

MINIMAL IMPACT
MAXIMUM OUTPUT

COMPETITION
SOLAR DECATHLON
EUROPE



TEAM MI-MO
MINIMAL IMPACT
MAXIMUM OUTPUT

FACULTIES
ARCHITECTURE, MECHANICAL &
PROCESS ENGINEERING, ELECTRICAL
ENGINEERING & INFORMATION
TECHNOLOGY, SOCIAL SCIENCES &
CULTURAL STUDIES

OUR PARTNERS
COOPERATING INSTITU-
TIONS AND SPONSORS

PUBLIC FUNDING



energy endeavour
FOUNDATION



PROMOTION OF ECONOMY

We need strong partners for the implementation of the student competition Solar Decathlon 21. Take part and become a member of Team MI-MO.

TEAM MI-MO

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A Good COMMUNITY
FOR THE BEST RESULT

HSD's Team MI-MO is facing the competition with a new urban profile: „Minimal Impact - Maximum Output“, which means only doing what adds value to the place and creates maximum benefit with minimal impact.

INTERDISCIPLINARY
LEARNING FROM EACH OTHER

The main advantage of our team is our multidisciplinary. The team currently consists of students and nine professors from four different faculties, supported by other professors, research assistants and student assistants, our workshop team and above all our partners.

HSD CAMPUS DERENDORF
A PLACE TO LEARN

The new campus in Duesseldorf Derendorf, opened in 2015, will provide the new fundament for teaching and research of all faculties at a central location. From here we work together on our version of the Solar Decathlon.



HSD MIMO



HSD.MIMO



HSD.MIMO



SOLAR DECATHLON MORE THAN ARCHITECTURAL CHALLENGES

- 1 ARCHITECTURE
- 2 ENGINEERING & KONSTRUKTION
- 3 ENERGY EFFICIENCY
- 4 AFFORDABILITY & REALIZABILITY
- 5 COMMUNICATION, EDUCATION & SOCIAL AWARENESS
- 6 SUSTAINABILITY
- 7 COMFORT
- 8 FUNCTIONALITY
- 9 URBAN MOBILITY
- 10 INNOVATION

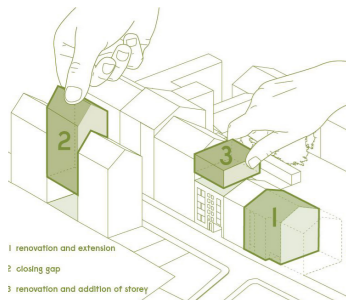
STUDENTS COMPETITION IN THE FIELD OF ARCHITECTURE WHAT IS THE SOLAR DECATHLON?

The Solar Decathlon is an 1:1 competition that primarily addresses architecture, energy and sustainability. The Solar Decathlon Europe 2021 is attended by 18 university teams from eleven nations. The student competition was first held in the USA in 2002. Four competitions have taken in Europe so far. The teams compete each others in 10 categories.

SOLAR DECATHLON GOES URBAN WHAT IS THE SDE 21 WUPPERTAL ?

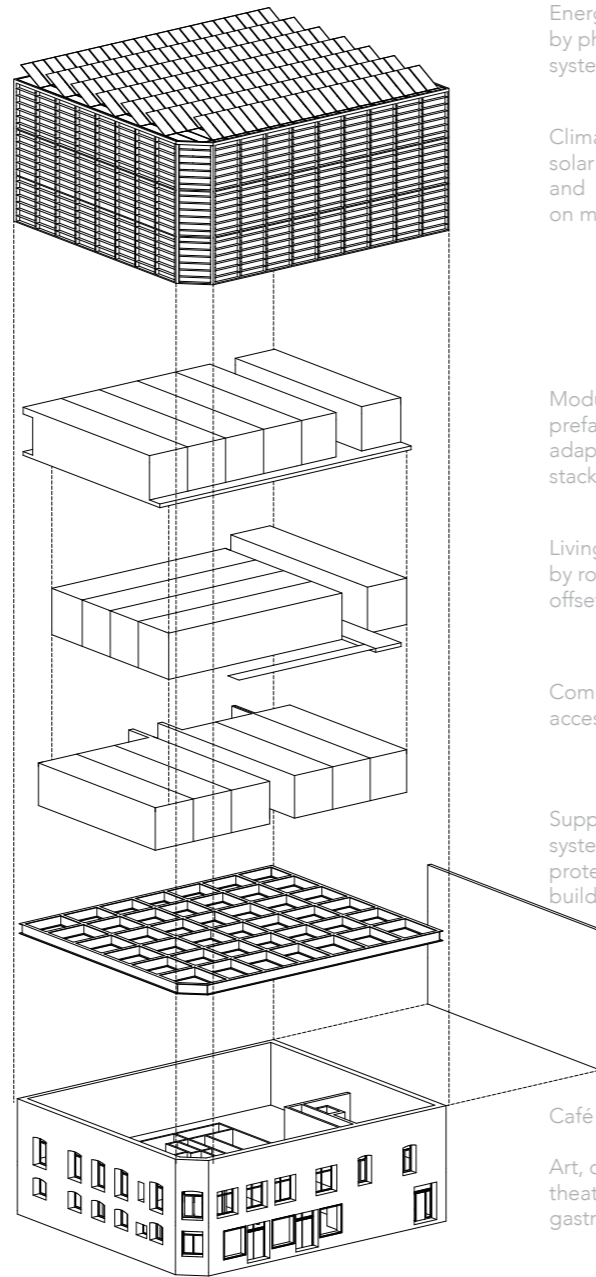
In 2021, the Solar Decathlon Europe will take place in Germany for the first time in the Mirke District in Wuppertal. It will focus on the energy consumption in European cities and thus the further development of the urban district. Each of the teams has applied and qualified for one of three different topics based on real examples of refurbishment in the district. The teams have two years to design and develop a building.

