

TEAM X4S AT SDE21»22

PRESS KIT

DECEMBER 2021



THE PROJECT

Since fall 2019, Team X4S - Extension for Sustainability - of Biberach University of Applied Sciences, is participating in the international competition Solar Decathlon Europe 21 (in 2022). The final of the competition will take place in Wuppertal in June 2022.

To create more living space within the city without sealing more land, we are extending the existing building of Café Ada in Wuppertal by adding four additional floors. We will then construct one representative residential unit of our

design for the final of the competition. The project's innovations are aimed at drastically reducing carbon dioxide emissions from buildings in urban neighborhoods while maintaining or improving the socio-cultural environment.

For the extension of Café Ada, our sustainability concept is based on sufficiency, efficiency, consistency and resilience. These ideas are pursued in three sub-areas: Architecture, Energy and Construction.



We are using the existing building structure to meet the growing need for living space without sealing additional areas.

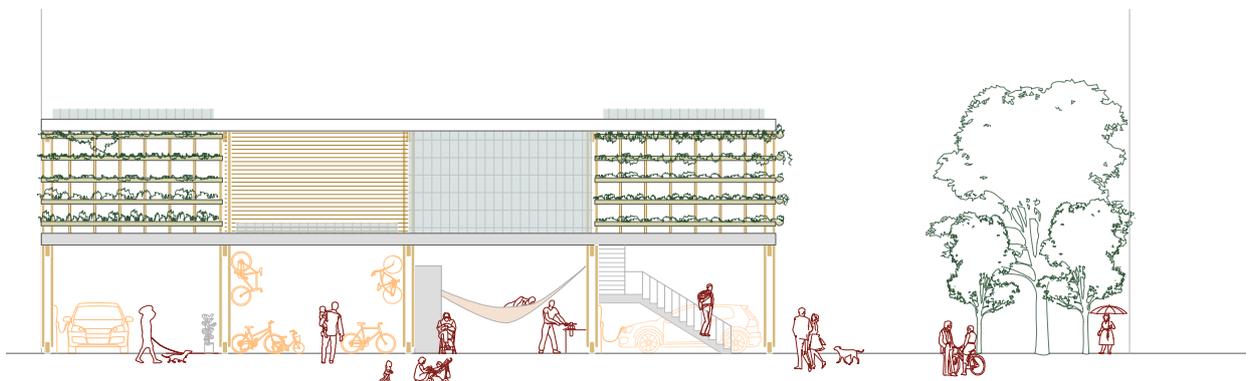
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THE PROJECT



The exterior of Café Ada is being integrated into the city in a sustainable way and thus influences the urban transportation network in a positive way. Private parking spaces are minimized in order to create green areas and recreational spaces.

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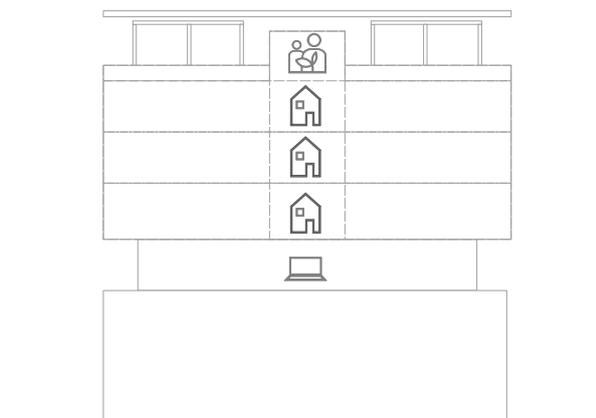
In our mobility hub we are offering a small DIY workshop, a garage and a bike rental service. The offer is being supplemented with car sharing.

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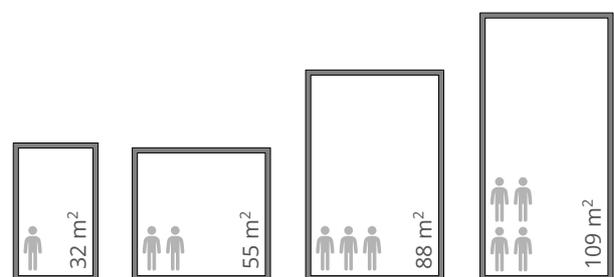
THE OBJECTIVES

Our aim as a team is to create a solution for climate change in the urban context. This solution excels in terms of sufficiency, efficiency, consistency and resilience. We have to rethink our view on cities and to change the built environment in order to achieve greater sustainability and address social and economic demands at the same time. This is where the extension of cafe Ada acts an example for a transferable approach. Densification solves urban issues like excessive land use, increased traffic due to spread-out cities or social isolation.

