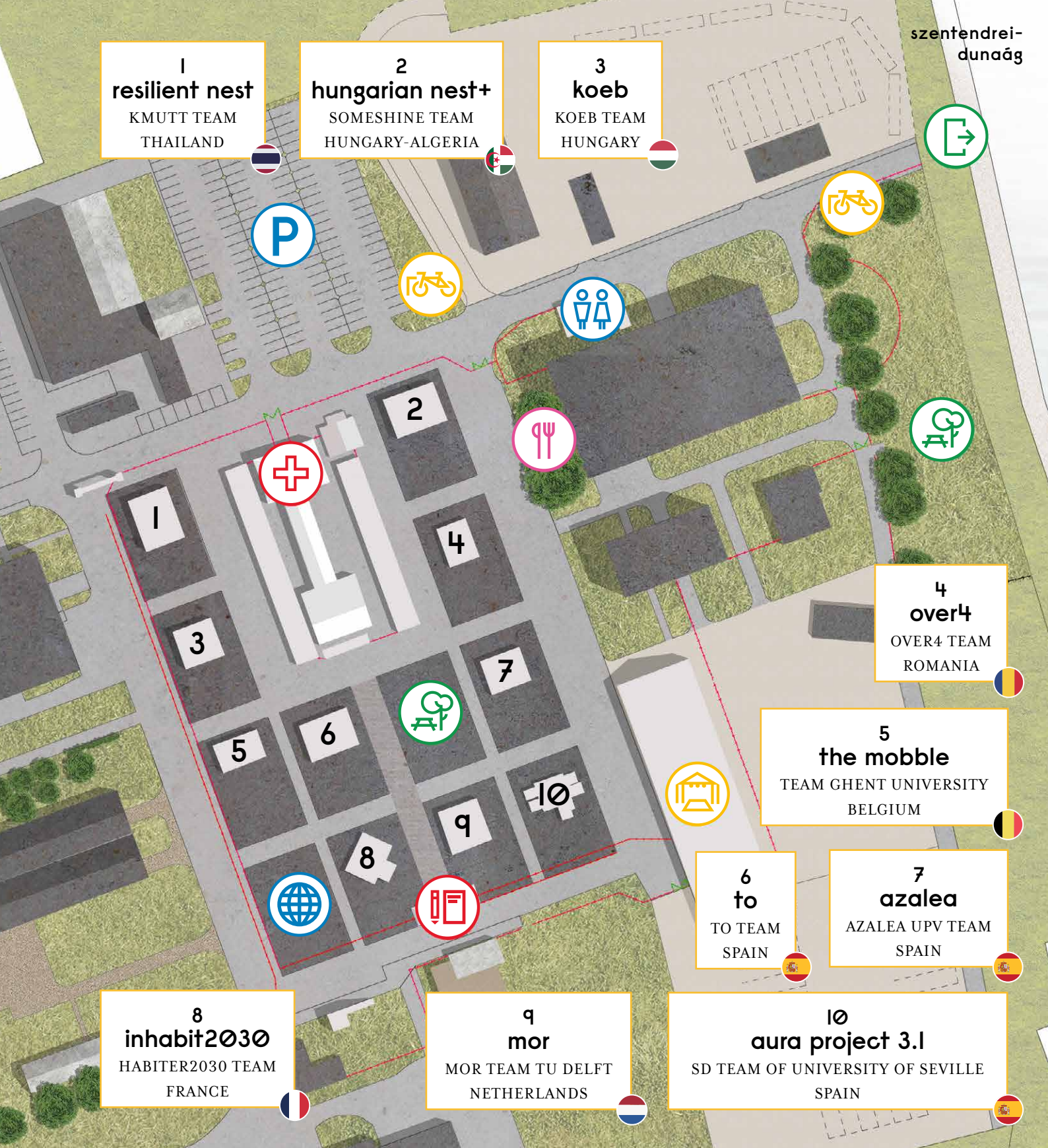
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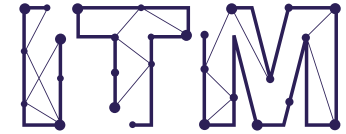
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# welcome



FELADATUNK A JÖVŐ



**Dr. László Palkovics**  
**Minister of Innovation and Technology**

The fundamental aim of the Hungarian Government's economic policy strategy is to implement actions that improve citizens' quality of life. Towards this goal a determining context is the built environment surrounding our every-day life. Its enhanced quality and sustainability is our common long-term interest.

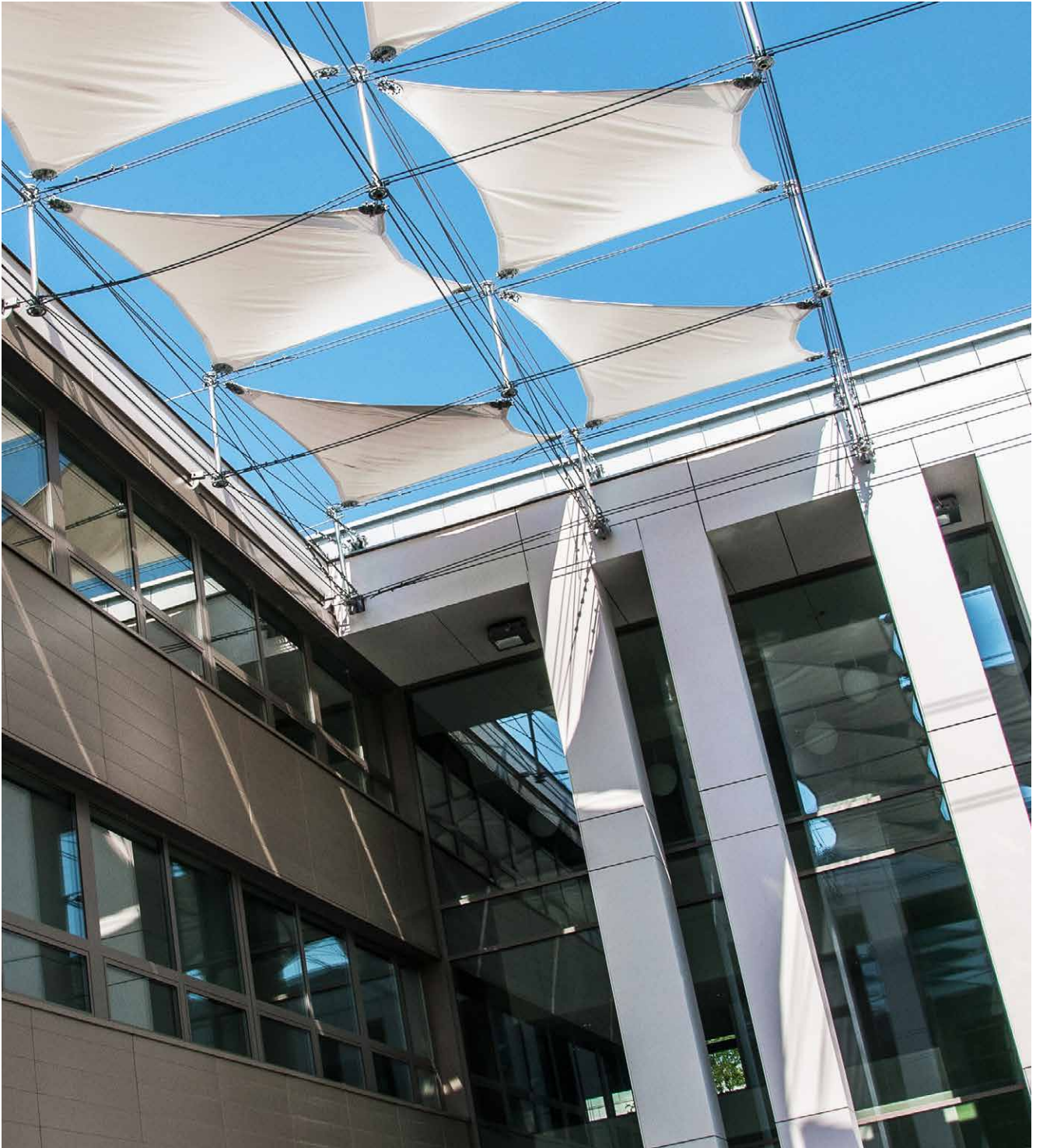
Dwellings, community spaces and ergonomic workplaces, which are liveable, aesthetically pleasing and energy-efficient with low-cost maintenance, help create quality and value. The Hungarian construction & creative industries, professional bodies and fresh young forces are vital in boosting and expanding creativity and talent. Furthermore, the built environment is a key factor for competitiveness: companies and workers follow the best living and working conditions in the global economy.

## **Local solutions indeed exist for global problems**

The Ministry of Innovation and Technology supports the Solar Decathlon Europe 2019 university competition in innovative homebuilding and the creation of a national smart home park with EUR 9.25 million. The visitor centre, resulting from the initiative, showcases the aims of our economic policy strategy. It proves that there are indeed solutions for global problems provided by industrial-academic cooperation. This edition of the Solar Decathlon Europe competition and its long-term programme highlights the innovative capacities and solutions of the construction industry not only to professionals but to Hungarian families as well. It helps spread innovative solutions in the construction industry and facilitates the sustainable development of the built environment.

The winners of the July Competition are those Teams, who merge architectural and engineering excellence with innovation, efficiency and smart solutions in the best ways. Furthermore, they take into consideration sustainability, their integration into their neighbouring environment and still have a market potential. Teams representing 27 universities on 3 continents have to be open to adapt and implement best practices just like any successful economy does. We, in Hungary, believe that learning from leading actors and countries is an innovation as well; the learning economy is an innovating economy. Such an international event provides an extraordinary opportunity for learning.

I wish the Decathletes of all 10 Teams not to only take away experiences and new relationships, but to find their own journey in the industry and/or in research & development, so that we can build our common future together.





**Louise Holloway**  
**Director, EEF**



Dear Decathletes, Dear Visitors,

We are thrilled to welcome you to the fourth edition of the Solar Decathlon Europe. After the first European SDE10 and SDE12 celebrations in Madrid, and the SDE14 in Versailles, France, it is a great step to see the expansion of the Solar Decathlon Europe toward Szentendre, Hungary. The renovation of our building stocks and our built heritage will be one of the challenges of the coming years as Europe moves toward a resource-responsible economy. The Competition entries brought to the Solar Village in Szentendre exemplify the spirit of the next generation of energy ambassadors and change agents championing this challenge. By combining technology with design, our Decathletes show us that resource responsible living does not mean compromising on comfort, quality, style or affordability. Over the next days, each Team will showcase their inspiring set of solutions to their juries and to the public at large.

The houses are an inspiration. Most importantly, the Decathletes are role models and leaders, for taking on the challenge to steward our built environment. They exemplifying three key values of the Solar Decathlon Europe: they truly are intrepid, ingenious and responsible.

## sde19 competition director



**Dr. Károly Matolcsy**

Dr. Matolcsy is an architect with extensive expertise in insulation, waterproofing and acoustics. He has been a leading engine at ÉMI for 30 years coordinating innovation and science for energy-efficient and renewable-oriented building construction. Currently Károly acts as Deputy Director of Development in charge of international R&D projects. He holds an honorary associate professorship at Budapest University of Technology and Economics and numerous international and domestic awards for his contributions in the field of sustainable construction. Besides other activities in international organisation, he is the vice-president of the European Network of Building Research Institutes.





**Csaba Gyutai**  
**CEO, ÉMI**



“ÉMI, as a key player in the Hungarian construction economy, must also be active in raising awareness. We aim to take on this challenge when organising the Solar Decathlon Europe 2019 competition.”



**Miklós Verseghi-Nagy**  
**Mayor, Municipality of Szentendre**



“Architecture is indeed art that influences the core of our daily life and well-being while simultaneously representing elements from historical times. The houses of the SDE19 represent the highest standards of the 21st century in an internationally acknowledged framework.”



**Prof. Dr. János Józsa**  
**Rector, Budapest University of Technology and Economics**



“The cooperation opportunities and experiences, as well as technical and scientific knowledge accumulated at the university, guarantees our projects’ success. This is why we are participating in the organisation of SDE19 and the creation of the National Smart Home Park.”

## sdel19 competition manager



**Csaba Szikra**

Mr. Csaba Szikra is a mechanical engineer with specialisation in fire protection, building energetics and service engineering. He leads two special engineering post-graduate courses on these subjects at the Budapest University of Technology and Economics. Csaba works on building simulations for smoke spreading and egress for large construction projects in Hungary; most recently on Biodom, the expansion of Zoo Budapest. He leads the Hungarian Expert Group for Fire and Egress Simulation. Csaba has prior SDE experience; he was the faculty advisor for mechanical engineering and energy-conscious design of the Odoo project, the first Hungarian SDE contestant in 2012.