Extension, Addition of Storey, Closing Gap:



These are the central architectural tasks of the energy consumption in the district. Here, architectural and energy aspects must be harmonized in the planning. The competition ends with a two-week public final round for all teams on the competition site. Here the colleges and universities compete with their 1:1 prototypes and are evaluated in ten disciplines.

OUR VISION FROM CONCEPTION TO CREATION



Energy production by photovoltaic systems

Climate envelope, solar protection and photovoltaics on moving slats

Modules - prefabricated, adaptable and stackable

Living areas by rotation and offset

Community & access spaces

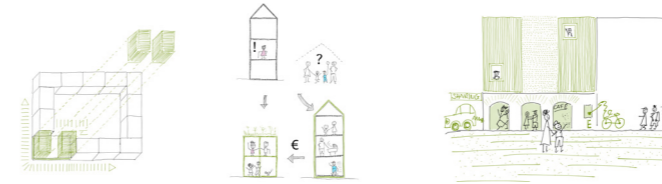
Supporting system that protects the building stock

Café Ada

Art, dance, theatre, music & gastronomy

ADDITION OF STOREY MINIMAL IMPACT MAXIMUM OUTPUT

Team MI-MO is facing up to the competition with their strategy of „Minimal Impact - Maximum Output“ and is taking on a real challenge of energy-related urban redevelopment and redensification: The addition of storey uses to a cultural centre in the Mirke district of Wuppertal. In addition to architectural, process-related and technical challenges, the team is required to inform and inspire the people in the district and to enable them to become part of an urban energy consumption using their own resources. In accordance with the team motto, only those things should be done adding value to the location and create maximum output with minimal impact.



ENVIRONMENTALLY CONSCIOUS PLANNING & BUILDING SUSTAINABLE MATERIAL CONCEPT

The addition of storey will be realised in timber construction. For some years now, wood has been regarded as an optimal solution for sustainable and resource-saving construction. The aim of the project will be to rethink and implement wood in a consistently sustainable and resource-saving way. In detail, the selected structural and building design should lead to a reduction of the required material. The use of solvent-free building materials in combination with fastening techniques that are reversible and easy to detach, allows an easy deconstruction.

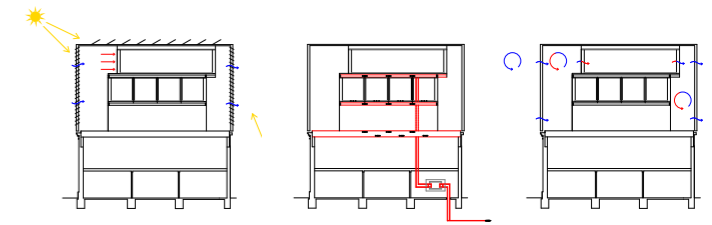


The digital production possibilities of timber construction can be exploited perfectly. Most of the components are already prefabricated in the computer from the 3D model and manufactured directly in the wood joinery. The approach of the pre-elementary construction method also fits in very well with the digital planning and production methods.

DESIGN & CONSTRUCTION 1:1 DRAFT

We are currently working on further developing the concepts for Café Ada: In June 2022, a section of the addition of Café Ada will be brought to Wuppertal as an 1:1 model in the form of a fully-functional residential building one- to two-storeys high. The design presented here is only one of many designs that have been created. Currently, the most exciting concepts are being taken as a starting-point and turned upside down again by students and teachers of the Department of Architecture.

ENERGETIC CONCEPT PICTOGRAMMATIC REPRESENTATION



Solar energy

The position of the slats can be varied according to the amount of sunlight in order to optimise electrical output, shading as well as to ventilate the climate envelope.

Heat supply

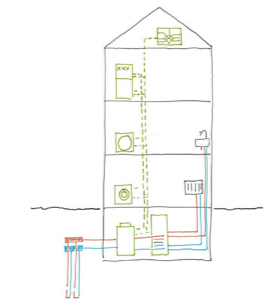
The heat supply combines local energy sources and the use of waste heat from appliances in the flats and central facilities.

Climate envelope

The climate envelope offers additional recreational areas. Natural ventilation and solar radiation are used according to the time of day and season.

INNOVATIVE TECHNOLOGIES „ENERGIBUS4HOME“

The current research project „energiBUS4home“ investigates the use of renewable energies on site and their logical interaction up to a functional model. To use additional low-temperature heat sources, waste water from the bathroom and kitchen or a solar system could be used.



What we are working on

- Integration of a multifunctional heat pump system as hardware-in-the-loop in a low voltage network model

- Construction and testing of a functional model for the functional and energetic coupling of household appliances and the heating and ventilation technology of low energy buildings.

- Heat consumers are integrated directly into the storage circuit or into the system via a domestic hot water station

- Simultaneous use of heat and cooling energy is made possible by coupling the household appliances to the heat pump of the heating/ventilation system

- Increasing the efficiency of the system by reduction of the electricity consumption of appliances.