The design focuses on residents who are interested in social participation. With floor plans of different sizes, the building provides living space for the growing demand for one or two-person households as well as for families up to four people. We reduce the floor area per person and maximize common areas for flexible use. We therefore provide spaces for co-working or shared urban gardening to reduce the emissions and to create community. We want our inhabitants to live and not only to house here.



On five floors, the addition provides private living areas as well as work and community spaces.
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We create flexible floor plans, providing living space for the growing demand for households of different sizes.
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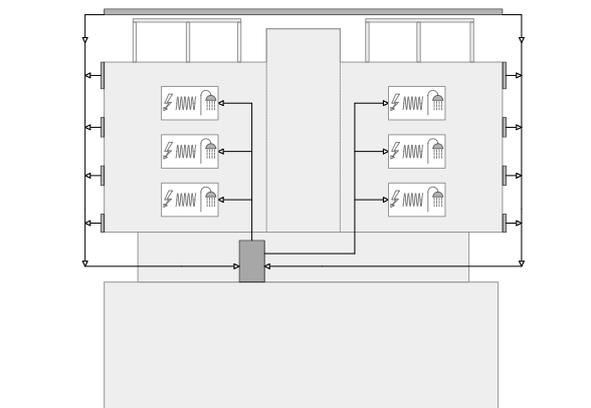
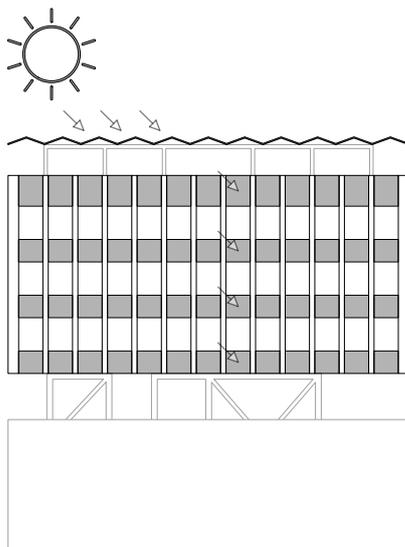
THE OBJECTIVES

Cost-effective and fast to build constructions can be achieved by solid timber elements. A great share of prefabrication, minimal loads and separable components are advantages of this construction. Also, solid timber constructions enable high fire protection that we need for multi-storey extensions.

The engineering and construction concept is aligned along the following principles: Reducing heat losses by a highly insulated building envelope which is optimized for solar passive gains.

Next, active use of solar energy on façade and roof to produce heat and electricity. Also, a grid friendly operation is enabled by storage systems in combination with an intelligent management system.

To make sustainability affordable, we make use of existing efficient technologies integrated in a highly efficient and resilient system design. Then, the components of the system are used multifunctional wherever possible.



The wooden building will sustain itself by reducing the energy demand and resource consumption and by generating solar energy on the roof and facade.

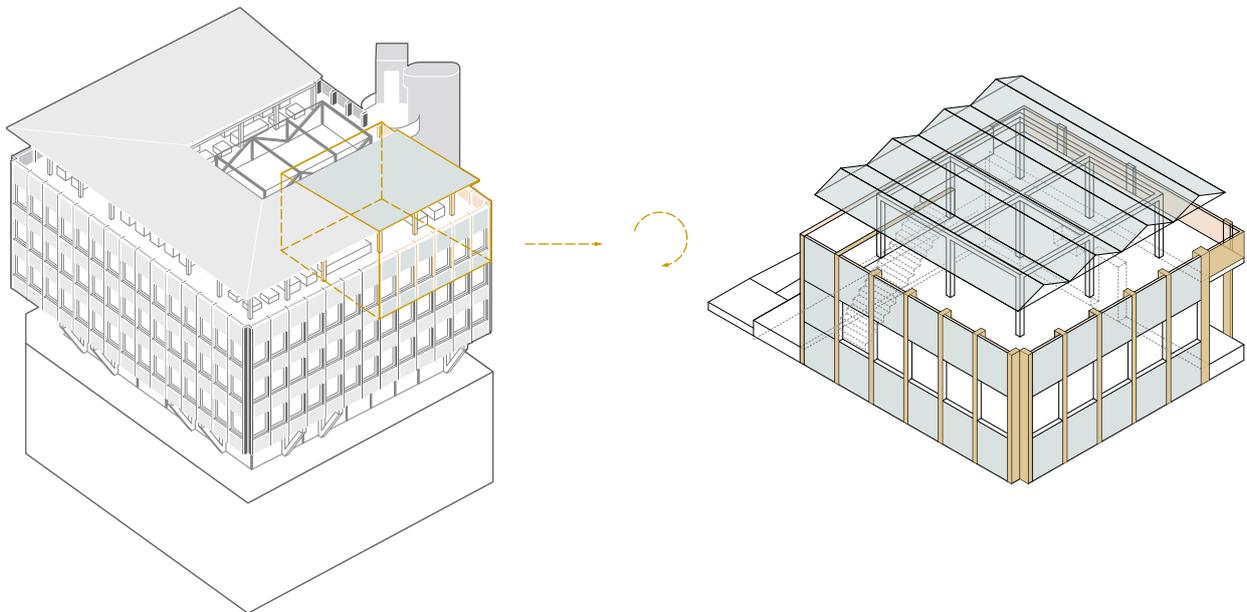
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THE HDU