# about sde 2019

## what is the solar decathlon?

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### **innovative ideas, cutting-edge tech, powerful university teams**

The Solar Decathlon is an award-winning international competition challenging ambitious university Teams to design, build and operate 1:1 dwellings that are powered by renewable energy. The Competition focuses on 10 separate contests, which show us how our living spaces can be simultaneously resource-responsible, cost-effective and attractive. The Solar Decathlon is a way to spread the word, educating citizens worldwide on how they can choose to live responsibly without sacrificing convenience, comfort, performance or pleasure. Teams work to assemble the buildings in record time, under demanding conditions! When the houses pass inspection, they are opened to the public, evaluated by a jury of renowned international experts, and truly celebrated in an open forum for learning-by-building.



## the solar decathlon worldwide phenomenon

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At the turn of this millennium, Richard King, a scientist at the United States Department of Energy, had a vision. He believed that the best way to encourage energy literacy was by empowering the change-agents of tomorrow. The Solar Decathlon Competition was initiated, encouraging multi-disciplinary university students to become our leaders in sustainable living. The first Solar Decathlon (SD) was launched in 2002, challenging university Teams to compete, through 10 separate contests, in the design, construction and operation of highly resource-efficient dwellings, powered by renewable energies.

The first edition of the Solar Decathlon took place on the U.S. nation's stage, the National Mall, in Washington D.C. The event welcomed over 200,000 visitors! By generating widespread media coverage to reach millions of people, the Solar Decathlon educated the broader public on the



benefits, affordability & availability of clean energy solutions. The next SD competitions in 2005, 2007 & 2009 were equally successful with important international participation. The SD 2011 saw record international participation with Teams from Belgium, Canada, China & New Zealand. The SD, a force, gaining worldwide momentum...

This momentum led to the first SD competition outside the U.S. The first Solar Decathlon Europe took place in the summer of 2010, in Madrid, Spain, broadening an international perspective of the Competition. In 2012, Teams from 11 countries, including Asia & South America, competed for the ultimate best scores in the 10 contests. The SDE14 in Versailles, France, welcomed 20 Teams from 16 nations and 4 continents, all participating in a naturally charged & exciting French hub, focusing on local urban issues and streamlined communications actions. The Speed Peer Review Bonanza kicked off the competition, which showcased some of the most ambitious houses yet in the SD story. Today, in Europe, the SDE is based on the original model, where Teams compete in the 10 contests, moving beyond the single dwelling home while considering the existing building stock in our cities and our urban & built environments.

In parallel, the SD has expanded and prospered in other parts of the world. China has hosted two editions of the Solar Decathlon competition (SDC), bringing together thousands of visitors and international participants. In 2015, the Solar Decathlon Latin America and Caribbean broke ground in Santiago de Cali, Colombia. Last year, we saw the first Solar Decathlon Middle East in Dubai, United Arab Emirates. In 2019, three Solar Decathlon competitions are taking place: Solar Decathlon Europe (SDE19, Szentendre, Hungary - right here!) in July; Africa (SDA, Ben Guérir, Morocco) in September,

and Latin America and the Caribbean (SDLAC19, Columbia) in December. The SDE19 emphasizes solutions aimed at the renovation of existing building stock and poses a number of new challenges to competing Teams, such as the application of local recycled materials, the high-level integration of solar photovoltaic and solar cell systems, solutions for summer overheating of buildings, bioclimatic planning and nature-based alternatives, as well as the use of high-performance composite materials. The event, held at ÉMI Szentendre Industrial Park, will run through the average fourteen days of Competition and lead to an extended exhibition of two months.

Supported by the Energy Endeavour Foundation and hosted by the city of Szentendre, ÉMI, and the Budapest University of Technology and Economics, the SDE19 celebrates the art of smart building:

We welcome you to this milestone edition of the Solar Decathlon Europe!



# innovative character of sde19

The Energy Endeavour Foundation's designation of Szentendre to host the SDE19 Competition was based on an application, submitted by ÉMI in partnership with the Municipality of Szentendre and Budapest University of Technology and Economics, which embraced some key conceptual innovations using a novel approach:

## The SDE19 competition is focused on the value-added renovation of existing buildings

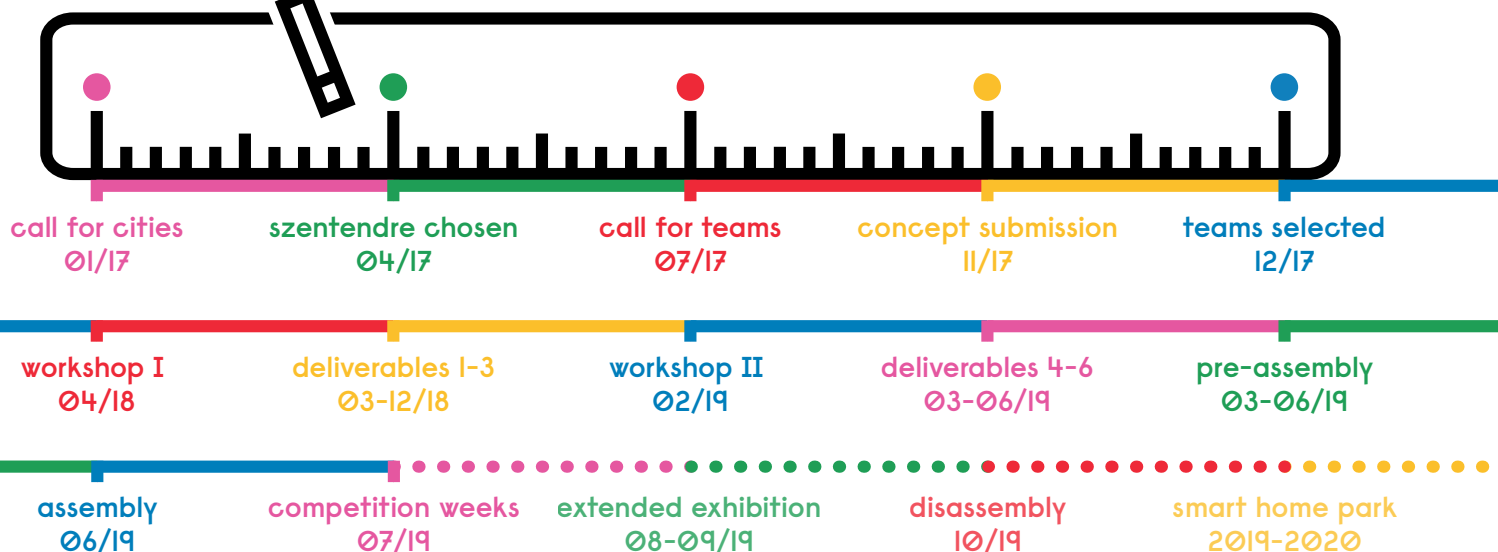
SDE19 is the first competition in Solar Decathlon history with specific emphasis on resource responsible, Net Zero Energy Balance (NZEB) focused renovations of existing buildings (e.g.: family houses, terraced houses, roof-top apartments). This contrasts with the construction of new, energy-efficient residential buildings showcased in former editions of Solar Decathlon. This positioning identifies

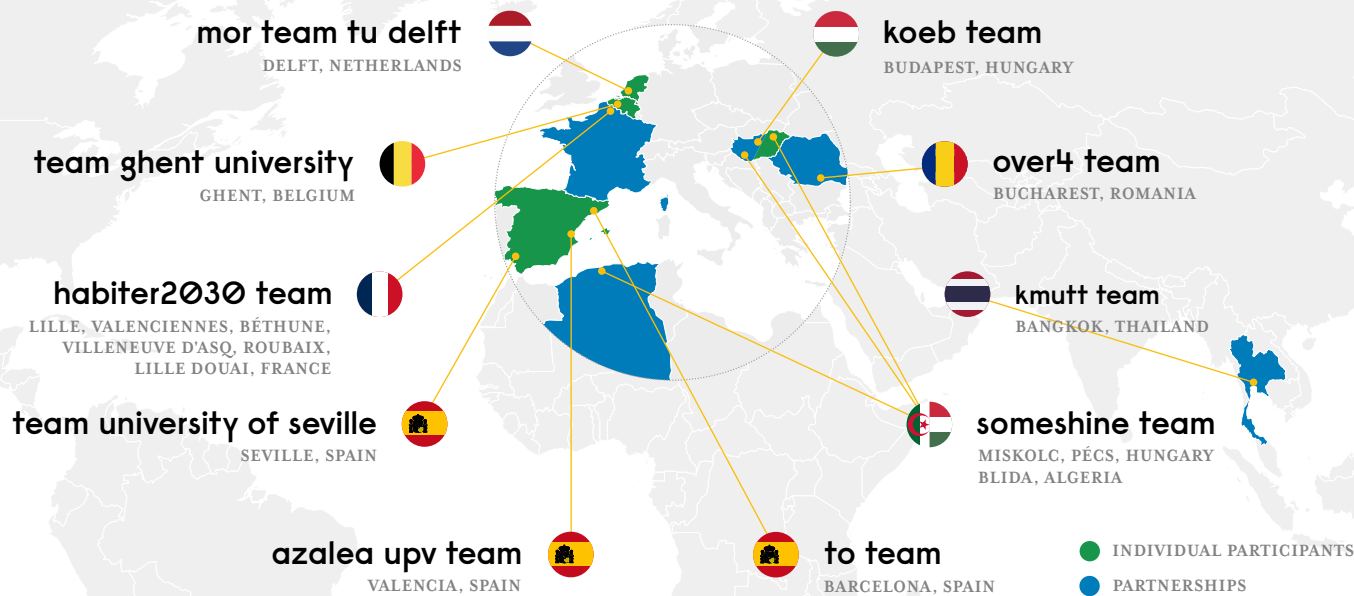
affordable and viable building renovation schemes combining modern, environmentally-friendly and innovative solutions. It is a fact that these are among the most actual pertinent challenges faced by the construction industry, triggered by social demand in Europe and beyond.

## Prototypes can be visited for longer than usual: a 2-month extended exhibition will take place after the 2-week competition

In other editions of Solar Decathlon Europe Competitions, the disassembly of the prototypes typically began immediately after the final awards ceremony, and carried out within a few days. The organisers of SDE19, have decided to shift this tradition in order to host an extended exhibition beyond the 2-week long public competition phase. The extended exhibition, which will last until the end of September,

## sde19 timeline





will allow the prototypes to be visited by a very broad and large audience. The organisers are inviting a wide audience of professionals and residents to share in Teams' messages and the solutions that their prototypes provide. Teams are indeed calling for a sustainable lifestyle with practical solutions. This contributes even more to the widespread dissemination of sustainable architectural solutions, resource-responsible and environment-conscious lifestyles that have been among the core Solar Decathlon principles since its first edition in 2002.

### **The competition serves as a basis for a long-term NZEB smart home park**

Since the first Solar Decathlon in 2002, SDE19 has been a unique edition embedded in a long-term local professional strategy of this kind; the recent Solar Decathlon China 2018 competition has also integrated this same long-term vision. With its competition site in Szentendre, competing Teams are given the opportunity to leave their smart homes standing on the site after the extended exhibition, instead of disassembling them. The remaining prototypes will be available for further visits. These first buildings of the National Smart Home Park will continuously operate as a living laboratory.

In coming years, this centre will expand with new model houses. This way, the SDE19 prototypes will contribute to extensive research, education and awareness raising activities for all local and Hungarian citizens, and international visitors.

# contest summary



## architecture

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reveals the symbiosis between state of the art architectural design, space use & technologies in a highly sustainable manner



## engineering & construction

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acts as an umbrella covering the design, implementation & functionality, as well as the quality of building structures & systems integrated into the overall architecture



## energy efficiency

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shows the methods behind highly efficient, energy-positive & high-functioning homes within their local contexts



## communication & social awareness

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focuses on the dissemination of innovation as it leads to energy literacy, resource-responsibility & behavioural change to the widest potential audiences & target groups



## neighbourhood integration & impact

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shows how dwellings can be based on global strategies & how these are integrated into specific local socio-spatial contexts by community-driven urban design proposals



## innovation & viability

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invites decathletes to demonstrate the proposals' originality, including the social, technical & economic innovations as well as their corresponding feasible market potential



## circularity & sustainability

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allows decathletes to prove their future-proof attitude, and how the projects' design, manufacturing and operation radically reduce the potential for negative environmental impacts



## comfort conditions

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calculates the interior living quality created by the chosen technical solutions regard to temperature, humidity, natural lighting, interior air quality & acoustic performance



## house functioning

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calculates the correct operation, performance & efficiency of the prototypes' electric home-appliances in their daily operation while reproducing the average energy use of a modern home



## energy balance

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closely relates to energy efficiency & calculates the houses' electrical energy performance including self-sufficiency, efficiency & overall consumption

week 1

12/7 friday

**9:00-12:00 Opening ceremony**

13/7 saturday

**11:00 Interactive Lecture for Children:**

Energy-saving lifestyle  
by MEKH Energy Embassadors

14/7 sunday

**Side-programme:**

HABITER2030 Team (FRA)

**18:00 Storytelling:**

Inhabit2030 (H2030) project

week 2

15/7 monday

**10:00 Speed Peer Review  
Bonanza Broadcasting**

**15:00 Roundtable discussion:**

Countryside in the city: Intelligent homes,  
self-sustaining villages with Tamás Perényi, BME;  
Tibor Köcse, Mayor of Nagypáli; Dr. Mariann  
Szabó, BME; Miklós Buzás, Szentendre Skanzen

16/7 tuesday 

**Side-programme:**

SOMEshine Team (HUN-DZA)

**17:00 Awards Ceremony:  
Communications & Social Awareness**

**18:00 Concert:**

The Carbonfools at Hungarian NEST+

programme



## 17/7 wednesday



### 13:00-19:00 Side-programme:

KMUTT Team (THA)

### 16:00 Case study:

Sustainable waste management  
by Gergely Mandula, VSZ Non-profit Ltd.