The Demonstration Unit which represents the building design of team X4S is being extracted as a two room apartment from the top floor. Also a part of the entrance situation and the atrium is extracted and displayed for visitors. The unit is divided into layers like is the addition of Café Ada. The open living layer, part of the served spaces, includes the living space and the bedroom. They are designed to be open and light-flooded. They are complemented by servant spaces like the kitchen, the bathroom and the entrance area. The building services are located here.

In addition to the transparent solar panels on the roof, PVT-panels are integrated into the eastern and southern facade. The western facade is painted black to display that the building get continued in this direction. Remaining wall surfaces are covered by wooden panels.

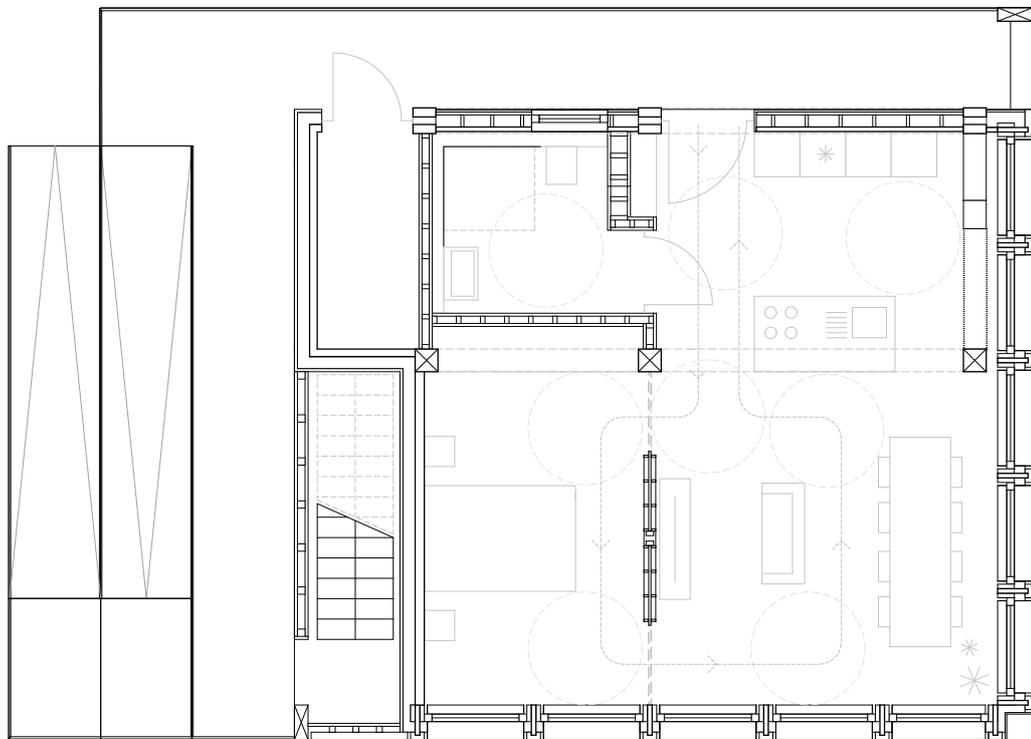
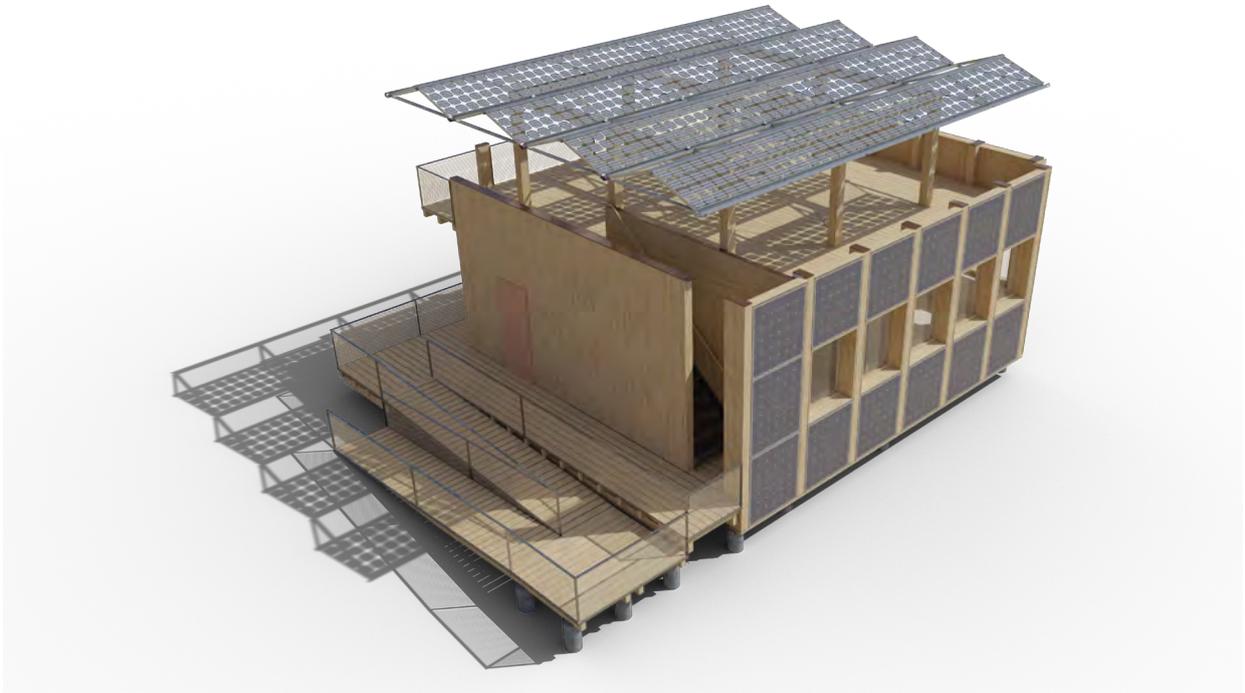
The rooftop can be reached by a concealed staircase but is not part of the public tour.