### 17:00 Awards Ceremony: Circularity & Sustainability

### 18:00 Storytelling:

Resilient Nest project

## 18/7 thursday



### Side-programme:

Over4 Team (ROU)

### 17:00 Awards Ceremony: Energy Efficiency

### 18:00 Storytelling:

Over4 project

## 19/7 friday



### Side-programme:

MOR Team TU Delft (NED)

### 13:00 Seminar:

Climate Action: What can We Do about It?

Curated by Andy van den Dobbelen, TU Delft

### 17:00 Awards Ceremony: Innovation & Viability

### 18:00 Storytelling:

MOR project

## 20/7 saturday

### Side-programme:

Team Ghent University (BEL)

### 11:00 Lecture:

More Sustainable Life, Minimalistic Home by  
Zsuzsanna Zóni and István Kun, kokusztalak.hu

## 21/7 sunday

### 11:00 Roundtable discussion:

Plastic and Sustainability: Is it possible/necessary  
to live plasticfree? with Bernadett Gyarmati,  
ZeroHero; Péter Merza, HUMUSZ Association;  
Dóra Drexler, Research Institute of  
Organic Agriculture

## 23/7 tuesday

**17:00 Awards Ceremony:**  
Neighbourhood Integration & Impact

## 24/7 wednesday

**Side-programme:**

TO Team (ESP)

**17:00 Awards Ceremony:**  
Engineering & Construction

**18:00 Storytelling:**

TO project

## 25/7 thursday

**Side-programme:**

Azalea UPV Team (ESP)

**18:00 Storytelling:**

Azalea project

## 26/7 friday

**Side-programme:**

SD Team of University of Seville (ESP)

**15:00 Lecture:**

Housekeeping with Reduced Waste

by Dóra Palotás, zoldmami.hu

**16:00 Lecture:**

Sustainable Forestry

by Péter Mészáros, Pilisi Parkerdő Zrt.

**18:00 Storytelling:**

Aura Project 3.1

## 27/7 saturday

**Side-programme:**

koeb Team (HUN)

**15:00 Lecture:**

The Hungarian Start-Up Scene and Sustainability

by Design Terminál

**18:00 Storytelling:**

koeb project

## 28/7 sunday

**10:00-12:00 Closing Ceremony**

(Private event)



the prototypes of the sdel9 solar village  
welcome visitors during the extended exhibition  
until 29 september



opening times:

13 july-27 july: mo-th 13-19h / fr 13-20h / sa 10-20h / su 10-18h

29 july-29 sept: mo closed / tu-fr 15-19 / sa-su 10-17

**BME - koeb Team / koeb / Budapest University of Technology and Economics / Hungary**

**EAL - Habiter2030 Team / Inhabit2030 (H2030) / National School of Architecture and Landscape of Lille /**

**Artois University (Bethune) / Catholic Institute of Lille (Villeneuve d'Ascq) /**

**Central School of Lille / Edhec Business School (Roubaix) / Ensiam National School of  
Computer, Automatic, Mechanical, Energy and Electronics Engineering (Valenciennes) /**

**Hei School of Engineering (Lille) / Mines Telecom Institute (Lille Douai) /**

**National School of Arts And Crafts, Lille Campus / School of Applied Arts and Textile (Roubaix) /**

**School of Political Sciences (Lille) / Superior School of Art and Design (Valenciennes) /**

**University of Lille (Lille) / Worker Association of the Compagnons du Devoir et du Tour de France**

**(Villeneuve d'Ascq) / France**

**GHU - Team Ghent University / The Mobble / University of Ghent / Belgium**

**KMU - KMUTT Team / Resilient Nest / Thonburi King Monkut's University of Technology /**

**Kasetsart University, Faculty of Forestry / Thailand**

**TUB - Over4 Team / Over4 / Technical University of Civil Engineering of Bucharest /**

**Ion Mincu University of Architecture and Urban Planning / Romania**

**TUD - MOR Team TU Delft / MOR / Delft University of Technology / Netherlands**

**UOM - SOMEshine Team / Hungarian Nest+ / University of Miskolc / University of Pécs /**

**Saad Dahlad University of Blida / Hungary-Algeria**

**UPC - TO Team / TO / Polytechnic University of Catalonia / Spain**

**UPV - Azalea UPV Team / Azalea / Polytechnic University of Valencia / Spain**

**USV - SD Team of University of Seville / Aura Project 3.1 / University of Seville / Spain**

**10 zero energy prototypes**

**27 universities**

**8 countries / 3 continents**

**11 languages**

kmu

bme

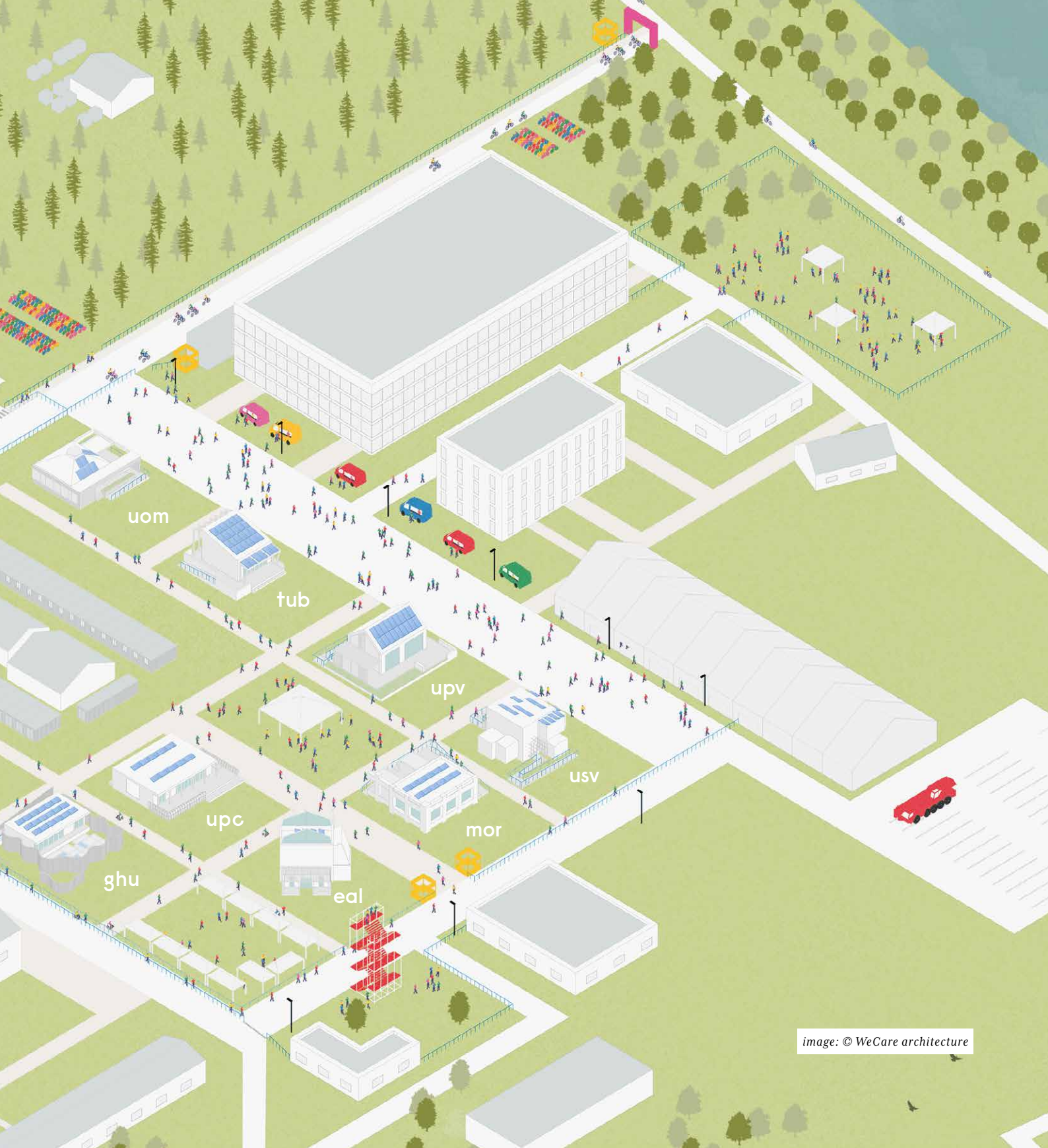
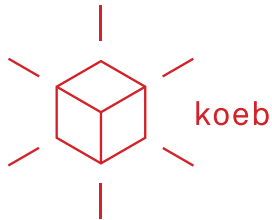


image: © WeCare architecture

# koeb



## team

koeb Team

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## university

Budapest University of Technology and Economics

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## slogan/tagline

Connect a koeb to your home!

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## project description

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How can we give new life to over 800,000 buildings in Hungary? Koeb has developed a new solution for the modernization and renovation of the Hungarian building stock, primarily in suburban areas and rural settlements. Energy efficiency, environmentally friendly construction and residential use also play an important role in the project. The koeb modules can be added to already existing houses, they are an effective solution to increase the lifespan of homes, reach lower energy consumption, and contribute to improving the comfort and conscious energy use of population. The build-in home refurbishment system consists of fully functional housing elements, such as Mechanical, Bathroom Module and the Sunspace. Prefabricated modules can be easily connected to existing one-storey residential buildings. For this reason, the tent-roofed cubic houses were given a prominent place in the project, also known as Kádár-cube in Hungary, of which over 800,000 are today. Koeb can respond to a real problem with technology and creativity. The prototypes can be viewed at this year's exhibition in the koeb house.

 koeb - bme solar decathlon team

 [www.koeb.hu](http://www.koeb.hu)

# key features

The koeb project examines modernization from the aspects of environment and society. From an environmental point of view, connecting a koeb mechanical module to an existing property results in an annual positive energy balance, optimal for real estate and residents, with the contribution of solar panels, a high share of green energy and battery power storage. The energy features are improved by additional passive and active solutions, such as a mass wall or an efficient heat pump system that meets the residents' temperature and water needs. The aim of the life cycle analysis of every built-in material and system is to monitor how the smallest possible ecological footprint can be reached. Koeb can be a system that contributes to several technological and sustainability benefits for creating forward-thinking areas.



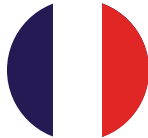
# applied innovative technologies

Some of the engineering solutions to mention: energy consumption and storage coordinated by building automation, supplemented with production forecasting, gabion wall with active ventilation in the interior of the module, solar system integrated in green roof, deciduous green facade for improvement of winter and summer energetics. The main objectives of the project are to improve the conditions of the Hungarian housing stock in economic, environmental and social terms. In addition to architectural innovations, the Team pays special attention to harmonizing the three pillars of sustainability with energy efficiency. The project focuses on building a sustainable energy community, whether it is a street or a network of settlements.

## sponsors:



# inhabit 2030 (h2030)



## project description

At the dawn of the new energy era, the region of the Team is facing new challenges. Typical of North-Western Europe, it is one of the most populated and economically vulnerable regions in France, with a dense urban fabric resulting from the industrial revolution and its decline. There are more than 700.000 of the so called 1930s houses in this region and despite their unique qualities their rehabilitation is essential. The Habiter2030 Team responds to the issues related to the renovation of these dwellings, encouraging a collective movement that inspires new opportunities for development, employment and education. The Team improves and transforms the typical 1930s house, but the real ingenuity of the Inhabit2030 (H2030) project is the integration of the social and urban environment. This implies a new model for sharing and mutualisation. The role of the inhabitant lies at the centre of the project and the Team members introduce unique and innovative approaches, combining ingenious products with frugal and straightforward solutions.

### team

Habiter2030 Team

### lead university

National School of Architecture and Landscape of Lille

### partnering universities

Artois University (Bethune), Catholic Institute of Lille (Villeneuve d'Ascq), Central School of Lille / Edhec Business School (Roubaix), Ensiam National School of Computer, Automatic, Mechanical, Energy and Electronics Engineering (Valenciennes), Hei School of Engineering (Lille), Mines Telecom Institute (Lille Douai), National, School of Arts And Crafts, Lille Campus, School of Applied Arts and Textile (Roubaix), School of Political Sciences (Lille), Superior School of Art and Design (Valenciennes), University of Lille (Lille), Worker Association of the Compagnons du Devoir et du Tour de France (Villeneuve d'Ascq)

### slogan/tagline

From 1930 to 2030 - the rehabilitation begins!



@habiter2030



<http://solar-h2030.eu/en/>



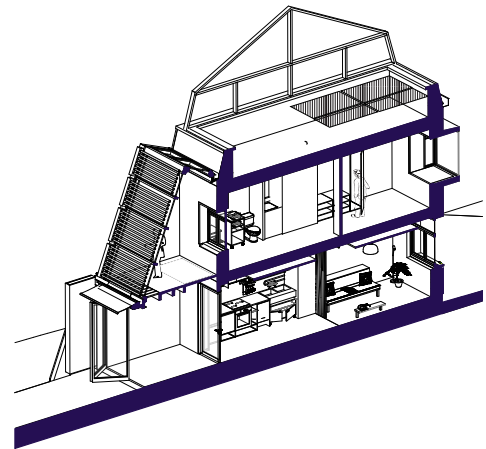
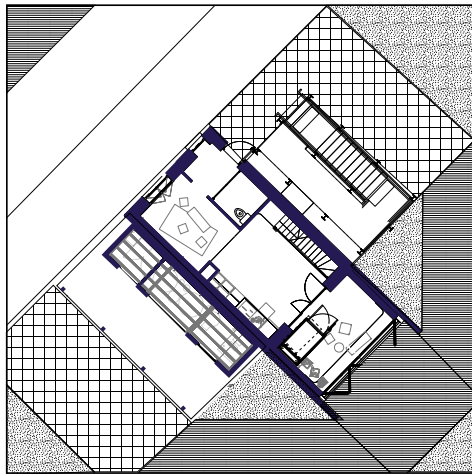
@hab2030



## key features

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The prototype of Habiter2030 Team is an analogous archetype representing the dimensional, architectural and thermal qualities of the typical 1930s house. The original envelope has been transformed with the introduction of a glasshouse extension, which not only provides additional floor area, but also contributes to the natural heating, ventilation and energy production. The Inhabit2030 (H2030) house reacts to season changes in response to the needs of its inhabitants. The Team is interested in innovative materials and solutions, but Habiter2030 goes far beyond architecture, engineering and construction. Human is placed at the core of the approach of the Team. At the scale of the neighbourhood and the community, they emphasize on sharing and exchange of energy production and services.



## applied innovative technologies

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The Team introduces unique and innovative approaches, combining ingenious products with frugal straightforward solutions, some of which are:

- \_ Photovoltaic roof mounted panels – allowing for the production of 2560 kWh/per year, about twice as much as electrical consumption of a typical 1930s house.
- \_ Thermal solar vacuum tubes installed on the glasshouse façade – heating water used for sanitary use.
- \_ The Glasshouse combined with mechanical ventilation – contributing to the passive heating, cooling and ventilation of the house.
- \_ All those distinctive building materials and technologies work in tandem with an intuitive home automation system adapted to the inhabitants needs and lifestyle.

### sponsors:

Bâtir ensemble  
l'avenir  
de nos cités



# the mobble

**THE MOBBLE**  
MODULAR BUILDING BLOCK



## team

Team Ghent University

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## university

Ghent University

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## slogan/tagline

The new cool is living in a Mobble!

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## project description

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More than 40% of the residential apartment buildings in North- and West-Europe date from the sixties and seventies and were the examples of progression in their time. Nowadays, these buildings are mostly outdated and in poor comfort conditions requiring a thorough renovation to meet the requirements again. In Belgium, contractors such as Etrimo shaped the skyline of many suburbs of big cities with their residential towers and were therefore chosen as the case study for the project. Since these buildings have a lack of thermal insulation, up-to-date technical installations and the required comfort, a renovation strategy was developed based on the main principles of the concept: modularity and circularity. At the same time, these principles were translated into the Modular Building Block, or the Mobble. A flexible module that can be used as a temporary housing unit during the renovation of these buildings but with which we also want to address some social and ecological challenges by proposing an exemplary solution.



@team ghent university - solar decathlon europe 2019

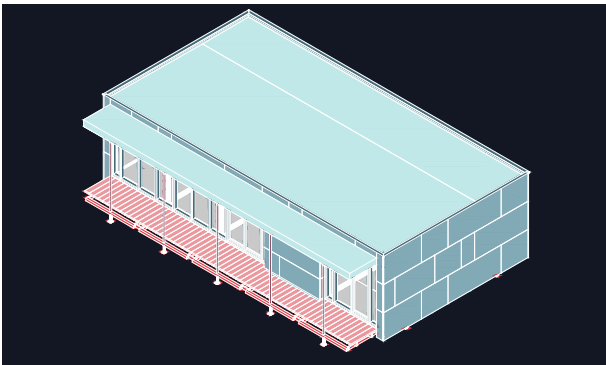


themobble.be

## key features

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- \_ The modular design allows to create custom-sized spaces for each function or inhabitant composition, resulting in a space saving concept with significant energy saving in the longer term.
- \_ Circularity is used as a mean to develop a fast and reversible construction method. This allows to remove building components at the end of the service life of the building and to reuse them in other applications for the remainder of their lifespan, resulting in a saving of raw materials and production energy.
- \_ The modularity, circularity and standardization of the used building components provide an easy, less error prone and rapid execution of the renovation. As a result, there is a greater support amongst the inhabitants to renovate.
- \_ Innovative technologies and installations can be incorporated in the building components to resolve the deficiencies by only replacing the building envelope during renovation.



## sponsors:



## applied innovative technologies

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- \_ Electricity: innovative solution to combine “non-smart” devices with smart operating control systems by integrating combined PV inverters and their inverter battery.
- \_ HVAC: a performant building envelope, passive strategies and a light weight construction are used in combination with an air to air heat pump to get a fast-responding system.
- \_ PVT panels: provide solar energy, heat domestic water or cool water at night, which is stored in a buffer tank to be used as a passive cooling installation during the day.
- \_ IoT technology: by GPS signals, but also through apps, your smartphone knows when you arrive at home. The control of the HVAC system can anticipate on this expected arrival.
- \_ Water: closing the water cycle by purification techniques and predictive energy saving control system for safe water without harmful organisms such as legionella.

# resilient nest



RESILIENT NEST



## team

KMUTT Team

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## lead university

King Mongkut's University of Technology Thonburi

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## partnering university

Kasetsart University

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## slogan/tagline

A smarter nest for urban living.

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## project description

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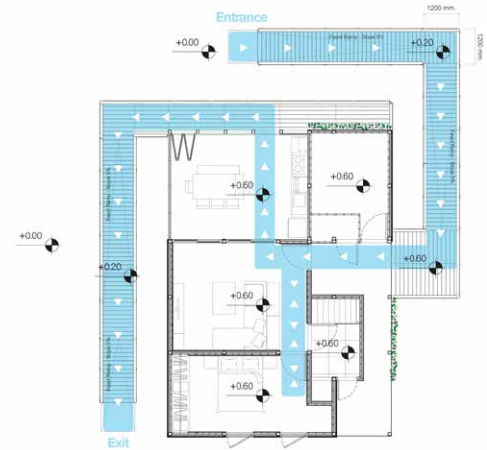
Resilient Nest is an innovative dwelling solution on the rooftop that uses nature as its conceptual model: how does a bird build its habitat? The aim is not only to effectively fabricate and adapt this model into urban context, but also to add values to our existing built environment. In this regard, Resilient Nest can provide a symbiotic relationship to the existing building where it rests by sharing the energy, food and water that is produced. The shophouses in Bangkok, one of the most common building typologies in the city since the past, serve as an example. Due to urbanization, many of them are being demolished to build more multi-story residences and some are left abandoned. Resilient Nest will help to rejuvenate these shophouses and make them livable again. In this way, shophouses lifecycles will be prolonged and conserved in the long historical tradition for future generations.



## key features

Resilient, in this project, represents the ability to adapt and prepare for future economic, environment and climate shocks. Resilient Nest's affordability divides its construction into four phases. Modules can be built slowly, starting from the roof in phase one on to phase three, based on budgets and economic planning. Also, the objective is to design a rooftop house that is adaptable through its odular system, an attractive feature for different contexts in other worldwide urban environments. The modules are flexible enough to swap and adaptable according to sun paths and climates.

Nest is the representation of the concept of a bird's nest. The main concept emphasizes lightweight, local material and mutual symbiotic relationships.



## applied innovative technologies

- \_ Resilient Nest uses Rubberwood, a light-weight and locally available material. Normally, it is used in manufacturing furniture, pallets and toys. Resilient Nest, on the other hand, enhances its properties through thermally treated (thermal wood) and glue-laminated technologies for building construction.
- \_ The energy monitoring system helps reducing energy usage by sending data to the adaptive smart controller, which analyses the data input and automatically adjust the power usage of each equipment accordingly.
- \_ The refrigerant from the compressor is used to heat the water in the preheated tank to reduce energy usage.

### sponsors:



# over 4



## team

Over4 Team

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## lead university

Technical University of Civil Engineering of Bucharest

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## partnering university

“Ion Mincu” University of Architecture  
and Urban Planning

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## slogan/tagline

#RenovationThroughTransformation  
#Build4Better #Together4Better

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## project description

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Over4 is both literally and figuratively, a multidisciplinary Team of young professionals, students and professors in the fields of architecture, design and civil engineering. The Team developed a renovation project of the 5 storey condominiums built during the communist era in most cities of Romania. Integrating eco-passive building principles and sustainable development, they propose a holistic renovation concept through which these blocks can reach NZEB standards, according to EUs development strategies for 2030. The Over4 prototype represents one module from the rooftop which is a solar eco-passive house that could be built as a self-standing house and as part of a passive rooftop. Their concept presents a set of good practices on how to design and build ‘smart’: energy efficient, comfortable, sustainable and financially accessible.



## key features

- \_ The Over4 prototype is designed and built as an eco-passive house, by following the 5 principles of Passive House standards: proper thermal insulation, passive glazing, reduced thermal bridges, very good air tightness and an adequate heat recovery ventilation unit. As a result, it is very efficient and comfortable.
- \_ Transformable interior spaces, our prototype can easily transform from a comfortable home into a co-working space, a fashion show, an art gallery, or a common meeting space for its inhabitants.
- \_ The northern and southern terraces attached to the module offer a common place for gathering people to socialize and relax, while being used both as storage space (North) and integrated Building Integrated Photovoltaic shading (South).



## sponsors:



## applied innovative technologies

Hybrid structure made of glulam frames with OSB panels with mineral wool as insulation is a simple but very efficient constructive system in terms of energy efficiency and modularity. The technical module incorporates the technical room, the kitchen, one bathroom and the windfang, a single modular piece of item which saves a lot of time for transportation and assembly. The heat recovery ventilation unit recovers not only the heat from the polluted air exhausted from the indoor space (odors, CO<sub>2</sub>, VOC, radon), but also recovers the humidity. Thus, the heat recovery system presents a higher efficiency and a lower energy consumption for the heating/cooling load. The efficiency of heat recovery is up to 84%, while the humidity recovery is up to 90%. The photovoltaic system (including the PV panels on the Southern terrace - BIPV) produces twice as much energy that the house consumes, the rest of it being injected into the network leading to financial benefits. As innovative materials we use Romanian sheep wool which is considered a total waste by the E.U. It is wrapped into a fabric capable of letting air vapor come into contact with the wool which is applied directly to the structure of the ladder rail, thus, the wool fulfills a double role – acoustic and air filtering inside the open-space design.

# mor



## team

MOR Team TU Delft

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## university

Delft University of Technology

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## slogan/tagline

Together we can do MOR!