The House Demonstration Unit represents our addition at the competition final in Wuppertal.

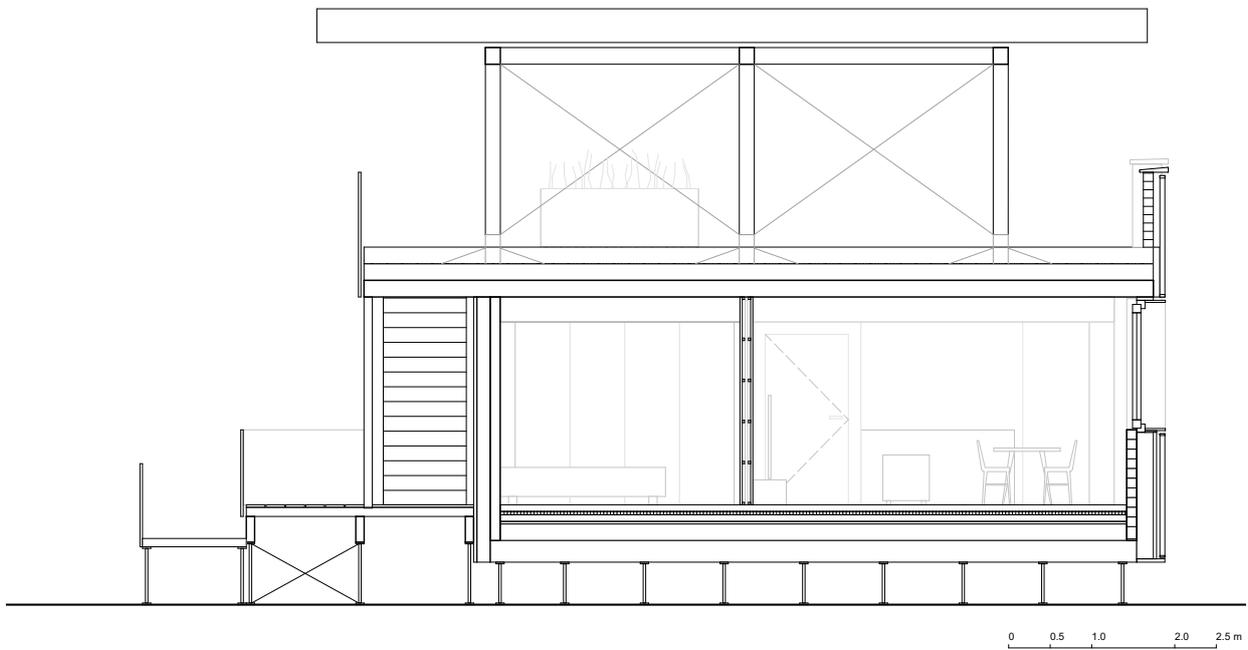
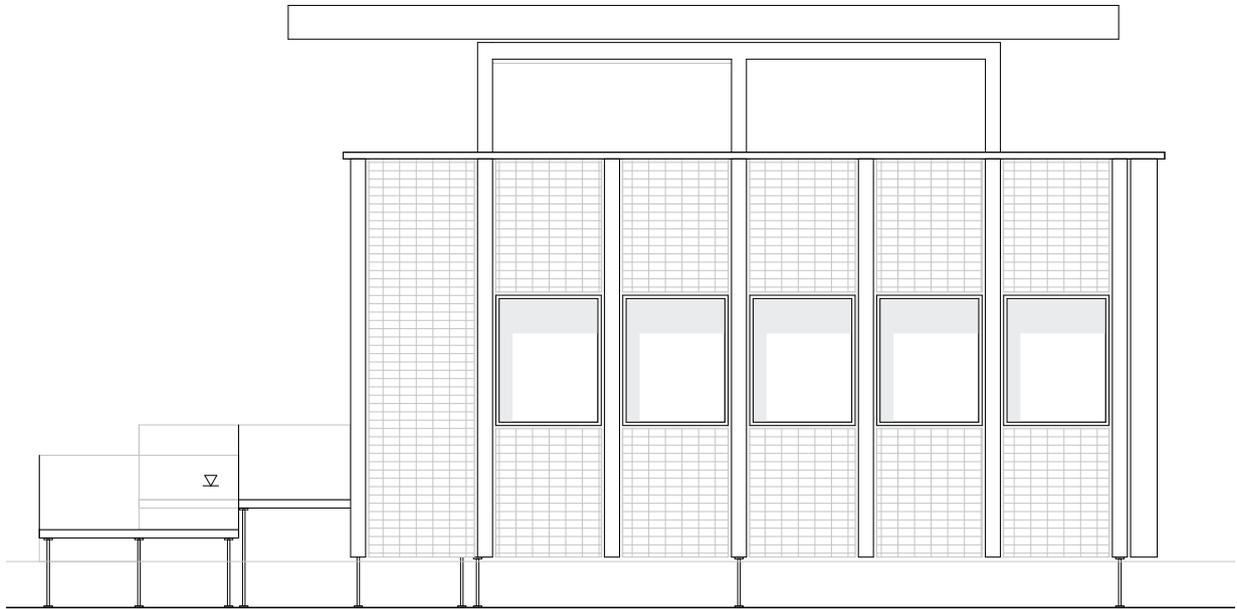
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THE PROJECT



Rendering and Floor Plan of the House Demonstration Unit.

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Elevation and section of the House Demonstration Unit.
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CURRENT STATE

TEAM-WORK

Due to the Corona pandemic, communication within the X4S team has been almost exclusively digital. The core team of Biberach University of Applied Sciences meets once a week to discuss the current status and project progress. Since some of the members live almost 600 kilometers from Biberach, digital communication certainly has its advantages.

MULTIPLE USE

To save resources, we develop components that can be used several ways. One example is the solid wood wall. It is the connecting element of statics, electrical engineering, building physics and interior design. An integrated rail system enables the individual living areas to be supplied with electricity, illuminated and furnished. Furthermore, static elements are used for line routing, the floor structure combines the function of thermal storage, sound insulation and the option of separability.

MODEL BUILDING

In June, we finished the model representing our building design in an urban context. It shows a section of the property with the topography of the immediate surroundings as well as the handling of the existing building of the Café Ada. The choice of material and the level of detail highlight the existing building and the design for the extension.