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## project description

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In the Netherlands, 55% of Dutch offices will not pass the energy rating certification of label C that will come into effect in 2023. Moreover, the country is currently experiencing a housing crisis with over 1 million homes needed by 2030. As such, MOR is developing a renovation strategy to renovate underperforming office buildings into net-positive, multi-purpose buildings that are contributors to their environment and catalysts for activities and social interactions. The building is flexible to programmatic changes and adaptable to the inhabitants' needs over time by way of a modular design from the interior modules to the photovoltaic facade tiles on the exterior, as well as through the use of design for disassembly methods. By using prefabrication methods with an economy of scale, MOR is able to offer these housing units at affordable prices for starters (young professionals, age 25-35). Starting from here, MOR aims to create a future-proof built environment that gives more to its surroundings than what it takes away from it. As a case study for the project, the Team decided to refer to the Marconi towers in Rotterdam, a typical 1970s office typology located in an area currently being transformed into a new makers district.





# key features

- MOR's renovation proposal achieves a net-positive footprint:
- \_ Energy+: By producing more energy than the building needs, the surrounding buildings can use that energy, or it could be stored in batteries in case of power outages.
  - \_ Air+: An intelligent and efficient system filters the outside air and provides a comfortable and healthy indoor climate.
  - \_ Material+: By using 'design for disassembly' methods and environmentally-friendly materials (high recycle/up-cycle values), the building becomes a material bank: each material is comprehensively recorded in an open-source material passport.
  - \_ Water+: Rainwater collected on the roof is used for irrigation, treated grey-water is used in urban parks and farms, and black water is processed with organic waste to generate energy.
  - \_ Biomass+: Food, such as mushrooms, vegetables or herbs, is produced in the building through hydroponics systems found throughout the living floors and with a greenhouse on the roof.



# applied innovative technologies

The facade tiles are coloured solar panels designed for easy assembly/disassembly, serving a practical and aesthetic function. A Helophyte filter system treats waste water to be reused for toilet flushing and irrigation by using. The system first separates the waste from the water, then purifies it with bacteria working together with helophytes to eliminate the contaminants. The Green Wall is both an architectural feature and important to the climate strategy. The incoming air is filtered through the plants as it enters the home. Behind it, salt-based PCM help pre-heat the air in the winter and pre-cool it in the summer: minimising the reliance on the more taxing technical systems. A 5m-long PCM battery is used to intelligently increase the performance of the air heat pump.

## sponsors:

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# hungarian nest+



## team

SOMEshine Team

## lead university

University of Miskolc

## partnering universities

University of Pécs

University of Blida

## slogan/tagline

Everybody needs some shine.

## project description

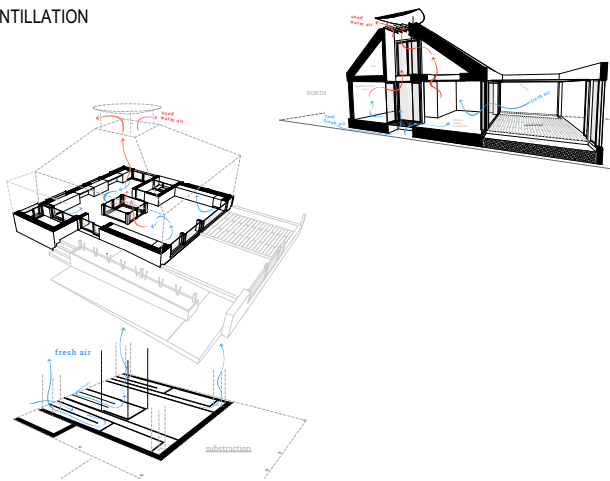
This year's contest addresses a very current social problem for the Hungarian contestants: 800.000 outdated, physically amortised "Cube Houses" are waiting to make them meet the challenges of the 21st century. Solar Decathlon Europe 2019 is an exciting opportunity to demonstrate a quality-oriented direction for the sustainable development of the inherited architectural environment, and define new architecture directions. For this experiment, the simple consistent ideas of vernacular Hungarian architecture, the self-confidence of environmentally conscious thinking and high-tech applications of energy design must be combined. In addition to the development of the prototype, the project puts particular emphasis on green environmental integration and social integration. The Team has worked on a variety of solutions and technological innovations for this unique blend that allows different versions of the Hungarian NEST+ to deliver a realistic solution for a sustainable, energy-conscious living, without ecological footprint.



## key features

- \_ The Venturi plate: it helps passive ventilation in summer, while in winter it makes internal sun exposure possible from the roof by the integrated mirrors.
- \_ Mobile living spaces: with free combination of the elements of the prototype, it can react on the differences in size and on the structure deficiencies of families in case of any kind of installation.
- \_ “Smart” furniture: incorporating “smart” furniture made of recycled materials, so that the building can provide new features for changing needs and different family structures.
- \_ Guide robot: an autonomous robot is placed in the house with capabilities for various tasks.

### VENTILLATION



## applied innovative technologies

- \_ Speech-based emotion detection.
- \_ Some of the furniture has been designed as part of the RETEXTIL movement, which means the products are made by cutting and knotting used clothes.
- \_ The live flora placed in the «Venturi Atrium» and the patio (day space) are the self-sustaining oxygen base of the house.
- \_ Mixing active and passive energy and mechanical systems for a sustainable energy balance.
- \_ Natural light flux control: the flow of natural light into the building is influenced by the rethinking of traditional passive devices compared to the seasons.

### sponsors:

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IT

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D2  
A tartalom

Twin Cable

Retextil

JÁNOSIK

to

TO



## team

TO Team

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## university

Polytechnic University of Catalonia

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## slogan/tagline

What to sustain?

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## project description

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TO is a physical and social space that allows the inhabitant to reflect on how their behavioural habits relate to sustainability. The team proposes a revision of daily activities, ways of living and of the inhabited spaces that are inherited from the past. They understand habitation, in all of its dimensions, as a key factor of individual dynamics, especially as these relate to those of society. With the aim of triggering an ecosystemic change, they propose a space dwelling that is structured around new logics of use and consumption, new day-to-day practices and new ways of interaction and living. TO project seeks that the user understands its functioning; it allows users the opportunity for good waste management, turning waste into resource, and to manage space comforts.



## key features

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- \_ First, to broaden the scope of the project so that it not only follows a sustainable housing model, but fosters a change towards an ecosystemic future.
- \_ Second, this change starts with small actions at home, with a critical attitude towards day-to-day habits.
- \_ Third, they acknowledge that we carry out these domestic actions everywhere in the city, which has, in turn, become our home.
- \_ Fourth, in consequence, the only agent determining our habits is ourselves. As such, that change starts with self-analysis.
- \_ And five, they understand their prototype as a material, an interactive and educational expression of this manifesto.



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**THERMOCHIP**

**AISLUX**  
CUBRIENDO EXPECTATIVAS



## applied innovative technologies

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- \_ Gadgets, to unlink activities from a space and link them to an environment.
- \_ Filters, providing the user with the tools to regulate their comfort.
- \_ Awareness of resources and waste.
- \_ Use of housing as an educational tool.

# azalea



AZALEA



## team

Azalea UPV Team

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## university

Polytechnic University of Valencia

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## slogan

#BePartOfTheChange

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## project description

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Azalea is a sustainable dwelling project. The goal is to preserve two of the most important elements of the Valencian Community: its orchard and its typical house, the Barraca. The proposal focuses on adapting this traditional dwelling to today's everyday life, basing each of the changes on a profound respect for the original building. The project is presented as a typology which works as a nexus between urban and natural living surroundings, respectfully weaving the city limits. The result is a house of nearly 70m<sup>2</sup> and 7m height where the organizational philosophy consists of one compact strip that encompasses all service areas (bathroom, kitchen, machines room and bedroom), leaving most of the space as a diaphanous and flexible area. Azalea is made entirely, from the design to the construction, by the Team. Azalea, more than a house, has become a home.



@azaleaupv



azaleaupv.com

## key features

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- \_ Tradition: Only by considering the roots can we look to the future. Azalea is based on the Barraca, the typical farmer's house, centuries old in the region, which has become one of the symbols of the city of Valencia.
- \_ Innovation: The prototype, besides including all the facilities of a contemporary house, incorporates new technologies and materials that make Azalea a cutting-edge dwelling which demonstrates that tradition and innovation can go together.
- \_ Self-sufficiency: Thanks to the energy production of the solar panels, the dwelling is completely energy-independent, capable even of generating more energy than necessary.
- \_ Modular design: Due to the nature of the competition, the joints have been conceived to keep an optimum mechanical performance and guarantee insulation continuity.
- \_ Energy efficiency: The cleanest energy is the one that is not produced. That is why the dwelling includes multiple passive strategies that create a minimal energy demand.



## sponsors:



UNIVERSITAT  
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DE VALÈNCIA



AELE



## applied innovative technologies

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- \_ Microencapsulated phase change material that can absorb or release heat and keep its temperature constant.
- \_ Motorised slats located in the south façade, automatically adjusting its openness allowing natural light to enter while avoiding beam radiation and overheating.
- \_ Innovative energy control system, able to sell or store electricity depending on the real consumption of the user. It also counts with a revolutionary system of hybrid panels, capable of producing electricity and hot water in a single panel.
- \_ Motorised windows, with East and West orientation, are automatically regulated depending on inside and outside temperatures, playing a key role in natural daytime and nocturnal ventilation as well as in suction chimney strategy, both for passive cooling purposes.
- \_ The dwelling includes a home automation control system which allows the user to control the lights and climate system. All this can be done thanks to an App.

# aura project 3.1



## team

SD Team of University of Seville

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## university

University of Seville

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## slogan/tagline

This is not a house.

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## project description

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This is not a house; this is a strategy based on urban, social and environmental regeneration. Through this proposal, Project Aura 3.1 exhibits its inquisitiveness for the interdisciplinary and for sustainability. The challenges that the prototype faces are technological in nature, including housing and environmental emergency in obsolete fabrics of the city. This is represented in a fragmented prototype, which represents an existent building through the steel central space, which is rounded by «gadgets». The «gadgets» are the pieces that add the missing parts of the dwellings, regardless of their nature. This is not a house, so the distribution of these pieces do not follow the logic of one; they could be situated in other places, depending on the buildings they join.

 @proyectoauraus

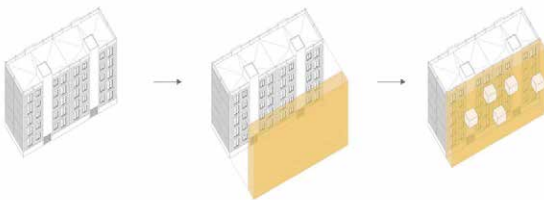
 <http://institucional.us.es/proyectoaura/>



## key features

- \_ Culture is the motor of any urban materialization, thus the approach does not only encompass the contextualization of the element as a physical product, but also the indispensable connection between it and the users, with a social history to accompany them.
- \_ This project follows the United Nations 17 Sustainable Development Goals, which justifies its exhibition as a process of investigative and social interest.
- \_ Legal building requirements in Hungary must be respected; these are considered and accomplished.
- \_ The elements, through which neighbourhoods regenerate, focus on the basic social, technical and productive needs of their homes. This is achieved through the multidisciplinary participation of highly qualified professionals.

URBAN PROPOSAL



COMPETITION DWELLING: GADGET HOUSE CONCEPT



## sponsors:



## applied innovative technologies

- \_ The monitored elements of the house are connected by wi-fi systems, which allow us to have a real-time compilation of data generated by the environmental conditions of the prototype.
- \_ The passive systems of the prototype are focused not only on their low environmental impact but also on the diminution of the exterior pollution produced by other agents, like our lime paint.
- \_ Technologies like BIM have been a part of the design project.



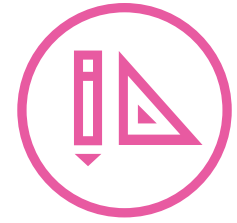
contests



# contest I

## architecture

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The Architecture contest, which represents a 10% value of the overall score, is a legacy flagship contest in the history of the Solar Decathlon Europe competition. The projects are evaluated based on their reports, technical drawings, and jury visits, with special attention to other contest materials.



## specialty

The contest aims to reveal the symbiosis between state of the art architectural design, space use, and technologies, in a highly sustainable manner.

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## challenge

The Teams have reflected over the future of housing and relevantly contributed to the cultural, spatial and socio-economic environment of their respective cities, regions and countries. The challenge? Designing, building and operating prototypes that correspond to the local, Hungarian building codes and construction requirements.

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## key contents

The buildings' architectural qualities are assessed by the clarity of the concepts and design intentions, as well as the organisation of space in relation to the technology sustaining it; all of this with an eye for simple, yet radical proposals. The prototypes are evaluated based on their innovative concepts in relation to their local contexts. Fundamental criteria include:

- \_ expandable and multifunctional space organisation;
- \_ comfortable and decorative lighting design;
- \_ coherent and sustainable material-use.

Teams must include a summary of their urban design strategies and address local housing organisation issues narrowing down from urban to living unit scale. They present their holistic understanding of a sustainable built environment considering their construction systems, energy consumption, solid waste production and water use, among others.

It is vital to integrate natural and electric lights in a comfortable and efficient manner. The selection of materials will be assessed based on their durability, maintenance and Life-Cycle-Analysis - reusable or recyclable - and incorporation of energy and CO<sub>2</sub> cycles. Teams describe the selected bioclimatic strategies (passive design strategies) by daylighting strategies, space planning and semi-passive conditioning systems (thermal energy storage, natural ventilation, shading, among others). Their exterior solutions have to improve the microclimate around the dwelling.

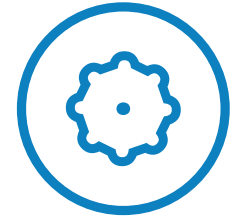
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## tours

Aside from the characteristic features of the building visible from long distances, expect enthusiastic tours given by the Decathletes describing the ideas that shape the future of housing and architecture.

# contest 2

## engineering & construction



The Engineering & Construction contest acts as an umbrella of the buildings' technical aspects. The emphasis of the projects' evaluation is based on the construction documents, technical drawings and accompanying reports, assembly videos and jury visits.



## specialty

The contest concerns the integration and coherent application of the houses' technical systems. Primarily, it comprises of the design, implementation, and functionality, as well as the safety of building structures, electrical, plumbing and photovoltaic systems; this includes their integration within the overall architecture.

---

## challenge

The assembly phase is vital and additionally challenging for this contest. While respecting the Site Operation Plan (timeline, logistic, zoning, waste management, etc.), the Teams have to prove their ability to adhere to their own planning and goals. They prepare a 2-minute summary of continuous webcam recordings to illustrate the constructions.

---

## key contents

Teams prove their engineering abilities by displaying the operation of functioning prototype systems as these relate to their original designs and expectations (calculations, reason of choices). This reflects the success of the construction phase. Key aspects are:

- \_ the house structure and the resulting acoustic performance;
- \_ the electrical system and its control with detailed energy balance monitoring;

- \_ plumbing, including water cycles with attention to saving, recycling and reuse of rainwater, greywater, with accessibility for maintenance and repair.

The solar systems have to be integrated into the architectural composition and prove to be economically viable. Teams document their production values in Szentendre relating it to international standard requirements from hourly to annual estimates. Teams can score higher if their Solar Thermal Systems can provide more than just domestic water heating, e.g. ventilation and air conditioning (HVAC).

The Teams' innovation qualities are highlighted within the structure, electrical and plumbing systems, and their integration on the facades. The sustainability measures target energy consumption, solid waste production, water use, and construction time in technical but also socio-economic aspects seeking proposals that catalyse a more efficient every-day life cycle.

---

## tours

It is not an easy task to coherently present the ideas and genius implementations of such complex systems! Yet, Teams translate their technical details into comprehensive and exciting stories for all audiences on the future of energy efficient building engineering.

*photos: © SDE14, Valeria Anzolin & Jason Flakes*

# contest 3

## energy efficiency



The Energy Efficiency contest reveals the methods behind highly efficient, energy-positive homes within their local contexts. The multidisciplinary jury will evaluate the projects based on the construction documents and descriptions, as well as the on-site evaluations.





## specialty

The contest provides insight to systems and house design excellence. It aims to present how the finalised buildings and the process that has led towards their realisation contributes to energy efficiency. The buildings reduce energy consumption while maintaining maximised functionality and efficiency of all house components.

---

## challenge

Teams must underline the climate adaptations they have carried out in the prototypes originally designed for specific local contexts. Teams must be very clear about design elements or systems that have been added to their houses. The Decathletes have continuously used energy analysis tools and techniques to iteratively “fine-tune” the housing unit design, in order to develop detailed system designs.

---

## key contents

Teams demonstrate how well the design of the house and its systems serve as catalysts for positive energy buildings, with a goal of optimising living conditions in their local context and climate. The envelope, materials, construction solutions; heating, ventilation and air-conditioning (HVAC) systems; lighting and hot water – all of these enhance efficiency, reduce consumption, and influence the inhabitants' awareness, habits and daily tasks. Teams report simulations that influenced the house design process, HVAC selections and final calculations. The adopted design criteria show where and why passive

(using only the sun's heat) or active (supported by technical features) systems have been chosen for energy conservation strategies.

The projects are evaluated based on the Team's energy design and analysis processes, as these are influenced by simulations. The structures' flexibility and possibilities for reuse, adaptability to future questions and energy-saving methods are also fundamental. The house performance measuring thermal simulations (ventilation, annual comfort temperature, humidity, internal gains) are compared using a common calculation. The jury places special attention on coupling housing and mobility, observing how energy production can support vehicles that could also perform as storage (20% of the contest points).

The innovation aspects include the active and passive technical contributions. These maximise the energy efficiency of the house and the methods that improve its hydrothermal, environmental, lighting and acoustic values, thus promoting liveability and ideal functioning. Both Innovation and Energy Efficiency contests are influenced by innovative concepts of building systems, equipment, functioning, and building-mobility coupling.

---

## tours

Teams do their best to show what efforts they have made to create maximised energy efficiency and productive homes. Monthly and yearly results are presented in both numeric and graphical forms.

*photos: © SDE14, Valeria Anzolin & Jason Flakes*

# contest 4

## communication & social awareness

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The Communication & Social Awareness contest concerns societal outreach and the dissemination of energy literacy. The expert jury will evaluate the Teams' communication plan, awareness actions, visual communications tools, live presentations and house tours. These will determine the Team's core message, the project's effectiveness, efficiency and creativity.



## specialty

The contest aims to tailor the project narrative to all potential audiences and target groups. The most relevant societal topics are resource-responsibility, innovation and energy efficiency, as these pertain to project's fundamental concept.

---

## challenge

Teams communicate how they have promoted the value of their project to the widest possible audience, from the most local to the most global. This includes all actions developed throughout the project's development up to the competition in Szentendre.

---

## key contents

Teams describe the activities carried out during the project development phase, including a timetable and budget as well as media appearances at home and internationally. Social media actions increase the project's visibility, while the project's specificity contributes to energy-literacy and behavioural change.

The Communication Plan defines the goals, key messages, the project's identity and corresponding values. A clear path toward specific target groups is considered key. A Sponsorship Manual with engaging offers for partners is also a key component. The communication tools are meant to be unique and memorable, as well as consistent and accessible for potential audiences including children, teenagers, professionals, industry stakeholders and the general public.

The Communication & Social Awareness contest seeks the finest qualities and applications of a strong project concept that drives underlying clear values. From the macro vision to the micro details in visual communications, from press releases, through multi-media campaigns to hands on visits with the public, the contest celebrates the Teams' determination to spread the word on energy transition, lifestyle balance and the use of natural resources.

---

## tours

Expect to be amazed by stories told in the most creative ways. Decathletes will share their original vision and mission, sharing knowledge on the architectural concept, special installations, specific design features, house technologies and surprising innovations. From the initial house entrance through the house tour, visitors are greeted with first-hand testimonials from students in this singular experience of learning-by-building. Teams pay special attention for inclusive tours, including guests with disabilities.

*photos: © SDE14, Valeria Anzolin & Jason Flakes*

# contest 5

## neighbourhood integration & impact

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The Neighbourhood Integration & Impact contest reveals how global strategies are the basis of house designs that are integrated into specific local socio-spatial contexts. The project manual narratives and on-site house tours in the SDE19 Solar Village form the basis of the multidisciplinary jury's deliberations.



## specialty

The contest showcases the projects' geographical locations and community-driven urban design proposals, in the context of the housing unit's neighbourhood, including the social and urban environment.

---

## challenge

The contest includes Key Performance Indicators (KPI) that the buildings exchange with each other to improve system efficiency in the case of both individual and collective houses. The indicators, considered in all the projects, can relate to global energy efficiency, weather adaptability, mobility, municipal services and user behaviour, amongst others.

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## key contents

The Decathletes prove the value of the renovations through socio-technical considerations, responsiveness and neighbourhood suitability, with particular attention to intergenerational interaction and community involvement. Some projects study collective housing buildings in dense urban areas, while some others promote the grouping of houses in less dense areas. Teams describe the flexibility of the structures and sizes; possibilities for reuse and adaptability to future technologies and to the local building industry.

The contest considers aspects such as community investments, housing and transportation correlation and how these apply to all generations and population classes. The proposals indicate how the projects' demanded

energy is produced. The jury will look at what social, environmental and economic opportunities the projects provide to their neighbourhood and urban environment. The evaluation strongly considers the contribution of the KPIs to the efficiency and approaches to the future of smart cities.

The innovation of the contest targets how holistic approaches provide ideas on smart building-networks and what key information they exchange. The projects emphasise how density and transportation solutions contribute to environmental, social and economic sustainability, while addressing the production of the houses and the economic viability of industrialisation.

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## tours

Teams will use innovative construction ideas and exhibiting opportunities to present their urban design and transportation strategies and demonstrate how collective housing or building-coupling contributes to smarter, energy efficient cities.

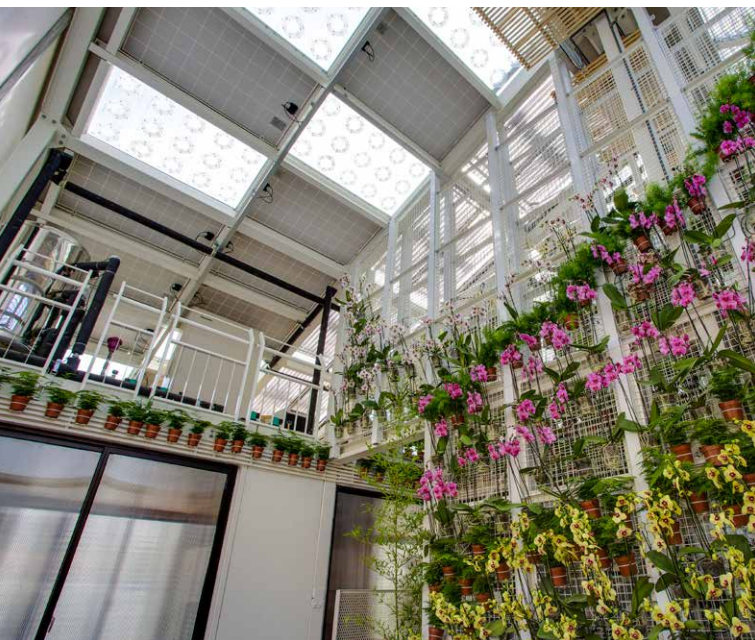
*photos: © SDE14, Valeria Anzolin & Jason Flakes*

# contest 6

## innovation & viability



The Innovation & Viability contest invites Decathletes to demonstrate the proposals' originality and inventive ideas as well as market potential. The evaluation is based on both project manuals and jury visits. The six other juried contests contribute with equal points while viability takes up 40% of the overall score.



## specialy

The contest evaluates to what extent the proposals are socially, technically & economically inventive and novel, while remaining feasible. Teams place emphasis on innovative elements or systems used for the design, development, construction and management of the house projects.

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## challenge

Decathletes must prove the affordable possibilities in the retro-fitting of spaces that often had completely different previous functions. They offer cutting edge technical solutions that benefit the widest possible user groups with sensible implementation methods.

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## key contents

The 'Architecture' segment of the contest addresses new spatial and functional concepts on all scales (urban, building, living unit) and new articulations in the formal use of materials, textures and the appropriation of light. 'Engineering' involves the design and construction of the prototypes' structure, systems (plumbing, electrical and photovoltaic) and acoustic performance. Innovation for 'Energy efficiency' is shown by the active and passive technological contributions that include perfectly functioning, liveable hydrothermal and illumination systems.

For larger scale innovative 'Impacts on the neighbourhood', holistic approaches demonstrate possible relationships among buildings and what key

information is exchanged between them. The goal is a smart and sustainable city management with enhanced building performance and communities. 'Sustainability' further involves the industrialisation of the buildings and their adaptability for multi-family settings that can attract these housing typologies, thus favouring their commercialization. Novel 'Communications' initiatives disseminate bold messages for the responsible use of energy, natural resources, and sustainable construction for a wide audience.

Affordability and viability address not only economical, but technical, ecological and social aspects from a universal point of view. Teams define their plans' economic impact, cost-effective strategies and decision making processes taking into consideration energy-saving and retrofitting (investments and payback, maintenance costs, economic impact of mobility). New ways of business planning and the promotion of the selected typologies, e.g. solutions for affordability, finances for renting and social housing, are crucial to reach the potential buyers.

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## tours

The innovations are usually hidden within the structures and beautiful backgrounds of the Teams, yet, the flagship projects are integrated to the stories. Nevertheless, you are always welcome to further inquire about details, such as coupling of technologies, use of space or community-shaping ideas.