Now we are starting with building our second and more detailed model of the Demonstration Unit itself.

DIGITAL PLANNING OF THE HDU

We started building a digital 3D-Model of our Demonstration Unit. This architectural model is now being completed step by step by the building services planning. This means that we combine the architectural model with information about heating, ventilation, air conditioning, the electrics and the photovoltaic system. The goal is to enrich the model so that we can use it to create simulations, a life cycle analysis over 50 years, and workshop planning. To exchange the digital model during this integral planning process, we are using the IFC standard.



Architectural model representing our concept for the building design.

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CURRENT STATE

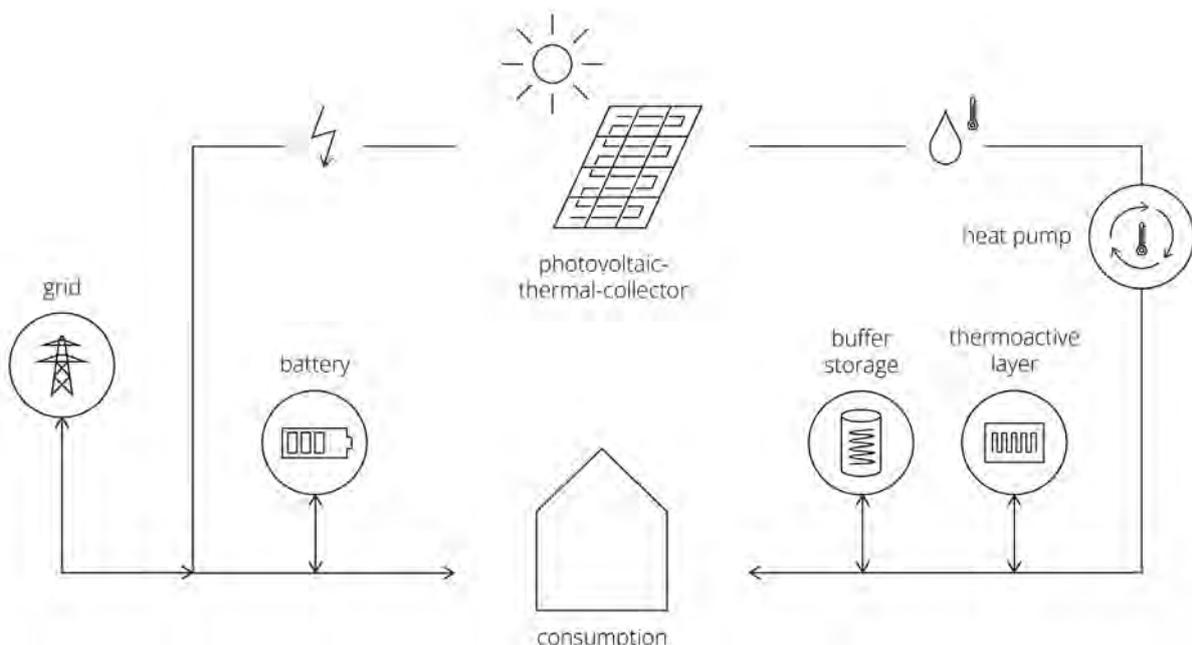
ENERGY CONCEPT

A highly thermally insulated building envelope, efficient technology with innovative storage systems and energy-saving lighting will significantly reduce the amount of energy used by future residents. We use the space on the facade and on the roof to generate electricity and heat from solar energy. In combination with low-temperature technologies, we are thus creating the prerequisites for climate-neutral operation. The existing part of the building is to be renovated in terms of energy and integrated into the joint energy supply system with the extension building. An intelligent building management system will take over the operational management of the entire building services, precisely tailored to the needs of the users.

EDUCATION

Both in project planning and in the courses, which are tailored to the competition, building aspects become more practical. For example, students will consider integral building design and further develop the areas of ventilation, direct current and automation. Architecture students are already thinking about sustainable furniture. They have developed models for tables, chairs, shelves, etc. that are easy to assemble, comfortable to use and fully recyclable.

Project Management students are currently dealing with digital construction logistics and plan, for example, the site set-up in Wuppertal, the schedule for the competition final and barcode-based component catalogs.



Heat and power are supplied by PVT collectors, a heat pump and various energy storage systems.

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DISSEMINATION

PRESS AND PUBLICATIONS

Continuous reporting on the progress of the project as well as press relations are an important part of Team X4S' work. The goal is to address different target and age groups - the general public as well as experts or potential sponsors. We want to offer as much scientific information as possible, packaged in multimedia formats to best reach the general public.

SOCIAL MEDIA

On Social Media, we are sharing our project objectives, information on sustainable building strategies and current tasks we are working on. Therefore, we create different series like the presentation of the ten contests or a photographic series about Wuppertal that we are sharing over a span of several weeks.



Architektonisches Modell für die Renovation und der 4-geschäftigen Aufstockung des Biberacher Team X4S. © X4S | 1508 21/22

Wuppertal und anderen europäischen Städten aufzeigen. Das erarbeitete Konzept basiert auf der Definition der Nachhaltigkeit: Suffizienz, Effizienz, Konsistenz und Resilienz. So kann neuer Wohn- und Lebensraum in einer möglichst CO2-neutralen, ökologisch und sozial nachhaltigen Einheit aus Café und aufgestocktem Wohngebäude mit Außenflächen und Mobility-Hub geschaffen werden.

Das Biberacher Team ist interdisziplinär aufgestellt. Es besteht aus etwa 15 Studierenden, Mitarbeitenden und Professoren aus baubezogenen Fachbereichen wie dem Energie- und Bauingenieurwesen, dem Projektmanagement und der Architektur. Zudem sind Wissenschaftler aus Forschungsinstituten für Gebäude- und Energiesysteme und dem Holzbauminstitut mit ihrer Fachexpertise an dem fächerübergreifenden Vorhaben beteiligt.

Das Wohnkonzept: Teilhabe schafft Bewusstsein

Der Entwurf von Team X4S adressiert Bewohner, die an sozialer Teilhabe interessiert sind. Mit Wohnungen unterschiedlicher Größen bietet die Aufstockung Wohnraum für den wachsenden Bedarf an Ein- oder Zweipersonenhaushalten sowie für Famili-

en von bis zu vier Personen. Kerngedanke bei der Entwicklung der Grundrisse ist dabei die Reduktion der privaten Grundflächen, die mit einem großzügigen Angebot an Gemeinschaftsräumen zur flexiblen Nutzung ergänzt werden.

Die finanzielle Umsetzung des Projektes von Team X4S soll als Genossenschaft realisiert werden. Dies ermöglicht die Verankerung der nachhaltigen Bauweise in der Lebenswirklichkeit der Bewohner sowie ein moderates Mietniveau und soziale Teilhabe ohne auf Privatsphäre verzichten zu müssen. Erzeugt wird vor allem vor Ort: die Energieerzeugung erfolgt an der Fassade und auf dem eigenen Dach. Urban Gardening auf dem Dachgarten und auf Freiflächen ermöglicht den Anbau von qualitativ hochwertigen Bio-Lebensmitteln für den Eigenbedarf.

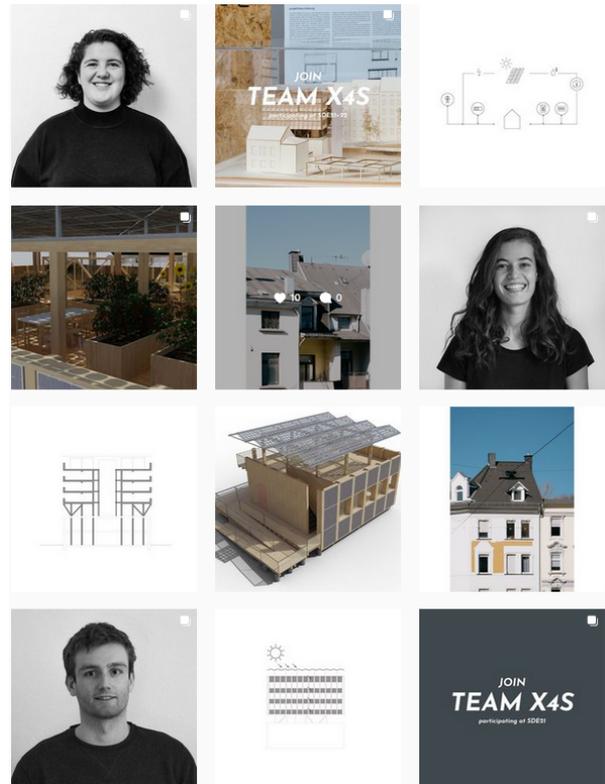
Die Aufstockung mit den Außenanlagen soll zudem als Quartierszentrum fungieren. Öffentliche Urban Gardening-Anlagen und gemeinschaftliche Angebote wie Werkstätten oder Betreuungsangebote ermöglichen Teilhabe und nachhaltiges Engagement im Quartier. Ein weiteres Quartiersangebot sind Parkflächen und Ladestationen für E-Autos und E-Fahrräder auf dem eigenen

Grundstück. Dieser sogenannte Mobility Hub leistet ein Beitrag zur nachhaltigen städtischen Mobilität im Quartier Mirke.