*photos: © SDE14, Valeria Anzolin & Jason Flakes*

# contest 7

## circularity & sustainability

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The Circularity & Sustainability contest allows Decathletes to prove their future-proof attitude and present their sensibilities regarding the environment. The multidisciplinary jury evaluates the project drawings, the Circularity and Sustainability Report, as well as the assembly and functioning of the prototype.





## specialty

The contest indicates how the projects' design and planning radically reduce the potential for negative environmental impacts. This includes the manufacturing of house components, the construction, the prototypes' operation and their legacy and potential after-life.

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## challenge

Teams have tuned their prototypes' technical details to its on-site functionality. At the same time, the building evaluations include comparisons to similar dwellings and annual calculations in their local context.

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## key contents

The contest reveals how Decathletes understand 'the sustainable built environment'. Design strategies respond to how density solutions on both urban and dwelling scales contribute to environmental, economic and social sustainability, e.g. reduction of the urban heat island effect and affordable housing. They show how public, low impact transportation strategies in relation to housing can enhance local as well as global energy efficiency.

Teams shall describe the production and flexibility of the structure and any possibilities for reuse or adaptation to future technologies, while articulating approaches to efficient maintenance. The viability of industrialisation is determined by energy consumption, solid waste, water use, construction time, social and economic aspects. The functioning of bioclimatic passive and hybrid design

strategies (glazing, daylight use, heating and cooling) is vital. Success in the selection of systems (HVAC, domestic hot water, artificial lighting) and appliances, with consideration for their contribution to energy efficiency, is evaluated. Active strategies and systems improve hydrothermal and artificial lighting efficiency as well as acoustic performance and air quality. They minimise the associated energy consumption.

Circularity addresses the system-wide redefinition of products, services and strategies to reduce consumption, and design waste cycles with minimised negative impacts. Teams specify solid waste management during construction, operation and disassembly. The Life Cycle Assessment (LCA) evaluates how green the chosen materials are (renewable, recyclable, reusable), and how these relate to embodied energy, CO2 and pollution emission, durability and necessity of maintenance. For instance, circularity involves the operation time that PVs need to recover their production's environmental costs. Evaluations are made of water management cycles: saving, re-collection, conservation, treatment and reuse. The jury for circularity assesses approaches that build economic, natural and social capital, underpinned by a transition to renewable energy sources.

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## tours

Decathletes ensure that visitors gain strong insights into what could lead a house to win the World's Most Sustainable House title! What is more, you can expect to see some extraordinary features representing social aspects, such as green walls, urban farms, interior-expanding glasshouses, and more.

*photos: © SDE14, Valeria Anzolin & Jason Flakes*

# contest 8

## comfort conditions

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The Comfort Conditions contest is a monitoring challenge that concerns the interior living quality created by the Decathletes' chosen technical solutions. The data is solely connected in the prototypes of the SDE19 Solar Village during the Competition weeks.



## specialty

In this contest Teams prove that their dwellings' state of the art technology can indeed provide a highly comfortable milieu for the inhabitants. As comfort has no single metric, there are five sub-contests, which represent the multiple variables involved: (1) temperature, (2) humidity, (3) natural lighting, (4) interior air quality (CO<sub>2</sub>) and (5) acoustic performance.

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## challenge

The Teams' engineering specialists face a rather heavy period during the Competition weeks as they must ensure that the prototypes' appliances and systems operate as they have been designed. There are two days when the houses use only 'passive' cooling or heating.

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## key contents

All relevant data is continuously measured by the on-site automatic monitoring systems. Some conditions are monitored in the bedrooms, i.e. temperature, relative humidity and CO<sub>2</sub>. Natural light and the acoustic performance (how fast sound fades away, the noise level of the HVAC) are primarily measured in the living room, with consideration for insulation from outside noise. To evaluate the impact on the neighbourhood, Teams have to anticipate the exchange of human sounds and artificial noise between collective housing units in all directions.

Most of the points are earned at the conclusion of each scoring period. Teams can lose points linearly for falling off optimal measurement levels. In terms of air

temperature, the maximum score is given for keeping the spaces between 23-25°C. Optimal interior humidity lies between 40-55%. CO<sub>2</sub> level has to stay below 800 ppm (parts per million) to receive the maximum points.

The houses maximise interior natural light for a comfortable setting without the use of any artificial support (Daylight Factor above 4%). In terms of the acoustic performance, the façade airborne sound insulation value has to be equal or higher than 42 dB for maximum score. The reverberation time that living room installations require to absorb sound has to be up to 0.8 second. The sound level produced by all HVAC and active equipment are measured in the most appliance-demanding circumstances and has to stay below 25 dB(A) for maximum score (points given only below 35 dB(A)).

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## tours

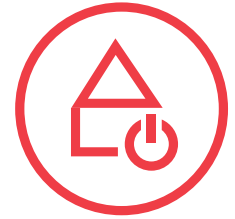
This is a highly accessible presentation for visitors upon entering as they instantly feel the achievements of the prototypes in their comfort levels. Discover the houses and observe solutions that facilitate extraordinary living conditions and do not hesitate to pose questions to the guides and Team members!

*photos: © SDE14, Valeria Anzolin & Jason Flakes*

# contest 9

## house functioning

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The House Functioning contest is a monitoring challenge that concerns the appropriate operation of the prototypes' electric home-appliances. The data is solely connected in the prototypes of the SDE19 Solar Village during the Competition weeks.



## specialty

The contest evaluates the operation, performance and efficiency of the electric appliances in their daily operation while reproducing the average energy use of a modern home. Decathletes aim to maximise the performance of their house while complying with the demanding standards of present-day society.

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## challenge

Although the SDE19 Organisers encourage Teams to consider innovative solutions seeking the maximised performance of all appliances, the evaluation addresses only quantitative results. While it may sound easy to operate a smart home, any slight temporary error in the highly controlled, yet complex systems, can threaten the completion of the tasks and result in lower ranking in the overall Competition.

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## key contents

Points can be earned during multiple scoring periods. To rank the Teams, reduced point values per challenge are scaled linearly based on performance. For refrigeration and freezing, a continuous performance score is given. Water Balance is also evaluated by performance. For clothes washing and drying, dishwashing, oven, hot water draws, cooking and automation, the evaluation criterion is the completion of the task. The Dinner Party receives points from fellow guests.

The refrigerator has to be used for storage of all food and beverages of the dinner contest. Its interior temperature has to be kept between 1°C and 4.5°C time-averaged.

The washing machine has to operate automatically and provide an uninterrupted wash and rinse cycle within a specified time period where its internal temperature reaches 40°C at some point. All available points are earned if the total weight of the washed towels is equal or less than before operation. The choice of drying method is optional as it can be either active (e.g. machine) or passive (e.g. on a clothesline), or even a combination. The dishwasher's internal temperature must reach 49°C at least once during its cycle while the oven's temperature must reach 220°C during specified scored periods.

In terms of hot water, 50 litres have to be produced maximum 3 times per day, in 10 minutes per cycle, with a minimum average temperature of 43°C.

In the kitchen, 2.3 litres of water has to be evaporated within a specified time period. Furthermore, Teams with lower water consumption will score higher at the end of the Competition weeks. The operation of entertainment electronics help to earn all the available points.

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## tours

An important aspect of the exhibition is to show fully functioning homes. Teams will be happy to delve into details on how their house is ready to cater for every day life in an energy-efficient way.

*photos: © SDE14, Valeria Anzolin & Jason Flakes*

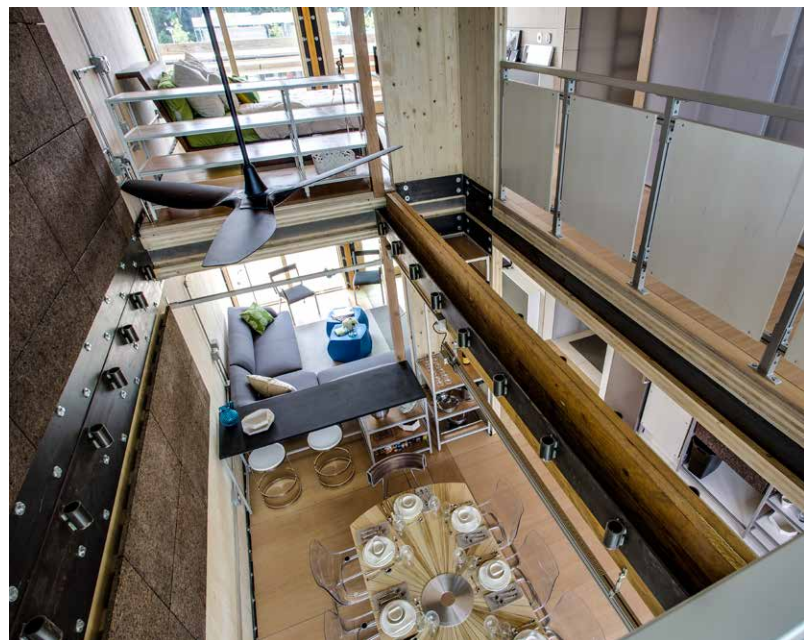
# contest 10

## energy balance

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The Energy Balance contest is a monitoring challenge that closely relates to the Energy Efficiency contest as it measures the different electrical energy flows. Automatic systems perform continuous quantitative assessments on the prototypes' performance in the SDE19 Solar Village during the Competition weeks.



## specialty?

In view of the Competition's crucial objective to promote energy-efficient building, the Energy Balance contest possesses a special role calculating the houses' electrical energy performance: this involves self-sufficiency, efficiency and overall consumption. There are 5 sub-contests to address this: (1) load consumption per surface area; (2) positive electrical balance; (3) temporary generation- consumption correlation; (4) house adjustment to network load state and (5) power peaks.

---

## challenge

Teams dance on thin ice by simultaneously maintaining optimal comfort and energy balance in their homes! They must perform considering the network load management and the limitations of power peaks. However, neglecting comfort conditions by decreasing active systems in order to reduce energy consumption, risks disqualification. Passive strategies are always encouraged.

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## key contents

The 'Load Consumption' sub-contest aims to evaluate the electrical energy efficiency of the houses while fulfilling comfort and functioning demands. Since consumption, e.g. heating, cooling and ventilation, depends on the surface of the house, the overall measurements are related to it as well as are compared to the average measurable area of all the prototypes.

photos: © SDE14, Valeria Anzolin & Jason Flakes

For a house to have a 'Positive Annual Electrical Energy Balance', the photovoltaic electricity generated through a whole year has to be higher than the electric loads' consumption. The balance is calculated on site ('Temporary Generation-Consumption Correlation') and simultaneously calculated towards a yearly consumption estimate. It shows the maximised effect of distributed solar generation, when electricity is produced and consumed in the same place and the same time. Energy stored in the batteries can only be harvested from the PVs.

'House Adjustment to Network Load State' aims to reduce peak load on the network. Teams prove their energy consumption management ability by showing how they seek the power grid at certain times of the day with respect to its general state of stress. The contest's network load maximum is set from 8:00 PM to 10:00 PM. Points are gained if energy is sent to the network at this period.

Lastly, energy load management aims to avoid 'power peak loads' on the electrical grid, i.e. having too many consumers. The amount of energy consumed and delivered to the SDE19 Solar Village grid by each Team will be monitored on a regular cycle of 60 seconds.

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## tours

This is likely the most technical contest. However, if you are hungry for technology and distributed energy generation, the house engineers will be happy to brief you into their prototypes electronic details.

Valencia 1100 km  
Thon Pri 8268 km

Delft 1158 km

MISKOLC 138 km

GENT 1174 km

Budapest 16 km

Quilua Yaich 1823 km

bangkok 8242 km

Lille 1209 km

BUKAREST 650 km

Pecs 180 km



partners



## the story

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Three Solar Decathlon Europe editions were not enough. After the groundbreaking SDE10 & SDE12 editions in Madrid, and the wonderful SDE14 in Versailles, former SDE Organisers and participants designated a secretariat to explore avenues for SDE continuity. After many efforts to secure long-term support from various European and international agencies, the SDE secretariat proposed a new organisational model to the U.S. Department of Energy, which was enthusiastically endorsed. Their meeting at the UN Habitat III conference in 2016 in Quito, Ecuador, was indeed a pivotal moment. The Energy Endeavour Foundation was established after this robust collective campaign to bring the Solar Decathlon back to Europe.

Based in the Netherlands, the EEF is a non-profit entity, buttressed by the EEF Board of Directors. It draws upon the input of the Solar Decathlon Europe Council of Experts, including former SDE Organisers, supporters and participants. In keeping with its charter, the EEF issued a first Call for Cities; based on the recommendations of an international jury of experts, the EEF designated Szentendre, Hungary as the host City for the SDE 2019. A Call for Teams was issued in 2017 and the designated Teams have brought their ambitious designs to Szentendre. In 2018, the EEF issued the SDE21 Call for Cities and Wuppertal, Germany was designated by the EEF to host the upcoming SDE21. The SDE21 Call for Teams is ongoing.

In its quest for collaborative contributions to resource responsibility, the Energy Endeavour Foundation is dedicated to the vibrant and ever-growing initiatives that link academia, research, industry and workforce. Recent winner of the European Solar Prize, the EEF seeks to empower today's consumers and citizens to be active responders to energy use, equitable living, and climate change. It celebrates today's generation of conscientious doers and makers, tomorrow's creative leaders, and their inspiring actions leading to impactful innovation. The EEF champions all energy literacy advocates, valuing human capital & entrepreneurship in our built environment; it is bolstered in its continued transfer of knowledge, stewardship, and special care of the Solar Decathlon Europe competition and corresponding brand values.

The EEF Director Louise Holloway wishes to thank the SDE19 Organisers for this SDE19 Solar Village, a place of safety, innovation and inspiration to all who visit. The whole EEF team extends a special thanks to the Decathletes, all of whom have put their wholehearted energies into this SDE19 in Szentendre. They prove that with grit, gumption and bold action, they are leading the way through the singular experience of learning-by-building. Congratulations!



# émi



**Csaba Gyutai**  
**CEO, ÉMI**

High quality and sustainable built environment is our shared interest, in fact, responsibility. Besides assuring quality, sustainability and sector-efficiency, ÉMI, as a key player in the Hungarian construction economy, must be active in raising awareness as well. We aim to take on this challenge when organising the Solar Decathlon Europe 2019 competition.

The event primarily aims to promote the use of renewable – in particular solar – energy and innovative architectural solutions, as well as raise societal and market support for green technologies. Decathletes develop in their professional trajectories by both their own and the contestants' projects. They get to know innovative solutions, which they can harvest in their own local environment or on international platforms.

Additionally, the Solar Decathlon brings along various other positive impacts on professional and societal levels: the spreading of environmentally conscious views, country branding, international relations, employment growth, community building, academia-industry-research atelier partnerships; just to name a few. I believe that this event and the National Smart Home Park will reward all participants with results and successes that provide strong foundations for the future.

ÉMI is pleased to initiate or join similar innovation-based and value-generating projects for the sustainable future.



## about

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ÉMI's predecessor was established in 1963. Today, more than half a century later, ÉMI is Hungary's largest quality control and innovation institute for building and construction material industry. It is a key player and intellectual centre for domestic construction affairs. ÉMI's activities cover the whole country while it verifies its knowledge and expertise, acquired after more than five decades, on both domestic and international levels. ÉMI's present operation is still inspired by the founding goals; nevertheless, it follows today's demands and challenges. It does not only follow the expanding domestic building construction but it aims for well-prepared and forward-thinking operation.

### ÉMI's versatile activities today:

- \_ Engineering services (expertise, laboratory analysis);
- \_ Quality control;
- \_ Complex building-diagnostics;
- \_ Compliance analysis;
- \_ Technical regulations;
- \_ Policy creation;
- \_ Research & Development & Innovation;
- \_ Expertise in nuclear facilities;
- \_ Activities related to large public developments;
- \_ Support in construction supervision;
- \_ Domestic and international projects;
- \_ Organisation of professional events
- \_ Education and training
- \_ Public advertisements



# szentendre



**Miklós Verseghi-Nagy**  
**Mayor, Municipality of Szentendre**

As mayor of Szentendre, I believe that the name, cultural heritage and traditions of the city are constructing forces and potentials that generate a foundation for creation in both direct and indirect ways.

The Solar Decathlon Europe international university competition in innovative home-building is a unique opportunity not only for the city but for the whole country. It is a future-oriented, innovative architecture event that we can be proud of.

Szentendre is usually regarded as the Hungarian capital of fine arts. In my opinion the Solar Decathlon Europe is not far from this idea as architecture is also a form of art. It is art indeed that influences the core of our daily life and well-being while representing elements from historical times simultaneously.

The houses of the SDE19 represent the highest standards of the 21st century in an internationally acknowledged framework. I am pleased to welcome the future and all participants of the Solar Decathlon Europe 2019 competition in our city!



## location and accessibility

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Szentendre has a great location in close proximity to Budapest. Its accessibility is easy on road (multi-lane speed-way along the Danube), by frequent regional buses and suburban trains, and through the EUROVELO 6 bicycle route. You can even access it on water by public boats.

images: © Municipality of Szentendre



## reliable experience

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Throughout the whole year, Szentendre hosts numerous events that attract a high amount of spectators:

- \_ Spring: Carneval, Spring Festival;
- \_ Summer: Teátrum, Art Capital, Beer and Wine Festival, ISTER Days, Szentendre Day and Night, 'Dumtsa Korzó' street festival on the weekends;
- \_ Autumn: "Pilisi Tekerő", Army Music Festival;
- \_ Winter: Advent market.

## international collaborations

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Szentendre has 13 twin towns, with whom it has a solid and intensive relationship and shares event hosting duties. The city organises international competitions with many partners. Among the events are the Salomon Ultratrail, TALIJA Folk Festival, International Blower Competition and the most extraordinary one; the Art Capital lasting for multiple months.





**Prof. Dr. János Józsa**  
**Rector, Budapest University of Technology and Economics**

Budapest University of Technology and Economics is a highly prestigious institution in Hungary's higher education. This is where architecture education first took place in Europe. Teachers' dedication as well as students' talent and perseverance are fundamentals in the university's success. These catalyse the establishment's stability and continuity in education, scientific research and technologic development.

Our university was the first Hungarian contestant to participate at the Solar Decathlon Europe in Madrid in 2012. The cooperation opportunities & experiences ,as well as technical & scientific knowledge accumulated within our university, guaranteed success for the project.

Based on this, we are participating in the organisation of SDE19 and in the creation of the National Smart Home Park as a higher education partner.





# the citadel of research and innovation

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The Budapest University of Technology and Economics is Hungary's most significant institution for engineering and business studies. Driven by its competences, it is a vital node in the country's competitiveness and sustainable development. BME is a leading research university in Hungary enjoying a significantly international position in education and professional credit. It aims to be a leading institution for innovation in Hungary and become a Europe-integrated elite university. The eight faculties of the university are all very unique in character and aim for top quality results.

## **Faculties and their inauguration year:**

- \_ Architecture: 1782
- \_ Mechanical Engineering: 1871
- \_ Civil Engineering: 1873
- \_ Chemical Technology and Biotechnology: 1873
- \_ Electrical Engineering and Informatics: 1950
- \_ Transportation and Vehicle Engineering: 1951
- \_ Natural Sciences: 1998
- \_ Economic and Social Sciences: 1998

images: © BME



# odoo

## the environmentally friendly and sustainable home

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From the CEE Region, it was students from Budapest University of Technology and Economics who submitted a successful application to the Solar Decathlon Europe competition in 2012. The interdisciplinary project team consisted of nearly 30 engineers from 6 faculties. Odoo project aimed to build a sustainable house that intensively uses its outdoor areas as well. The team created a new living space, which merged contemporary comfort demands with Hungarian traditions. Odoo is a house where the inhabitants can be in continuous connection with their environment that is not only healthy, but provides foundation for a sustainable lifestyle.

“we believe that we cannot live sustainably without changing our engrained habits and lifestyles.”





**Prof. Dr. Gábor Becker**  
**Academic Mentor**

“The experience gained at the Solar Decathlon Europe is so enormous that you will remember it for the rest of your life and it influences your professional attitude too.”



**Attila Pém**  
**Construction Supervisor**

“All team members, without exception, placed the common goals higher than themselves. They set an example to follow regarding energy literacy and energy efficient building.”



**Katalin Mária Dudás**  
**Contest Captain**

“Participating as a student and taking on real responsibility is a unique opportunity. I gained leadership and organisation experience that many years later I still consider invaluable.”



**Balázs Szelecsényi**  
**Project Architect**

“The Solar Decathlon multiplies the knowledge that is accessible at the university. The dynamism picked up in the project is still lasting today. I am grateful to the team for going all the way.”



**Bálint Bakos**  
**Project Structural Engineer**

“The Solar Decathlon is an international challenge, multidisciplinary teamwork, life-long experience, friendships and knowledge; by far the most interesting project I have ever taken part in.”



**Balázs Zeitler**  
**Sponsorship Manager**

“During those two years I got to learn about innovative technologies and global sustainability questions. I realised how to be efficient and useful member of a multidisciplinary team.”

# sde21

## the first urban edition

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The SDE21 is unique! The upcoming SDE21 is the first Solar Decathlon competition, which specifically focuses on the transition of urban neighbourhoods and their existing building stocks.

### Go urban!

In the 21st century, humanity is at a turning point: our planet cannot sustain current human activity, and a proliferation of highly populated cities is in full swing. This trend is evolving upward, and radically. Buildings generate about 40 percent of EU energy consumption and emit 36 percent of CO2 emissions. About 50 percent of waste is generated by the construction sector, and about 75 percent of EU building stock is energetically inefficient. If current building practices based on concrete and steel are not altered, the two-degree climate target will not be reached.

**call is out! go urban!** \_ Submission Period ends \_ October 25, 2019 \_ 17:00 CET \_ [www.sde21.eu](http://www.sde21.eu)



## sde21 on the site

on the left-hand side from the main entrance in the sde19 solar village you can find an inviting chill-out spot where the solar decathlon europe 2021, the sd global movement and wuppertal's world famous "schwebebahn" are presented.

## sde21 profile

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The SDE combines urban architectural challenges with social, economic and ecologic aspects, providing blueprints for sustainable urban transitions. The SDE21 in Wuppertal maintains the Solar Decathlon's fundamental long-range objectives: to demonstrate and further develop cost-effective, highly resource-efficient dwellings powered by renewable energy. However, this edition also takes a new turn; instead of planning and designing buildings from scratch, Decathletes will work with existing building stock and implement efficient and sustainable living solutions into specific urban situations.

### **SDE21 focus: the revitalisation of our urban building stock**

The competition will focus on the added value in renovation, transformation or reuse of existing apartment buildings in our densifying cities. While managing specific architectural challenges, Teams will provide real-world solutions. They will address specific urban issues, such as urban mining, gentrification, energy poverty, shared living spaces and urban mobility. This 2021 edition of the Solar Decathlon Europe truly 'goes urban', offering an exciting opportunity for long-lasting impact through an envisioned post-competition Living Lab.

## join us live on sde19!

Would you like an interview or a background talk about the SDE21 or the Call for Teams?

Make an appointment with the SDE21 Organisers at the SDE19 Solar Village in Szentendre!



[www.sde21.eu](http://www.sde21.eu)

[join@sde21.eu](mailto:join@sde21.eu)



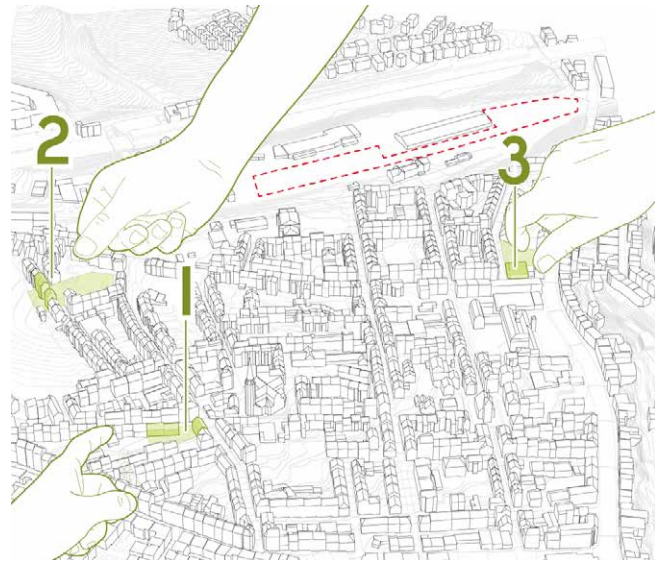
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[sd\\_europe21](#)



### **The vitality of our social scenarios and neighbourhoods**

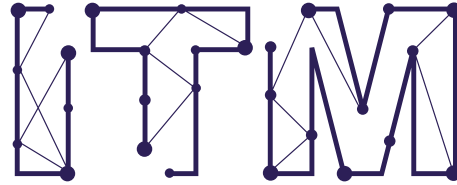
In the heart of Wuppertal, the vibrant “Mirke” neighbourhood will be the focal point, a hub to imagine the modern, sustainable city of tomorrow. For all prospective Teams, you are invited: investigate ways to reduce waste and be more energy-efficient; share your concepts for a better urban life with efficient living spaces; show us how we can share, comfortably, in our ever-changing world.

**answer our call to this urban edition of the solar decathlon europe for 2021! be the voice for our transition towards urban sustainability!**

main sponsors



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