Die Aufstockung auf ein bestehendes Gebäude ist stets eine neue Herausforderung, da die Bestandsstrukturen immer variieren. Team X4S setzt hier konstruktiv nicht auf die Bestandsmauern auf, sondern schafft ein unabhängiges Tragwerk, welches das Gewicht der Aufstockung über Massivholzsäulen durch die Bestandsstruktur in den Boden leitet. Mit diesem Konzept ist die Lösung auch auf andere bauliche Situationen übertragbar. Gestalterisch lassen die

Steckbrief Team X4S

- Teamname: X4S (Extension for Sustainability)
- Hochschule: Hochschule Biberach (HBC)
- Bauaufgabe: Sanierung & Aufstockung
- Bestandsgebäude: Café Ada, Wissenstraße 6, Mirker Quartier, Wuppertal
- Website: www.team-x4s.de



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COLLABORATION

PERSONAL COLLABORATION

We also work together with local personalities who support our participation through their public appearance. These include Biberach Mayor Norbert Zeidler. In a video message, Zeidler has expressed his wishes for our success and perseverance for the upcoming tasks. He emphasized the importance of participation, also for the city of Biberach. We received further encouragement from the neighboring city of Ravensburg in a video contribution of Ravensburg Mayor Dirk Bastin.

In order to reach the younger target group, Mathias Brugger, German decathlete and student of civil engineering at HBC, supports us in external communication. Due to his sporting career, he is very familiar with the successful mastering of ten disciplines and has already promoted our participation in SDE21 on posters and in video contributions.

INSTITUTIONAL COLLABORATION

Our cooperation with the carpentry training center currently consists of exchanging know-how and developing sustainable construction techniques as well as preparing and planning the joint execution phase.

PARTNER

By the distribution of our competition entry, our name recognition and also the interest of regional or thematically-related companies and organizations increases. Thus, the team of Biberach University of Applied Sciences already receives support in the area of software. We are also in contact with companies and organizations in the field of timber construction and wood-based materials. We receive further support from named companies in the energy and technical sector.

A message from Biberach Mayor Norbert Zeidler on the YouTube Channel of Biberach University of Applied Sciences.

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PARTNERS

The following institutions and companies are partners of Team X4S:



THE TEAM

Our interdisciplinary project team consists of energy and civil engineers, project managers and architects. Students work on the project with the support of professors. Different institutes of the Biberach University contribute to the progress of the project with profound expertise, innovative approaches and practical experience. These include the Institute for Timber Construction, the Institute for Applied Research, the Institute for Education and Transfer as well as the University PR and Marketing Team.

The SDE21»22 project permeates the entire university and combines subject-specific competencies to create innovative solutions. With growing tasks and increasing workload, our core team has also grown.

Due to the different specializations and practical experiences of the individual team members, we can rely on professional competence in areas such as public relations, project management or visualizations.



The interdisciplinary core Team X4S of Hochschule Biberach
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THE TEAM

Find here the list of our Team Officers:

Faculty Advisor	Andreas Gerber
Project Manager	Lena Frühschütz
Project Architects	Timo Pahl, Sven Neubauer
Project Engineer	Mari Lewandowski
Structural Engineer	Johannes Ruf
Electrical Engineer	Frank Widmann
Student Team Leader	Marie-Lise Hofstetter
Health & Safety Team Coordinator	Mari Lewandowski
Safety Officers	n/a
Site Operations Coordinator	n/a
Contest Captain	n/a
Instrumentation Contact	n/a
Communications Coordinator	Marie-Lise Hofstetter
Sponsorship Manager	Marie-Lise Hofstetter

CONTACT

Do not hesitate to contact us for further information about the competition, the final in Wuppertal as well as about us and our project.



PRESS CONTACT

M. Sc. Marie-Lise Hofstetter
hofstetter@hochschule-bc.de
+49 163 9219318



PROJECT MANAGER

M. Sc. Lena Frühschütz
fruehschuetz@hochschule-bc.de
+49 160 4541128



FACULTY ADVISOR

Prof. Dipl.-Phys. Andreas Gerber
gerber@hochschule-bc.de
+49 7351 582 257